WAR DEPARTMENT TECHNICAL MANUAL **TM 5-1100**

ROLLER, ROAD,

GASOLINE ENGINE-DRIVEN,

3-WHEEL, 10-TON,

GALION, MODEL CHIEF

★ ★

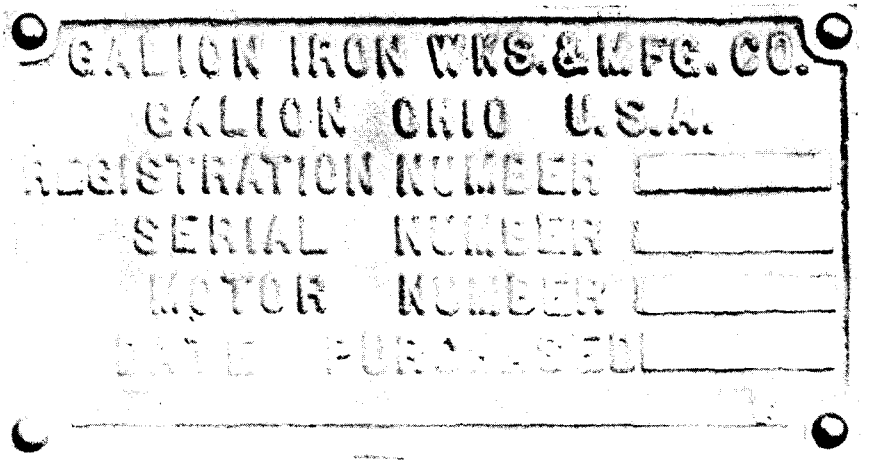
MAINTENANCE INSTRUCTIONS AND PARTS CATALOG

WAR DEPARTMENT ∴ *OCTOBER, 1943*

GENERAL INDEX

IMPORTANT:

Galion Chief Rollers are equipped with either a WXC3 or WXLC3 Engine—This information is shown on engine model plate.



IDENTIFICATION PLATE

P. O. Number	Units	Model No.	Government Registration Numbers
54940	26	R23555H	W-85809 to W85834 inclusive
55323	13	R23555H	W-88339 to W88351 inclusive
55898	112	R23555H	W-89659 to W89770 inclusive
PI-2343	427	R23555H	W-823596 to W823999 inclusive
			W-825000 to W825022 inclusive
PI-3193	15	R23555H	USA832728 to USA832742 incl.
CI-1578	358	R27301	USA845954 to USA846311 incl.
CI-1760	347	R27301	USA846312 to USA846658 incl.

WAR DEPARTMENT
Washington 25, D. C., 28 Oct. 1943

TM 5-1100, Roller, Road, Gasoline Engine-Driven, 3-Wheel, 10-Ton, Galion, Model Chief, is published for the information and guidance of all concerned.

[A. G. 062.11 (8 Apr. 1943)]

By order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff

Official:
J. A. ULIO,
Major General.
The Adjutant General.

GENERAL INFORMATION

The Galion Chief Roller meets all the requirements of a heavy duty roller and is constantly establishing new records for roller performance, efficiency and economy.

Its well proportioned design combined with extra strength of parts and materials adapts it to the heaviest kind of work.

Operation is extremely simple — all controls being conveniently located within easy reach of the operator.

HEAVY DUTY TRANSMISSION - The three speed sliding gear transmission and the final drive are assembled in unit and operate in dust tight cases in oil bath. Gears are S.A.E. alloy steel heat treated for long wear and greater strength. All shafts are S.A.E. alloy steel and are mounted on anti-friction bearings. Clutches are heavy duty type, velvet smooth in action. Transmission is mounted in sub-frame with power unit.

The **FRAME** assembly of the Galion Chief serves not only as a frame of tremendous strength but also as an enclosure and protection for the engine and transmission. Frame side plates are made in one piece from heavy steel plate. King pin head is secured between side plates at front by hot driven rivets. The frame is further stiffened and braced by electrically welded cross members and by the operator's platform which is of safety diamond tread steel plate. The cowl and hood provide a weather proof enclosure which can be locked.

ROLLS - A special analysis, tough, fine grain cast iron is used in both the front and rear rolls, to insure long uniform life with minimum wear. The diameter of rear rolls is ample for easy climbing of loose material without the tendency to push material into ridges. Both front and rear rolls are equipped with spring tensioned scrapers, front and back.

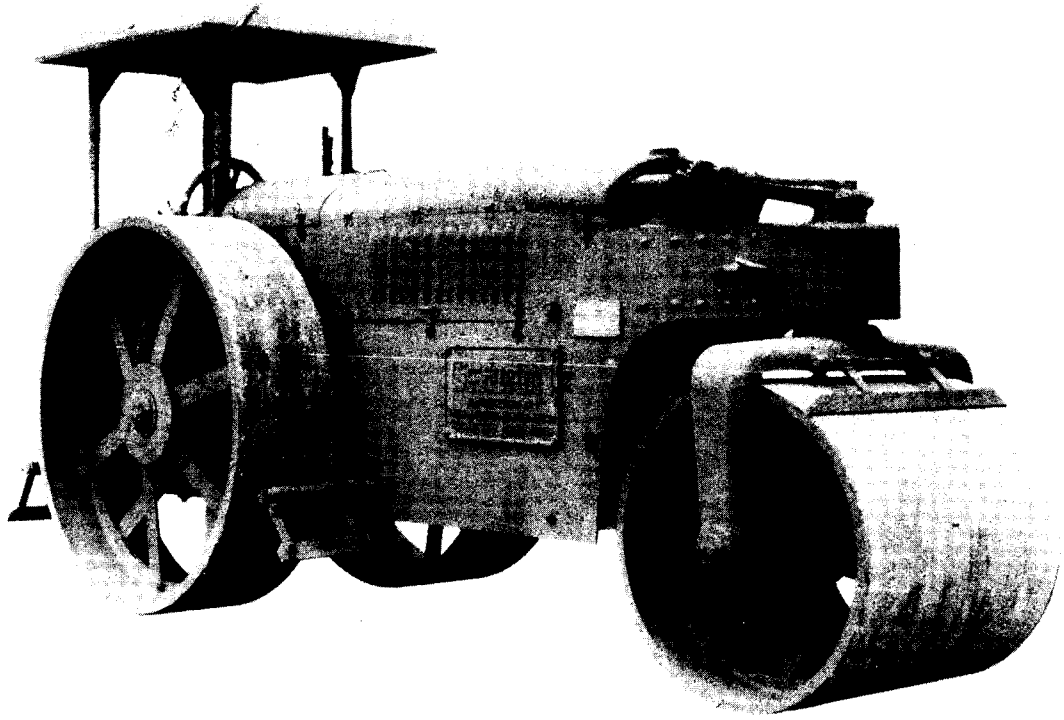
The rear assembly of the Galion Chief is exceptionally sturdy, consisting of a large diameter one piece axle operating in two large bronze bushed bearings. One roll is fixed to the axle while the other runs free to insure easy turning of roller, giving full differential effect. However, when stiff axle operation is desired, an efficient differential lock controlled by a lever in the cab locks the free roll to the axle by means of a sliding gear keyed to the rear axle which engages an internal gear in the roll hub.

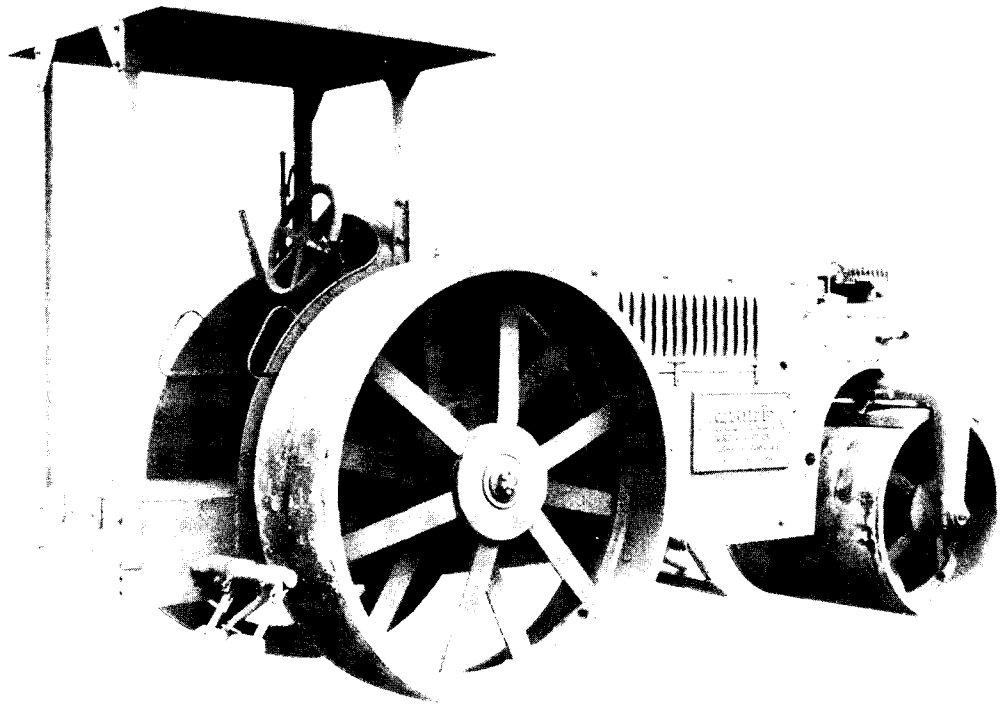
Rolls are driven by means of alloy steel cut and heat treated pinions which engage the bull gears bolted to hubs of rolls.

Rolls are secured to rear axle by means of a large nut and cotter.

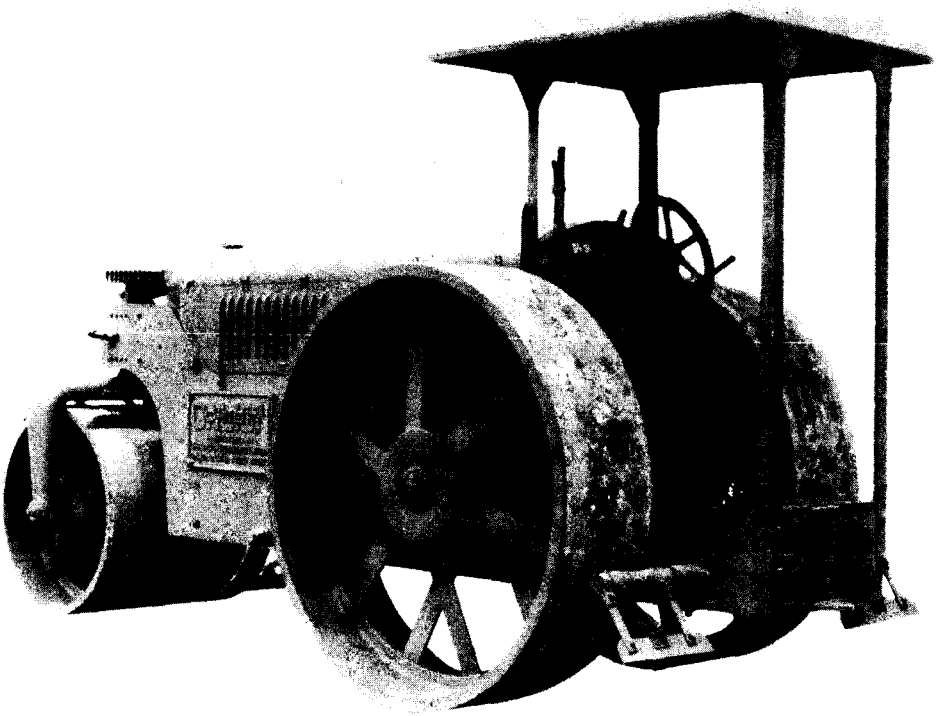
Ample braking effort is obtained by a large drum on rear axle. Brake is controlled by a hand lever conveniently located in front of operator. The front roll of the Galion Chief is designed to eliminate all former defects in the old method of mounting rolls on brass bushings. The rolls float on four large adjustable Timken Roller Bearings. Due to this design it is possible to assemble these rolls with only .005 of an inch clearance, which is constantly maintained between the rims of the front rolls. This eliminates all wear on yoke, roll hubs and inner edges of roll rims.

The front yoke is a sturdy steel casting reinforced at points of strain and secured to king pin by a swivel joint. The movement of this joint is limited by stops cast integral with yoke so that yoke will not cramp against frame in turning on very uneven ground. The king pin to which the steering spider is attached is mounted top and bottom on Timken Roller Bearings, insuring easy movement.

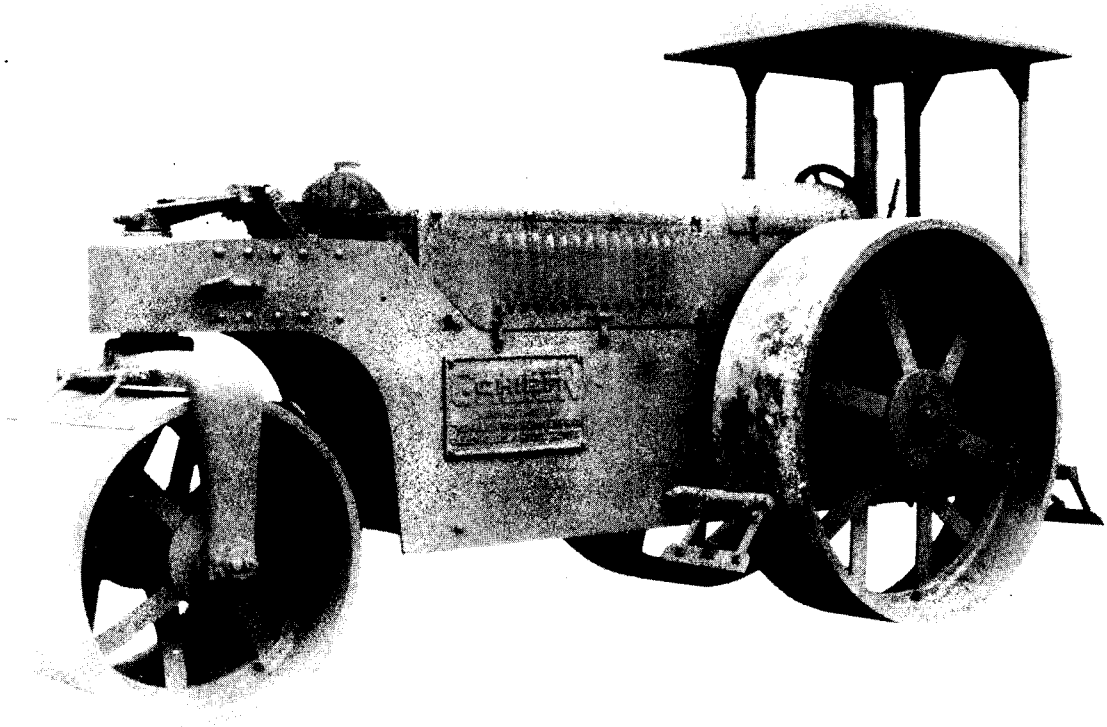




Chief Roller - Right Rear



Chief Roller - Left Rear



Chief Roller - Left Front

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PREPARATIONS FOR STARTING

Examine the roller carefully and see that all oil holes and grease fittings are cleaned of paint and dirt. If any threaded holes are found without grease fittings, the fittings were probably lost in transit and should be replaced before starting the roller.

1. Lubricate all fittings and grease cups.
2. The oil should be drained from the engine as soon as possible after arrival and replaced with new oil.
3. Fill fuel tank with clean fuel. Keep fuel free from water. Any water in fuel will accumulate in the strainer bowl and can be emptied. Fuel tank is located under the operators platform. Capacity 39 gallons - Inspect the Sediment Bulb daily.
4. See that oil in transmission and differential is up to level of plug. The plug is located on left hand side of the transmission case just below the reverse clutch.
5. Fill radiator with clean (soft, if available) water. Be sure all water outlets are closed.
6. Check crankcase, fill to proper level if necessary.

On rollers that are not placed in service for several days after arrival, the following precautions should be taken.

1. Spark plugs should be removed and a small quantity of engine oil (not more than one ounce) be placed in each spark plug hole.
2. See that spark plug gaps are set at .025 inch.
3. Place a small quantity of fuel in top of the carburetor to facilitate starting.

STARTING ENGINE

1. Put forward and reverse clutch lever in neutral. Disengage Master clutch.
2. Open throttle slightly by pulling button labeled "G" toward you. Do not open more than 1/5 throttle.
3. Retard ignition by pushing button labeled "I" - advance after engine starts.
4. Close choke by pulling button labeled "C" about 2/3 way out.
5. Turn on ignition switch and crank with hand crank.
6. After engine starts gradually push the choke button all the way in after the engine is running smoothly. Adjust throttle to desired speed.

TO MOVE ROLLER

After the engine is running proceed as follows:

1. Disengage master clutch by pulling lever toward you.
2. Place gear shift lever in speed desired. Use first or low speed until acquainted with roller.
3. Put forward and reverse clutch control lever in center position.
4. Engage master clutch by pushing control lever forward.
5. Release brake lever.
6. To move roller forward push forward and reverse clutch control lever toward dash. To move roller backward pull foward and reverse controll lever toward you.

TO STOP ROLLER

1. To stop roller place forward and reverse clutch control lever in neutral. If leaving the platform disengage the master clutch lever and set the brake.

COLD WEATHER STARTING

SUGGESTION: If ignition and carburetion are perfect, starting in cold weather can be made less difficult by observing the following suggestions.

1. Never attempt to start with wide open throttle. Have throttle open not more than one-fifth of total opening.
2. Close carburetor choke and turn engine several times with the crank before the ignition switch is closed.
3. Turn on ignition switch and keep choke closed nearly all the way and crank engine over, in the same way as has been followed in warmer weather.
4. When engine starts to fire keep choke partially closed until engine is warmed up sufficiently to run normally.
5. Filling cooling system with hot water or wrapping hot rags around carburetor and manifold will assist starting.
6. Light oil, such as 20W or 10W will make cranking easier.
7. Poor quality gasoline makes cold weather starting very difficult.
8. Be sure gasoline flows through the carburetor. Water in gasoline line may have turned to ice and restricted flow.
9. If engine has been standing idle several days, remove spark plugs and dry out. At same time pour a tablespoon of oil in each spark plug hole.

COLD WEATHER CARE

The cooling system should be protected in freezing weather by the use of a non-freezing solution. When using denatured alcohol and water as a non-freezing solution care must be used to avoid spilling the solution on painted parts as alcohol will dissolve the finish on these parts. In cases where the solution has been allowed to touch finished parts, it must immediately be rinsed off with pure water. When alcohol or any other agent which vaporizes readily is used as the non-freezing solution, the solution must be checked frequently to be certain that it will protect the cooling system to the desired temperature.

Check all water connections regularly for leaks. The rubber hose connections should be inspected and renewed periodically, as deterioration on the inside of the hose restricts the flow of water, causing the engine to overheat. Some anti-freeze solutions also have a tendency to cause damage to rubber hose causing it to crumble away and fill up the water passages.

CARE OF THE COOLING SYSTEM

Always use clean water. The radiator and engine should be drained and flushed thoroughly every three months. The radiator and engine hold approximately 8 gallons.

Should the cylinders and radiator become limed up, make a solution of 1 part muriatic acid and 7 parts water and allow this solution to stand in the system for 36 hours. Then drain and flush thoroughly.

1. Brake Lever
2. F.& R.Clutch Lever
3. Gear Shift Lever
4. Differential Lock Lever
5. Governor Control
6. Master Clutch Lever
7. Instrument Panel
8. Steering Wheel

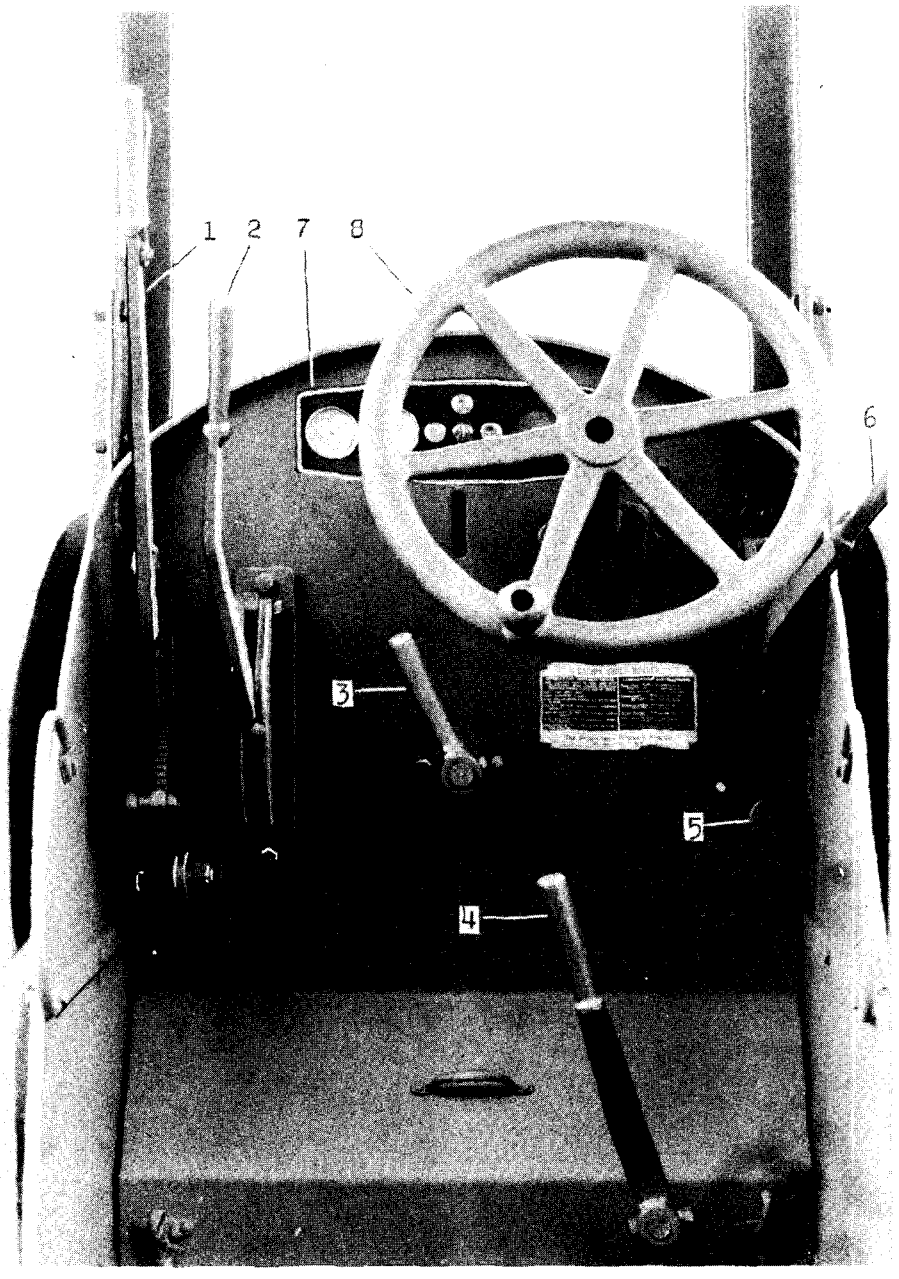


Fig. No. 1 - Controls

CONTROLS, INSTRUMENTS AND GAUGES

CONTROLS - (Fig. 1)

1. BRAKE LEVER - Emergency brake in easy reach of operator.

2. CLUTCH CONTROL LEVER - F & R. Push forward for forward motion, pull back for reverse motion.

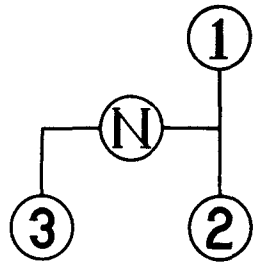
3. GEAR SHIFTING - Note: Always disengage master clutch before making a gear shift.

   NEUTRAL - Hand lever in vertical position.

   LOW SPEED - Move hand lever to right and forward.

   SECOND SPEED - Move hand lever to right and back.

   HIGH SPEED - Move hand lever to left and back.



Gear Shift

4. DIFFERENTIAL LOCK LEVER - Throw to right to lock differential Left to unlock. The operation of locking the differential should be done while one wheel is slipping so as to engage the gears. The differential is locked when doing heavy work such as scarifying.

5. GOVERNOR CONTROL - Pull out to increase governed speed and in to decrease speed of engine. In order for the governor to operate it is necessary that the throttle be opened wide (pulled out) as the governor will not operate if engine is idling.

6. CLUTCH CONTROL LEVER - MASTER - Push forward to lock master clutch in operating position. Pull back to release clutch.

7. INSTRUMENT PANEL - See Figure 2.

8. STEERING WHEEL - Controls direction of travel by turning front rolls.

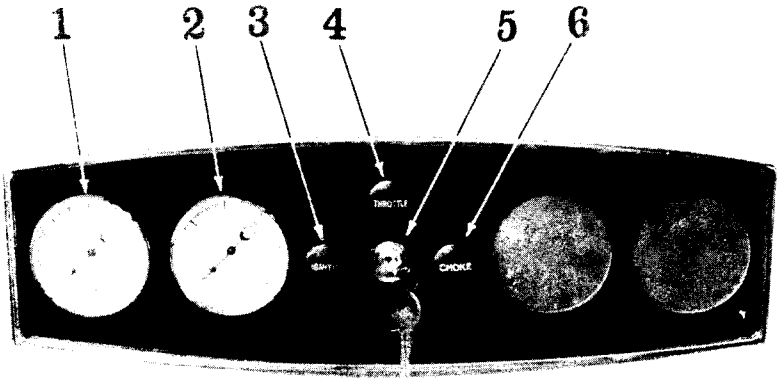


Fig. 2--Instrument Panel

INSTRUMENT PANEL - (Fig. 2)

1. MOTOMETER - Motor temperature reading.
2. OIL GAUGE - Pressure reading of lubricating oil in engine.
3. IGNITION CONTROL - (I) - Pull out to advance spark and push in to retard spark.
4. THROTTLE CONTROL - "T" - Pull out to increase speed and push in to retard speed. This control must be pulled out when governor is to be used.
5. IGNITION SWITCH - Ignition lock switch for engine.
6. CHOKE CONTROL - "C" - Pull out to choke engine.

LUBRICATION INSTRUCTIONS FOR ROLLER, POWERED, GASOLINE 3-WHEEL, 10-TON (GALION MODEL "CHIEF")

1. GENERAL—The following lubrication instructions for the Roller, powered, gasoline, 3-wheel, 10-ton, (Galion model "Chief"), are published for the information and guidance of all concerned, and supersede all previous instructions.

2. LUBRICATION GUIDE—Lubrication instructions for all points to be serviced are shown in Lubrication Guide published herein which specifies the types of lubricants required and the intervals at which they are to be applied. Guides from which this information is reproduced are 10 x 15 in. and are an accessory of each piece of equipment.

3. REPORTS AND RECORDS—*a. Reports*—If lubrication instructions are closely followed, proper lubricants used, and satisfactory results are not obtained, a report will be made to the engineer officer responsible for the maintenance of the equipment.

b. Records—A complete record of lubrication servicing for this equipment will be kept on forms as listed in paragraph 37, AR 850-15.

Requisition replacement guides and technical manuals from The Engineer Field Maintenance Office, P. O. Box 1679, Columbus, Ohio.

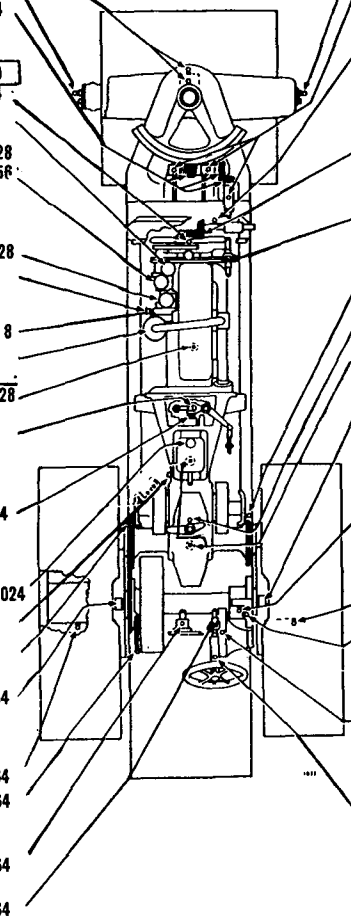
EFSB L-1022 No. 1022

WAR DEPARTMENT LUBRICATION GUIDE

CORPS OF ENGINEERS

ROLLER, POWERED, GASOLINE
3-WHEEL, 10-TON
(GALION MODEL "CHIEF")

MFR'S. SERIAL No. located on plate on instrument panel.



Lubricant	Hours	
CG	64	Swivel pin and king pin bearings
CG	64	Front roll bearing
CW	64	Steering worm gear and bevel gears (Clean and coat teeth)
		SERVICED FROM UNDER HOOD
CG	64	Fan hub bearing
OE		Crankcase, Fill (See Table) (Note 4)
	128	Crankcase breather (Clean and oil)
OE	256	Magneto rotor bearings (Sparingly) (Remove distributor cap and lubricate through oil hole) (Note 7)
	128	*Oil filter* (Note 5)
WP	4	Water pump (grease cup) (Every 4 hrs. screw cup in 1 turn. Refill as necessary)
	8	Crankcase level gage check level
OE	8	Air cleaner (Note 3)
	128	*Crankcase drain plug* Drain and refill (Note 4)
WB	8	Master clutch throwout collar (Sparingly) (Remove cover plate, lubricate through fitting)
WB	64	Clutch pilot bearing (Sparingly) (Remove cover plate and screw fitting into clutch shaft)
GO	1024	Transmission and differential, Fill (See Table) (Note 6)
	128	Trans. and diff. level plug. Check level
WB	8	Forward and reverse clutch throwout collar
CW	64	Main spur gear (Stop roller. Remove cover, lubricate, move roller to distribute. Repeat process.)
CG	64	Rear roll bearing
CG	64	Rear axle bearing (Sparingly) (Remove cover at front of floor plate)
CG	64	Gear shift shaft support bearing
CG	64	Steering Universal

Hours	Lubricant	
64	CG	Front roll bearing
64	CG	Worm and bevel pinion shaft bearings
64	CG	Hand crank shaft brg. (Pull down plunger to disengage gears after cranking)
64	CW	Hand crank gears (Clean and coat teeth)
64	CG	Steering Universal
8	WB	Forward and reverse clutch throwout collar
8	CG	Clutch shifting arm
1024		*Transmission and differential drain plug* (Note 6)
64	CW	Main spur gear (Stop roller, remove cover, lubricate, move roller to distribute. Repeat process.)
64	CG	Differential lock cross shaft (Remove cover at front of floor plate)
64	CG	Rear roll bearing
64	CG	Rear axle bearing (Remove cover at front of floor plate)
64	CG	Differential lock throwout shaft (Remove cover at front of floor plate)
64	CG	Steering shaft bearings

KEY

LUBRICANTS

OE—OIL, engine Crankcase grade	**WB**—GREASE, general purpose No. 2
GO—LUBRICANT, gear, universal	**WP**—GREASE, water pump
CG—GREASE, general purpose No. 1 (above +32° F.) No. 0 (below +32° F.)	**CW**—OIL, lub., chain and wire rope, grade 2

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED 1022

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		Above +32°F.	+32°F. to 0°F.	Below 0°F.
Crankcase	8 qt.	OE SAE 30	OE SAE 10	OE SAE 10 Plus 20% Gasoline
Transmission and Differential	40 qt.	GO SAE 90	GO SAE 80	GO Grade 75

NOTES

1. FITTINGS—Clean before applying the lubricant gun.

2. CLEANING—SOLVENT, dry-cleaning, or oil, fuel, diesel, will be used to clean, or wash all parts. Use of gasoline for this purpose is prohibited. All parts will be thoroughly dry before relubrication.

3. AIR CLEANER—Every 8 hours, clean and refill oil cup to circular level mark with OE. Under severe dust conditions service more often. Every 64 hours, or as often as 8 hours if operating in severe dust conditions, remove entire assembly and clean. Clean entire air cleaner and air pipes. Keep air intake screen clean and all connections tight.

4. CRANKCASE—Drain only when engine is thoroughly warm. Refill to FULL mark on gage. See Table. CAUTION: When running engine, be sure pressure gage indicates oil is circulating.

5. OIL FILTER—When changing crankcase oil, drain filter, clean case, top cap and filter element thoroughly.

6 GEAR CASES—Every 128 hours, check level with roller on level ground and add lubricant if necessary. When draining, drain immediately after operation.

7 MAGNETO—Every 1024 hours, wipe distributor breaker cam lightly with CG.

a. When disassembled, clean and repack magneto rotor bearings with WB.

8 OIL CAN POINTS—Every 64 hours, lubricate throttle connections, clutch and brake linkages and differential lock throwout shaft fork with OE.

9. POINTS REQUIRING NO LUBRICATION—Governor, Universal Joints on Gear Shift.

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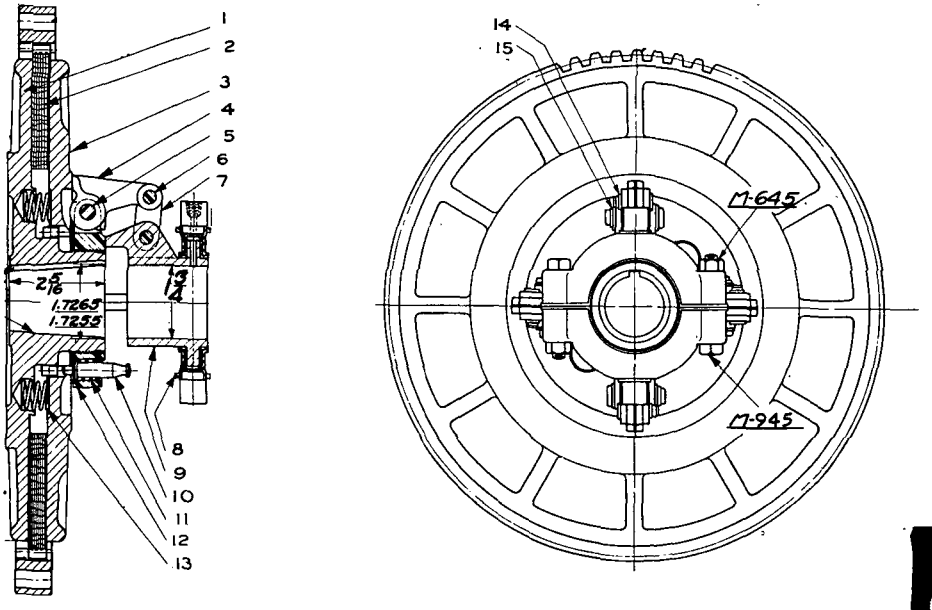

Fig. 5 - Master Clutch

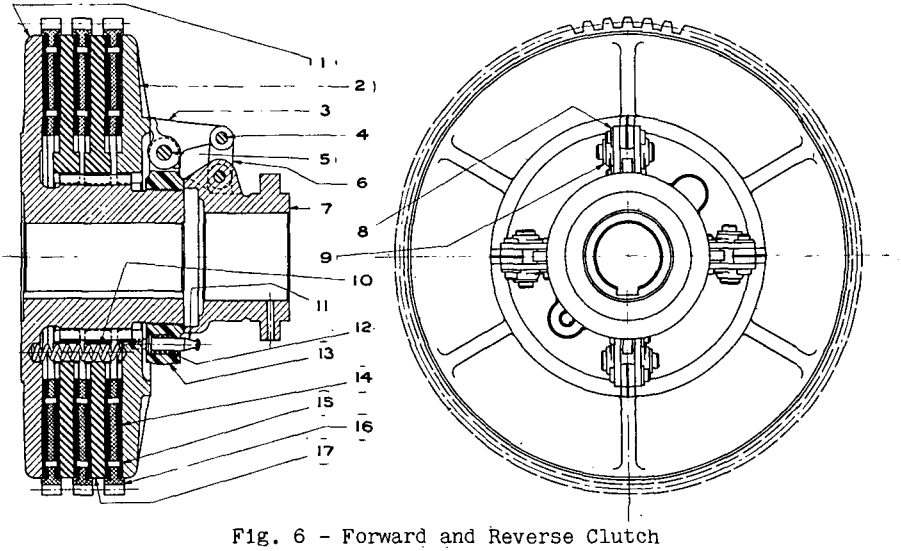

Fig. 6 - Forward and Reverse Clutch

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MAINTENANCE AND ADJUSTMENT OF UNIT

BEARINGS - All bearings are properly adjusted when the units leave the factory and should any adjustment be necessary after years of service refer to Maintenance Manual for proper handling or refer to proper personnel for handling.

CLUTCHES - Don't let the clutches slip.

MASTER CLUTCH ADJUSTMENT: To adjust master clutch, which is in flywheel of engine, remove cover plate, pull out adjusting pin #9 and turn collar #12 to the right until pin drops into next hole. Each hole adjusts the clutch about .005" closer together. Clutch will have to be disengaged to make this adjustment. Keep clutch tight. Do not slip clutch, as slipping causes excessive heat and wear. Do not start roller with Master Clutch, use the forward and reverse clutches for moving roller.

FORWARD AND REVERSE CLUTCHES: To adjust the forward and reverse clutches, pull the pin #11 on the adjusting collar #13 and turn to right, the same as on the master clutch. Do not allow clutches to become too loose. Keep them tight enough so that you can feel a snap on the lever when you engage the clutch.

GENERAL CHECK - Check all nuts, bolts, capscrews, etc. and be sure they are tight. Make this check every week.

FUEL TANK - The Fuel tank is located under the operator's platform and should be filled daily if possible. The tank will hold 39 gallons.

Inspect the glass bowl on the fuel pump for water and sediment in fuel each day. If sediment continues to accumulate in bowl, disconnect the fuel line and pipe bushing from the tank and draw off all fuel and sediment. Strain the fuel through a cloth before replacing in tank.

BRAKE ADJUSTMENT - The brake is adjusted by nuts #48 at the brake band. Turn nuts to right to tighten and to left to loosen the brake. Normally the brake will need but little attention. Be sure that no grease is allowed to contact the drum or lining.

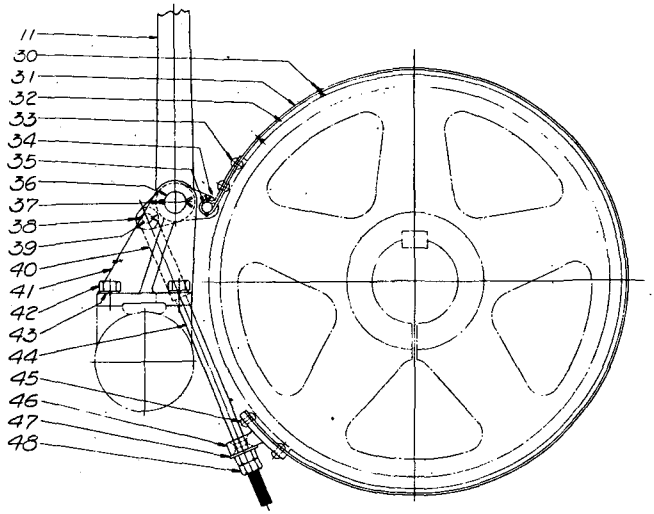

Fig. 7 - Brake Adjustment

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ENGINE

GENERAL INSTRUCTIONS

Before attempting to start engine check the following points.

1. Remove spark plugs and insert a small quantity of engine oil (not more than one ounce) in each spark plug hole. This applies to engines that have been in storage for some time before being put into service.
2. See that spark plug gaps are set at .025 inch.
3. Check crankcase, fill if necessary as shown on gauge.
4. Be sure that all water outlets are closed.
5. Fill cooling system with water (soft if available).
6. See that differential and transmission are filled to proper level with oil of proper viscosity.

INSPECTION SCHEDULE

DAILY

Check level of water in radiator. Check for leaks.
Check fuel supply.
Check oil level in engine crankcase, transmission and differential.

WEEKLY

Check all nuts and bolts. Be sure they are tight.
Thoroughly clean engine.
Inspect clutches to be sure they are not slipping.
Check water pump for leaks.
Check fan belt for proper tension. Replace if worn.

EVERY 100 HOURS

Check magneto - wipe head clean and check timing contacts.
Clean inlet screens on carburetor.
Clean and adjust spark plugs.
Remove and clean screen in fuel pump.
Air Filter - wash filtering unit thoroughly in a container of thin oil (no gasoline). Drain and fill oil receptacle.

EVERY 150 HOURS OF OPERATION

Check cylinder compression.
Clean the cooling system thoroughly. Remove all rust and sediment.
Check spark plugs for broken insulators, clean and set gaps to .025 inch.

INSTRUMENTS, CONTROLS AND GAUGES

All of the engine controls are arranged on the dash or instrument panel and are fully explained in the Operator's Section of the unit.

INDEX TO MAINTENANCE AND ADJUSTMENT OF ENGINE

MAINTENANCE AND ADJUSTMENT

Always keep the engine clean. Check the fan belt to be sure it is properly adjusted.

Follow lubrication instructions on all points.

CARBURETOR - ZENITH MODEL IN156B (Outline 0-6459) This model carburetor used on rollers up to and including Serial No. USA846038.

The fixed jet type carburetor has an air metering idling and high speed fuel adjustment. The idle adjusting screw is located in the upper section of the carburetor. Turning screw in provides a richer mixture, turning it out a leaner mixture. High speed adjusting screw in lower section of carburetor is a fuel adjustment and must be adjusted according to elevation and climatic conditions. Turning screw in provides a leaner mixture, turning out a richer mixture.

ADJUSTMENT - The adjustment of the carburetor is of the fixed type, being determined by the size of the following parts, each of which is numbered.

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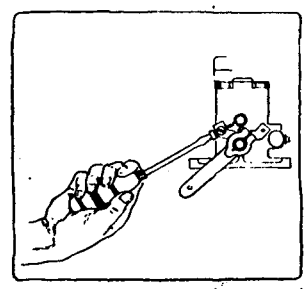
VENTURI - The function of the venturi is to measure the air through the carburetor and to keep it moving fast enough at low speed to completely atomize the fuel. The size is marked on the top.

MAIN JET - This is directly connected with the fuel chamber. Being subject to suction its flow of fuel will vary with the load or speed of the engine. Its effect is most noticable at high speed. The size is stamped on its base.

COMPENSATING JET - This jet empties into the compensating well, which is open to the air, and therefore it is not subject to suction. Its flow of fuel is constant, being determined by the fuel level in the bowl and the size of the jet. It is most effective at low speeds. The size is stamped on the base.

IDLING JET - Its function is to measure the fuel for closed throttle (idling) position. When the throttle is opened, it is put out of action as the fuel then changes direction and goes through the cap jet. Its size is marked on the hexagon base.

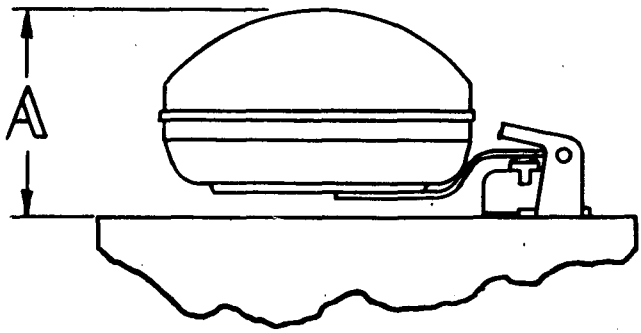
CAP JET - The fuel emptied into the compensating well by the compensator is carried into the air stream through the cap jet. This jet is subject to suction but, of course, can flow only as much fuel as is supplied by the compensator. Its size is stamped on the base.



ADJUSTMENT OF IDLE - Do not expect a new engine that is too stiff to "rock" on compression when stopped, to idle well at low speed. Set stop screw on throttle lever so that engine will run sufficiently fast to keep it from stalling. Turn in or out on idling needle valve, until

engine hits evenly and without rolling or skipping. Then back off on stop screw until desired engine speed is obtained. During the latter operation it sometimes happens that the idling needle valve can be opened a trifle, as the nearer the throttle plate is to the closed position, the greater the suction on the idling jet. The correct idling adjustment is usually found between 1 and 3 turns open of the idling needle valve. A good starting point is 1½ turns from its seat.

FUEL LEVEL - The fuel level in these down draft model carburetors is 5/8" below the top edge of the bowl. The weight of the float and the fitting and location of the fuel valve and seat are such as to maintain the fuel level in this position. These parts are interchangeable, so when necessary



to change the fuel valve and seat assembly or the float assembly, this may be done without having to readjust the fuel level. The fuel level can be checked with the use of a special level test gauge which attaches to the drain hole in bottom of bowl. Test gauge Part No. C-4088. Refer to maintenance section.

CARE OF CARBURETOR - Due to the lack of moving parts affecting carburetor adjustment, about the only thing that can disturb its function is the presence of dirt and water. Accordingly, the carburetor should be cleaned periodically as this will insure uninterrupted operation.

CARBURETOR - ZENITH MODEL 28BV12 (Outline S-880)
This model carburetor used on rollers beginning with Serial No. USA846039

The Zenith 28BV12 Carburetor is a downdraft unit of double ventur design. It is a balanced carburetor which maintains proper depression ratio between the air intake and the fuel bowl. Air cleaner restrictions have a minimum influence on mixture ratio. This construction protects bowl vent, well vent, idling air opening, etc., from admitting dirt because all air must enter through the air cleaner.

The accelerating pump is mechanically operated and the accelerating discharge is actuated by throttle movement.

MAIN JET SYSTEM - All fuel for part throttle operation is supplied through the main jet orifice.

COMPENSATING SYSTEM - The compensating system consists of the main discharge jet (1) and the well vent (4).

POWER JET SYSTEM - The power jet system consists of the power jet valve which regulates the volume of fuel and the power jet piston (6) which, actuated by the manifold vacuum, causes the power jet valve (7) to open.

IDLING SYSTEM - The idling system consists of the idling jet (9), which measures the fuel; the air bleed (5), and the idling adjusting needle (10) which regulate the air.

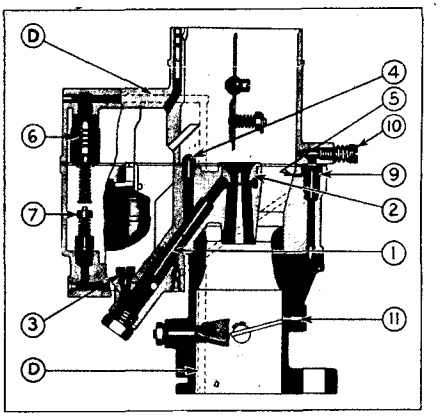


Figure 1

ACCELERATING SYSTEM - The accelerating system consists of the accelerating pump piston, a series of channels check valves and an accelerating jet. The pump piston is actuated by throttle movement. The accelerating jet and pump spring control the rate of fuel discharge.

FUEL FILTER - The Filtering Element has been incorporated in the gasoline inlet in assemblies of this type carburetor. The fine edge type element (.002 spacings) assures a supply of clean fuel in the carburetor at all times.

To clean the filter (see Fig. 2), remove the filter head (26) and element (23). The sump (22) may then be cleaned with a small cloth. The channel must be covered so that no dirt or water from the sump is wiped into it during the cleaning operation. Remove the element from the head. This allows the individual washers to be slightly separated from each other. Wash the element in gasoline. If the accumulated dirt is gummy, a brushing in gasoline will loosen it. Every particle of dirt may then be blown off with compressed air. It is important that only moderate air pressure is used in the cleaning operation. The element and head may then be be reassembled in the carburetor.

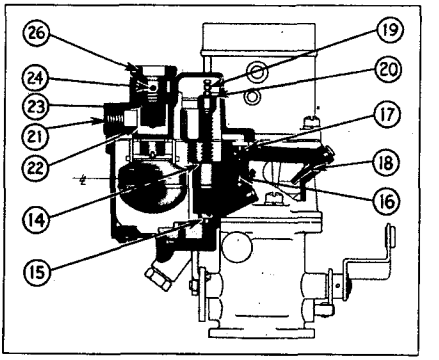


Figure 2

COOLING SYSTEM - All water connections must be checked regularly for leaks.

CRANKCASE - Check the oil level regularly. Do not flush the crankcase with kerosene. It is impossible to drain all oil pockets without removing the oil pan and the kerosene which is trapped remains to dilute the new oil.

AIR FILTER - The oil bath air filter is attached to the carburetor by means of hose and tubing. The upper assembly of the air cleaner contains the filtering unit. The lower assembly is a receptacle for oil. The servicing of this unit depends on operating conditions. For normal operation the air filter oil receptacle should be drained and refilled each time the engine oil is changed. If the engine is operated under abnormally dusty conditions the air filter should be serviced more frequently.

SPARK PLUGS - Remove spark plugs every 200 hours and examine plug terminals to see that they are tight and that plug is clean. Check for proper electrode gaps which is .025 inch. If the electrodes are burnt, replace plugs. Worn plugs as well as improper electrode gaps will cause inefficient engine operation.

CLEANING - Avoid accumulation of excessive dirt, grease or oil. Keep the engine clean.

For complete details on engine maintenance and repair refer to Engine Maintenance Manual.

INDEX

TO

MAINTENANCE MANUAL

INDEX TO MAINTENANCE OF UNIT

1. Brake Lever
2. F.& R. Clutch Lever
3. Gear Shift Lever
4. Differential Lock Lever
5. Governor Control
6. Master Clutch Lever
7. Instrument Panel
8 Steering Wheel

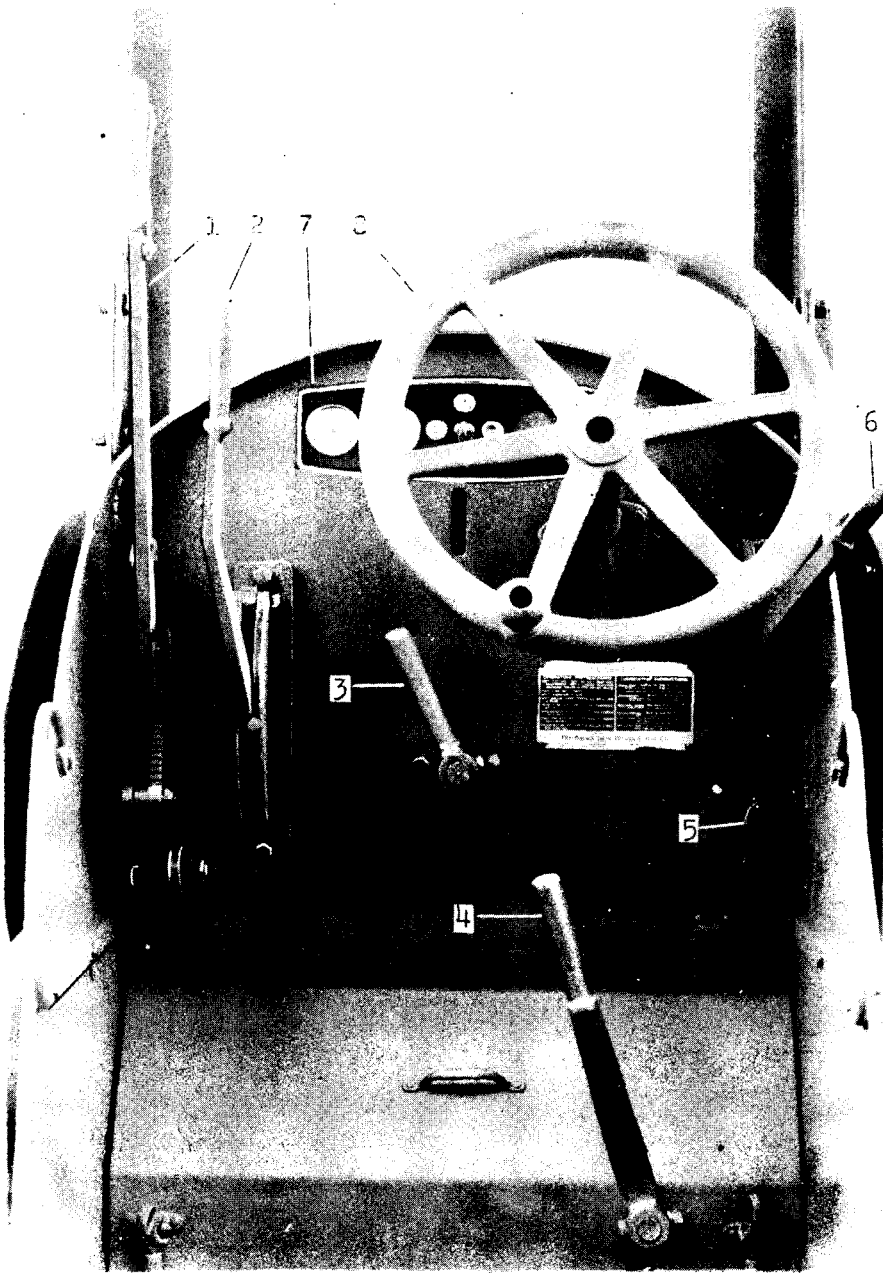


Fig. No. 1 - Controls

CONTROLS, INSTRUMENTS AND GAUGES

CONTROLS - (Fig. 1)

1. BRAKE LEVER - Emergency brake in easy reach of operator.

2. CLUTCH CONTROL LEVER - F & R. Push foward for forward motion, pull back for reverse motion.

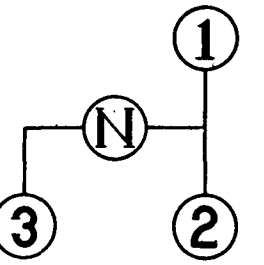
3. GEAR SHIFTING - Note: always disengage master clutch before making a gear shift.

   NEUTRAL - Hand lever in vertical position.

   LOW SPEED - Move hand lever to right and forward.

   SECOND SPEED - Move hand lever to right and back.

   HIGH SPEED - Move hand lever to left and back.



Gear Shift

4. DIFFERENTIAL LOCK LEVER - Throw to right to lock differential Left to unlock. The operation of locking the differential should be done while one wheel is slipping so as to engage the gears. The differential is locked when doing heavy work such as scafifying.

5. GOVERNOR CONTROL - Pull out to increase governed speed and in to decrease speed of engine. In order for the governor to operate it is necessary that the throttle be opened wide (pulled out) as the governor will not operate if engine is idling.

6. CLUTCH CONTROL LEVER - MASTER - Push forward to lock master clutch in operating position. Pull back to release clutch.

7. INSTRUMENT PANEL - See Figure 2.

8. STEERING WHEEL - Controls direction of travel by turning front rolls.

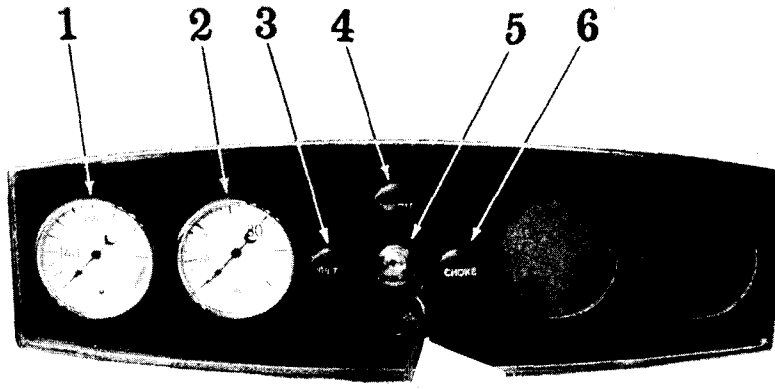


Fig. 2 - Instrument Panel

INSTRUMENT PANEL - (Fig. 2)

1. MOTOMETER - Motor temperature reading.
2. OIL GAUGE - Pressure reading of lubricating oil in engine.
3. IGNITION CONTROL (I) - Pull out to advance spark and push in to retard spark.
4. THROTTLE CONTROL - "T" - Pull out to increase speed and push in to retard speed. This control must be pulled out when governor is to be used
5. IGNITION SWITCH - Ignition lock switch for engine.
6. CHOKE CONTROL - "C" - Pull out to choke engine.

INDEX TO FRONT YOKE, SWIVEL PIN, ROLL AND SCRAPER

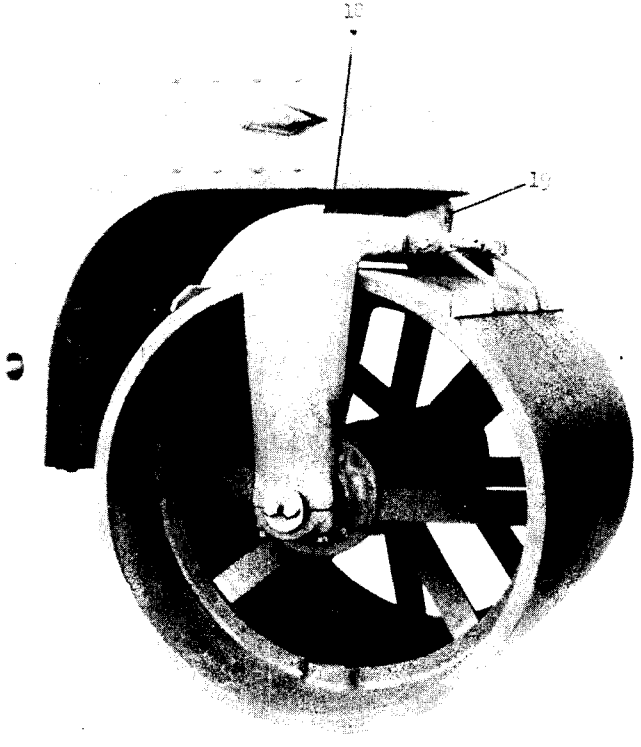


Fig. 3 - Swivel Pin Removal

FRONT YOKE AND SWIVEL PIN

REMOVAL AND DISASSEMBLY (Figures 3 & 5)

1. Remove bolt #18.
2. Support weight of yoke on chain falls and drive out pin #19 from front.
3. Lower yoke and remove.
4. Remove two #22 spacer washers - remove from both ends of the opening.
5. Drive bearings #21 and spacers #20 from king pin - Drive from front end.

Inspect bearings for wear or pitts. Check swivel pin for wear which might cause end or rock play in yoke. Replace if worn.

REASSEMBLY

The front yoke is replaced on the roller in the reverse order of the above. Be sure that bolt #18 is securely tightened and the swivel pin is lubricated.

KING PIN

REMOVAL AND DISASSEMBLY (Figures 4 & 5)

After the front yoke has been removed proceed as follows to remove the king pin.

1. Loosen bolt #4 and remove spider #23 and key #8 from top end of the king pin.
2. Remove the two capscrews #1 and washer #2.

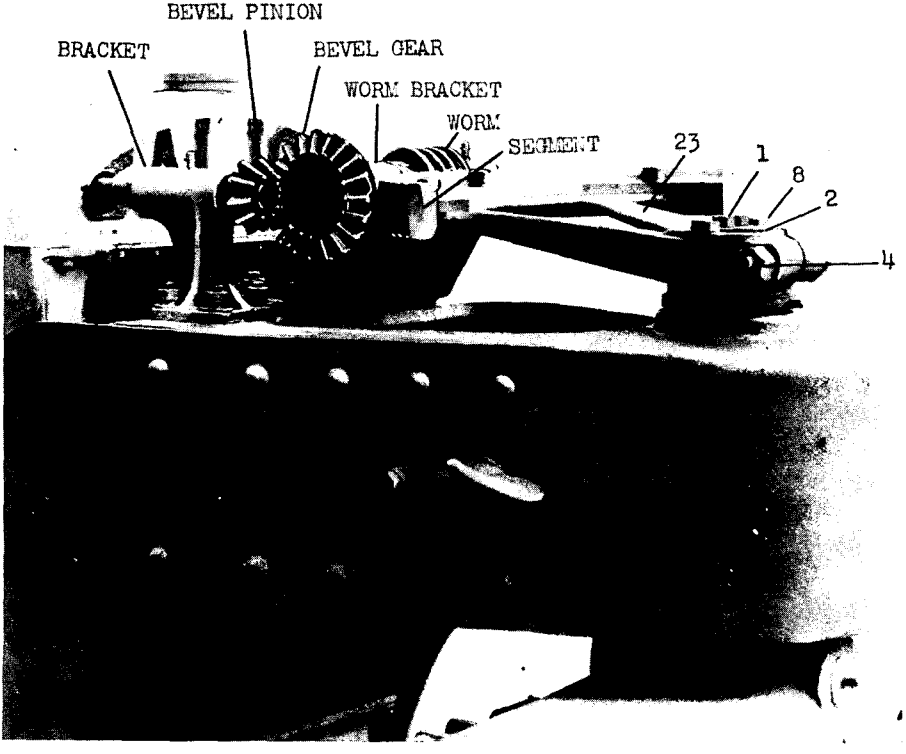


Fig. 4 - King Pin Removal

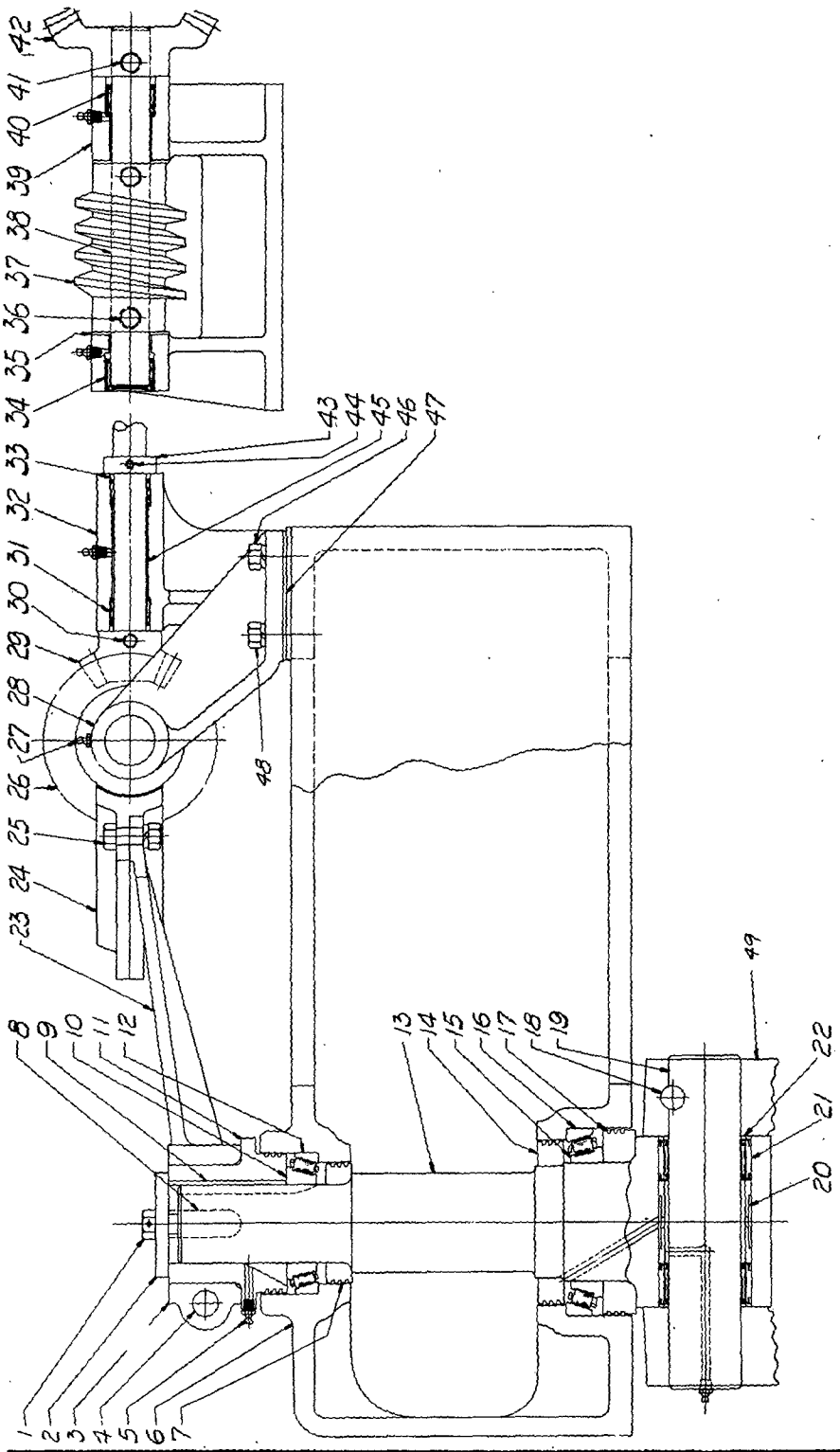


Fig. 5 - King Pin and Steering Parts

3. Drive king pin #13 out of head #6. In removing the king pin collars #7 and #14, Cone #15 and Collar #17 will also be removed along with the king pin. If it is necessary to remove these parts from the king pin they can be driven off.
4. After the king pin is removed, #11 Cap can be lifted off with Key #9. Cone #10 can be lifted out.
5. Cup #12 and #16 can be driven out.

Check bearings for wear and pitts. See if races are tight in housing. Inspect dust collars to be sure they fit properly in head and replace if worn.

REASSEMBLY OF KING PIN IN ROLLER

Proceed in reverse of above, being sure keys are in proper location. The two capscrews #1 adjust the bearings and should not be drawn tight. Draw only tight enough to make proper bearing adjustment.

FRONT ROLLS

The front rolls are mounted on four Timken bearings with proper dust seals, etc.

REMOVAL (See Figures 6 through 10)

Remove cap screws from clamps at bottom of front yoke. Loosen capscrews on ends of axle. Raise front of roller high enough for the yoke to clear end of axle and roll the front rolls from roller.

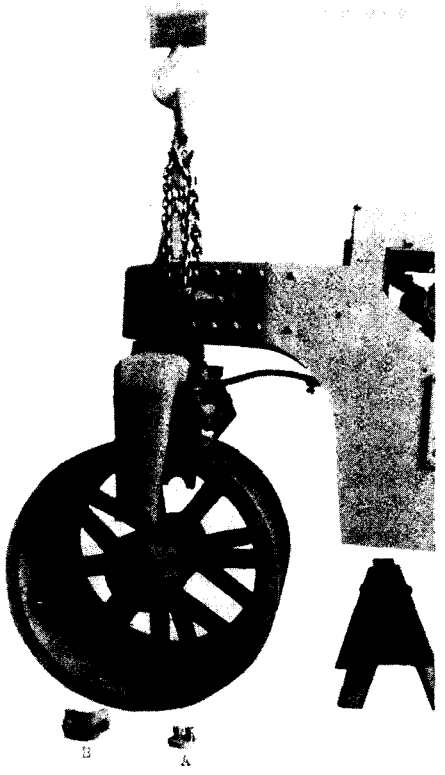


Fig. 6 - Removing Front Roll From Roller

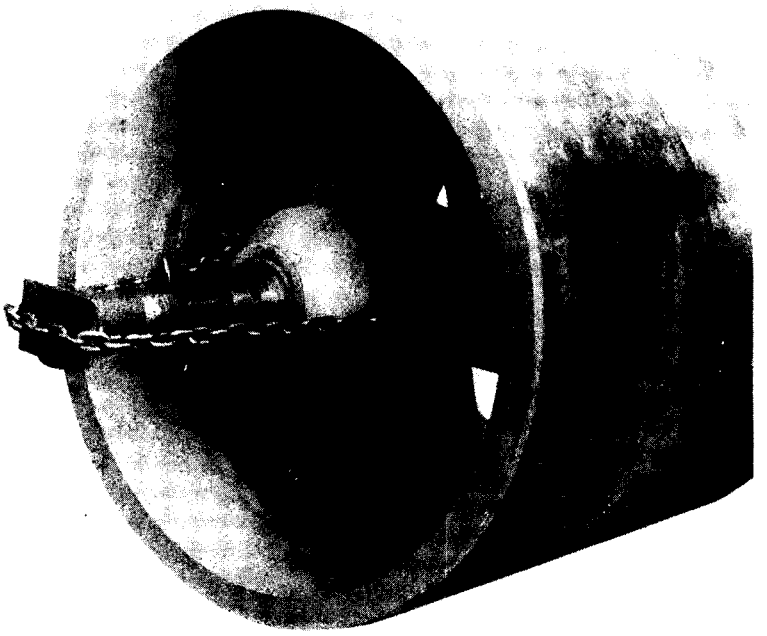


Fig. 7 - Removing Front Axle

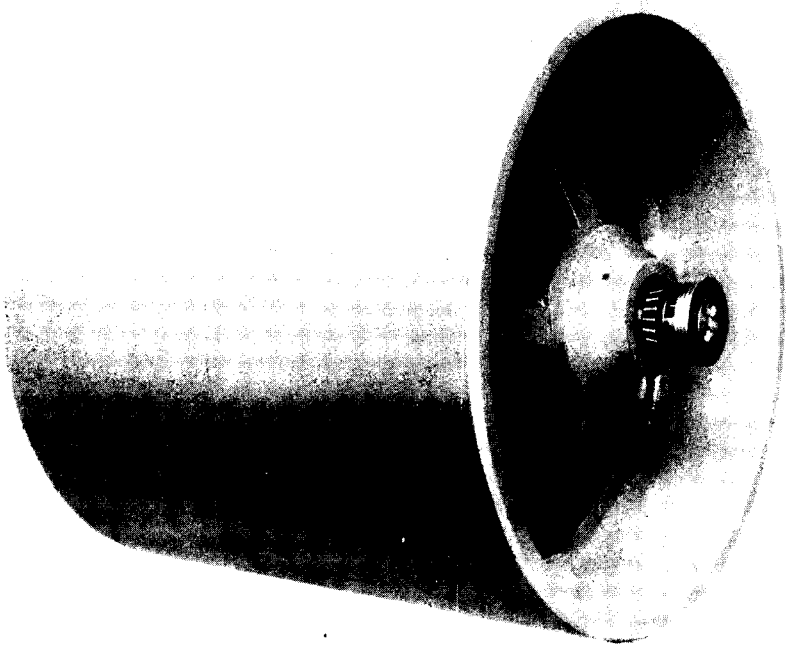
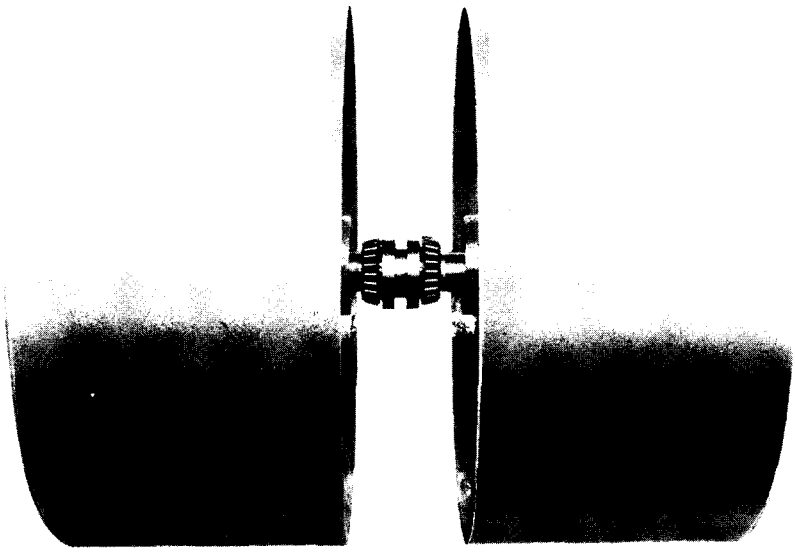


Fig. 8 - Removing Front Rolls From Axle



Removing Front Rolls from Axle

Fig. 9

DISASSEMBLY

Remove capscrews and washer on ends of axle. Place a chain around the inner spokes of one front roll close to the hub. Fasten the ends of the chain together outside the roll leaving sufficient room to place a jack between the axle and chain and apply pressure forcing the axle out of one of the rolls and outer bearing. The other roll should be removed in the same manner after which the inner bearings and dust collars may be pressed from the axle. If it is necessary to drive on the end of the axle - leave capscrews in place in order not to damage the end of the axle.

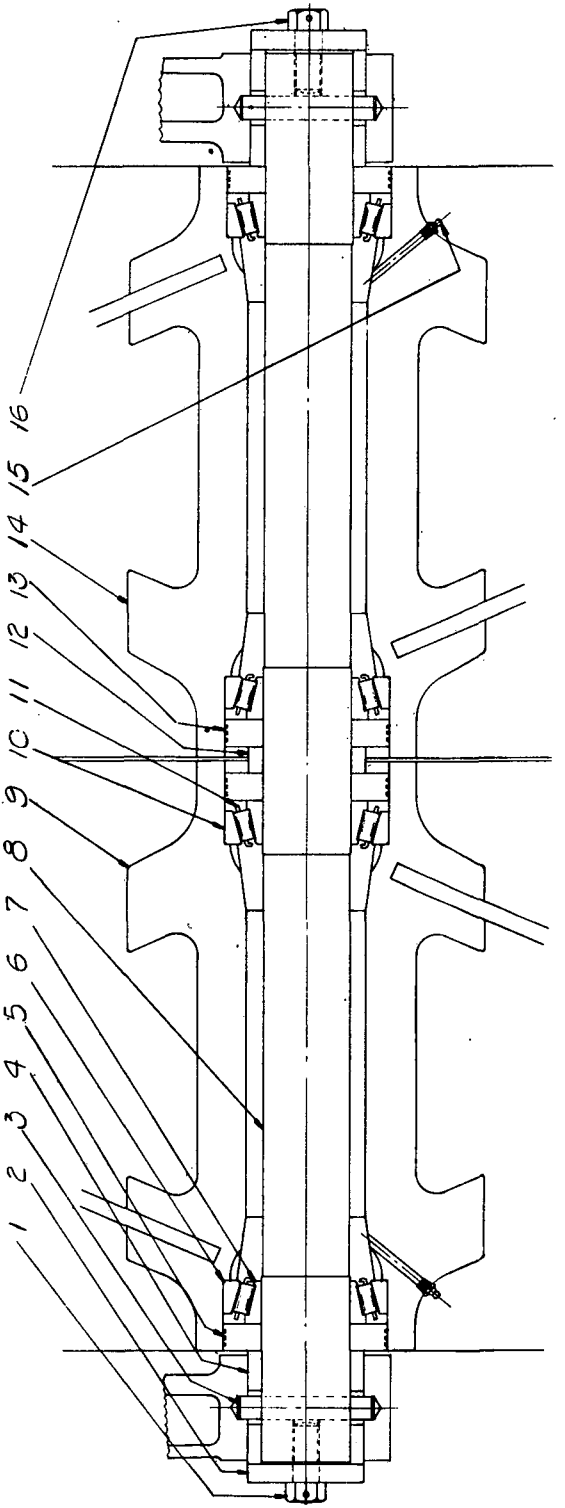
Inspect bearings and dust collars for wear. Bearings may be loose or pitted and should be replaced. Be sure the bearings were properly lubricated - if not the bearings may have worked loose and cut the axle.

REASSEMBLY

Proceed in the reverse of above. Assemble dust collars and bearing cones on the center of the axle. Place bearing cups in roll. Place rolls on axle and drive outer bearings and dust collars on outer ends of the axle. Put washer in position and put capscrews loosely in place.

ADJUSTMENT

Adjustment of front roll bearings must be made with the capscrews on the outer ends of the axle with the capscrews in the front yoke caps loosened.



Front Roll Axle and Bearings

Fig. 10

ADJUSTMENT

To tighten the bearings turn capscrews in (to right) and to the left to loosen.

The two capscrews on each end of the axle will tighten the bearings in the entire front roll assembly.

Be sure and not draw these adjusting capscrews too tight which could cause the two sections of the front rolls to bind when turning.

FRONT ROLL SCRAPER

REMOVAL (Figure 11)

1. Remove cotter pin #1 and nut #2 as well as bolts nuts and washers number 6,7,8 and 9 after which rod #10 can be pulled out and release scraper.

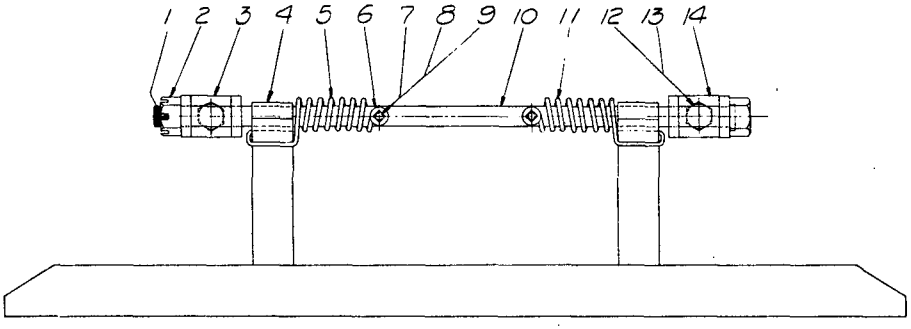
REASSEMBLY OF FRONT ROLL SCRAPER

To replace the scraper proceed in the reverse and follow instructions under spring tension.

FRONT SCRAPER SPRING TENSION

To adjust the spring tension on the front roll scraper follow the following instructions.

1. Remove cotter pin #1 and back nut #2 off about 5/16" to 3/8". Push rod so that head of rod on opposite end clears the stop. Use a wrench on the bolt head and turn to left to increase tension. Be careful that the wrench does not slip off the bolt head.
2. After tension is properly adjusted and while holding the tension with the wrench - drive bolt back in place until head locks in stop and then tighten nut #2 and insert cotter pin #1.



Front Roll Scraper

Fig. 11

INDEX TO STEERING PARTS

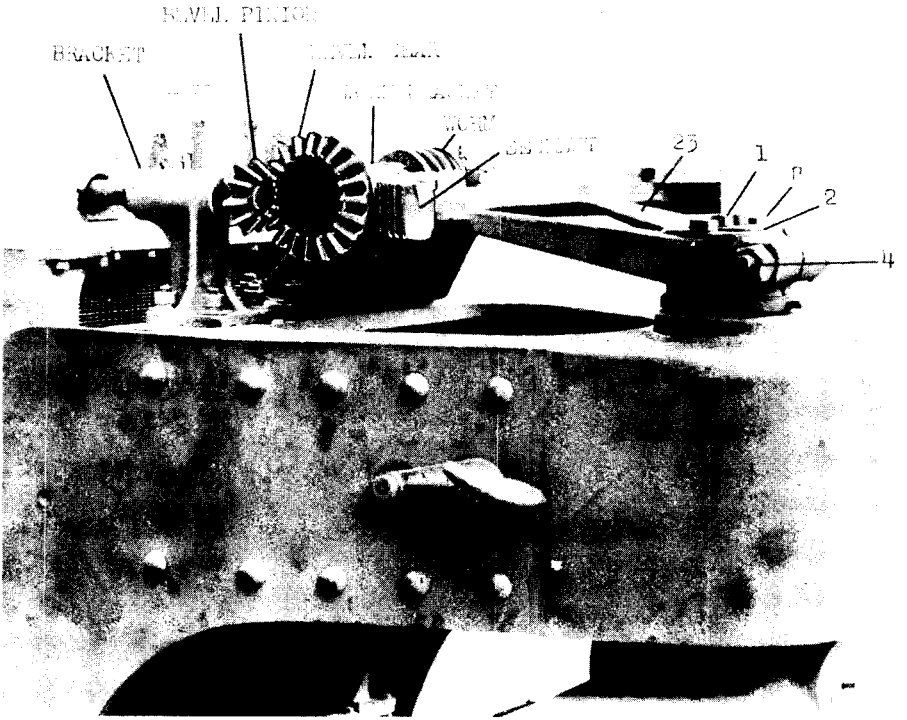
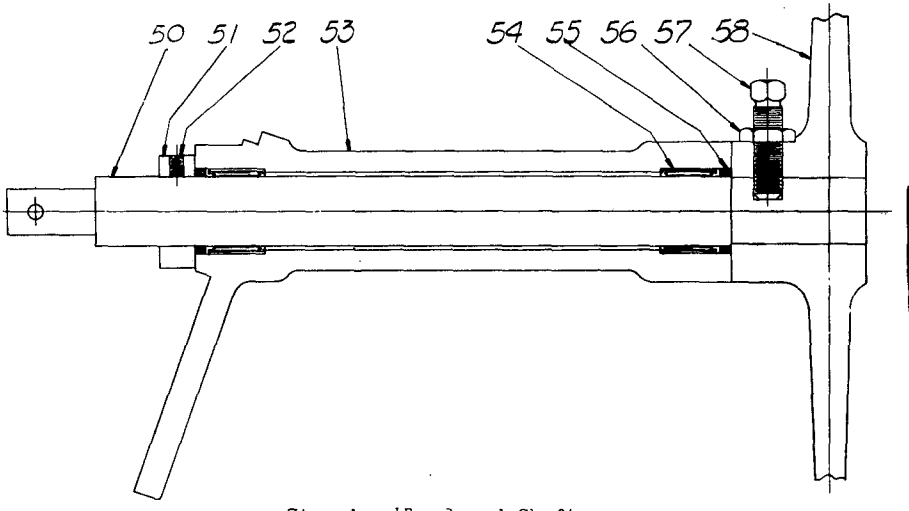


Fig. 12 - Steering Parts

STEERING PARTS

All steering parts are mounted on bearings and disassembly of any group of steering parts is not difficult.

STEERING WHEEL AND BRACKET



Steering Wheel and Shaft

Fig. 13

DISASSEMBLY (Figure 13)

Remove Collar #51 by loosening set screw #52 and pull collar from shaft.
Pull shaft and wheel from bracket.
Remove grease seals #55 and Bearings #54.
Inspect bearings for wear and pitting and also grease seals to be sure they are not damaged or worn. Replace if necessary.

REASSEMBLY

Insert upper bearing #54 and seal #55 after which shaft is placed in housing and second bearing and seal put in place on the shaft.

Place Collar #51 on shaft and tighten set screw.

STUB STEERING SHAFT AND BRACKET

DISASSEMBLY (Figure 14)

Loosen set screw in gear #29 and remove gear.
Remove collar #43 and pull out shaft #45.
Remove both seals #33 and Bearings #31.
Check bearings for wear or pitting and be sure grease seals are in good condition. Replace all worn or damaged parts.

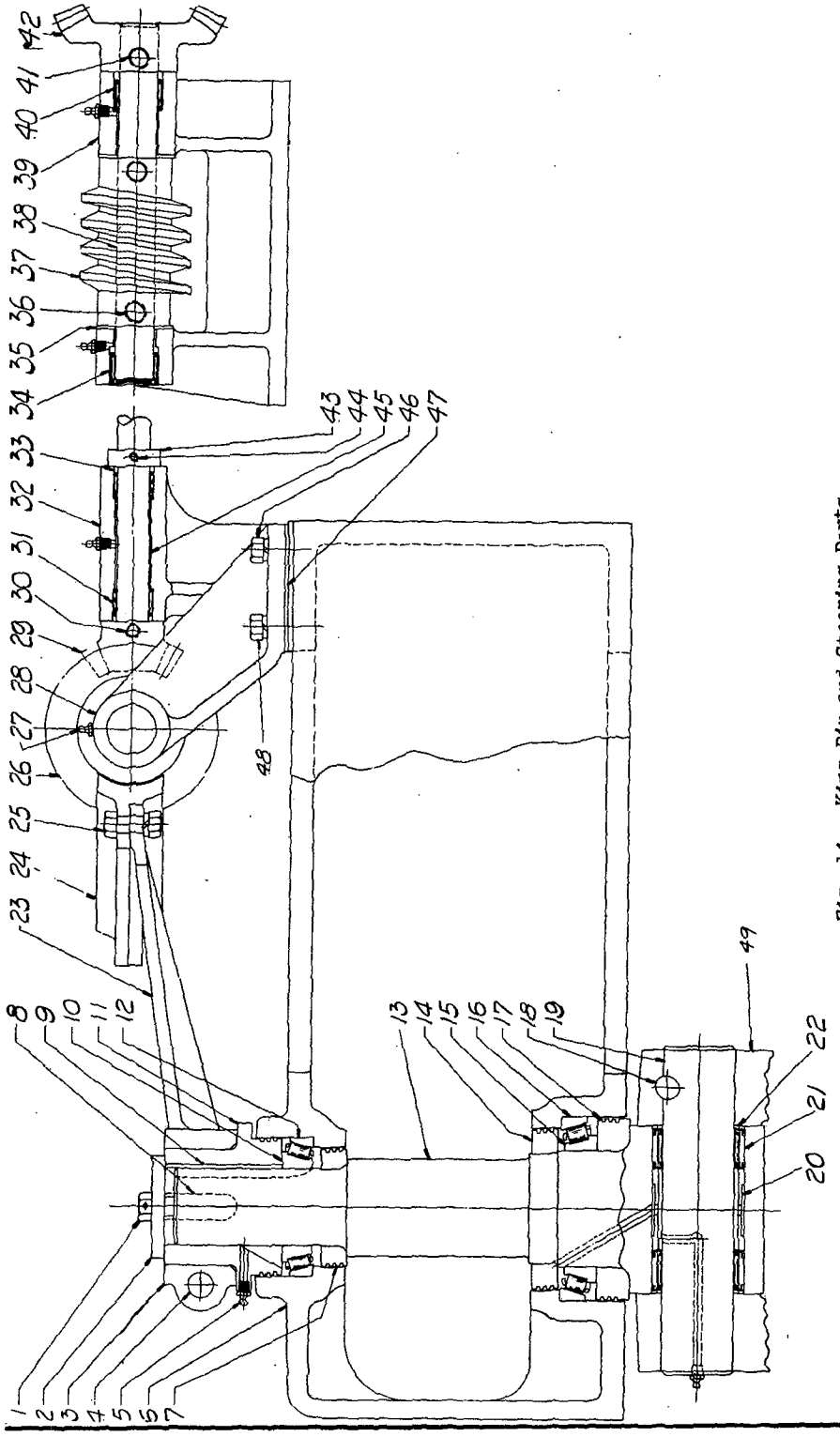


Fig. 14 - King Pin and Steering Parts

REASSEMBLY

Proceed in reverse of disassembly being sure the grease seals are in proper location.
Shims under bracket are provided if adjustment should be necessary between pinions.

WORM SHAFT AND BRACKET

DISASSEMBLY (Figures 12 and 14)

Loosen both set screws in worm #37.
Pull shaft #38 with bevel gear #42 from bracket. Watch that washers #35 are also removed and not lost.
Loosen set screw in bevel gear and remove gear, removing bearing #34 and 40.
Check washers, bearing and grease seals for wear or damage, also check worm to see that it is not worn. If worn only slightly adjustment with shims can be made, otherwise replace.

REASSEMBLY

Proceed in reverse of above. Be sure closed end bearing #34 is in proper position and that thrust washers #35 are in place.
Shims under bracket are provided for worm adjustments to segment if this should be necessary.

INDEX TO TRANSMISSION

TRANSMISSION

REMOVAL - The transmission should be removed from the unit for complete breakdown and overhaul. The following steps outline the removal of all assemblies of the transmission.

A. Remove both drive shafts and pinions.
B. Remove transmission from Roller.
C. Remove case cover, gear shift housing and clutch cover plate.
D. Remove differential gear assembly.
E. Remove first countershaft and both bevel gear and drum assemblies.
F. Remove back gear shaft.
G. Remove master clutch shaft.

NOTE: The master clutch shaft or the first countershaft can be removed without removing the differential assembly or back gear shaft, however the above outline is for complete disassembly. To remove only the master clutch shaft or first countershaft refer to that subject in the following detail.

A. REMOVAL OF DRIVE SHAFTS AND PINIONS (Figure 16)

1. Remove gear rolls. Refer to Rear Roll Removal.
2. Remove capscrew #115 holding bearing retainer to housing #104.
3. Pull assembly from transmission being sure shims #117 are not damaged as they must be replaced.

4

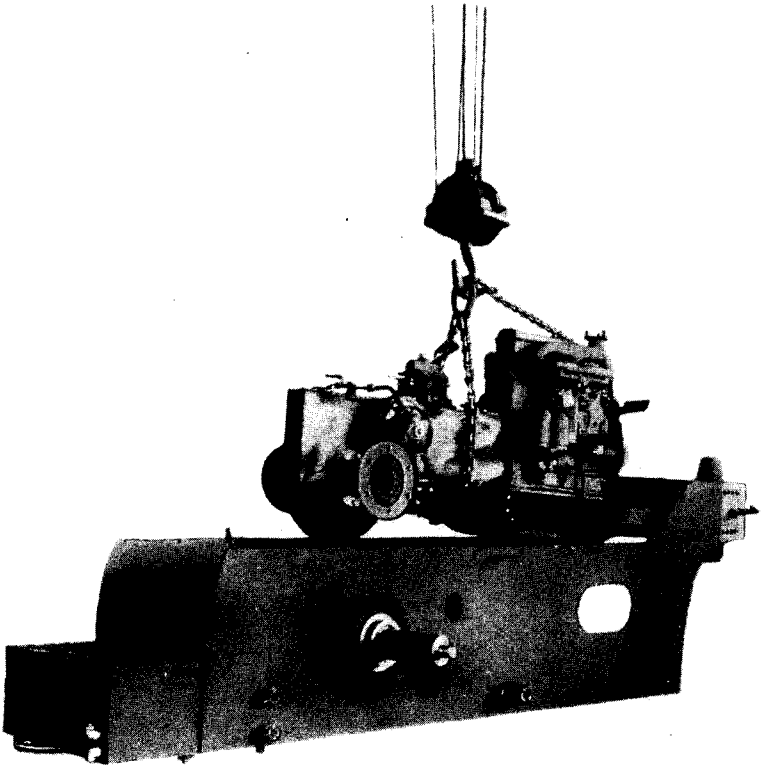


Fig. 15 - Removing Transmission And Engine From Frame

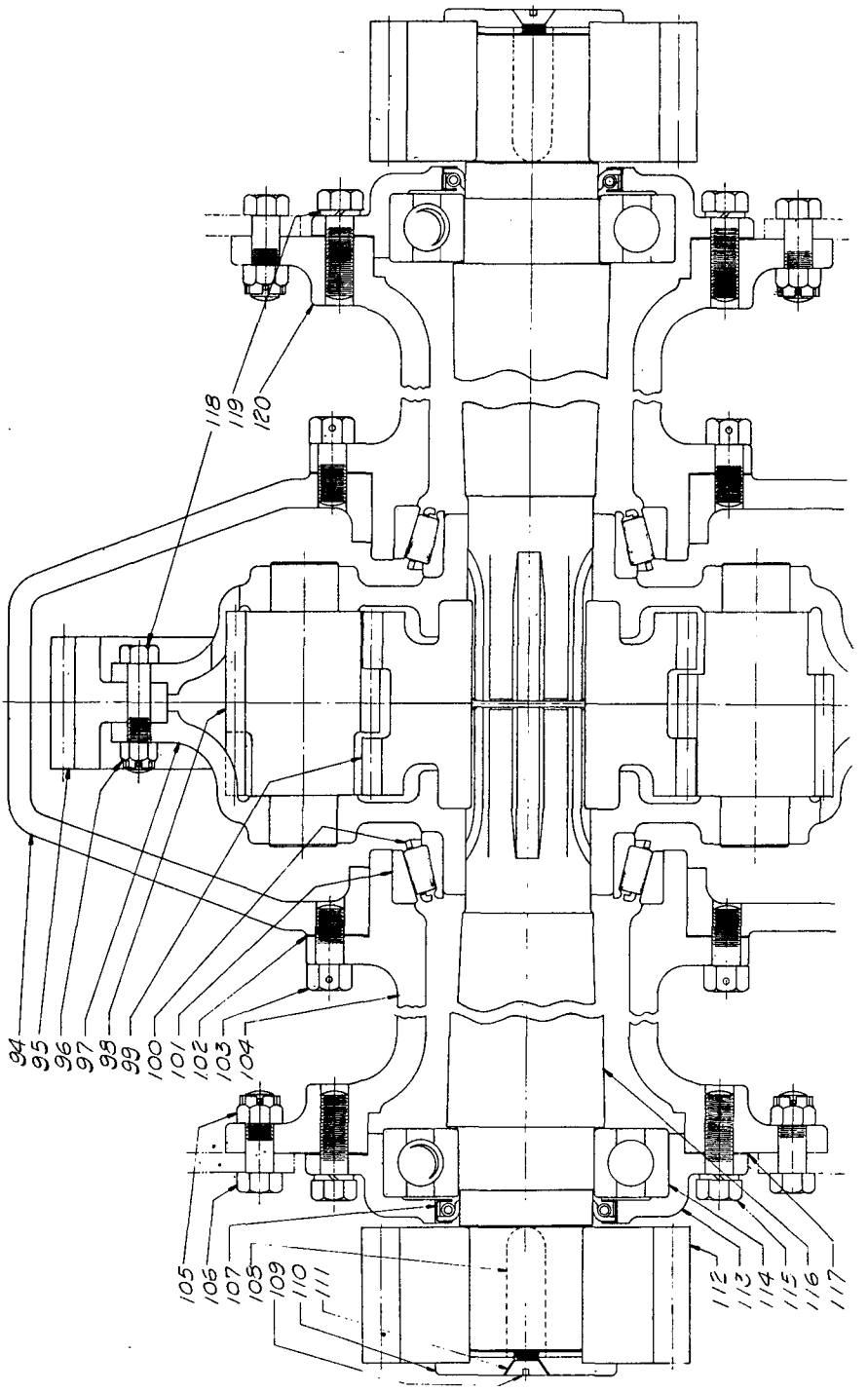


Fig. 16 -Differential & Second Countershaft

DISASSEMBLY OF DRIVE SHAFT AND PINION

1. Remove screw #109 and washer #110.
2. Place supports under housing #113 and bearing #114 with entire weight resting on the supports and sufficient room below to allow for the shaft to be driven from pinion #112 and bearing. If a press is available it is always advisable to use this type of equipment for pressing gears from shafts.
3. Drive shaft from pinion #112 and bearing #114 and remove key.
4. Remove oil seal #107 from housing being sure not to damage the seal.
5. Press or drive bearing #114 from housing #113.

Check bearings for wear or pitts also grease retainers and be sure they are in good condition. Check pinion for wear and replace all worn parts.

To reassemble proceed in reverse of the above being careful not to damage oil seal. The shaft should be first assembled in the bearing and housing, the oil seal replaced and pinion then placed on shaft.

B. REMOVE TRANSMISSION FROM ROLLER (Figure 15)

1. Remove hood sides and top cover.
2. Remove side crank assembly.
3. Drain and remove radiator.
4. Remove all control rods, lines and wires attached to transmission and engine.
5. Remove all bolts and capscrews holding sub-frame to roller frame.
6. Use a chain hoist and remove engine and transmission as a unit attached to the sub-frame.
7. Remove bolts around bell housing attaching this housing to the transmission.
8. Remove all bolts holding engine to sub-frame.
9. Attach lift chain to engine and pull away from transmission allowing clutch shaft to slide out of pilot bearing in the flywheel.
10. Raise engine and remove.
11. The transmission is now in position for complete disassembly and the case need not be removed from the sub-frame unless the transmission case is to be replaced.

C. REMOVAL OF CASE COVER, GEAR SHIFT HOUSING AND CLUTCH COVER

1. The above mentioned parts are held to the transmission case by cap screws. The case cover and clutch cover are removed by first removing all cap screws. The shifter housing is removed by removing all capscrews holding it to the case and lifting straight up. In replacing this shift housing be sure that the shift forks fall in the proper slide in the gears.

DISASSEMBLY OF GEAR SHIFT HOUSING (Figures 18 and 19)

1. Remove cover #31 and gasket #33 by removing cap screws holding it on the housing.
2. Loosen jam nuts #56 and remove capscrews #55. When removing these capscrews be careful that springs #57 do not fly out and cause injury.
3. Remove bolt #54 and drive shaft from housing and shift arm #35.
4. Remove bolts #61 from both shift forks and drive shafts from housing and forks and remove forks from inside of housing.

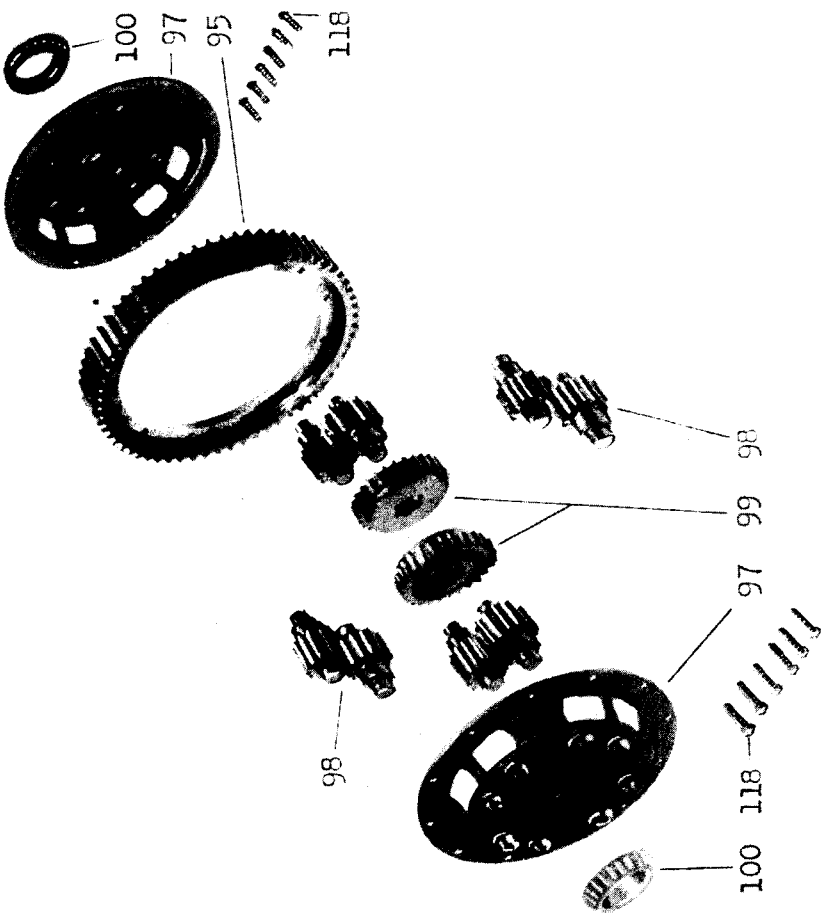


Fig. 17 -Differential

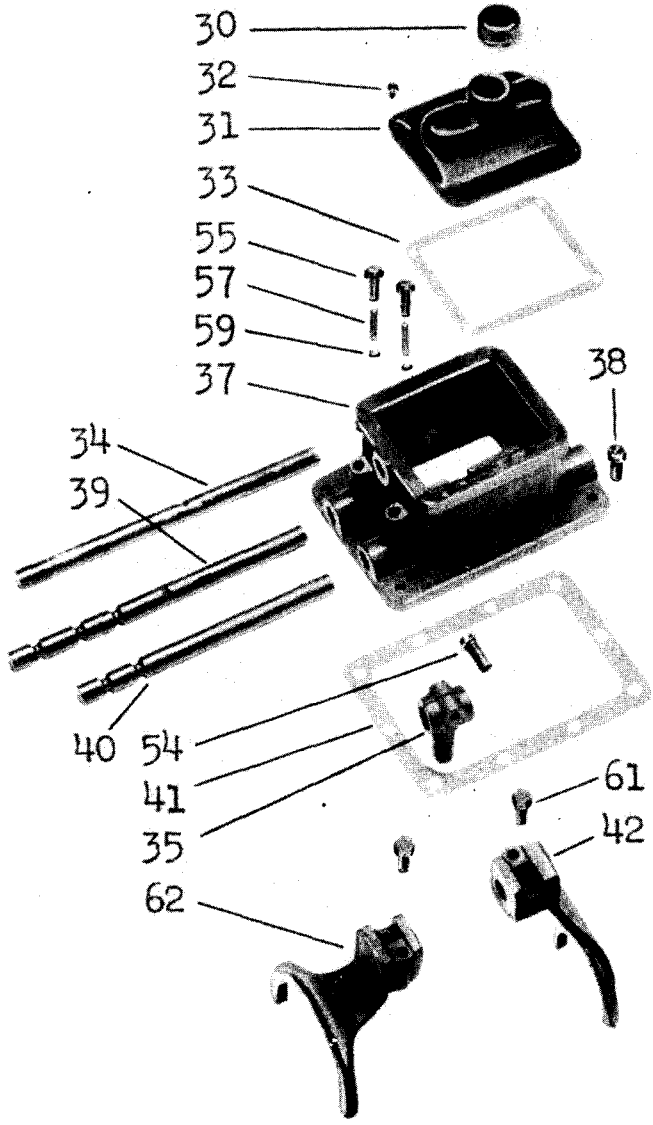


Fig. 18 - Gear Shift Box

Check forks and shaft for wear. Replace gasket if damaged and be sure that the keys in the fork and shaft are not sloppy.

To assemble the above reverse the order of procedure

D. REMOVE DIFFERENTIAL GEAR ASSEMBLY

1. Remove cap screws # 103 holding housing #104 to transmission case. This housing forms the retainer for the Differential bearing.
2. After removing the capscrews pull both housings from case being sure the shims #102 are removed and counted as the same amount should be replaced. Also, be careful when removing the housings that the differential assembly does not fall to the bottom of the case and cause damage.
3. Attach chain falls to differential assembly and lift from case.

DISASSEMBLY OF BULL GEAR (Figure 17)

1. Place assembly on side and remove 6 of the nuts and bolts holding the housings. You will note that the heads of the bolts are in alternate directions through the housings.
2. Turn assembly to other side and remove remaining 6 bolts.
3. Lift top side of housing from assembly which will allow the removal of the 8 pinions #98 as well as the 2 gears #99. The ring gear #95 may also be lifted from the housing.
4. The bearing cones #100 may be removed from the housing if necessary.
   In reassembly be sure the pinions #98 are in proper alternate direction and gears #99 are turned in proper direction as shown.

Inspect pinions and gears for wear. Check bearing races in housing for pitts and also bearings rolls for wear. Replace worn parts.

E. REMOVE FIRST COUNTERSHAFT, BEVEL GEAR AND CLUTCH DRUM (Figs. 20 thru 23)

1. Remove both the forward and reverse clutches by first removing capscrew #69 and extension #91. Be sure that shims #90 are also removed. Note - refer to clutch removal.
2. Remove capscrews #74 from one side of the case. Be sure and remove the keys which hold the clutch to the shaft.
3. Pull one bevel gear and drum assembly from shaft.
4. With key and clutch removed from opposite end of shaft the shaft can now be pulled from the transmission case.
5. Remove remaining bevel gear and drum assembly by removing cap screws holding the housing to the case.
6. Be sure that all washers and bearings are accounted for and that oil seals are not damaged.

REMOVE PINION FROM FIRST COUNTERSHAFT

1. The pinion and shaft are splined and pinion may be pressed or driven from the shaft.

DISASSEMBLY OF BEVEL GEAR AND DRUM (Figs. 20, 21 and 23)

1. Remove bearings #81 from inside of the bevel gear hub.
2. Straighten the holding lug on lock #73 and remove nut #72.
3. Bevel gear may now be pressed from drum. Be sure key is removed and not lost, also #83 washer.

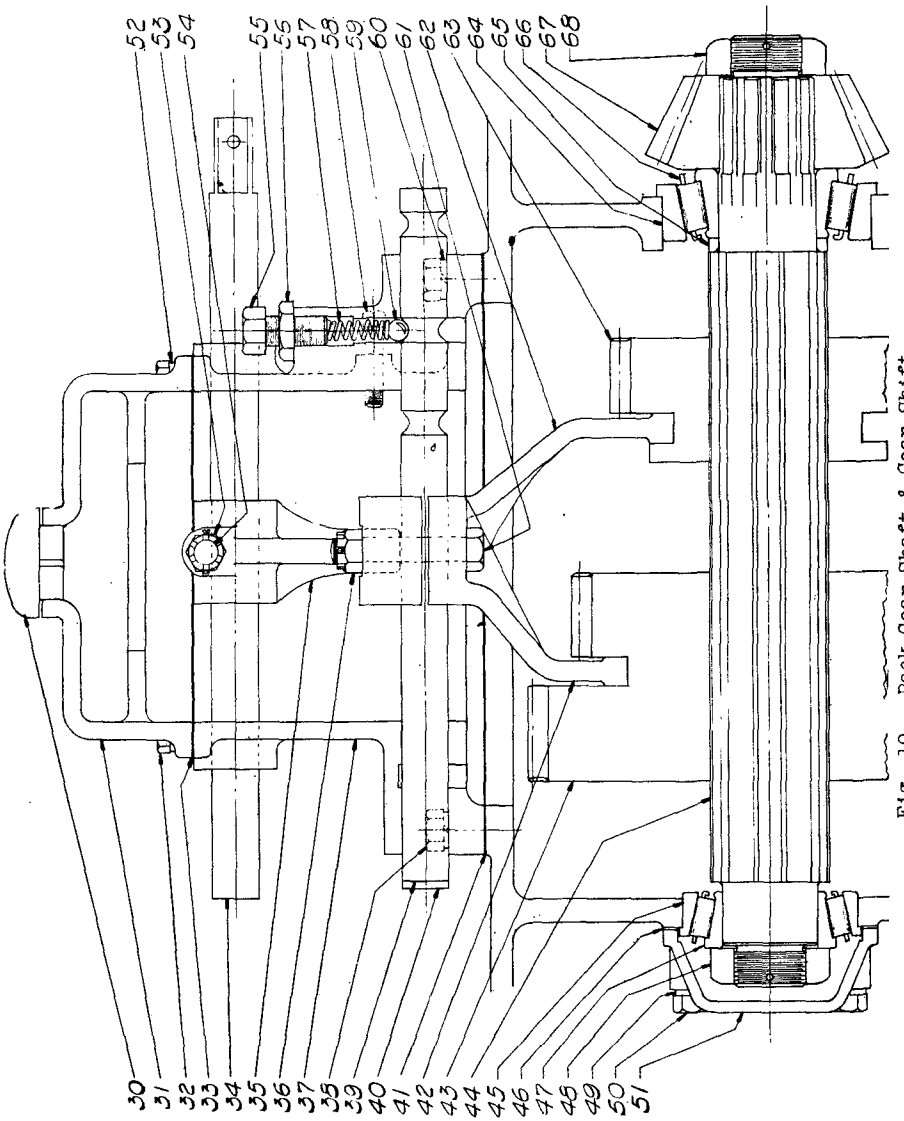


Fig. 19 - Back Gear Shaft & Gear Shift

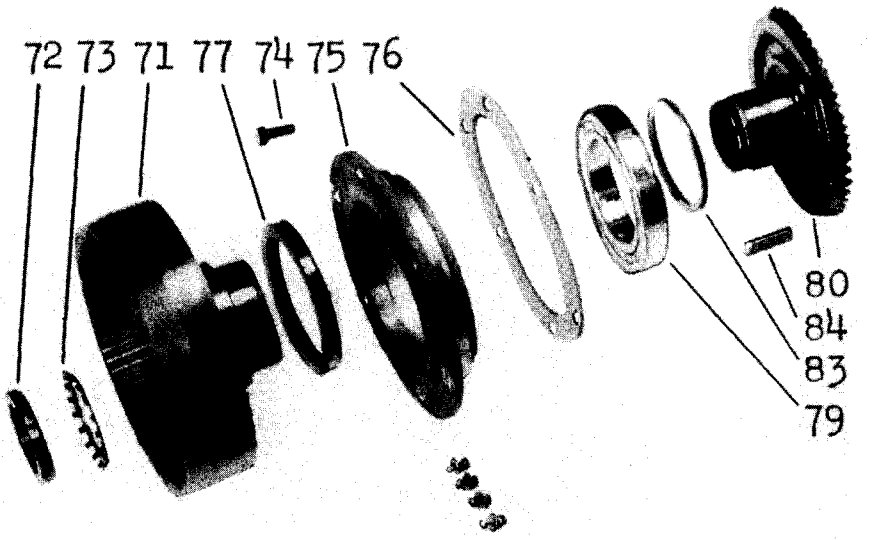


Fig. 20 - Clutch Drum and Bevel Gear

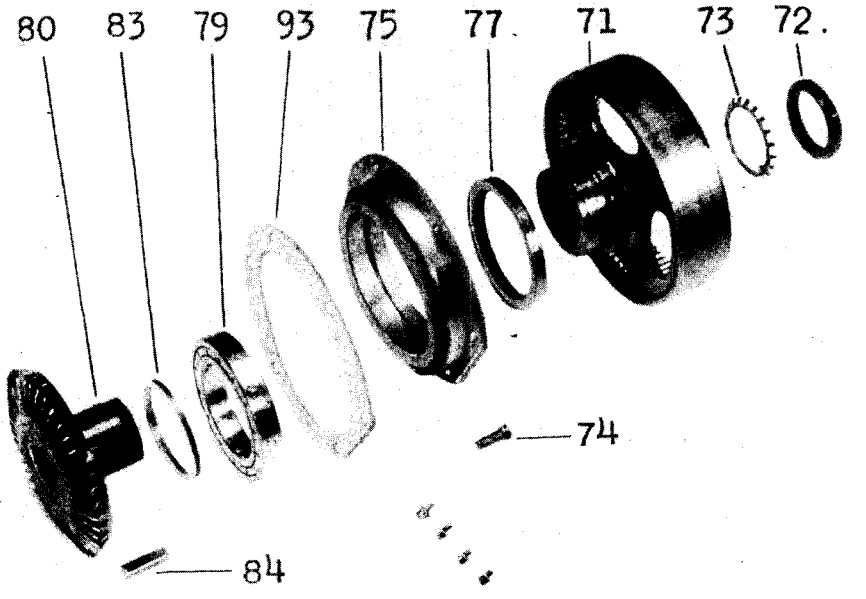


Fig. 21 - Clutch Drum and Bevel Gear

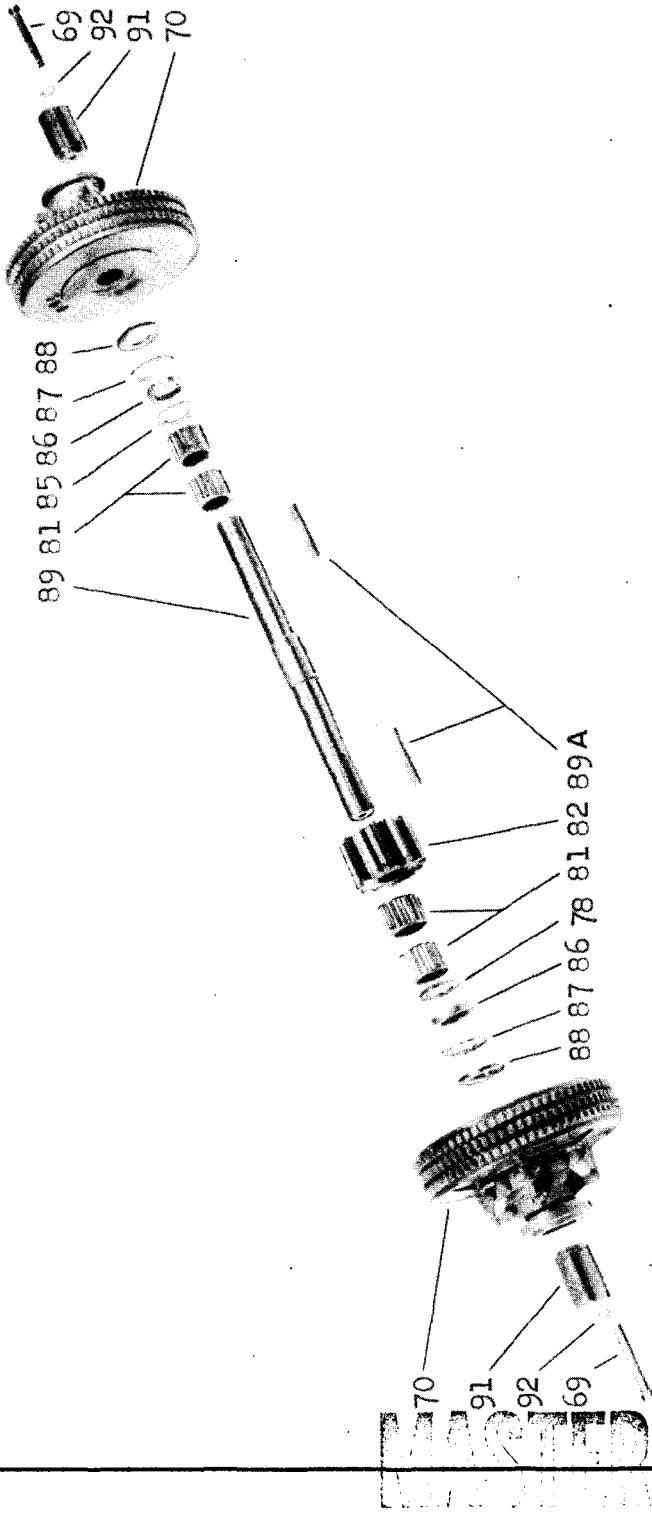


Fig. - 22 First Countershaft

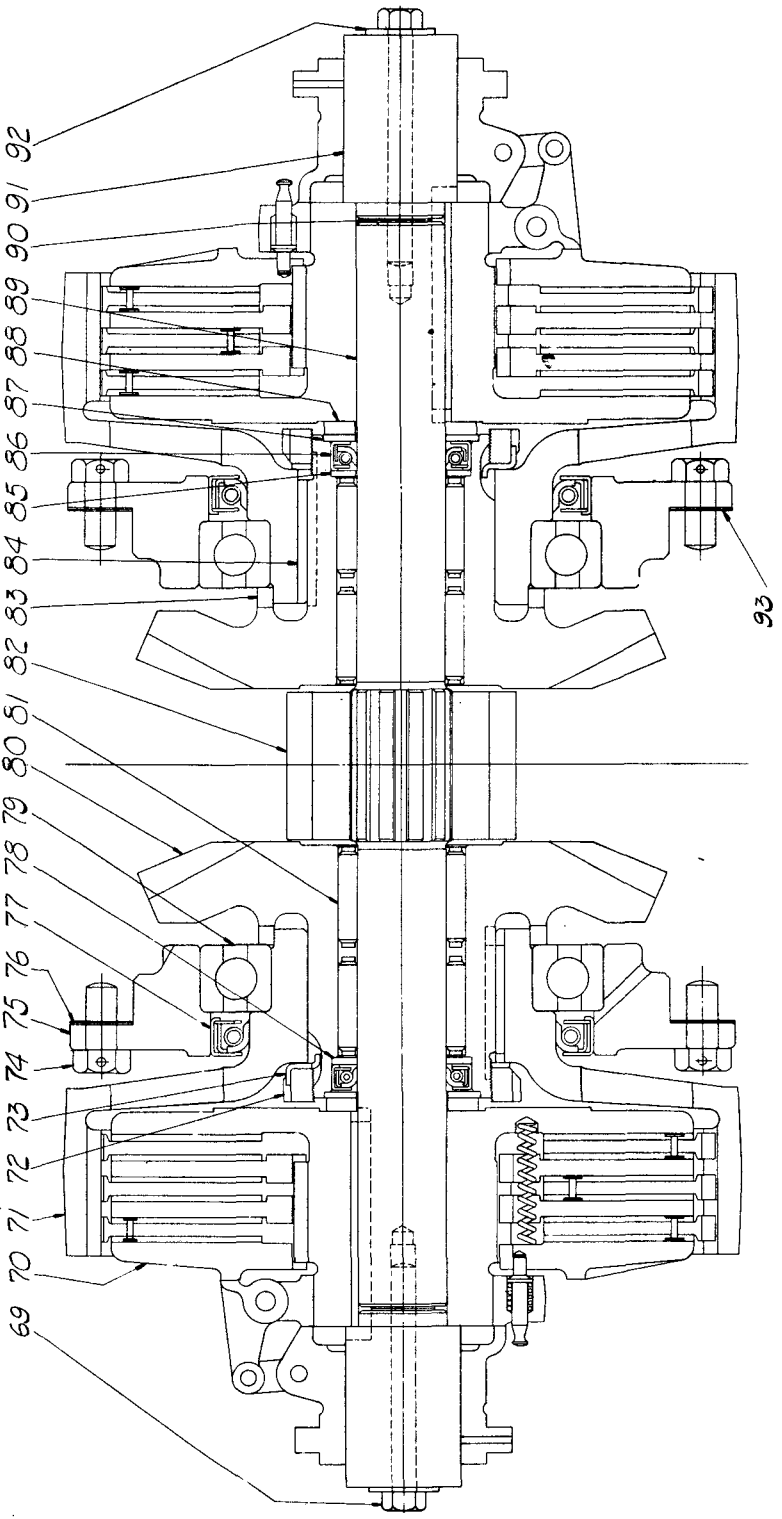


Fig. 23 - First Countershaft & Clutches

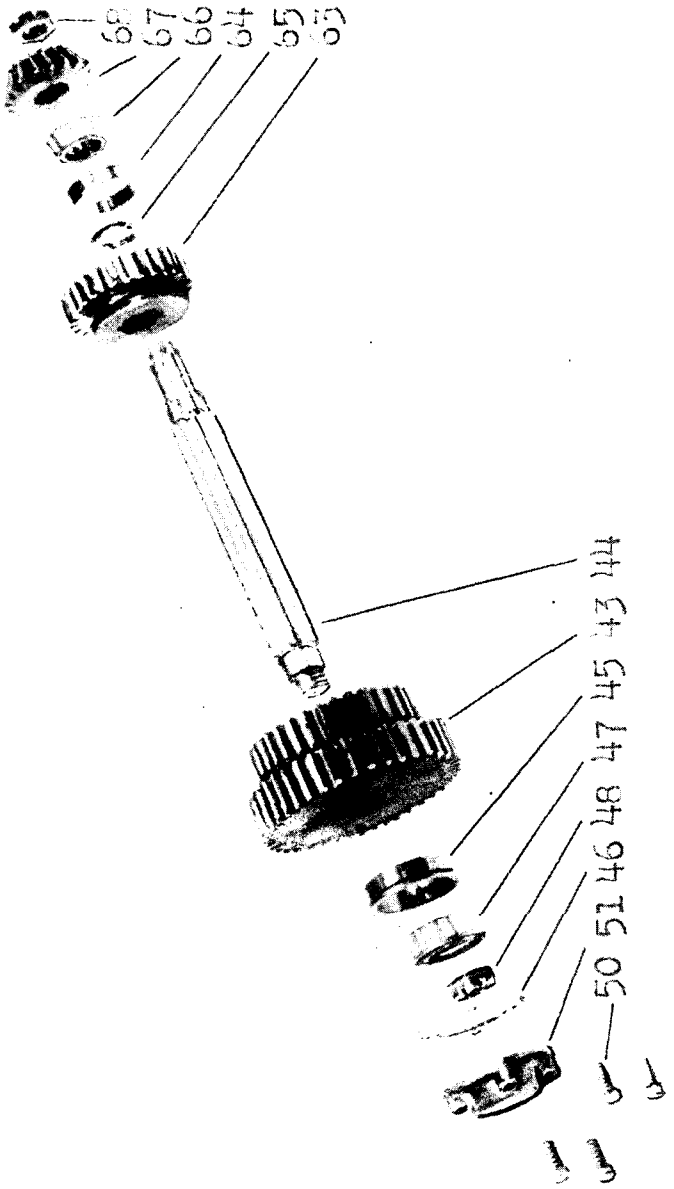


Fig. 24 - -Back Gear Shaft

4. Remove washers 85, 87 and 88 as well as oil seal #86.

Check gears, bearings and oil seal for wear or damage. The oil seal is very important and should be replaced if it shows slight signs of wear.

NOTE: In reassembly the oil seal and washers must be replaced on the shaft after both bevel gear and drum assemblies have been assembled on the shaft and tightened to the transmission case. These seals cannot be placed in the housing prior to assembly owing to the fact that they would be damaged by shoving the shaft through the seal.

Bearing adjustment is made by adding or removing shims #93.

F. REMOVAL OF BACK GEAR SHAFT (Figs. 19 and 24)

1. Remove capscrews #50, cap #51 and gasket #47.
2. Remove nut #48 from front end of shaft and drive shaft out of bearing race #47 being careful not to damage threads.
3. After shaft has been driven from bearing, pull shaft out of gears #43 and #63 and remove.
4. Remove gears from transmission on shaft as mentioned above and note their relative location on the shaft.
5. Bearing cups #45 and #64 may be pressed out of case.
6. Remove nut #68 and Bevel pinion #67 which is on a spline.
7. Bearing cone can now be pressed from shaft.

Check all bearings and races for wear or pitts. Check condition of gears and shaft and replace if necessary.

Reassemble in reverse of above outline. Nut 48 should not be pulled too tight as this acts as a bearing adjustment. Bearings are adjusted to a point that will allow the shaft and gears to revolve about 1-1/2 turns when given a quick spin by hand.

G. REMOVAL OF MASTER CLUTCH SHAFT (Fig. 25 and 26)

1. Remove master clutch #1.
2. Remove shift fork #9 and shaft #8.
3. Remove capscrews #10 and pull housing #15 from shaft. Be sure and remove shims #13 as the same number must be replaced when assembling.
4. Pull clutch shaft and gear assembly from front of transmission.
5. Bearing cones #18 and #27 can now be removed from the shaft as well as gears #20, #23 and #26. Notice spacer #24 between gears #23 and #26.
6. Oil seal #16 and bearing race #17 can be pressed out of housing. Bearing cup #28 can be driven from transmission case.

Note location of shifter bracket #12 when it is being removed.

Check fork for wear, also key and keyway. Inspect gears, shaft and bearings for wear and be sure they are in good condition. Replace all worn parts. Check the oil seal carefully to be sure it does not leak.

REASSEMBLY

Proceed in reverse order of disassembly. Be sure all bearing cups are properly seated. Oil seal #16 should be placed in the housing after the shaft and Housing #15 are on the transmission. Shims

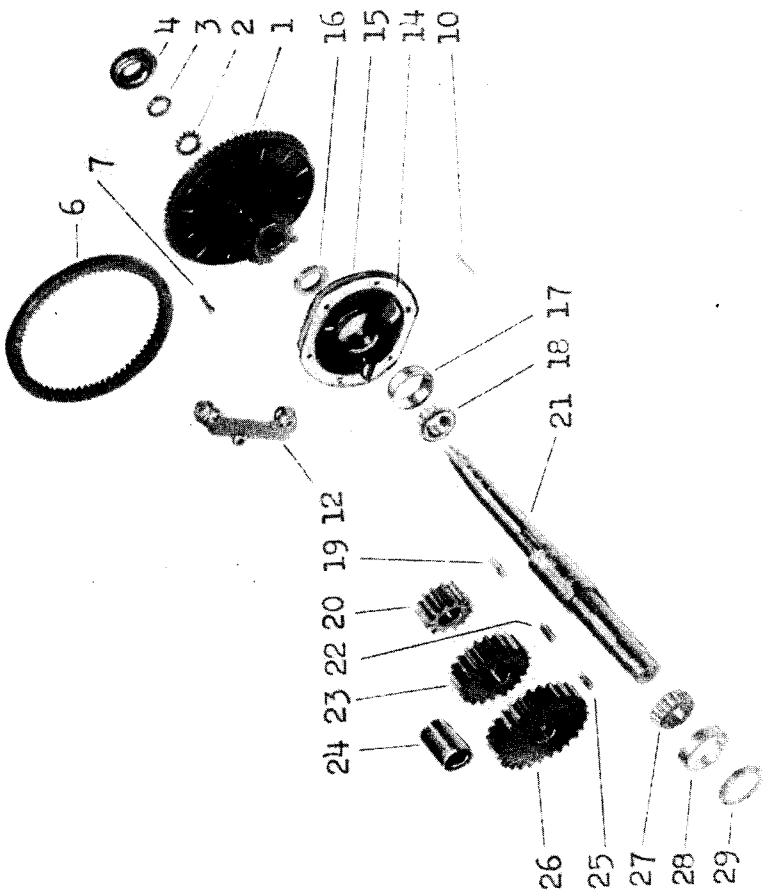


Fig. 25--Master Clutch Shaft

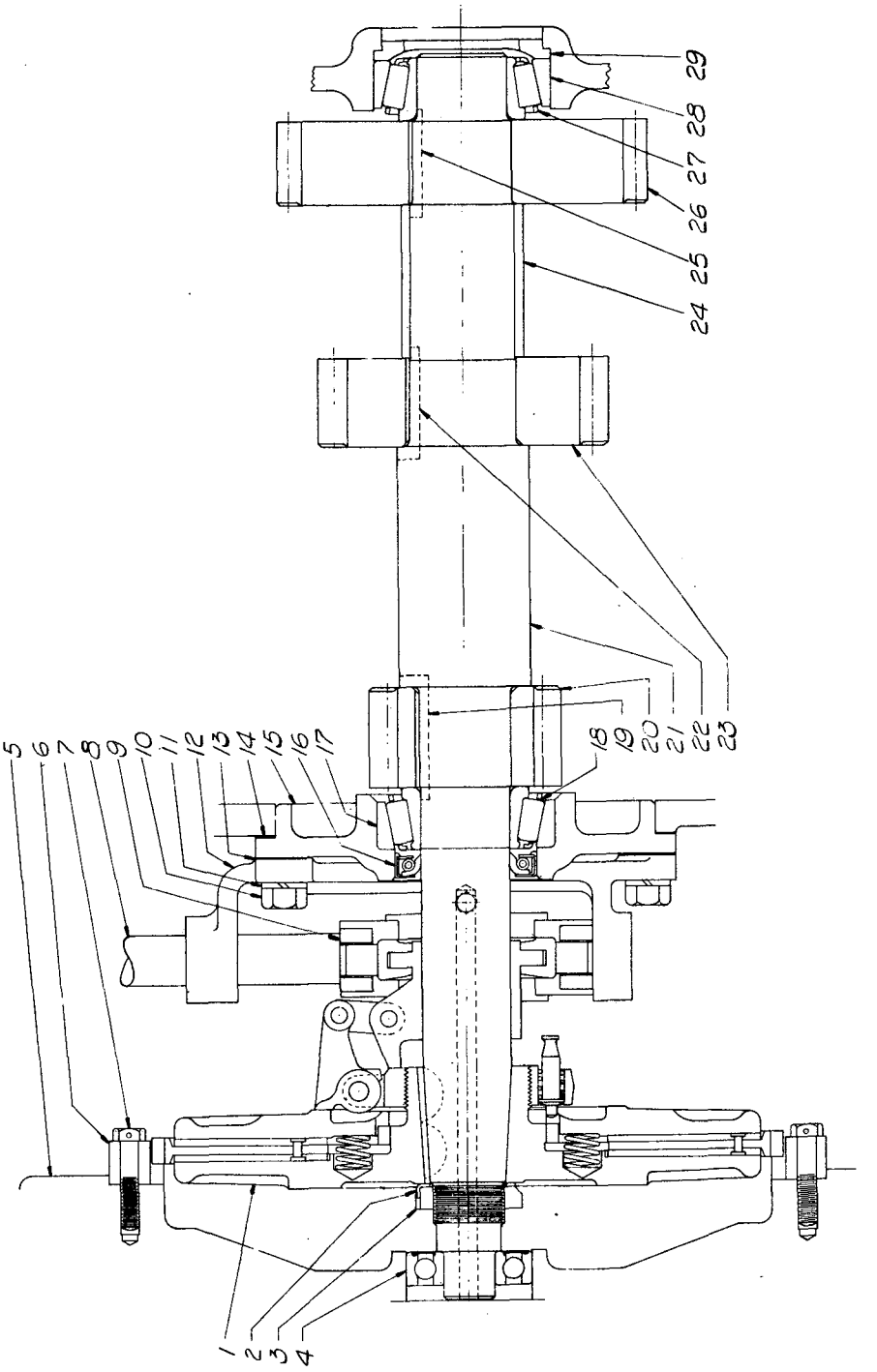


Fig. 26--Master Clutch Shaft

#13 are for bearing adjustment of the clutch shaft bearings. To properly adjust the bearings tighten capscrews #10 and turn shaft. These bearings should not be too tight. Tighten just enough to avoid thrust and spin shaft by hand. If it revolves about five turns and there is no thrust on the bearings the adjustment is correct.

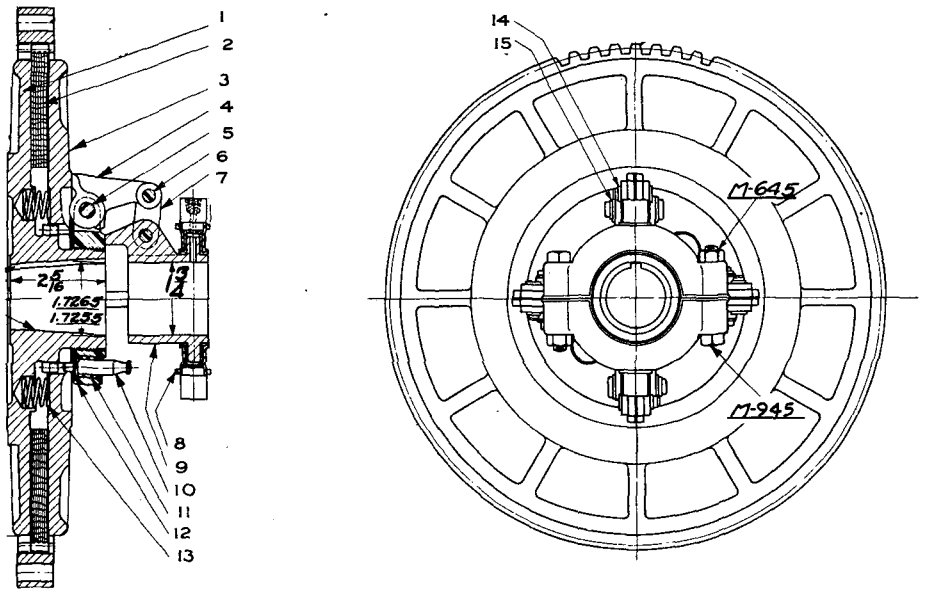


Fig. 27 - Master Clutch

MASTER CLUTCH (Fig. 27)

REMOVAL - Nut #3 is locked by washer #2. Both of these parts should be removed, after which the master clutch may be pulled from the tapered clutch shaft.

DISASSEMBLY

1. Pull pin #10 and while holding it in this unlocked position turn adjusting nut to left until it is released from the threads on the hub and back plate #1.
2. The parts which have now been removed may be taken apart by removing pins #5 and #6 and the bolts in collar #8.
3. Lift plate #3 from hub and back plate.
4. Remove disc - which is in 2 halves.
5. Remove six springs #13.

Check collar for wear, check pins and linkage for play. Check discs for wear and replace any worn parts. Never replace only part of the linkage, always replace all of these parts otherwise the clutch will not engage evenly.

REASSEMBLY

Proceed in the reverse order being sure the six springs are in proper position and that the teeth on the inside of plate #3 fit on the teeth of the hub and back plate.

MASTER CLUTCH DISC REPLACEMENT

It is not necessary to remove the transmission or master clutch to replace driving discs. This can be accomplished by removing the clutch cover plate on the transmission and then removing the eight capscrews which hold the driving ring to the flywheel. With the clutch control in release position the plate which is in two halves can be removed as shown in Figure 28 and new discs inserted.

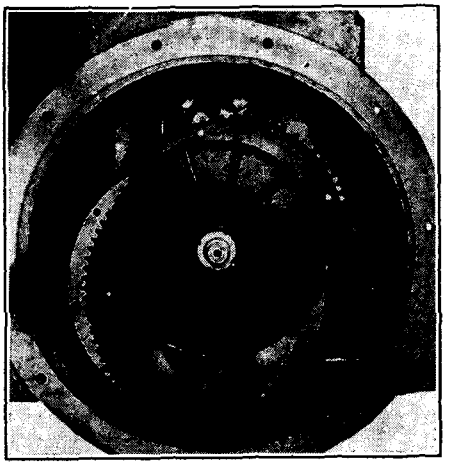


Fig. 28-Replacing Clutch Disc

MASTER CLUTCH ADJUSTMENT (Figure 27)

To adjust the master clutch remove the cover plate from the top of the transmission case and pull out on adjusting lock pin #10 and turn collar to the right until the pin drops into the next hole. Turn to right to tighten and left to loosen. Each hole adjusts the clutch about .005" closer together. Make adjustment with clutch disengaged.

Do not allow the clutch to slip as slipping causes wear. Tighten so that a snap is felt on the clutch lever when it is engaged.

FORWARD AND REVERSE CLUTCHES (Figure 29)

REMOVAL

1. Remove cap screw #69 from end of countershaft and pull short shaft out of collar and sliding sleeve.
2. Pull out on lock pin and while holding in this position turn adjusting nut and collar as one assembly to the left until it can be removed.
3. Remove floating plate and six pressure springs.
4. There are three driving plates and two center plates in each of these clutches. The driving plate can now be removed followed by the first center plate. The balance of the plates are removed in the same order.

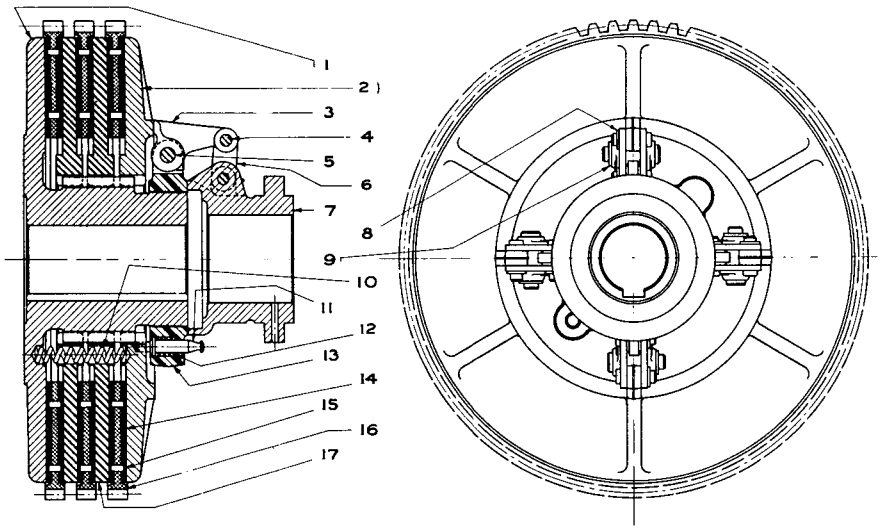


Fig. 29 - Forward and Reverse Clutch

5. At this point new discs can be placed on the Driving plates and reassembled.
6. Remove hub and back plate with a puller. This plate is keyed to the shaft.

DISASSEMBLY OF FORWARD AND REVERSE CLUTCH

After the clutch has been removed as above the only parts remaining assembled are the adjusting nut and sliding sleeve which may be dismantled by removing pins #4 and #5.

INSPECTION

Check collar for wear, check pins and linkage for play, check discs for wear and replace any worn parts. Never replace only part of the linkage, always replace all of these parts otherwise the clutch will not engage evenly.

ASSEMBLY OF FORWARD AND REVERSE CLUTCH

Reassemble in reverse order and be sure the six pressure springs are in place. In replacing the short shaft #91 be sure the gasket #90 is in place.

ADJUSTMENT OF FORWARD AND REVERSE CLUTCH (Figure 29)

To adjust the forward and reverse clutches release clutch and pull out on lock pin #11 on the adjusting nut and turn the adjusting nut and sleeve assembly to the right to tighten. Do not allow the clutches to become loose and slip. Keep them tight enough so that you can feel a snap on the lever when the clutch is engaged.

BRAKE

BRAKE ADJUSTMENT (Figure 30)

The brake is adjusted by nuts #48 at the brake band. Turn nuts to right to tighten and to left to loosen the brake.

BRAKE BAND REMOVAL

1. Remove nuts #48 and washer #47.
2. Pull brake band end #46 down off of rod #44.
3. Remove cotter pin #34 and pin #35.
4. Slide brake band to right and remove.

INSPECTION

Inspect lining for wear. Look for loose rivets in the lining and replace if necessary.

REPLACING BRAKE LINING

To reline brake remove all rivets #30, replace old lining and replace all rivets #30. Reassemble on roller in reverse of removal.

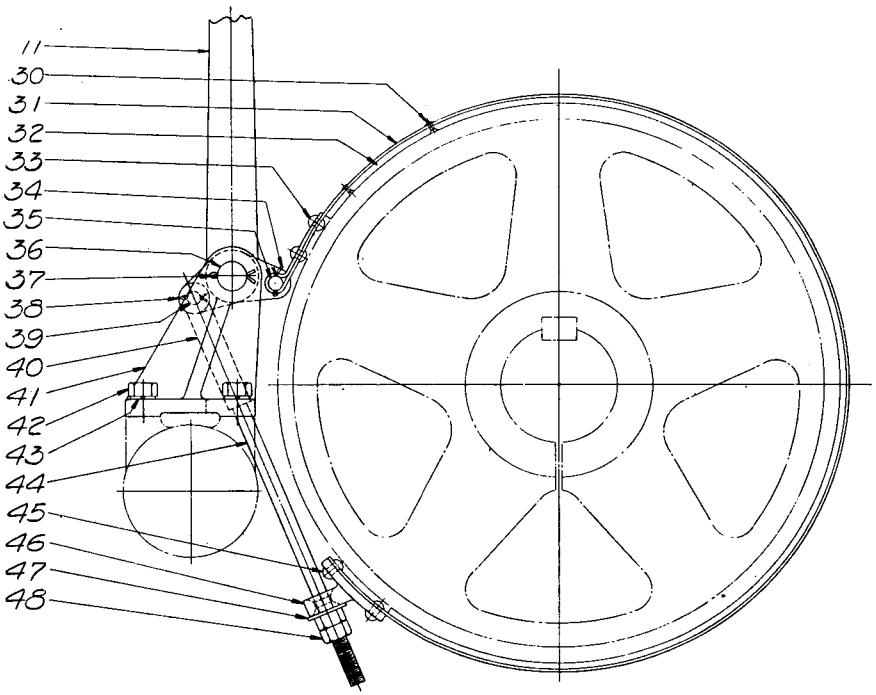
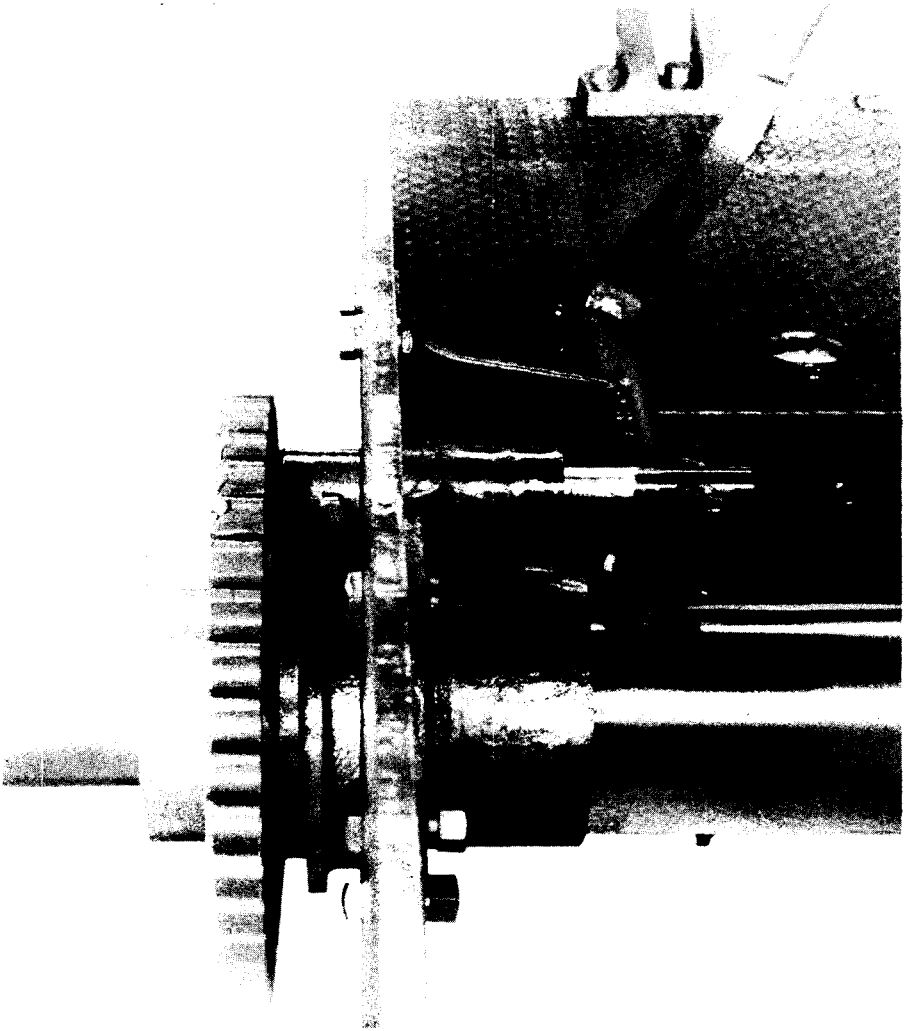


Fig. 30 - Brake Parts

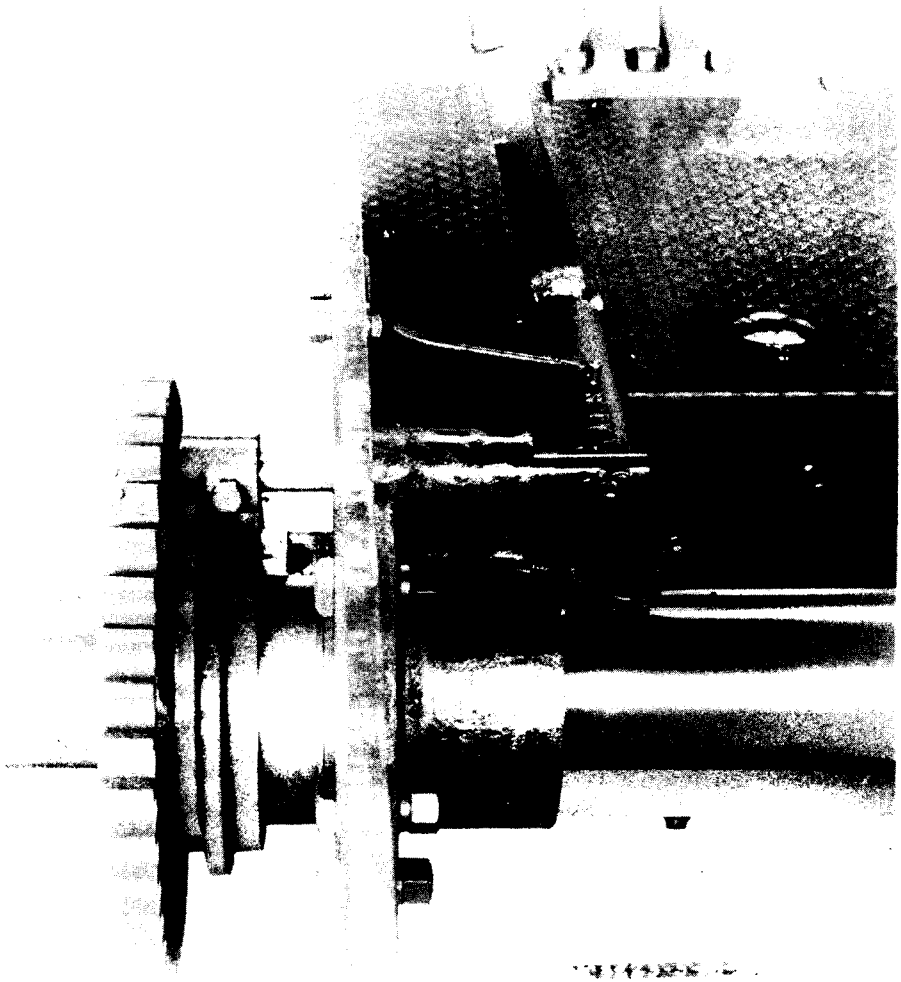
INDEX TO REAR ROLL, DIFFERENTIAL LOCK AND REAR AXLE

5



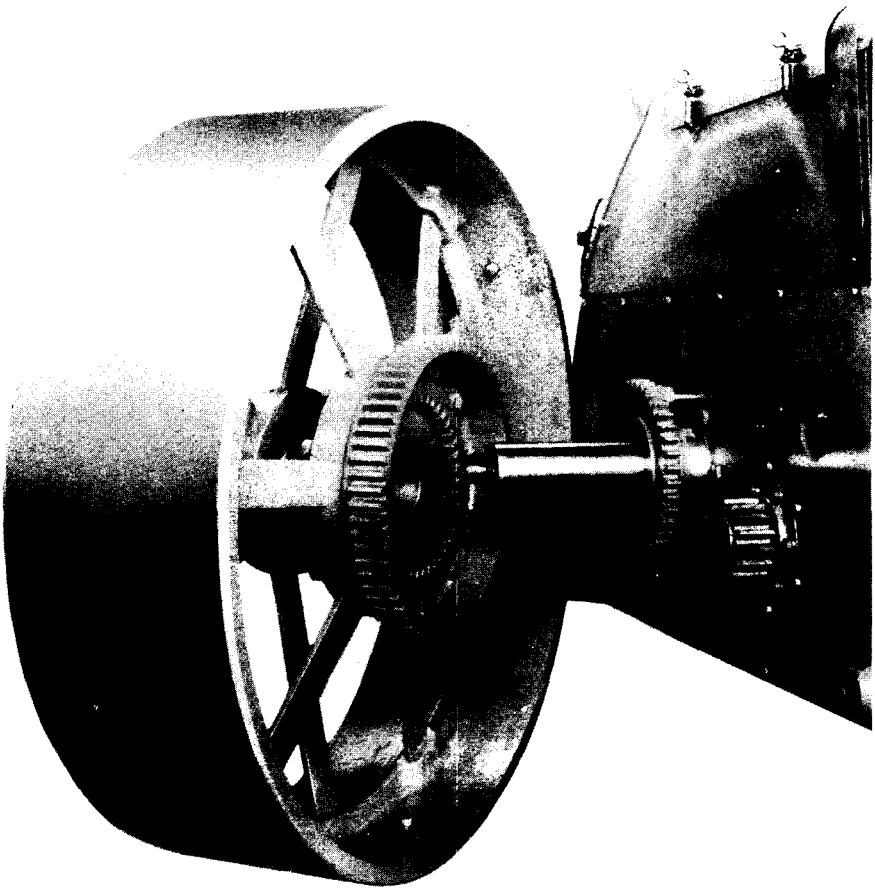
Differential Lock (Unlocked)

Fig. 31



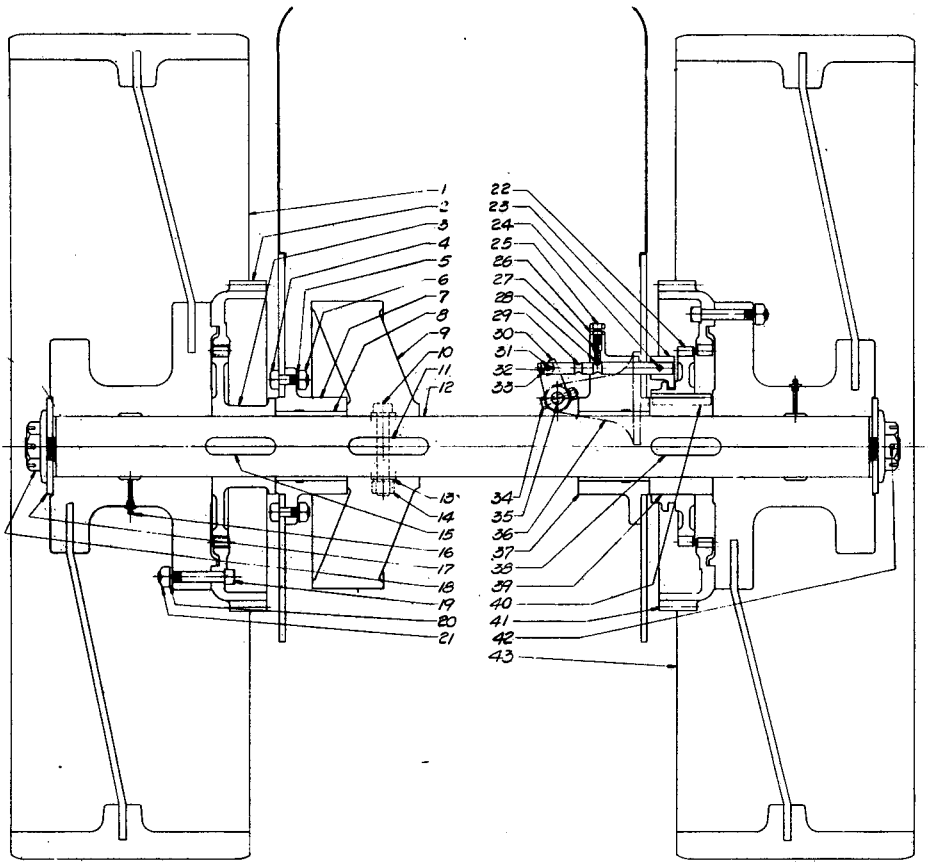
Differential Lock (Locked

Fig. 32



Removing Rear Roll

Fig. 33



Rear Rolls - Axle and Differential Lock Parts

Fig. 34

REAR ROLL REMOVAL (Figs. 33 and 34)

1. Jack up frame and securely block to carry weight.
2. Remove cotter pin #42 and nut #18 followed by washer #17.
3. Remove gear guard housing the gear #41 and pinion.
4. Attach chain hoist to roll and balance weight as near as possible.
5. Use Crow bars between frame and roll or floor and roll to slide roll from axle.

INSPECTION

Inspect drive gear for wear and be sure all bolts are tight. If gear has worn replace.

REASSEMBLY

Proceed in reverse of disassembly and tighten axle nut securely and insert cotter pin. Lubricate thoroughly.

DIFFERENTIAL LOCK REMOVAL (Figs. 31, 32 and 34)

After both rolls have been removed proceed as follows:

1. Remove bolt #24 - Gear #22 and yoke #23 can now be removed as well as key #40.
2. Remove bolt #34. Pull out shaft #35 at the same time remove yoke #30.
3. Loosen lock nut #26 and remove adjusting screw #25 and spring #27. Pull out shaft #29 being very careful not to lose ball #28 as it will fall out at this time.

INSPECTION

Check for wear in linkage. Check teeth in lock gear. Inspect poppet and shaft for wear, also shaft in the bracket for wear. Replace worn parts.

REASSEMBLY

The differential lock is replaced in the reverse procedure except replace ball #28 before inserting spring #27. This should be done after shaft #29 is in place.

REMOVAL OF REAR AXLE AND BRAKE DRUM (Fig. 34)

1. Remove #39 spacer and key #38.
2. Loosen nut #14 in brake Drum hub. Drive a wedge into split brake drum hub to loosen same on shaft. Move brake drum away from bearing #7 so that key #11 can be removed.
3. Remove Gear #3 and key #15.
4. Axle can now be driven out of bearings from either end.
   NOTE: If necessary to remove only brake drum, the axle need be driven only far enough out of the one bearing to allow removal of the drum.
5. Axle brackets #7 and #37 can be removed by removing bolts #4 holding the bracket to frame after which bushings #8 can be pressed out and replaced.

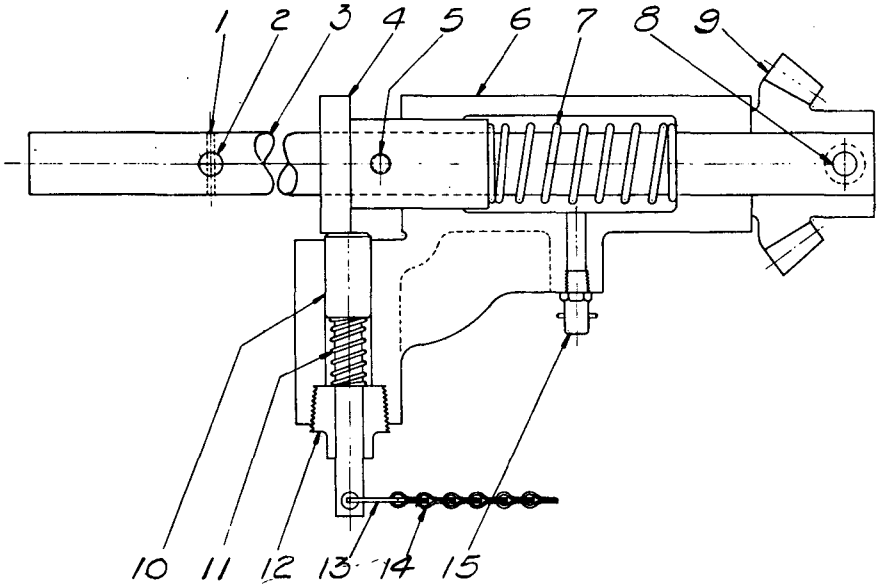
INSPECTION

Check wear on axle bushings and replace if worn. Be sure keys are tight in keyseat.

REASSEMBLY

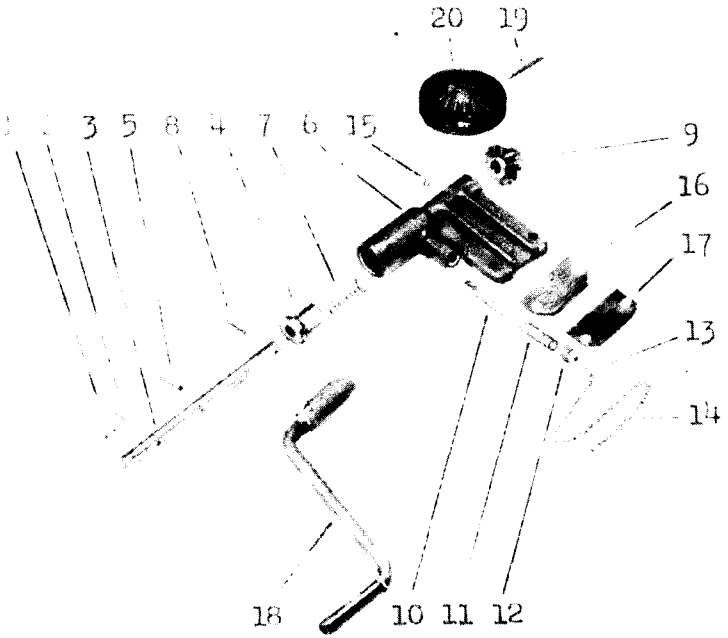
Reverse procedure and be sure all keys are in place and all nuts and bolts securely tightened.

SIDE CRANKING PARTS



Side Crank

Fig. 35



Side Crank

Fig. 36

SIDE CRANKING DEVICE

DISASSEMBLY

1. Remove side cranking bracket and gears from front of engine by removing attaching bolts.
2. Remove cap #12 and pull out spring #11 and plunger #10.
3. Drive rivet #8 out of bevel gear #9 and remove gear.
4. Pull shaft #3 out of bracket with collar #4 attached. Remove spring #7 from bracket.
5. Drive pin #5 out of #4 collar and remove collar from shaft.

Check teeth in cranking pinions for wear. Check shaft in bracket for wear and replace parts if necessary.

ASSEMBLY

To assemble the cranking device proceed in reverse of disassembly and replace in proper position on roller. Note the shims which are under the bracket for proper adjustment.

INDEX

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ENGINE MAINTENANCE MANUAL

INDEX TO MAINTENANCE MANUAL OF ENGINE

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ENGINE REPAIR

REMOVE ENGINE FROM ROLLER - Remove cowl cover and hood sides. Remove radiator and cranking bracket. Disconnect all controls and wires from engine. Loosen and remove bolts holding engine to sub-frame. Remove bolts holding bell housing to transmission. Support engine on chain hoist and remove. The clutch shaft will slide free of the pilot bearing in the flywheel if the motor is moved forward before being lifted from unit.

REMOVE ENGINE AND TRANSMISSION - Proceed as above but do not remove bolts attaching engine bell-housing to transmission. After all controls, etc. have been disconnected from transmission and engine and all bolts holding the above two parts to the sub-frame have been removed, and the drive pinion assemblies are removed, the engine and transmission can be removed as one unit. See Transmission Repair.

DISASSEMBLY

To disassemble engine, remove manifold and carburetor assembly by removing studs which bolt manifold to cylinder block. Place motor on a small low stand or bench in a vertical position resting on the fly wheel housing, see Illustration Fig. 1. Remove oil pan by removing cap screws which bolt oil pan to bottom of block. Remove front gear case cover and accessory drive assembly.

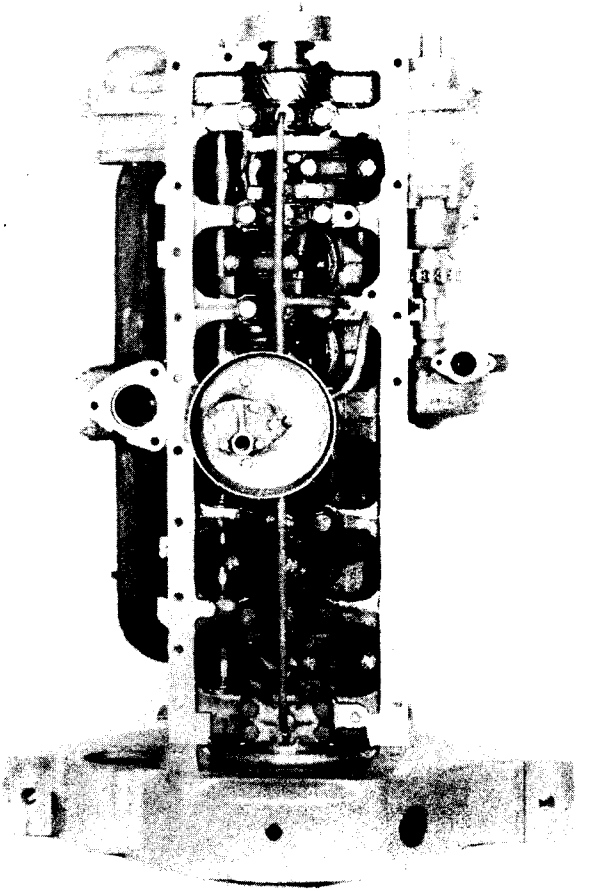


Fig. 1—Engine Pan Removed

REMOVE CRANKSHAFT - To remove the crankshaft it is first necessary to remove the oil pump and oil line which lubricates the crankshaft bearings. Next remove the connecting rod caps by removing cotter pin and connecting rod nut making certain that each connecting rod and cap is numbered as removed so that it may be fitted with its related half of connecting rod when replacing. The crankshaft can now be lifted from the block.

REMOVE CYLINDER HEAD - Next remove cylinder head bolts and cylinder head. Remove old gasket and clean face of block.

REMOVE PISTONS - Remove pistons by pushing up and out through the top of the block. Do not attempt to remove through the bottom. Remove valves and tappets. (See instructions under valves and tappets for removal).

OIL PUMP - The oil pump is easily removed for repair or inspection after the oil pan is removed from the engine. Disassemble by the following procedure: Remove pin through hub of spiral driving gear (this is a straight pin and can be driven out either way), pull or drive spiral gear off shaft (do not attempt to push shaft down through as the Woodruff key will damage the bushing.)

After gear is removed, remove the Woodruff key. Remove bottom cover; the shaft with lower pumping gear can now be withdrawn from the pump. To remove the pumping gear from either the main or idler shaft, the gear must be pressed onto the shaft about 3/8 inch (9.53 MM) making the lock ring accessible. After removing the snap ring from groove in the shaft the gear can then be pressed off. To reassemble reverse the disassembly procedure.

PISTON REFITTING

In fitting new or oversize pistons and rings to reground or honed cylinder bores the clearances should be carefully controlled. Pistons should be tried in the bore for fit and if a true fit is not obtainable cylinder should be measured with internal micrometer to determine amount of cylinder wall to be removed to make cylinder true. If the cylinder wall is not out of round too much it is possible to correct by the use of a mechanical hone. This method is usually effective when replacing pistons in the first two oversizes .005 inch (.127 MM) and .010 inch (.254 MM). If it is necessary to replace the piston in a larger oversize it will be necessary to rebore the cylinder wall with a mechanical boring bar. Pistons are available in the above-mentioned oversizes and .015 inch (.381 MM) and .020 inch (.508 MM). When reboring the cylinder it should be bored to these oversizes.

When fitting the aluminum pistons it is essential that the split side of the piston be assembled on the left or side of cylinder wall opposite the camshaft. This is necessary due to the thrust side or camshaft side having more bearing space than the split side.

Aluminum pistons are usually marked with the word "front" on top of the piston and when piston is installed the word "front" to the front side of the engine automatically puts the split skirt side in the proper place.

When measuring pistons for fit in cylinder, it is recommended that a feeler ribbon-type gauge be used, see Illustration Fig. 2, a gauge with a

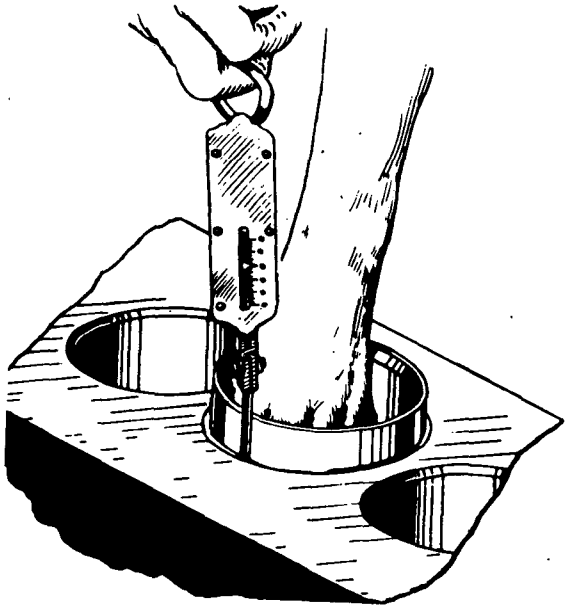


Fig. 2--Measuring Piston Fit

minimum thickness corresponding to the minimum clearance desired as shown in the Table of Engine Clearances. A slight drag the equivalent of approximately two foot pounds should be felt when pushing piston through the bore with the feeler ribbon gauge.

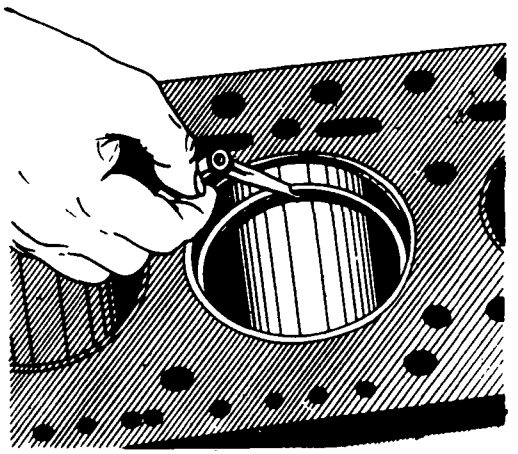


Fig. 3--Measuring Piston Ring Gap

PISTON PINS - Piston pins are clamped in the upper end of the rod and must have a proper working fit in the piston. When fitting pins in aluminum piston (aluminum pistons have no bushings), a better fit can be obtained if the piston is heated for a few minutes in boiling water which will cause the piston to expand, allowing a closer fit of the pin to be made. (Refer to Table of Clearances for proper fit.) Turn the notch in the pin in line with the clamp screw hole in the connecting rod to prevent damage to the threads of the screw as it is screwed into place. Be sure the screw is drawn tight and locked in the same manner as when removed. Connecting rods using the clamp screw method of fitting piston pin to connecting rod do not use a bushing in the connecting rod and do not revolve. For pin clearance on aluminum pistons see Table of Engine Clearances.

PISTON RINGS - When installing new piston rings each ring must be tried in the cylinder bore for fit before assembling to the piston. These should have gap of .015 inch (.381 MM) to .020 inch (.508 MM), see Illustration Fig. 3 If necessary to increase the gap by filing the ends, be sure the ends are parallel. The use of a ring filing block is recommended if this tool is available. See Illustration Fig. 4 for method of hand filing.

Each new ring should be tried in the piston ring groove (see Illustration Fig. 5) to be sure of

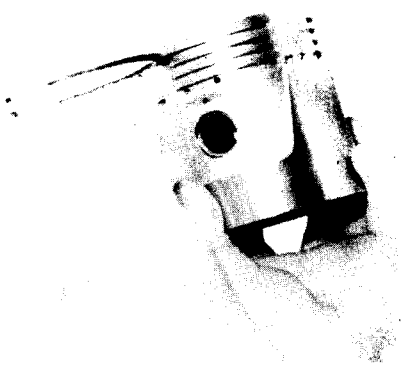


Fig. 5--Checking Piston Rings

Fig. 4--Filing Piston Rings

an accurate fit. In case the rings do not fit smoothly in the ring grooves of the piston, it is recommended that they be lapped slightly with a fine sheet of emery using a light uniform pressure for this operation. After rings, pins, and pistons have all been fitted individually to the cylinder walls reinstall same in cylinders and proceed with the fitting of the connecting rods and bearings.

There are two types of bearings used. Bearings on the WXC-3 engine are babbited type while those on the WXLC-3 engine are shell type, however, the same adjustments will apply. These bearings are available in the following undersizes:

.020 inch (.508 MM)
.040 inch (1.016 MM)
.060 inch (1.52 MM)

The size to be used when replacing is to be determined by the size of the crankshaft journal, the standard size being 2-5/8 inches (6.67 CM) diameter. In the event it is necessary to grind the journals of this crankshaft they should be ground in sizes of .020 inch, .040 inch, .060 inch undersize. It is recommended that connecting rod bearings be replaced in complete sets when replacing.

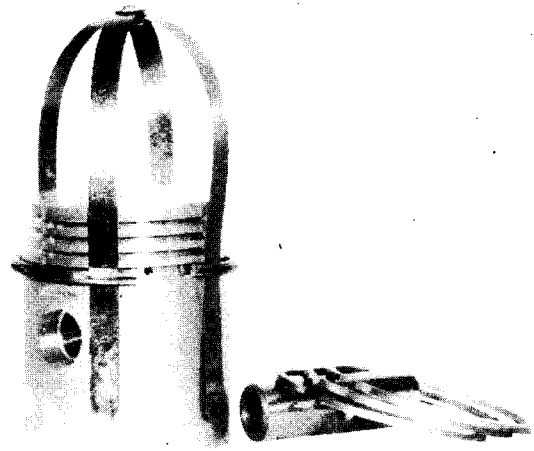


Fig. 6--Placing Rings on Piston

ADJUST BEARINGS - Adjustment of bearings on WXC-3 and WXLC-3 engines made necessary due to excessive clearance caused by wear is made by removing shims from under the connecting rod and main bearing caps. Bearings should never be adjusted so tightly that they bind or drag.

A certain minimum clearance is required at all times to provided an adequate oil film between shaft and bearing and insure a free running engine. These bearings are of ample proportions and the full pressure lubrication system employed will give long lasting bearing service provided they are not fitted too tightly.

The best method is to remove just enough shims from each bearing in turn until shaft can be turned only with considerable effort, then adjust each bearing individually replacing the proper amount of shims needed to obtain desired fit in each bearing.

Both the connecting rod and main bearing shims are available in .002 inch (.051 MM) and .003 inch (.076 MM) sizes.

While testing each bearing for tightness the other bearings should be comparatively loose and after all bearings are adjusted and tightened it should be possible to turn the engine shaft readily with the crank. When trial shimming of bearings is being done and a .001 inch (.025 MM) difference is desired this can be obtained by interchanging a .002 inch (.051 MM) shim for a .003 inch (.076 MM) one.

VALVES

REMOVE VALVES - To remove the valve for grinding remove valve inspection plate and tappet cluster assembly. Now with tappet cover removed a conventional type of valve compressor or lifter can be used to compress the valve spring so that the valve spring seat lock can be removed, after which the valve can be lifted through top of block and spring and seat be removed through the side. Next, clean all carbon from cylinder heads, piston heads, valve seats, valve guides, and valves.

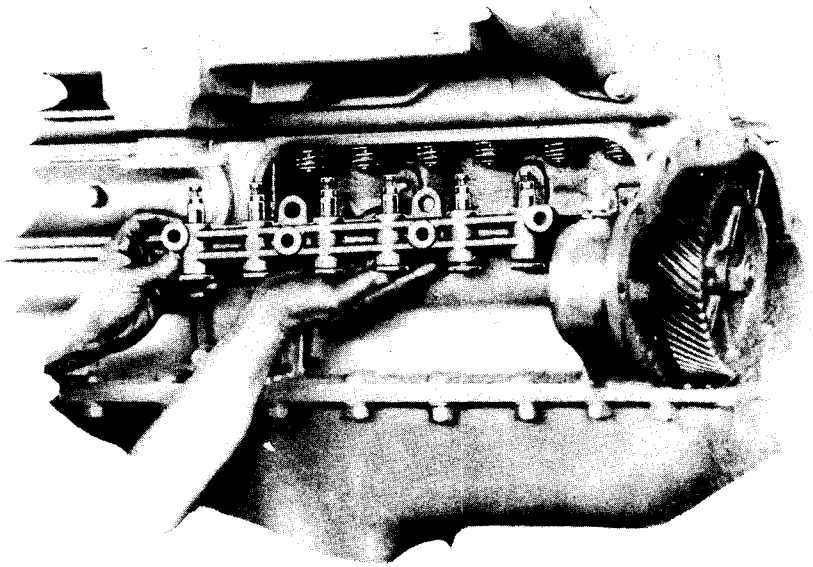


Fig. 7--Valve Tappet Cluster Removal

After disassembly, first inspect all valves after they have been cleaned free of carbon and other foreign matter for signs of excessive wear or a burned condition. If this condition is not too bad, it will be possible to reface the valve on a valve face grinder. Care must be taken that the face of the valve is ground on the correct angle. This angle in both the exhaust and intake is 30°.

The valve stem end should also be reground on a valve grinder to relieve any worn spots that may appear due to wear or other conditions.

GRINDING AND LAPPING - When grinding or lapping valve into valve seat be sure that the tappet is in such a position that it does not hold the valve off the seat. Use a light coil spring under each valve as it is being lapped in to raise valve off its seat during this process. Use a medium grade grinding compound and a very light pressure to rotate the valve only part of a turn with a screwdriver or other suitable tool before raising off its seat and rotating while off seat to a new position before again lightly bringing it against the seat for another part of a turn. Avoid a continuous round and round motion that would cut grooves in the valve or seat.

After the process of lapping has been repeated until a bright silver-like band of uniform width is produced on valve and seat, then clean off all traces of the compound and test each valve for a tight seat by making pencil marks across the face of the valve at short intervals and then rotate the

valve against its seat for part of a turn with a firm pressure and again lift out and observe if the pencil marks are all rubbed out on the contact surface. If not, regrind until this test shows a gas tight mating of valve to seat.

ADJUST TAPPETS - After valves have been reseated adjust tappets by using the following procedure. Use a thin open-end wrench with 1/2 inch (12.70 MM) opening. Adjust clearance by turning the adjusting nut at top of the tappet. Valve clearances are stamped on the name plate of the engine on the left hand side.

Caution should be used when replacing valves in engine that intake and exhaust valves do not become interchanged, as they are of different diameter and will not alternate in valve seats.

VALVE GUIDES - Inspect the valve guides for excessive wear, refer to Table of Clearances. If the guides are to be removed this should be done before any work is done on the valve seat. This will insure the seats being finished square with respect to the new guides. The exhaust guides usually show greater wear. To allow space in the valve chamber for driving out old guides run the tappet adjusting screw all the way down and crank engine so tappet is on low part of cam. To drive out guides use a drift punch 5/8 inch (15.88 MM) in diameter with a 3/8 inch (9.53 MM) pilot. Break off lower end of guide if it comes in contact with tappet before top is out of block. Drive new guides to same depth location as old guides. After new guides are driven in, they must be reamed to size on the inside diameter to correct any squeezing in or possible distortion due to being driven into place. This is important in order to obtain proper fit and proper clearance.

VALVE TIMING - The proper timing of valves depends on the proper meshing of the camshaft gear with the crankshaft gear. These gears are marked for this purpose with a prick punch mark near the end of a tooth on one and at the base of a tooth space on the other. The mark in each instance is on the front face of the gear. When these marks line up the valve timing is correct. The punch mark for timing on a new gear has the same position relative to the keyway as on the old gear. Therefore one or more new gears can be installed and the valves put in correct timing by simply meshing the gears so the marks line up.

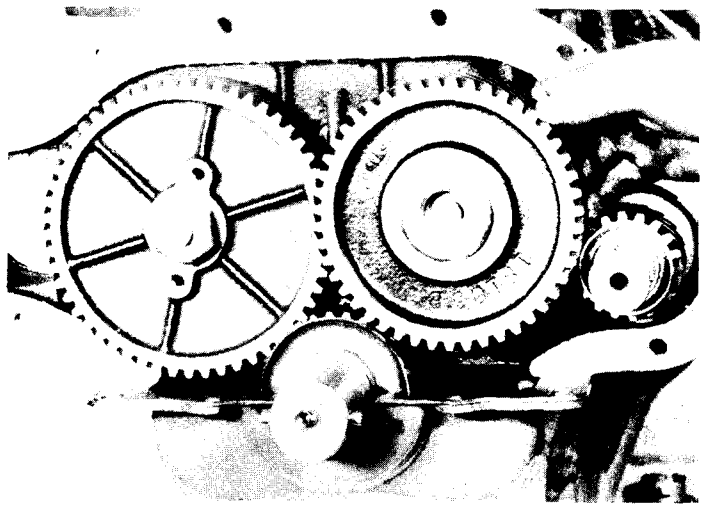


Fig. 8--Timing Gears

The valve timing with respect to crankshaft or flywheel travel in degrees and minutes is as follows: Intake opens 5 degrees past top center; intake closes at 55 degrees past bottom center; exhaust opens 45 degrees before bottom center and closes at 15 degrees before top center. When checking valve clearance use clearances stamped on motor.

TAPPETS - The valve tappets are carried in two clusters each containing six tappets. The cluster acts as a bracket and guide and can be removed by first removing the valve side inspection plate and then removing bolts which attach cluster to block. Tappets can be removed from cluster by placing cluster in vise and lightly tapping the tappets out. It is recommended that a lead or wood hammer be used when tapping out tappets so as to avoid damaging them.

CAMSHAFT

TO REMOVE THE CAMSHAFT - The camshaft can be removed very easily when the motor is disassembled being only necessary to pull out the gear and shaft as a unit rotating the shaft so that the cams will clear. It is also necessary to disconnect the oil pump as the driving gear of same operates on the cam. It is necessary that push rods or tappets be removed for this operation. When replacing camshaft when motor is not disassembled, it is necessary to remove the front gear case cover and the large fiber washer between cam gear and block, in addition to the above instructions.

CAMSHAFT BEARINGS - The four camshaft bearings in which the camshaft operates can be removed by driving or pressing out the old bearings and pressing in new bearings. It is recommended that these bearings be reamed after the installation if the clearances do not meet the specifications set up for cam bearing clearance in the Table of Engine Clearances, which is from .0015 inch (.0375 MM) minimum to .0025 inch (.064 MM) maximum. A close precision fit being essential to efficient valve operation, care should be exercised when installing these bearings that the proper bearing is used in the proper bearing recess as these bearings are of different sizes.

REPLACE CAM GEAR - The cam gear is attached to the camshaft by pressing gear onto the end of camshaft and is held in place by a nut which screws on the threaded end of the camshaft. To remove, first remove the front gear cover plate by removing screws which hold same to block and prying off with a large screwdriver or similar tool. It is not necessary under normal conditions to remove the camshaft for this operation. When reinstalling the camshaft, place the gear tooth with the punch mark in mesh with the crankshaft gear having a similar punch mark, as this is the means of controlling the valve timing. Replace lock nut, replace cover using a new gasket each time the cover is removed. Adjust end-play by means of the adjusting screw which is located in the gear case cover for this purpose. It is possible to replace the cam gear as often as necessary inasmuch as these gears are punch marked at the same position with relation to the keyway, and should give no trouble when refitting.

CRANKSHAFT

GRIND AND POLISH CRANKSHAFT - Crankshaft journals (or bearing surfaces) for the main bearings and connecting rod bearings often become out of round due to a faulty bearing or other causes, in which case it becomes necessary to regrind or polish the crankshaft journal (or bearing surface) to restore the shaft to a perfect state of roundness. The customary procedure is to grind all journals to the same undersize. This, however, requires special grinding equipment and in the absence of such equipment an individual journal can be

polished by placing in a lathe and polishing with crocus or emery cloth while the shaft is turning in the lathe. However, if the condition of the crankshaft is such that the above methods will not correct it, it is recommended that the shaft be taken to the machine shop for complete regrinding or be replaced.

REPLACE CRANKSHAFT GEAR - This gear differs from the cam gear being held onto the crankshaft by means of the Woodruff key and is pressed on under pressure. If this gear is removed while crankshaft is in motor it requires special pullers to handle the operation. In the absence of such tools it will be necessary to remove the crankshaft from engine and perform this operation on the hydraulic or power press. There is usually very little need for replacing this gear.

CYLINDER

HONING CYLINDER WALLS - In some cases where the wear is not too great it is possible to fit pistons in at least the first oversize without reboring cylinders. In such cases it is necessary that the cylinder walls be trued by means of a cylinder hone, to remove high or uneven spots of the cylinder wall. It is usually best to use a piston that fits a little too tightly and then hone cylinder until the desired clearance between piston and cylinder wall is obtained. If there is a noticeable ring groove at the top of the cylinder (end of piston travel) it should be removed. This can be done by the use of any standard cutter of which many are manufactured for this purpose.

CYLINDER REBORING - To rebore cylinder, all attached removable parts and accessories must first be removed. Make sure that the cylinder block is absolutely clean. Cylinder block should be placed in a motor stand suitable for this operation, in which it can be securely clamped into a firm position. Place boring bar on motor using a boring head or jig whichever is available, set the cutting tool to cut just a few thousandths of an inch under the desired cut, and make a first rough cut, retract the boring bar, inspect the initial cut, and if satisfactory make a second cut using fine cutting tool for a smooth finish on cylinder wall. Clean all abrasive out of block after cutting operation is finished. Next using a power rotating cylinder hone with a very fine cutting stone, hone each cylinder (use of common lard or a vegetable compound is helpful in obtaining a high polished surface). This is essential to the wearing quality of piston rings, as it removes any tool marks in the cylinder walls and greatly assists in the seating and wearing of the piston rings.

To determine the size of the cut to be made by the boring bar, use a pair of inside micrometers, measure the lowest point on the cylinder wall and make the cut a few thousandths of an inch greater than this point. (Example: If there is a low spot in the cylinder wall which would measure .030 inch (.762 MM) more than standard size of the bore, it would be necessary to bore this cylinder approximately .035 inch (.889 MM) oversize to make this cylinder wall true and to regain its original shape. The size of this bore is 4-1/4 inches (10.80 CM).

REASSEMBLE ENGINE

Assemble piston rings and pins to piston. When installing the rings place the back side or side opposite gap in the ring land (groove) of the piston and slowly move the ends into the ring land. After all rings are installed they should be clamped in place on the piston for easy installation in the cylinder.

To install piston pins, clamp piston in vise after first heating in boiling water for a few minutes to expand same. Place upper end of connecting rod in between the two pin bosses on inside of piston and drive pin in pin hole in piston. Make sure the notch in the piston pin lines up with the clamp screw, and tighten clamp screw.

Place piston and rod assembly in cylinder wall. Install connecting rod bearings and adjust as outlined in article titled Bearing Adjustment, after the crankshaft has been installed.

Install crankshaft in position in block, place main bearing liners in position and adjust as outlined in article titled Bearing Adjustment.

Install camshaft by inserting same in hole in front of engine block and push slowly back until it is in place in all bearing ports.

Install oil pump and connect driving gear to camshaft.

Install valves, guides, springs and assemble placing keeper and retaining pin in bottom to hold together. Install push rod cluster and space valves, as outlined in article listed as Tappet Adjustment. Install valve cover plates and gaskets using new gaskets. Make sure there are no oil leaks.

Install oil pan, using new gaskets, and apply gasket cement for a good oil seal. Tighten the cap screws which hold crankcase to block. (Do not tighten bolts all the way down, but tighten each bolt a few turns each until all bolts are tightened to the same pressure.) This assists in obtaining a better fit of the gasket to the block and oil pan.

Install front gear case cover using a new gasket, tighten all bolts to an even pressure. The accessory drive also is installed with the front gear case cover. Tighten the adjusting screw which controls the end thrust of the camshaft at this time. Adjust as outlined in the Table of Clearance.

Install cylinder head using a new gasket and sealing on block with a good gasket cement. When tightening the cylinder head bolts tighten each bolt a few turns until all bolts have been tightened to the same pressure. Never tighten one bolt all the way down before tightening the others as this may ruin the gasket and cause a water leak.

Install spark plugs (clean and space plugs before reinstalling). Set plug gap at .025 inch (.635 MM).

Install engine accessories such as accessory drive, water pump, oil filter and cleaner, carburetor, air filter, fuel pump, differential oil pump, fan and belt and magneto.

Install motor in roller, connect all wiring. Install manifold. Connect fuel lines. Connect differential oil lines. Fill oil pan with new oil. Fill radiator and cooling system with water.

Time magneto according to instructions as set up in the subject titled Magneto. Set magneto points at .015 inch (.381 MM). Pour small amount of oil in each spark plug hole for the purpose of lubricating the upper cylinder wall during the course of breaking in the engine and the seating of the new piston rings. Start engine and run at idle speed (approximately 400 R.P.M.) for one hour. This will assist in running in the new parts which have been installed.

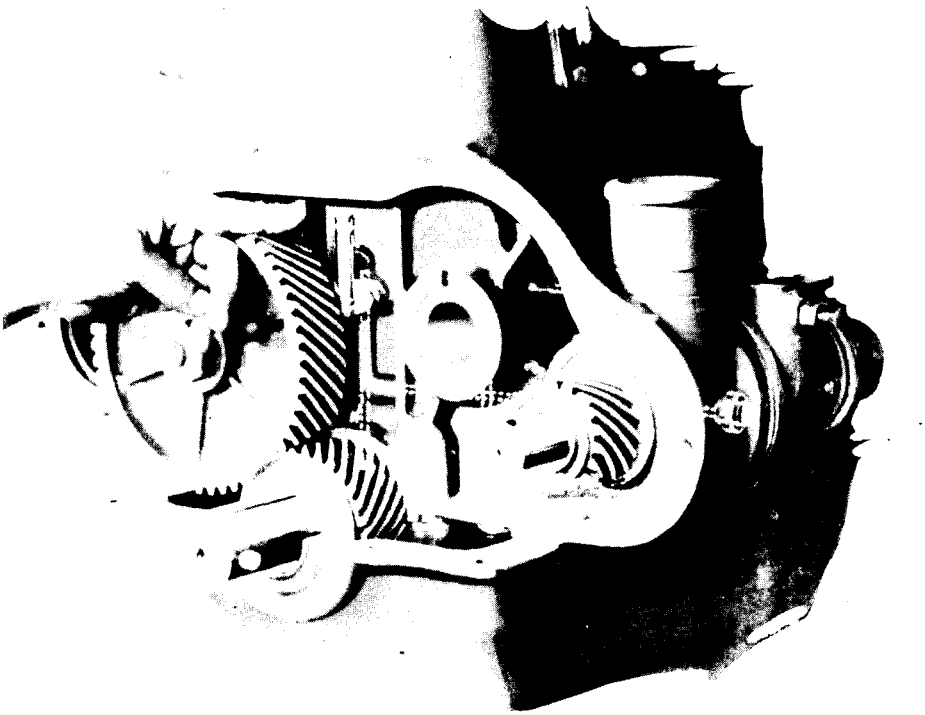


Fig. 9--Oiling System

OIL PRESSURE - The oil pressure is automatically controlled or regulated by compression spring which controls the relief or bypass valve. This device is located in the oil filter and can be adjusted by removing the acorn nut on front of filter and using a screwdriver to turn the adjusting screw. The oil pressure should not be changed or judged to be too high or too low until it is known that the proper weight of oil is being used and the engine is warmed up to a normal operating temperature.

As the bearings become worn, more oil will escape around the bearings into the case and this will lower the oil pressure slightly. It is not advisable to try to correct this slight loss of pressure by an adjustment of the pressure regulator because the extra amount of oil being thrown off by the worn bearings is also over-oiling the cylinder walls.

The oil pressure should not be less than 20 pounds as shown on the gauge when the engine is running at 1600 R.P.M. When the engine is idling at 400 R.P.M. the oil pressure will drop to around 5 or 10 pounds. At speeds above 1600 R.P.M. the pressure may even be above 26 pounds.

If necessary to change oil pressure, this may be accomplished by removing the acorn nut which covers the regulating screw, then loosen the lock nut, then with a screwdriver turn the adjusting screw in or clockwise to increase the pressure, out or counter clockwise to decrease the pressure. After desired pressure is obtained, tighten the lock nut and replace acorn cap nut.

OIL PAN - Whenever the oil pan is removed for any purpose it should be thoroughly washed and cleaned. The oil pump screen should also be removed at this time and cleaned.

When replacing the oil pan, care should be exercised to insure a tight joint at the corner or angle formed by the cylinder block and the bellhousing. After all cap screws are started they should be drawn up gradually and progressively both on the vertical and horizontal screws alike. This will prevent any undue strain on the pan and at the same time insure a safe tight joint and eliminate the possibility of oil leaks.

BELLHOUSING - When installing a new bellhousing or a new rear main bearing the clearance between the oil throw flange on the crankshaft and the chamfer in the bellhousing may have been changed. This clearance as shown at "A" in illustration Fig. 10, must be checked carefully and controlled within the limits of .012 inch (.305 MM) to .025 inch (.635 MM), to prevent oil leaks.

Illustration Fig. 11 shows how to measure this clearance with feeler before the flywheel is installed. This clearance must be uniform all the way around. The crankshaft should be crowded back to the full limit of its end Float before checking the clearance. To prevent oil leaks all possible chance of inteference or rubbing at this point should be eliminated. If necessary to increase the clearance the bellhousing chamfer can be scraped slightly or additional gasket installed between the bellhousing and the crankcase.

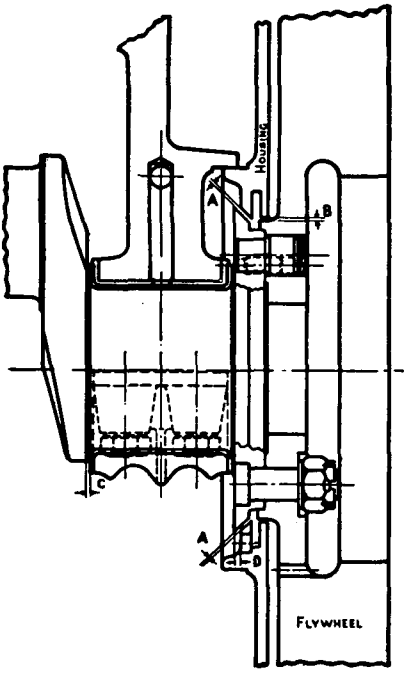


Fig. 10—Checking Flywheel Clearance

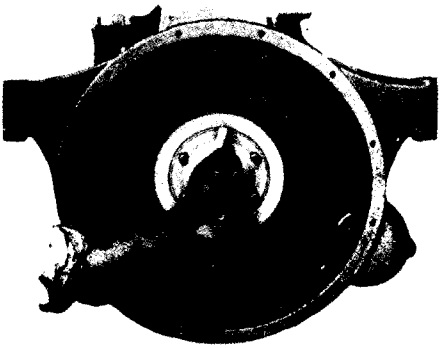


Fig. 11—Checking Flywheel Clearance

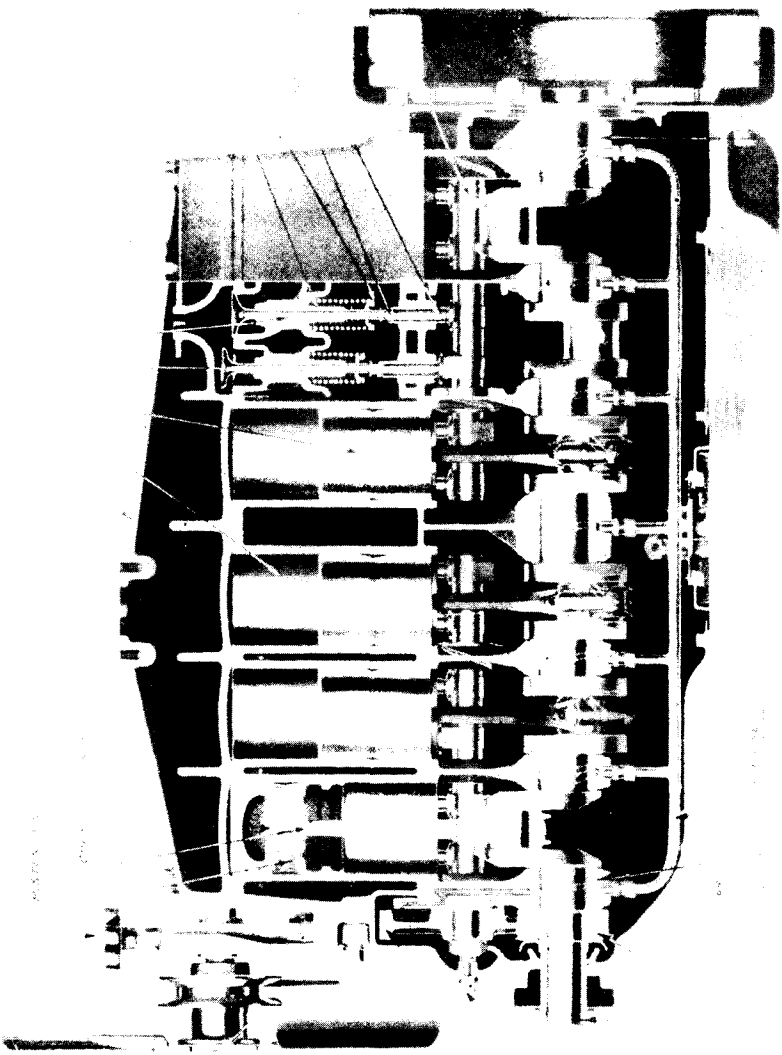


Fig. 12--Engine Cross Section

INDEX TO ENGINE TUNE-UP

ENGINE TUNE-UP

The engine is designed to pull a given load a given distance in a given time, using a given amount of fuel. If it does not do this, the performance is not normal, and should be given a tune-up inspection. The following procedure is recommended:

Remove, clean and inspect spark plugs, check gap.

Test compression.

Test compression with oil seal.

Check magneto (points and timing and condenser).

Inspect fuel pump (check diaphragm), test pressure.

Clean air cleaner.

Clean oil filter.

Check manifold nuts.

Drain and clean carburetor bowl (check float level).

Adjust idle speed, check main jets.

Check and adjust fan belt (should flex one inch when pressure applied to center half way between upper and lower pulley).

Check oil level.

Tighten head nuts.

Start engine and test.

After engine has been run a few minutes, again tighten the spark plugs in cylinder head. Caution should be used that plugs are not tightened too tightly as this will distort the plug case and change the plug gap.

INDEX TO ENGINE TROUBLES

ENGINE TROUBLES

The following suggestions are designed and set forth to assist in locating and remedying engine troubles.

Cause	Remedy
Engine won't start	Engine operation depends on three factors. Unfailing fuel supply, uninterrupted ignition and good compression. The failure of either of the first two will prevent starting or cause the engine to stop. Loss of compression will cause engine to lose power or make it difficult to start, but is not likely to cause sudden stoppage. This being the case if engine has previously been running satisfactorily, refuses to start, or stops with but slight warning and without the noise of a breaking part, it is reasonable to assume that either the fuel supply or the ignition has failed. The first step therefore, should be to determine which of the two systems is at fault.
Fouled or broken spark plug	Clean fouled plug, replace broken plug.
Poor contact in magneto breaker	Clean and adjust for strong contacts of magneto. If points are worn or burned file or hone to a smooth surface, adjust so as to make a clean break. If badly worn or burned, renew. If they become badly burned rapidly, magneto condenser is bad and should be replaced.
Dirt in safety gap of magneto	Remove and clean. NOTE: Keep magneto clean and dry at all times.
Weak spark	Spark points improperly adjusted. Adjust gap to .025 inch (.635 MM). Magneto points improperly adjusted. Adjust to .015 inch (.381 MM). Weak magneto coil, or magneto demagnetized--remagnetize or replace coil assembly.

Cause	Remedy
If engine runs irregularly or misfires	This trouble is usually recognized by the uneven sound of the exhaust, the unevenness occurring at regular intervals or in no consistent way. As a general rule the first condition indicates that the trouble is confined to a single cylinder, or pair of cylinders, except in the case of an over-rich fuel mixture. Irregular operation is due to the same general causes that cause engine to stop, prevent starting, the difference being misfiring does not affect all cylinders.
Poor carburetion	Improper mixture--adjust. Improper float level--correct. Dirt in carburetor--clean.
Water or dirt in fuel system	Drain carburetor and strainer taps, also fuel tank, until clean fuel runs freely. If all drain cocks are opened in the system frequently, this will not occur. Clean fuel filter and sediment bulb on fuel pump. Blow out all fuel lines.
Air leak in intake manifold	Test for leak with oil or with cloth soaked with fuel around joints. Repair leaks, replace gaskets.

INDEX TO ENGINE CLEARANCES AND SPECIFICATIONS

TABLE OF ENGINE CLEARANCES

	MINIMUM		MAXIMUM	
	MM	INCH	INCH	MM
Valve tappet clearance, intake	(.254) (.152)	(.010) (.006)		
Valve tappet clearance, exhaust	(.406) (.254)	(.016) (.010)		
Valve seat face width, intake and exhaust	3.9687	5/32		
Valve seat diameter, intake	20.637	1-13/16		
Valve seat diameter, exhaust	20.002	1-11/16		
Valve stem clearance in guide standard exhaust and intake	.025	.001	.0015	.0375
Valve tappet clearance in guide	.018	.00075	.001	.025
Idler bearing clearance	.025	.001	.0015	.0375
Cam bearing clearance	.0375	.0015	.0025	.064
Crankshaft main bearing clearance	.051	.002	.003	.076
Crankshaft end thrust	.076	.003	.005	.127
Bellhousing on chamfer	.305	.012	.025	.635
Connecting rod bearing	.0375	.0015	.002	.051
Connecting rod end clearance	.127	.005	.010	.254
Accessory or water pump drive shaft	.0375	.0015	.0025	.064
Accessory shaft end clearance	.025	.001	.003	.076
Gear cover clearance around water pump shaft	.152	.006	.015	.38
Gear cover clearance around crankshaft	.203	.008	.015	.38
Oil pan clearance around crankshaft	.203	.008	.015	.38
Accessory gear backlash to idler	.051	.002	.004	.102
Idler gear backlash to cam gear	.025	.001	.002	.051
Camshaft gear backlash to crankgear	.000	.000	.001	.025
Oil pump gear backlash to cam gear	.203	.008	.010	.254
Piston pin clearance--aluminum piston	.003	.0002	.0003	.0075
Piston ring gap	.38	.015	.020	.508
Piston ring to land clearance	.0375	.0015	.003	.076
Piston clearance (aluminum)	.088	.0035	.004	.102

SPECIFICATIONS CHART
WXLC3 ENGINE

Bore and Stroke	4 1/2 inches (10.795 CM) x 4 3/4 inches (12.065 CM)
Number of Cylinders	6
Piston Displacement-cubic inches	404
Firing Order	1-5-3-6-2-4
Piston Pin:	
Diameter	1 1/8 inches (28.58 MM)
Bearing, Length	2 7/16 inches (61.91 MM)
Bearing, Location	In piston
Number of Bearings	2
Crankshaft:	
Number of Bearings	7
Bearing, Diameter	2 5/8 inches (66.68 MM)
Bearings, Length (Front)	1 3/4 inches (44.45 MM)
Bearings, Length (Center)	2 3/4 inches (69.85 MM)
Bearings, Length (Rear)	2 3/4 inches (69.85 MM)
Bearings, Length (Intermediate)	1 1/2 inches (38.10 MM)
Camshaft:	
Timing Gear Face Width	1 1/4 inches (31.75 MM)
Drive	Helical Gear
Number of Bearings	4
Diameter, Front, Center, and Rear	2 1/8 inches (53.98 MM)
Length (Front)	1 5/16 inches (33.34 MM)
Length (Center) 2 and 3	15/16 inches (23.81 MM)
Length (Rear)	1 3/8 inches (34.93 MM)
Location--Right Hand Side Looking at Flywheel	
Connecting Rods:	
Connecting Rod Bearing, Diameter	2 1/4 inches (57.15 MM)
Connecting Rod Bearings, Length	1 1/2 inches (38.10 MM)
Connecting Rod Length, (center to center)	8 7/8 inches (22.54 MM)
General Data:	
Spark Plug Size	7/8 inch (22.23 MM) x 18 SAE
Exhaust Manifold Bore	2 1/2 inches (63.5 MM)
Valve Angle (Seat) intake and exhaust	30^{0}
Cylinder Head:	
Valve Arrangement	L-head
Inlet Valve, Diameter Clearance	1 5/8 inches (41.28 MM)
Exhaust Valve, Diameter Clearance	1 1/2 inches (38.10 MM)
Piston Rings:	
Number above Pin	4
Number below Pin	0
Ring Width--oil	3/16 inch (4.76 MM)
Ring Width--compression	1/8 inch (3.175 MM)

INDEX TO ENGINE ACCESSORIES

ZENITH CARBURETOR SERVICE-MODEL IN156B (OUTLINE 0-6459)
This model carburetor used on rollers up to and including Serial No. USA846038.

To repair the Zenith Model IN156B carburetor properly, we suggest the following routine: (See Figures 13 and 14.)

1. Remove the idling adjusting screw and spring using the fingers only.
2. Remove the fuel screen and plug assembly and gasket using a 5/8" wrench.
3. Remove the channel screw and gasket using a screwdriver.
4. Remove bowl to intake assembly screws, (there are two) and lockwashers using a screwdriver.

   Note: The bowl assembly is known also as the fuel bowl, the lower body, or the throttle body, while the intake assembly is known also as the air intake, the upper body or the cover assembly.

5. Raise the intake assembly slightly and loosen the gasket from the bowl assembly so you may--
6. Lift the intake and gasket clear of the bowl assembly being careful to avoid damaging the idling jet, the float and the pump assembly.
7. Remove the gasket and the pump assembly using the fingers only.
8. Remove the idling jet using C161-25 service tool (or a 5/16" end wrench).
9. Remove the float axle using a screwdriver to push the axle through the slotted end of the bracket and the fingers to remove it the rest of the way to--
10. Remove the float assembly and the fuel valve needle using fingers only.
11. Remove the fuel valve seat using C161-24 service tool or a 1/2" wrench.
12. File off the riveted ends of the air shutter retainer screws then remove them using a screwdriver.
13. Remove air shutter plate.
14. Remove the air shutter shaft thrust collar taper pin using a suitable punch and a light hammer.

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

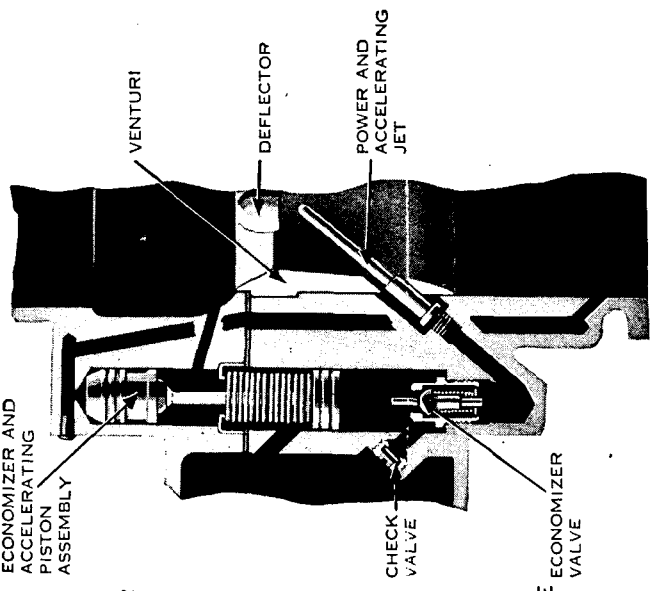


Fig. 14

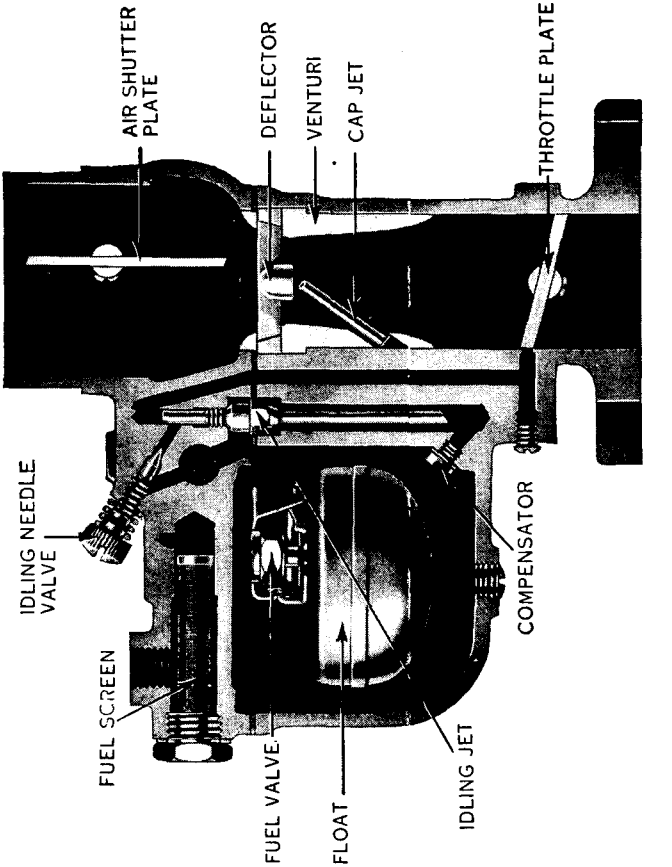


Fig. 13

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

15. To remove the thrust collar, drive the shaft and lever assembly out of the collar using a suitable punch and a light hammer.

16. Mark, or otherwise note the correct position of the air shutter bracket, then loosen the clamp screw and remove the bracket.

17. Do not remove the float bracket, air shutter stop pin, channel plugs or identification disc.

18. Remove the venturi and deflector as a unit using fingers only.

19. Remove both lower plugs and gaskets using a 1/2" wrench.

20. Remove the main jet and gasket and the cap (or supplemental) jet and gasket using C161-83 service tool or a suitable screwdriver.

21. Remove the power (or accelerating) jet and gasket using C161-86 service tool.

22. Remove compensator jet and gasket using a screwdriver.

23. Remove pump check valve using a screw driver.

24. Remove power jet (or economizer) valve using C161-81 service tool.

25. Remove priming hole channel screws using a screwdriver.

26. File off the riveted ends of the throttle plate retainer screws using a screwdriver with a safety edge to prevent damaging the inside of the barrel.

27. Remove the throttle plate retainer screws, using a screwdriver, to remove the throttle plate and shaft and lever assembly.

28. If new throttle shaft is to be installed, remove stop lever taper pin using a suitable punch and a light hammer, then remove the stop lever by driving the shaft out of the lever.

29. Do not remove well bushing, throttle stop pin, bowl drain, shaft hole plug or channel plugs.

30. Clean the castings in gasoline or other suitable solvent and blow through each channel with compressed air to complete the cleaning operation.

REASSEMBLY PROCEDURE

1. Place new throttle shaft in position and install the throttle plate. Be sure the plate is properly centered so it fits well all the way around then tighten the retainer screws securely, and

2. Support the screw heads with a suitable mandril in a vise while you rivet the screw ends using a center-punch and a light hammer.

Note: If the shaft and stop lever are installed as an assembly, be sure the stop screw is backed out far enough to permit complete closing of the throttle plate, and disregard the next item.

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

3. Install the throttle stop lever locating it on the shaft so that when it is against the top in the open direction, the throttle plate is straight up and down in the barrel, (wide open). Drill and pin the stop lever in position.

4. Install priming plug channel screws, using a screwdriver.

5. Install the power jet valve using C161-81 service tool.

   Note: We suggest holding the bowl on its side as an aid in getting the valve started into place more easily.

6. Install the pump check valve using a screwdriver.

7. Install the compensator jet and new gasket using a screwdriver.

8. Install the power jet and new gasket using C161-86 service tool.

9. Install the main jet and cap jet, with new gaskets, using C161-83 service tool, or a suitable screwdriver.

10. Install both lower plugs, with new gaskets, using a 1/2" wrench.

11. Install the venturi and the deflector as a unit, using the fingers.

12. Install the air shutter bracket in correct position (see item 16 of disassembly procedure) and tighten the clamp screw securely.

13. Place the air shutter shaft and lever assembly in position in air intake assembly, and

14. Install the air shutter and when properly centered tighten the retainer screws securely.

15. Support the screw heads with a suitable mandril in a vise and rivet the screw ends using a center-punch and a light hammer.

16. Install air shutter shaft thrust washer and pin in place, leaving as little end-play as possible without binding.

17. Install new fuel valve seat and new gasket using C161-24 service tool (or a 1/2" wrench).

18. Place new fuel valve needle in the seat and hold the float in position while you

19. Install the float axle using the fingers to start it, and the handle end of a screwdriver to push it through the slotted end of the bracket.

20. Hold the intake assembly upside down and observe the position of float in relation to the casting. To obtain correct fuel level (with normal fuel pump pressure) the "A" dimension as shown in Figure 15 should be 1-1/16", plus or minus 3/64".

21. Install the idling jet using C161-25 service tool (or a 5/16" end wrench).

22. Install the pump assembly, using fingers and the flat side of a screwdriver blade to push the spring seat into the recess in the casting.

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

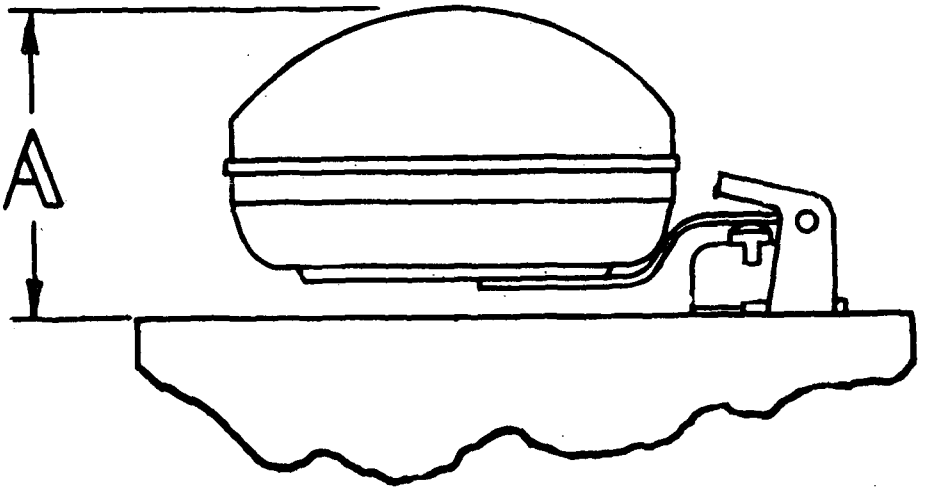


Fig. 15

23. Place the bowl to intake gasket in position on the intake body, then

24. Hold the bowl assembly upside down over the intake assembly and guide the pump into the cylinder and the idling jet into the wall being careful to avoid damaging the float, etc.

25. Install the assembly screws and lockwashers, and tighten them evenly and securely using a screwdriver.

26. Install the channel screw and gasket using a screwdriver.

27. Install the fuel screen and plug assembly with new gasket using a 5/8" wrench.

28. Install idling adjusting screw and spring using the fingers only.

Note: As a preliminary setting turn the idling adjusting screw to one full turn off the seat; and adjust the throttle stop screw to hold the throttle plate just slightly open (about 1-1/2 full turns from the fully closed position). These preliminary adjustments will make it easier to start the engine which would not run at all if the throttle plate were completely closed.

The special service tools recommended are as follows:

C161-24	Fuel Valve Seat Wrench	C161-83	Main Jet Wrench
C161-25	Idling Jet Wrench	C161-86	Cap Jet Wrench
C161-81	Power Jet Valve Wrench		

Other tools required are usually found in the mechanic's tool kit.

Note: An identification disc riveted to the bowl cover specifies the assembly outline number to which the carburetor was built originally. Reference to this number when ordering parts, or requesting information, will prevent errors, as the outline number positively identifies the carburetor to us..

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

ZENITH CARBURETOR MODEL 28BV12 (OUTLINE S-880)
This model carburetor used on Rollers beginning with Serial No. USA846039

The Zenith 28BV12 carburetor is a downdraft unit of double venturi design. It is a balanced carburetor which maintains proper depression ratio between the air intake and the fuel bowl. Air cleaner restrictions have a minimum influence on mixture ratio. This construction protects bowl vent, well vent, idling air opening, etc., from admitting dirt because all air must enter through the air cleaner.

The accelerating pump is mechanically operated and the accelerating discharge is actuated by throttle movement.

MAIN JET SYSTEM

All fuel for part throttle operation is supplied through the main jet orifice.

When the manifold depression drops, the power jet system comes into operation to supply the additional fuel for maximum power.

The main jet fuel passes through the main discharge jet (1) (see Fig. 15B) and into the air stream through the secondary venturi (2). The main jet (3) is located in the fuel bowl.

COMPENSATING SYSTEM

The compensating system consists of the main discharge jet (1) and the well vent (4).

The flow of fuel from the main jet (3) and the power jet valve (calibration of which is in the lower end of the power jet valve assembly (7)) is controlled by the size of the well vent (4) and the size of the main discharge jet (1).

The proper seating of the main discharge jet and of the well vent is insured by a tapered seat. No gaskets are to be used.

POWER JET SYSTEM

The power jet system consists of the power jet valve which regulates the volume of fuel and the power jet piston (6) which, actuated by the manifold vacuum, causes the power jet valve (7) to open. A series of channels (D) connects the power jet vacuum piston with the carburetor barrel below the throttle plate.

At part throttle operation, the manifold vacuum is sufficient to overcome the tension of the power jet piston spring and the piston is held up in its cylinder. Under certain conditions such as sustained high speeds, lugging with wide open throttle or when the throttle is opened suddenly, the manifold vacuum drops. This permits the vacuum piston to descend in its cylinder and causes the power jet valve (7) to open and permit fuel to flow through the power jet valve calibration.

This fuel, added to the main jet supply furnishes the proper mixture for full power development.

IMPORTANT NOTICE: (a) No gasket is used under the power jet valve. (b) Never change the spring tension of the power jet vacuum piston or of the valve.

IDLING SYSTEM

The idling system consists of the idling jet (9), which measures the fuel; the air bleed (5), and the idling adjusting needle (10) which regulate the air. The idling jet is calibrated in the side.

The air bleed prevents syphoning of fuel through the idling system even if the idling adjusting needle is closed.

The idling jet receives fuel from the main jet (3). The fuel then goes through the small calibration in idle jet (9) where it is mixed with air going through the center of the jet. The idling system functions only at idling speeds. At these speeds the throttle plate is almost closed and there is a very strong suction past the edge of the throttle plate. The mixture of fuel and air from the idling jet is discharged through the priming plug (11). There is no gasket used under the idling jet.

IMPORTANT NOTICE: The priming plug must never be removed.

ACCELERATING SYSTEM

The accelerating system consists of the accelerating pump piston, a series of channels, check valves and an accelerating jet. The pump piston is actuated by throttle movement. The accelerating jet and pump spring control the rate of fuel discharge.

As the throttle opens, it causes a downward stroke of the pump lever (12) (see Fig. 15C). Through the link and accelerating pump rod (13), the accelerating pump piston (14) (see Fig. 15D) is forced downward in its cylinder.

Fuel from the carburetor bowl has previously entered the cylinder through the check valve (15).

As the pump piston starts its downward stroke, it supplies a pressure upon the fuel which closes the lower check valve (15) and causes displacement of the fuel through the ball check valve (16). The pressure of the fuel closes the air vent check valve (17) and the fuel is discharged into the air stream through the accelerating jet (18).

When the fuel has been discharged, there is no more pressure against the ball check valve (16) or the air vent check valve (17). The ball check valve then drops on its seat and the upper check valve opens. This admits ventilation from the bowl and eliminates direct suction on the fuel through the accelerating jet. No further fuel discharge comes from the accelerating jet until the throttle is closed and the accelerating procedure is repeated.

The stroke of the accelerating pump is controlled by the position of the pump rod (13) in relation to the pump piston rod (19).

The variable stroke is obtained by changing the position of the hairpin cotter (20).

The upper groove gives minimum pump stroke.

The center groove gives intermediate pump stroke.

The lower groove gives maximum pump stroke.

IMPORTANT NOTICE: The accelerating check valves (15) and (17) are not to be removed when inspecting the carburetor.

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

FUEL FILTER

The patented Zenith Filtering Element has been incorporated in the gasoline inlet in assemblies of this type carburetor. The fine edge type element (.002 spacings) assures a supply of clean fuel in the carburetor at all times.

Gasoline enters through the inlet (21) (see Fig. 15D) filling the sump (22), passes between the discs and spacers of the filter element (23), which removes all dirt, rust, water, etc. The clean gasoline then flows up through the spaces (see Fig. 15A) in the center of the filter element, through the hole (24) (see Fig. 15C) in the filter head, and through channel (E) and the fuel valve (25) into the carburetor bowl.

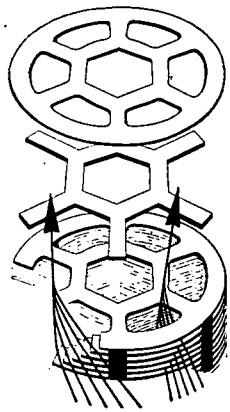


Fig. 15A

To clean the filter, remove the filter head (26) and element (23). The sump (22) may then be cleaned with a small cloth. The channel (E) must be covered so that no dirt or water from the sump is wiped into it during the cleaning operation.

Remove the element from the head. This allows the individual washers to be slightly separated from each other. Wash the element in gasoline. If the accumulated dirt is gummy, a brushing in gasoline will loosen it. Every particle of dirt may then be blown off with compressed air. It is important that only moderate air pressure is used in the cleaning operation. The element and head may then be reassembled in the carburetor with the assurance that none of the dirt will enter the carburetor.

ZENITH CARBURETOR SERVICE

To properly repair the Zenith Model 28BV12 carburetor, we suggest the following routine:

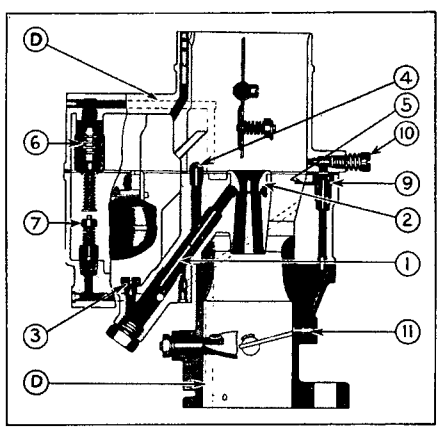


Figure 15B

1. Remove filter head assembly (see 26 in Fig. 15C or 15D) using a 13/16" wrench.
2. Remove cover assembly screws. (There are six of these.)
3. Raise cover assembly slightly and loosen gasket from bowl assembly so you may lift the cover and gasket clear of the bowl assembly without damaging the float. Remove gasket from cover assembly.
4. Remove float axle using a small screwdriver to push the axle out of the slotted end of the hinge bracket, and fingers, or pliers, to remove it the rest of the way to remove the float and fuel valve needle (see 25, Fig. 15C)
5. Remove fuel valve seat using service tool C161-85.
6. Remove vacuum cylinder assembly (6, Fig. 15B) using a 7/16" thin walled box wrench. (Zenith service tool C161-10.)
7. Remove idling adjustment screw and spring (10, Fig. 15B).

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

NOTE: Do not remove identification disc, float hinge bracket, or either of the two bowl vents.

8. Remove discharge jet passage plug using 1/2" wrench.
9. Remove pump lever link & retainer, using fingers only.
10. Remove throttle shaft nut and lockwasher using a 5/16" open end wrench and remove the lever (12, Fig. 15C) on the shaft.
11. Remove bowl to body assembly screws using a screwdriver.
12. Lift the bowl from the body.
13. Remove venturi and gasket.
14. Remove pump and pump rod assembly. NOTE: It may be necessary first to file burrs or rough spots from the sides of the pump rod at the hole for the link.
15. Note which of three notches cotter is used in (20 in Fig. 15D).
16. Remove main discharge jet (1 in Fig. 15B) using service tool C161-1 (or suitable screwdriver).
17. Remove power jet and valve assembly (7, Fig. 15B) using service tool C161-9.
18. Remove main jet (3) and gasket with screwdriver.
19. Remove idling jet (9) with screwdriver.

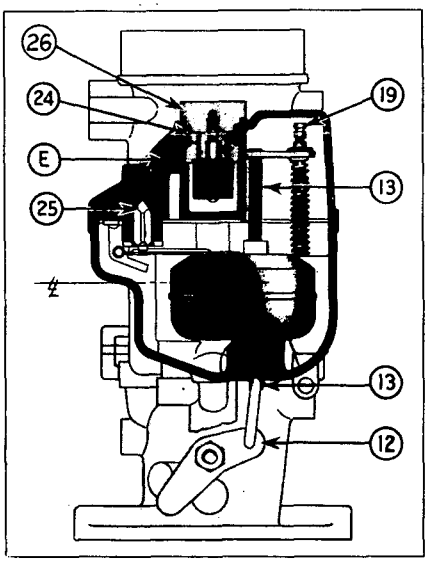


Figure 15C

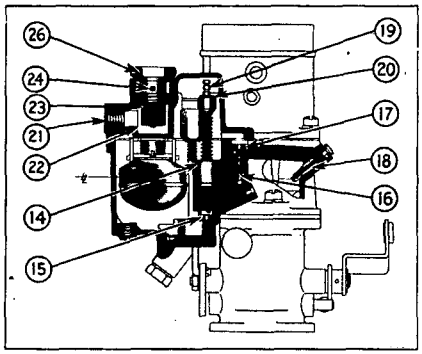


Figure 15D

20. Remove well vent (4) with 3/16" wrench (Zenith service tool C161-80).
21. Remove accelerator jet channel plug, using C161-21 extractor as described in notes following the tool list.
22. Remove air vent check valve assembly (17, Fig. 15D) using service tool C161-5 as described in note following tool list.
23. Turn bowl upside down to allow retainer washer, weight (16) and pump refill check ball to fall out.
24. Remove pump check valve assembly (15) using service tool C161-5, after first bending the retainer lugs with a small screwdriver and removing the valve disc.
25. Remove lead channel plugs using a No. 46 drill and C161-21 extractor.

NOTE: Do not remove the following parts:
(a) Pump refill check valve seat (16, in Fig. 15D).
(b) Secondary venturi (2, Fig. 15B).
(c) Idle channel bushing. [(Located in channel below idling jet (9 in Fig. 15B)]

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

(d) Accelerator Jet (18, Fig. 15D).

26. If air shutter shaft or shutter must be replaced proceed as follows:
(a) File off the riveted end of air shutter screw.
(b) Remove screw with screwdriver.

27. Read NOTE A on page 23G **before removing throttle plate and shaft.**

28. If throttle plate is to be removed, the riveted ends of the throttle plate screws must be filed before they are removed.

NOTE: Do not disturb the priming hole plug (11, Fig. 15B).

REASSEMBLE CARBURETOR as follows:

1. Clean the barrel with gasoline or other solvent and blow out the channels with compressed air.
2. Reassemble throttle parts as suggested in Note A.
3. Rivet ends of throttle plate screws, being careful to avoid springing the shaft; use a mandrel in a vise and a tinner's riveting hammer.
4. Clean and blow out bowl channels.
5. Install lead channel plugs using service tool C161-19 and a light hammer.
6. Replace pump check valve assembly (15, Fig. 15D) using service tool C161-53 as described in notes following tool list.
7. Place pump refill check ball on the seat followed by the weight (16, Fig. 15D) and the retainer washer, then —
8. Replace air vent check valve assembly (17) using service tool C161-5, NOTE: This assembly is the same as the pump check valve assembly (15) but is installed with the opposite side up.
9. Install new accelerating jet channel plug using a light hammer.
10. Install well vent (4, Fig. 15B) using service tool C161-80 or 3/16" wrench (no gasket).
11. Replace idling jet (9) no gasket is required. NOTE: There is a small drilling (size .8 m/m) shown at 5 in Fig. 15B. This hole admits a fixed quantity of air in addition to that supplied by the idling adjustment. This small channel must be clean.
12. Replace main jet (3) and new gasket.
13. Install power jet and valve assembly (7) using service tool C161-9. (No gasket.)
14. Install main discharge jet (1) using service tool C161-1 (no gasket).
15. Install pump and pump rod assembly (19 and 13, Fig. 15C). NOTE: Hair pin cotter (20, Fig. 3) should be in same groove as before disassembly.
16. Place venturi and gasket in position in bowl assembly. NOTE: The notch in the venturi fits over the discharge arm of the bowl assembly.
17. Place bowl in position on the body and --
18. Install assembly screws and lockwashers.
19. Install pump lever, retainer nut and lockwasher using a 5/16" wrench. Also lever link & link retainer.
20. Install discharge jet passage plug and new gasket using 1/2" wrench.
21. Reassemble air shutter and shaft, then --
22. Rivet the end of the air shutter screw. Be careful to avoid springing the shaft. Use small mandrel in a vise and a tinner's riveting hammer.

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

23. Install idling adjustment screw and spring (10, Fig. 15B) and set at 1 full turn open.

24. Replace vacuum cylinder assembly (6) and new gasket using service tool C161-10.

25. Install new fuel valve seat and new gasket using service tool C161-85, followed by new fuel valve needle, float and float axle.

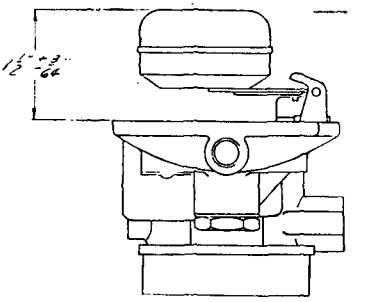


Figure 15E

26. Hold cover assembly upside down as shown in figure 15E and observe position of float with relation to the cover. To obtain correct fuel level, with normal fuel pump pressure, measurements should be as shown.

27. Place cover assembly in position with new gasket and install assembly screws with lockwashers. NOTE: Assembly screws should be tightened evenly.

28. Before installing the filter head, unscrew the filter with fingers only, and clean the filter in gasoline. NOTE: For cleaning filter and sump when carburetor is fully assembled, see instructions contained under Fuel Filter.

SERVICE TOOLS RECOMMENDED ARE AS FOLLOWS:

C161-1	Main discharge jet wrench.
C161-5	Air vent check valve tool -- to remove or to install.
C161-9	Power jet valve wrench.
C161-10	Vacuum cylinder wrench.
C161-19	Channel plug punch.
C161-21	Channel plug and accelerator jet extractor.
C161-53	Pump check valve tool (to install)
C161-80	Well vent wrench.
C161-85	Fuel valve seat wrench.

NOTE: C161-5 AIR VENT CHECK VALVE tool is used as follows:

Insert the tapered thread end into the air vent check valve body and screw down (anti-clockwise) until the tool is firmly fastened into the body. Then raise the sliding weight up sharply against the stop bar a few times to remove the check valve assembly.

One end of the stop bar of C161-5 tool is machined to fit the air vent check valve body and is used to install the air vent check valve assembly by lightly hammering the end of the tool to drive the assembly down as far as the tool will permit.

C161-21 ACCELERATOR JET CHANNEL PLUG EXTRACTOR. Drill a 5/64" hole in the center of the plug. Insert the tapered thread end of the tool into the hole just drilled and screw down (anti-clockwise) until the tool is firmly fastened into the plug. Then strike the tool sharply with a light hammer to lift the plug out.

C161-53 PUMP CHECK VALVE TOOL is used as follows:

(a) Place the tool upright in a vise, gripping the tool at the flattened end.
(b) Place check valve assembly in position in the end of the tool.
(c) Place the bowl upside down with the pump cylinder fitting over

the check valve and with the tool guide rod inserted into guide for the pump rod.

(d) Strike the bottom of the bowl with a wood or rawhide mallet at a point directly over the inverted pump cylinder to drive the check valve in place.

PARTS TO BE REPLACED ARE IN THE C182-483 REPAIR PARTS KIT.

NOTE A: The location of the priming hole plug in relation to the throttle plate is extremely important for uniform idling and part throttle operation. To maintain a uniform relation between the priming hole plug and the throttle plate, our factory assembles the throttle shaft and plate in the throttle body before drilling the body for the priming hole plug, locating the hole in a definite relation to the throttle plate in each case. It is readily apparent from the above that throttle plates and throttle bodies cannot be interchanged indiscriminately. When it becomes necessary to replace the throttle shaft or throttle plate, we suggest the following routine:

1. Unscrew the throttle stop screw (or remove throttle advance lever) to permit complete closing of the throttle plate.
2. Hold throttle in tightly closed position and mark the inside of the throttle body close to the throttle plate with a steel scriber.
3. Using this scribed line as a guide, replace the throttle shaft or plate. If new plate used shows a noticeable variation from old one, select another new plate to get one that fits very close to the scribed line when installed.
4. If throttle body has to be replaced, we recommend obtaining a complete carburetor.

NOTE B: A round aluminum identification tag riveted to the carburetor bowl cover specifies the assembly outline number to which the carburetor was originally built. When ordering special parts such as the throttle bodies, throttle lever and stop lever assemblies, etc., be sure to specify outline number of the carburetor to prevent errors in selecting parts required.

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

FUEL PUMP

The fuel pump mounted to the right rear of the engine, is operated by a lever which contacts a cam on the camshaft.

A glass sediment trap is located on the intake side of the pump, for the purpose of trapping water and sediment. This should be cleaned frequently. Make sure the gasket is not damaged when replacing the glass sediment trap.

The pump action is controlled by a diaphragm located between the upper and lower halves of the fuel pump body. To replace diaphragm, remove the screws which hold the two halves of pump together and the old diaphragm can easily be removed and a new one installed. When installing new diaphragm, make certain it is smoothly located on the body before drawing the screws down tight. If it should be crimped or wrinkled when installing, a leak is likely to develop.

A worn or leaky diaphragm may cause gasoline to leak into the oil pan and cause dilution of the engine oil.

A worn or leakly diaphgram will also cause the pump to lose pressure and result in an insufficient or irregular amount of fuel being supplied to the carburetor.

AIR CLEANER - INSTRUCTIONS FOR CARE

CONNECTIONS - As vibration may loosen the connections from air cleaner to carburetor, they should be checked frequently. It is very important that all joints between cleaner and carburetor be kept air-tight.

OIL IN CUP - Fill cup to center bead line with light grade oil corresponding to oils having S.A.E. viscosity numbers 20 to 30. Empty cup and refill when oil becomes too thick to spray readily, or when cup is about one-fourth full of dirt.

DRAINED CRANKCASE OIL - May be used if it is thin, but should be changed more often.

CHANGING OIL - Due to local conditions it is not possible to state definitely how often the oil in the cup should be changed. Under average conditions very little care is required, but when dust conditions are very severe the cleaner cup will fill up rapidly and the oil will become thick. For this reason the operator knowing the conditions should inspect the cleaner cup at short intervals when he first starts operating the machine, until from experience he will be able from dust conditions to judge how often the oil should be changed.

FILTER COMPARTMENT - If the oil in the cup is not permitted to become thick, the oil will keep the wire filter clean, and it will not require any other attention. Best results will be obtained by following directions on the instruction plate which is attached to each cleaner.

Rapid wear to cylinder walls, pistons and piston rings will result if careful attention is not given air cleaners on engines being operated under dusty conditions. Badly worn top rings and piston grooves are indications of dust reaching engine through the carburetor.

WATER PUMP

The water pump on both the WXC-3 and WXLC-3 engine is driven through a coupling from the accessory drive which connects the shaft from accessory drive and shaft in the water pump. This pump requires very little service and is very simple in construction and no difficulty should be experienced in making inspections or repairs. However, when ordering repair parts, it is important to give the engine number to make certain of obtaining proper parts as pumps have been supplied in which detail parts vary slightly.

To remove pump it is first necessary to disconnect the coupling which is of the link chain type and is disconnected by merely snapping off the spring lock and removing pin. Next remove cap screws which hold pump to block and pump assembly can be removed from the engine.

REPAIR WATER PUMP - This pump can be adjusted or repacked. Do not tighten the packing nuts too tight. They need only be tightened sufficiently to keep the pump from leaking.

DISASSEMBLY - Drive out grooved pin which holds the drive sprocket on pump shaft (pump cover end) and remove sprocket.

REMOVE WOODRUFF KEY - Remove gland packing nut. Remove three cap screws which hold pump body and pump cover together.

The pump cover can now be slid off of the shaft and the impeller and shaft pulled from the housing.

This leaves the pump housing and cover assembled with packing and the impeller and shaft assembled.

Inspect and replace worn parts and packing and replace parts in reverse of the above.

ACCESSORY DRIVE

The accessory drive for the water pump and magneto is located on the opposite side of engine from camshaft. The accessory drive shaft is supported in a removable sleeve casing. This permits easy removal for service operation. The accessory shaft and sleeve can be removed without removing front gear case cover as in Illustration Fig. 16.

OIL FILTER - The oil filter should be given regular and careful attention. The base of the filter should be drained at least every time the engine oil is changed. To drain the sludge and settlings from the filter remove the large drain plug and allow to drain for several minutes, or start engine and allow to idle until about two quarts of oil has run out. Then replace plug and add sufficient oil to crankcase so oil level will be correct after engine has run long enough to refill the filter. The filter can also be cleaned by

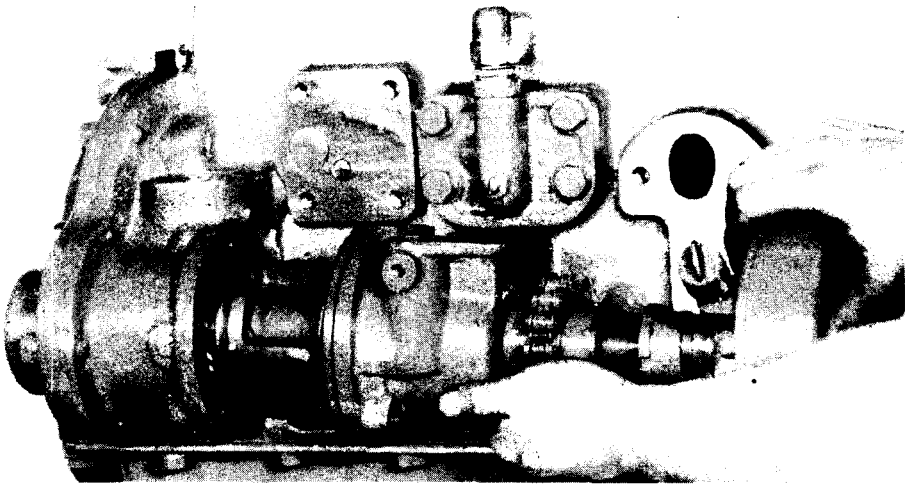


Fig. 16--Removing Accessory Drive

removing the case and scraping the sludge from outside of element with wooden paddle. On units equipped with felt cleaner the element should be replaced every time the oil is changed.

MAGNETO - WICO
USED ON MODEL R-23555-H

The Electromag is a highly efficient magneto especially designed for heavy duty work. Built-in impulse coupling and automatic advance mechanism, together with distributor-type mounting provide a combination of features which enable the user of engines equipped with battery distributor to now enjoy the advantages of magneto ignition. Periodic inspection and maintenance service add greatly to the life and service rendered by this unit. Any major repairs should be made with the distributor removed from the engine.

DISASSEMBLY

First remove cap screws which attach base bracket to accessory drive bracket. The magneto can then be lifted from the engine.

TIMING TO ENGINE

Where specific instructions are given by the engine manufacturer for the timing of the distributor, it is recommended that they be followed in preference to those given herein.

Rotate the flywheel and bring piston No. 1 cylinder into firing position of compression stroke. The flywheel is usually marked to identify firing position.

With the distributor cap removed, turn the magneto shaft in a direction opposite to its ordinary rotation until the monel metal segment of the distributor arm is opposite the No. 1 terminal of the distributor cap and the breaker points just begin to open. Clamp the magneto to the engine in this position. Complete the installation by replacing the distributor cap and connecting the remaining leads to their correct firing order.

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

It is good practice to recheck the timing under actual running conditions and make final adjustments by slightly advancing or retarding the magneto (slightly turning the housing), as may be required to obtain best engine performance.

DISTRIBUTOR CAP AND ARM

To remove, snap off the two spring clips which hold the distributor cap to the main housing and remove the cap. Pull the distributor arm off the cam.

When replacing the distributor arm, line up the key inside the arm with the slot in the cam and press the arm down. Cement the gasket to the distributor cap with shellac. When replacing the cap, line up the three lugs on the main housing with the three slots in the cap.

BREAKER POINTS

The breaker points should be adjusted to .015 when fully open. Adjustment is made by shifting the fixed contact by means of the small eccentric screw. After adjustment, tighten the fixed contact screw.

The points should be free from foreign matter. Lacquer thinner is an ideal cleaner for this purpose. Use Wico tool X-5449 to adjust the alignment so that the full surfaces of both contacts meet squarely.

To remove the breaker arm, take out the breaker arm clamp screw, lockwasher, and two leads (condenser lead and black coil lead). Next remove the cotter pin, washer and pull the breaker arm off the pivot. When replacing make certain that the two leads are in place above the spring terminal.

To remove the fixed contact, the breaker arm must first be removed as outlined above. Take off the clamp screw, washer and lock washer after which the fixed contact may be pulled off the breaker arm pivot.

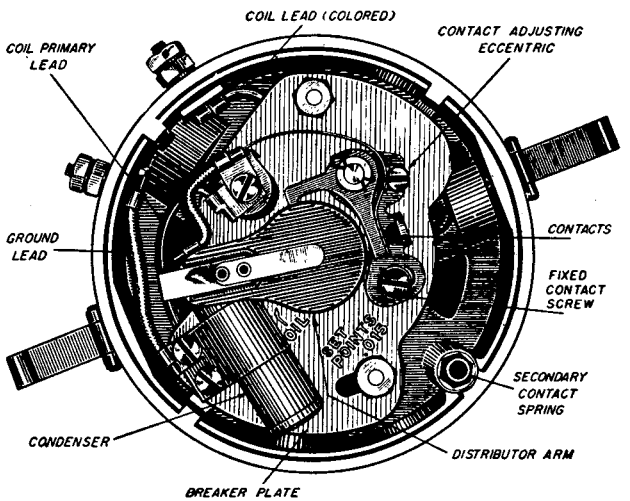


Fig. 17--Breaker Compartment

If the points need replacing it is recommended that both the fixed contact and breaker arm be replaced at the same time. After reassembly the points should be adjusted as described.

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

CONDENSER

The condenser should have a capacity of .16 - .18 microfarads. To remove the condenser disconnect the ground lead and remove the two condenser clamp screws which hold the condenser to the breaker plate. Remove the condenser lead from the condenser by taking off nut and lock washer.

When replacing the condenser make certain that the condenser lead and ground lead are in place.

CAM

To remove cam take out clamp screw, lockwasher and washer. The cam may now be pulled off. If the cam does not readily come off gently strike with a brass rod, the rotor shaft inside the cam, while pulling on the cam. Do not attempt to pry the cam from underneath or the carbon thrust washer will be damaged.

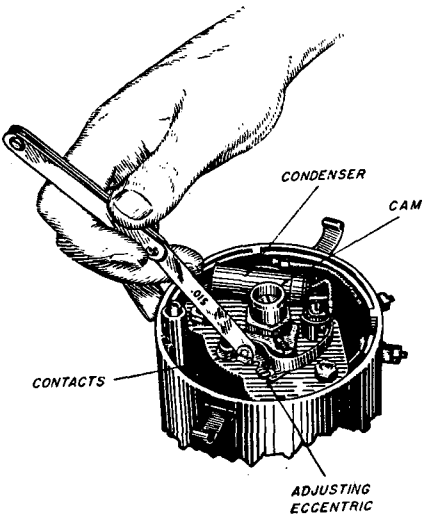


Fig. 18

BREAKER PLATE

When removing the breaker plate first pull off the distributor arm. Remove the black coil lead from under the breaker arm spring clamp screw, and ground lead, from under the condenser clamp screw. Next take off the two breaker plate clamp nuts, washers, and lock washers. Place two screwdrivers under the breaker plate and pry out being careful not to damage the main housing.

When replacing the breaker plate make certain that the black coil lead is under the breaker arm spring clamp screw and the ground lead is under the condenser clamp screw.

ROTOR

Do not attempt to recharge the rotor. The magnet steel used in the rotor is such that is is virtually impossible for the rotor to lose its charge.

To remove the rotor from the main housing, first take off the distributor cap, distributor arm, cam, end and intermediate plates drive shaft, automatic advance, and impulse parts. Now remove the woodruff cam key by placing a screw driver at the end of the key and sharply striking the screw driver with the palm of the hand. Next pull out the shaft snap ring and remove the cam thrust washer. The rotor may now be pulled out of the housing.

When reassembling pack Wico grease or equivalent in the needle bearings. The rotor should have .003" to .004" air gap between the rotor and the poles in the main housing, if it does not, replace the needle bearings. If replacment of the needle bearings does not give the correct air gap it will be necessary to replace the rotor, the housing or both.

With the cam in position the rotor must have an end play of .002" to .006". This can be checked by inserting a feeler gauge between the bottom

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

of the cam and the thrust washer. If the end play is greater than .006" the thrust washer is worn and should be replaced.

Extreme care should be taken to see that no metallic chips adhere to the rotor when it is reinstalled in magneto.

INNER CORE

To remove, push the inner core down and remove the snap ring. A Wedge, must be inserted in the split of the inner core and turned so as to spread the inner core to allow its removal. See Figure 19.

When replacing the inner core, the springs on the inner core should be against the coil gasket. Line up the keyway in the core with the keyway in the housing and press in the key. The beveled part of this key should be down into the housing, against the housing. When a snap ring has been removed, it is recommended that a new ring be inserted. The snap ring opening should be over the split in the inner core.

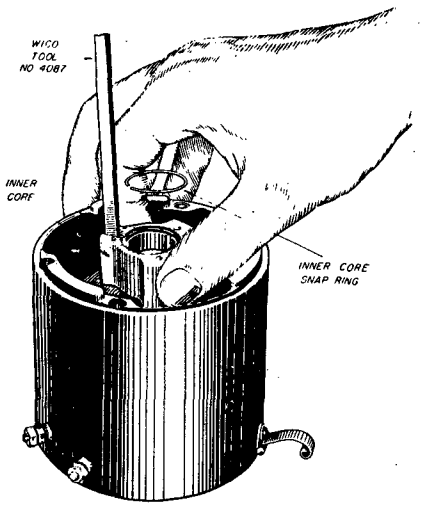


Fig. 19

COIL

It is not necessary to remove the coil from the magneto when testing the coil. Remove the distributor cap and arm. When using an Eisemann Coil Tester, connect the ground lead of the tester to the battery terminal of the Electromag, connect the breaker lead of the tester to the breaker arm clamp screw of the Electromag. Connect the spark lead of tester to the high tension spring of the secondary terminal of the Electromag, turn the cam until the breaker points are open. The coil must be replaced if it requires more than .80 amperes to give a steady spark on a 5 mm gap.

If the coil is to be replaced, first remove the inner core, the breaker plate, and disconnect all coil leads. Remove the coil by using Wico tool No. 4086 as follows: With the main housing right side up place one leg of the tool in the largest hole in the housing casting, place the other leg of the tool in the second largest hole in the housing casting, move the tool around until it is as nearly across the center of the main housing as possible. With the legs of the tool against coil, strike the top of the tool with a hammer and drive out the coil being careful not to damage coil insulation. See Figure 20.

When replacing the coil, be sure the high tension button is against the interlead spring and that the coil wedges are in place. The colored primary lead connects to the battery terminal in the main housing and the black insulated lead connects to the breaker spring clamp screw.

END AND INTERMEDIATE PLATES

To remove end plate and intermediate plate, take out four intermediate plate screws, and lock washers. Hold the drive shaft down and pull the end

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

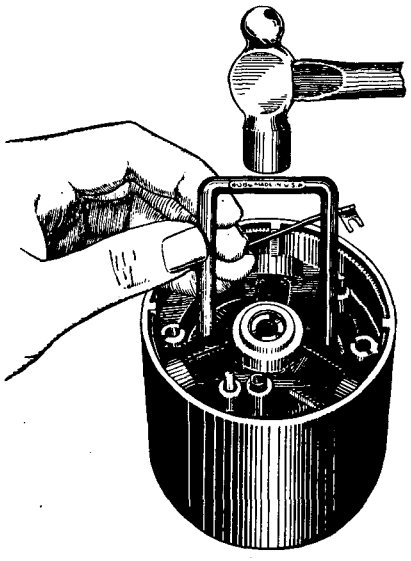


Fig. 20

plate and intermediate plate off the shaft, leaving the drive shaft, advance and impulse parts attached to the magneto. To remove the end plate from the intermediate plate remove the three end plate screws and the end plate screw clamp locks.

When reassembling make certain that the end plate gasket and intermediate plate gasket are in place. The rotation arrow on the intermediate plate must be on the same side of the main housing as the ground studs. The witness mark on the end plate must line up with the witness mark on the intermediate plate.

DRIVE SHAFT, AUTOMATIC ADVANCE, AND IMPULSE MECHANISM

DISASSEMBLY - After having removed the end and intermediate plates the drive shaft, advance, and impulse mechanism should be pulled off rotor as a unit. The drive yokes and advance springs may then be removed from the advance weights. The advance weights and the pivot pin spacer washers should then be removed from the advance and support plate assembly. To disassemble the impulse parts from the drive shaft remove the impulse spacer clamp nut, the impulse spacer clamp washer and the impulse spacer clamp nut lockwasher. The advance and support plate may then be pulled off the shaft as a unit. This unit consists of the advance and support plate group which is not sold separately, the trip arm pivot pins, the trip arms and the trip arm pivot pin cotter pin. The impulse spacer should be removed next after which the two impulse springs and the four impulse spring guides may be taken off the cam plate. It may be necessary to gently press the drive shaft out of the cam plate.

ASSEMBLY - To reassemble, the cam plate group is first pressed onto the drive shaft after which the impulse spacer should be placed on the drive shaft.

The two impulse springs and the four impulse spring guides, should now be assembled to the advance and support plate assembly as shown in Figure 21. An ordinary large size crochet hook is an ideal tool for this operation. The advance and support plate assembly, together with the impulse spring should now be assembled to the drive shaft. Care should be taken to see that the impulse spring guides are looped over the pins in the cam plate.

The impulse spacer washer, lock washer and the impulse spacer clamp nut should now be placed on the drive shaft and the nut tightened.

There are two different size holes in the support plate. The size of the advance stop ring and the hole in which it is placed determine the maximum advance of the magneto. The following specifications cover the magneto as used on the Galion Chief roller.

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

Fig. 21.

Magneto specifications -
EM-1340 or EM-1612

Rotation - CCW

Log Angle - 3°

Advance Curve in terms of magneto speed
Start - 700 R.P.M. 2½° - 4½°
Finish- 1500 R.P.M. 9° - 11°

End plate group - X4093

Drive shaft - 4206

Stop ring - 3967B

Hole in plate - large

Advance spring - 3836G

Hole in yoke - B

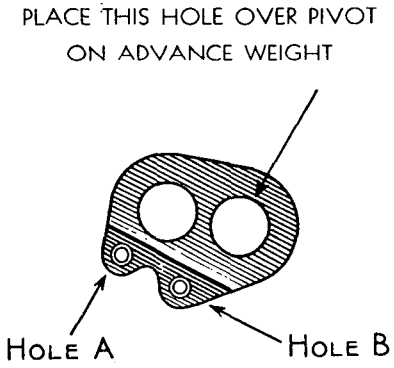


Fig. 22 - Drive Yoke

The correct advance stop ring should be placed on the advance weight with the pin and secured by lock spring. The advance weights should now be assembled to the advance and support plate assembly, being careful to plate the weight with stop ring on the proper pivot to permit the stop ring to rest in the correct hole.

The large end of the drive yokes should now be placed on the advance weights so that the small holes on the drive yoke are on the concave side of the weight.

The small loop of the proper advance spring as determined above should be hooked through the correct hole in the drive

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

yoke, also listed above. The long loops of the advance spring should be hooked over the pin on which the other advance weight pivots.

The complete automatic advance and impulse mechanism may now be assembled to the rotor by inserting the studs in the bottom of the rotor into the holes in the drive yokes. The intermediate plate and end plate should now be assembled to the magneto. Care should be taken to see that the rotation arrow on the intermediate plate is on the same side of the housing as the ground studs, otherwise the holes for checking the edge gap will not be in the right position.

NEEDLE BEARINGS

If it is necessary to replace the needle bearings, remove them after completely disassembling the magneto.

The new bearings should be inserted in the housing with its lettered end facing out. Be sure the oil hole in the top bearing lines up with the oil hole in the main housing. See Figure 23.

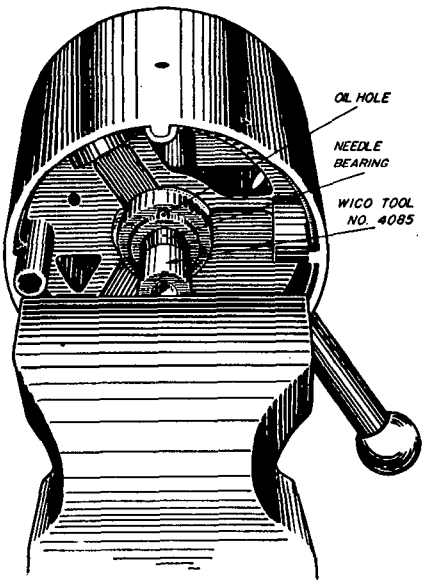


Fig. 23

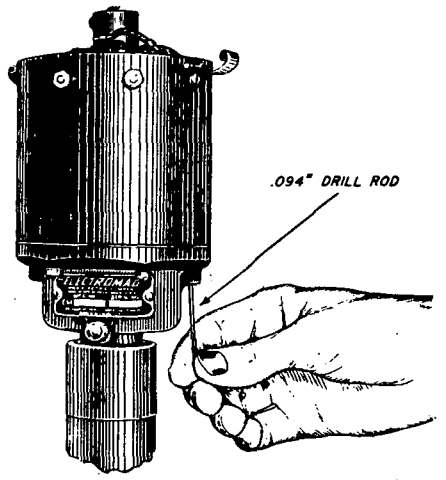


Fig. 24

TIMING ELECTROMAG ON TEST STAND

Place the electromag on the test stand so that the ground studs are facing out. Remove the distributor cap. Attach lead wires from both ground studs to test stand. Turn the shaft in its specified rotation until the impulse trips. Insert a 3/32" or .094" diameter drill rod or wire in the hole in the right side of the intermediate plate. See Figure 24. Take up all play by turning the distributor arm and rotor shaft in direction opposite to the specified rotation, and observe position of the pointer on the 360° rotating spark gap. Remove the drill rod or wire. Adjust the points to .015" when fully open. Connect lead wire from rotating gap to secondary spring contact. Rotate magneto at approximately 200 RPM or at such a speed that the advance is in retarded position and the impulse coupling is not in operation. Observe where the spark occurs and if it does not come in at the same angular

INFORMATION on this page covers WICO MAGENTO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

position as above, rotate the breaker plate group until it does. Recheck the .015" adjustment of the points.

The magneto should now be rotated at a speed sufficiently slow to operate the impulse. When tripping the impulse by hand, the spark on the rotating gap should come in at a retarded angle from the point where the spark occurs when the magneto is not operating on impulse. This angle may be found under the specifications given under the heading of Lag Angle. The lag angle or impulse range may be changed by rotating the end plate in relationship to the intermediate plate. To rotate the end plate it is merely necessary to loosen the three end plate clamp screws. After rotating the end plate, with the magneto in operation so the correct lag angle is obtained, tighten the end plate clamp screws.

The advance curve of the magneto should now be checked by rotating the magneto at the various speeds listed under the specifications. At each speed the spark should come in at an angle from the retarded non-impulse position. This angle should be equal to that given on the table.

Tighten all screws and nuts in breaker compartment and apply a small quantity of Wico cam lubricant to the cam. A summer grade of automobile transmission grease will closely resemble cam lubricant. Replace the distributor cap on the magneto and check the output from each tower. When taken through the distributor cap as above, the secondary current should jump a No. 5 star gap or 11/32" needle gap at 65 RPM and a No. 6 star gap or 7/16" needle gap at 150 R.P.M.

POSSIBLE SERVICE FAULTS AND CORRECTIONS

Faulty Operation	Cause	Correction
Engine misses at low speed	Points sticking	Replace points
Operates unevenly	Points spaced too wide	Check and set to .015" (.381MM)
Weak spark	Defective coil	Check coil .80 amperes should give strong spark at 5 mm gap
Weak spark	Weak or defective condenser	Replace, should check .16-.18 microfarads.

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 34-37.

MAGNETO - BOSCH

This supplement to TM-5-1100 APPLIES to Chief rollers supplied on P.O. CI-1578 & P.O. CI-1760. These rollers are equipped with BOSCH MAGNETO which incorporates the use of a through shaft water pump. Hour meters are added to the engine.

ROLLER MODEL NUMBER CHANGED FROM R-23555H to R-27301

FIXED SPARK SERIES

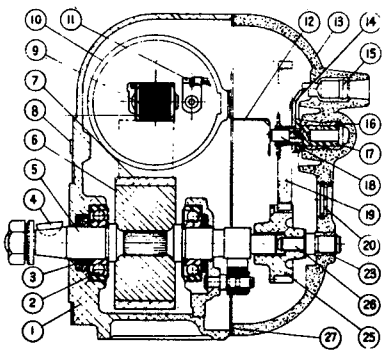


Figure 25

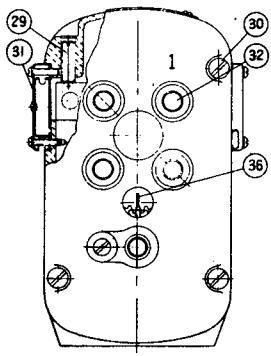


Figure 26

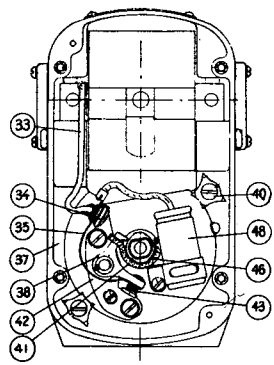


Figure 27

1. Magneto housing
2. Ball bearings
3. Felt sealing washer
4. Woodruff key
5. Magnet rotor shaft
6. Alnico magnet
7. Steel pole shoe
8. Indicating mark on housing
9. Coil core
10. High-tension coil
11. Terminal clip
12. High-tension conductor
13. Distributor plate
14. Electrode
15. Cable clip
16. Distributor gear bearing
17. Distributor gear shaft
18. Dist. gear brush & spring
19. Distributor gear
20. Observation window
23. Lever shaft bearing
27. Distributor plate gasket
29. Coil mounting screw
30. Dist. plate fast. screw
31. Ventilator
32. Cable tower
33. Coil cable
34. Insulated bracket
35. Interrupter oper. spring
36. Line on dist. gear
37. Pole shoes
38. Interrupter lever
40. Inter. holding brkt. screw
41. Felt wick
42. Adj. contact bracket
43. Tungsten contacts
46. Cam
48. Condenser

GENERAL INSTRUCTIONS

NOTE: The numbers given in the following paragraphs refer to Figures 25, 26 and 27 on Page 34.

The MJC 6C series magnetos employ the induction principle of current generation, the coil windings (10) being stationary and magnets (6) ro-

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 26-33.

tate between laminated pole shoes (37). The condenser (48) and interrupter are also stationary. Labyrinth type ventilators (31) are mounted on either side of the magneto housing (1). Magnet rotor ball bearings (2), packed in high-temperature American Bosch U.S. 508 grease, require no additional lubrication for at least one year. The distributor gear bearing (16) is of bronze, requiring lubrication only at yearly intervals. A single casting (1), the open end of which is covered by the distributor plate (13), encloses the magneto. An observation window (20) in the distributor plate (13) with a line (36) on the distributor gear (19) facilitate timing the magneto to the engine.

TIMING THE MAGNETO:

The magneto, producing an ignition spark only at certain definite points in the rotation of the magnet rotor (6) must be connected and timed to the engine in such a manner that the spark is always available at the instant when required in the cylinder.

Turn engine with hand crank until the piston in cylinder #1 moves upward on the compression stroke to the location where ignition is to occur. The proper marking is shown on the flywheel.

A. Rotate the impulse coupling until the line (36) on the distributor gear (19) is visible in the observation window (20). This operation is best performed by turning the impulse coupling in the opposite direction of rotation to that in which it will be driven by the engine, thus eliminating the engagement of the impulse weights.

B. Mesh the impulse coupling with the engine drive. Approximate timing is now obtained. Carefully align the magneto with the engine drive and securely fasten the unit in place.

C. Remove the distributor plate by loosening the four screws. This will expose the interrupter assembly.

D. To obtain the Exact timing, the interrupter points must just begin to open. It may be necessary, in order to get that position, to loosen the adjustable drive member and turn the impulse coupling in a clockwise or anti-clockwise direction.

E. Reinstall the distributor plate and insert the cable between outlet No. 1 and cylinder No. 1 which is then timed to fire correctly.

Complete the installation by connecting the remaining cables of the magneto to the spark plugs in their proper firing order (generally marked on engine block). The firing sequence on the distributor or high-tension end of the magneto follows the opposite direction of rotation from that indicated by the arrow on the magneto name plate and must be taken into consideration when the cables are connected to the spark plugs.

CARE AND MAINTENANCE

LUBRICATION:- Cam lubrication felt wick (41) is saturated with Mobile grease No. 2 at the factory and should be re-lubricated periodically with a small quantity of S.A.E. 50 or 60 oil. The ball bearings are packed with American Bosch U.S. 508 grease and should be repacked once a year. Extreme care must be exercised so that contact points remain free from oil and grease. When a periodic repair of the engine is under-taken, the magneto should be referred to the proper personnel for service.

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 26-33.

TROUBLE SHOOTING

In case of defective ignition, it must first be determined whether the fault is in the magneto or elsewhere. In general, when only one cylinder misfires, the fault is in the spark plug. The most common plug difficulties are as follows:

PLUG GAP TOO WIDE - The proper distance between the electrodes of the spark plugs varies in some engines but, normally, this distance should not be less than .025". On the other hand, however, too wide a gap increases the electrical resistance and interferes with the operation of the engine at low speed. Difficulty in starting an engine and missing at low speeds are very often due to the spark plug gaps being too wide, and as the spark will have a tendency to burn the electrodes and thereby gradually increase the gap, it is especially important that the plugs be examined occasionally to see that the gap is not too great; any difficulty due to this cause may be readily overcome by readjusting the electrodes.

PLUG SHORT-CIRCUITED - This is usually caused by a cracked or porous insulator, or by fouling of the electrodes or insulator. Any of these conditions will cause misfiring by permitting the current to stray from its intended path.

CABLES - Misfiring of one cylinder, either continuous or intermittent, may be due also to a chaffed or broken cable or a loose cable connection. The metal terminals of the cables must not come into contact with any metal parts of the engine or the magneto, except those designated as being correct according to the instructions given.

IRREGULAR FIRING - If the cables and plugs are in good condition and yet the ignition is irregular, the trouble is probably with the magneto, and the interrupter assembly (40) should be carefully examined. It should be seen that the interrupter lever (38) moves freely and contacts (43) are clean and in correct alignment (see paragraph headed "Interrupter").

DAMAGED INSULATING PARTS - As it sometimes happens that distributor plate parts of the magneto are damaged, it should be carefully examined for possible arcing or leakage of high-tension current.

SERVICE ADJUSTMENTS:

INTERRUPTER - The contacts (43) should be adjusted to an opening of .014" - .018" when the interrupter lever (38) fibre bumper rests on the top of the cam lobe (46). This is done by shifting the adjustable contact bracket (42) until the correct opening has been reached. After adjustment, the bracket (42) must be secured by means of its fastening screw. Contact points (43) must be free from oil or grease and be in proper alignment, so that the full surface of both contacts meet squarely. Pitted contacts (43) can be cleaned on a suitable stone. The use of a file is not recommended.

When point renewal becomes necessary, always replace both interrupter lever (38) and contact bracket (42) at the same time.

IMPORTANT - Proper method of removing and replacing the distributor plate assembly to permit contact point inspection or adjustment:

Rotate the engine until line (36) on distributor gear (19) is visible in observation window (20). Remove the four fastening screws (30) and withdraw the entire distributor plate assembly. Adjustment can now be made as outlined in the previous paragraphs.

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 26-33.

When replacing the distributor plate assembly, line (36) on distributor gear (19) must be visible in observation window (20). Engage magnet rotor shaft (5) with rotor gear (25) and tighten distributor plate fastening screws (30).

NOTE: If the distributor plate assembly was removed before the instructions given above were noted, it will be necessary to rotate the engine until piston of No. 1 cylinder, this is the cylinder nearest the radiator, is in approximate firing position of compression stroke. Rotate the distributor gear (19) until line (36) is visible in observation window (20). Engage magnet rotor shaft (5) with rotor gear (25), slightly moving rotor gear (25) in either direction, as required, to permit engagement. Tighten distributor plate fastening screws (30).

INDEX TO CARE OF ENGINE

SEASONAL CHANGES

Whenever the roller is in the repair shop for repairs at the time of the changing of the seasons, it is recommended that the following items be checked in accordance with the procedure as outlined in the following article before returning to service. It is imperative that changes and adjustments be made in a roller as the seasons change, to assure proper performance and dependability. The changes or adjustments to be made are listed in the following paragraphs.

LUBRICANTS - The lubricants throughout the unit should be made to conform to specifications given. If the climatic conditions vary as stated above, lubricants should be changed to suit the conditions. When changing lubricants be certain that the lubricants used conform to general classifications as accepted by the petroleum industry and are high quality. There is no economy in cheap oil. Neither is there any economy in using lubricants, no matter how high their quality may be, for the wrong purpose. Use specific lubricants for specific purposes.

CARBURETOR - It will not be necessary to change the carburetor adjustment for the different seasons of the year. The only time any change should be made in the carburetor setting is when the roller is operating continuously at elevations above 5000 feet (1525 M). The change in jets should not be entered into haphazardly. Considerable development work has been done to provide a carburetor setting which will permit maximum engine efficiency with greatest economy and any unskilled effort to change certain jets will unbalance the carburetor. A carburetor service station should make the change in setting in order to have the carburetor conform to the change in elevation

6

COOLING SYSTEM - The cooling system requires very little service; however, caution should be used to see that the radiator solution is protected against freezing whenever climatic conditions warrant. There are many types of qualified antifreezes. In the event an antifreeze of alcohol base is used care should be taken that it is not spilled on the paint parts of the roller as it will remove the paint if allowed to stand. It can be quickly washed off with clear water in the event it is spilled on roller if this is done immediately.

It is advisable for the cooling system solution to contain an adequate rust inhibitor. This is especially true under tropical conditions as it tends to counteract the chemical action, and neutralize the various types of water used.

All water connections must be checked regularly for leaks.

The radiator and cooling system should be drained and flushed out every three months. If the condition warrants, it is advisable to drain off about

three gallons (11.356 liters) of water and add three pints (1.419 liters) of common lye and run engine slowly for about fifteen minutes to remove any foreign matter that may have accumulated in the radiator taking care that the lye solution is flushed clean and the cooling system is again filled with clean pure water. It is advisable to use soft water whenever possible.

The capacity of this cooling system is ten gallons (37.85 liters).

ENGINE OIL - Check engine oil frequently to determine if diluted on account of excessive use of carburetor choke or due to an accumulation of water on account of engine not operating at a sufficiently high temperature. At the beginning of the cold season fill the crankcase with fresh oil as recommended in lubrication chart. Drain and refill crankcase to proper level at the first indication of oil dilution.

Do not flush the crankcase with kerosene. It is impossible to drain all oil pockets without removing the oil pan and the kerosene which is trapped remains to dilute the new oil. Drain the crankcase while the engine is warm and the oil agitated; this will carry off the loose and harmful sediment.

OIL FILTER - When changing engine oil be sure to service the oil filter. Remove the sludge plug from the bottom of the settling chamber and allow to drain several minutes or start engine and allow to idle until about two quarts (1.89 liters) of oil has run out.

After servicing the filter, run the engine for a few minutes and then add sufficient oil to the crankcase to bring the oil level to the proper height on the bayonet gauge.

INDEX TO PARTS LIST

Revisions in QMC Form 400 for requisitioning spare parts are confined to new column headings. Until new forms are available all organizations will use the present form and type or write in corrections indicated.

Under revised heading "Nomenclature and Unit" list the article and the unit (ea for each; lb for pound; etc.). Under heading "Maximum or Authorized Level" list the authorized organizational allowances or depot stock levels given in ENG 7 and ENG 8 of the ASF Engineer Supply Catalog (superseding Part III, Corps of Engineers Supply Catalog). The total number on hand for each item is listed under "On Hand". In column headed "Due In" enter the total quantity previously requisitioned but not delivered. Column headed "Required" is to be changed to read "Quantity Desired." In "Remarks" column enter additional information. For "Initial" and "Replenishment" requisitions, the sum of "Quantity Desired", "Due In", and "On Hand" should equal "Maximum or Authorized Level".

On this page is shown a sample requisition on QMC Form No. 400 which conforms to the latest revisions. The marginal notes give instructions for preparing a requisition for spare parts for Engineer equipment. Additional information on this subject is contained in Section ENG 1-2 of the ASF Engineer Supply Catalog (superseding Section AA-1 of Part III Engineer Supply Catalog), available on requisition from Engineer Field Maintenance Office, P. O. Box 1679, Columbus, Ohio.

State PERIOD designation by use of one of the following terms:
(1) "INITIAL"—first requisition of authorized allowances.
(2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.
(3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.

Type "SPARE PARTS" in upper right hand corner of requisition.

Give complete shipping instructions. Special instructions for packing, marking, routing, etc., should be given at the end of requisition.

State proper nomenclature of machine, also make, model, machine serial number and U. S. A. registration number.

Prepare a separate requisition for each different machine.

State basis or authority and date delivery is required, immediately below description of machine.

Double space between items.

Group parts required under group headings as shown in manufacturers' parts catalogs (Technical Manuals).

State stock numbers, manufacturers' parts numbers and nomenclature accurately and completely. Do not use abbreviations.

WAR DEPARTMENT
Q. M. C. Form No. 400

SPARE PARTS

REQUISITION

To: Engineer Field Maintenance Office, P.O. Box 1679, Columbus, Ohio — No. of Sheets 1 — Sheet No. 1

Requisition No. R-631-3-44 — Date 18 November 1943 — Period Replenishment

SHIP TO Engineer Property Officer, Pine Camp, New York

MARKED FOR: Supply Officer, 149th Engineer Regiment, Pine Camp, New York

REQUISITIONED By (show Signature, Rank, Organization, Destination. If different from "SHIP TO" include address):

Robert E. Roe,
Major, C.E.,
Engineer Property Officer.

for the Commanding Officer

John D. Doe,
Colonel, C.E.,
Executive Officer.

STOCK No.	NOMENCLATURE	UNIT	MAX. OR AUTH.	ON HAND	DUE IN	QUANTITY DESIRED	REMARKS
	PARTS FOR ROLLER, ROAD, GASOLINE ENGINE-DRIVEN, 3-WHEEL, 10-TON, GALION, MODEL CHIEF, MACHINE SERIAL NUMBER USA832728.						
	Basis: Repair of disabled equipment						
	Delivery requested by 20 October 1943						
	GOVERNOR						
19806-A	CONNECTING ROD	ea	-	0	0	1	
16987-A	ROCKER ARM	ea	-	0	0	1	
	DIFFERENTIAL ASSEMBLY						
R-10962	RING GEAR	ea	-	0	0	1	
R-10967	DIFFERENTIAL HOUSING	ea	-	0	0	2	
	BRAKE PARTS						
R-11744	BRAKE ARM	ea	-	0	0	1	
R-11794	LINING	ea	-	0	0	1	
	FUEL PUMP (A.C. No. 1537712)						
854009	SCREEN	ea	-	0	0	1	
855035	DIAPHRAGM (4 pieces)	ea	-	0	0	1	

*Nonexpendable items such as tools must be accounted for, when requisitioned, by a statement that they have been placed on REPORT OF SURVEY or STATEMENT OF CHARGES.

Emergency requisitions sent by telephone, telegraph or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)."

PREPARATION OF REQUISITIONS

A sample requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS

In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY IN PREPARING REQUISITIONS FOR SPARE PARTS:

a. Prepare a separate requisition for each different machine.

b. Type "SPARE PARTS" in upper right hand corner of requisition form.

c. State PERIOD designation by use of one of the following terms:

   (1) "INITIAL"—first requisition of authorized allowances.

   (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.

   (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.

d. Give complete shipping instructions.

e. State proper nomenclature of machine, and make, model, serial number and registration number.

f. State basis of authority, and date delivery is required, immediately below description of machine.

g. Group parts required under group headings as shown in manufacturer's parts catalogs.

h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.

i. Double space between items.

j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "*Confirming* (state identifying data)."

k. Nonexpendable items must be accounted for.

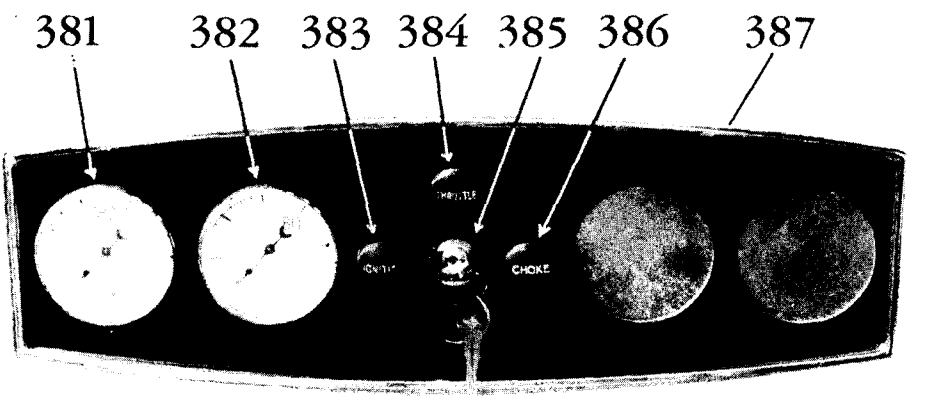
INDEX

1

INSTRUMENTS, CONTROLS AND GAUGES

INSTRUMENT PANEL (Fig. 1)

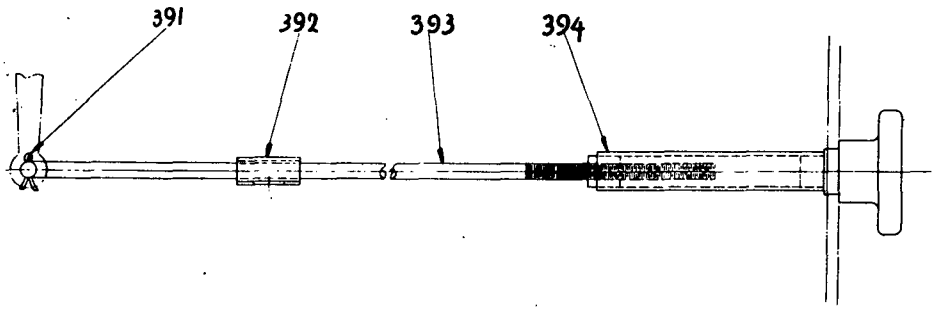
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
381	R-11386-3	Gauge - Motor-meter	1	0.80
382	R-11386-1	Gauge - Engine Oil Pressure	1	0.50
383	R-11386-8	Choke - Ignition Control	1	0.60
384	R-11386-6	Choke - Throttle Control	1	0.60
385	R-11386-5	Switch-Magneto, used only with WICO Magneto	1	0.10
	R-12234-5	Switch-Magneto, used only with BOSCH Magneto	1	0.10
386	R-11386-9	Choke - Carburetor Control	1	0.60
387	R-11386	Assembly - Instrument Panel	1	4.00



INSTRUMENT PANEL
(Fig. 1)

GOVERNOR CONTROL (Fig. 2)

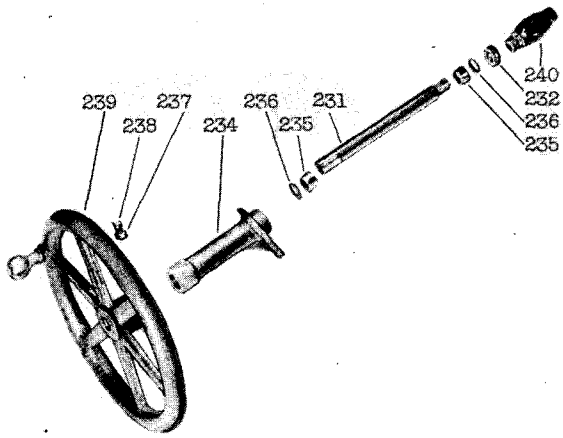
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
391	M-19	Cotter Pin 3/32" x 1" Lg.	1	
392	R-11710	Bracket	1	.05
393	R-11478	Rod - Governor Control.	1	1.00
394	RSA-12074	Assembly - Governor Adjusting Knob. . .	1	0.75



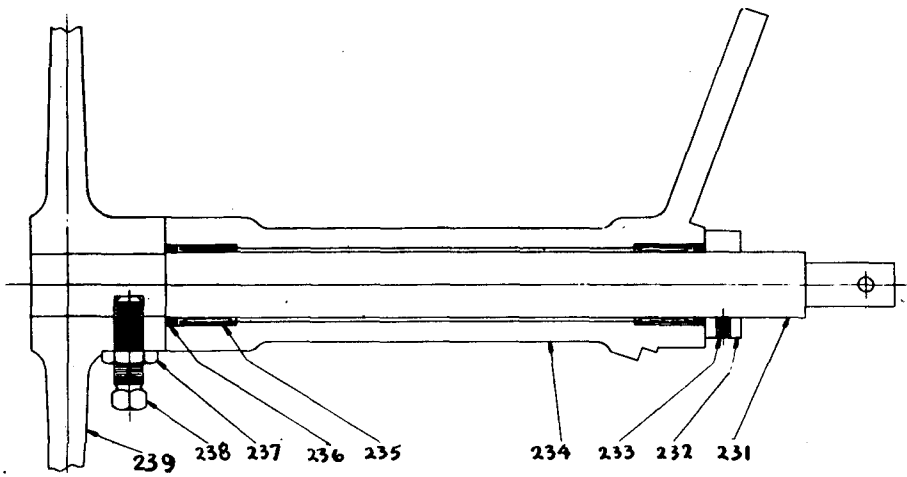
GOVERNOR CONTROL
(Fig. 2)

STEERING WHEEL AND SHAFT (Fig. 3 & 4)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
231	R-18502	Shaft - Rear Steering	1	5.20
232	R-18504	Collar - Steering Shaft	1	0.40
233	M-30	Set Screw - 1/4" x 3/8" Unbrako	1	
234	R-18501	Bracket - Rear Steering Shaft	1	8.75
235	R-18505	Bearing - Needle B-2016	2	0.12
236	R-18503	Felt - Seal	2	
237	M-35	Jam Nut 1/2" U.S.S.	1	0.04
238	M-29	Set Screw - 1/2" x 1-3/4" Cup Point . .	1	0.30
239	RSA-23439	Assembly - Steering Wheel	1	49.00



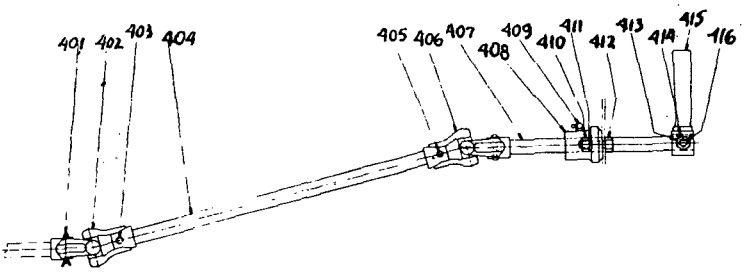
STEERING WHEEL & SHAFT
(Fig. 3)



STEERING WHEEL & SHAFT
(Fig. 4)

SHIFTING PARTS — CHANGE SPEED GEARS (Fig. 5)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
401	M-22	Cotter Pin 3/16" x 2" Lg.	1	
402	SAD-597	Universal Joint	1	2.15
403	M-66	Rivet 1/4" x 1-3/4" Lg. Round Head.	1	
404	R-11152	Shaft - Gear Shift.	1	5.40
405	M-66	Rivet 1/4" x 1-3/4" Lg. Round Head.	2	
406	SAD-597	Universal Joint	1	2.15
407	R-11150	Shaft - Gear Shift.	1	3.00
408	R-11806	Bracket - Gear Shift.	1	2.50
409	1613	Fitting - 1/8" Zerk Grease.	1	
410	M-74	Nut 1/2" Hex U.S.S. Bracket to Cowl	2	.06
411	M-84	Lockwasher 1/2" Bracket to Cowl	2	.017
412	M-8	Capscrew 1/2" x 1-3/4" U.S.S.	2	.119
413	M-35	Jam Nut 1/2" U.S.S.	1	.05
414	M-90	Woodruff Key #15.	1	
415	RSA-11140	Assembly - Gear Shift Handle.	1	2.25
416	M-27	Setscrew 1/2" x 1" Lg. - Cup Point.	1	.2



CHANGE SPEED SHIFT CONTROL
(Fig. 5)

DIFFERENTIAL LOCK CONTROL

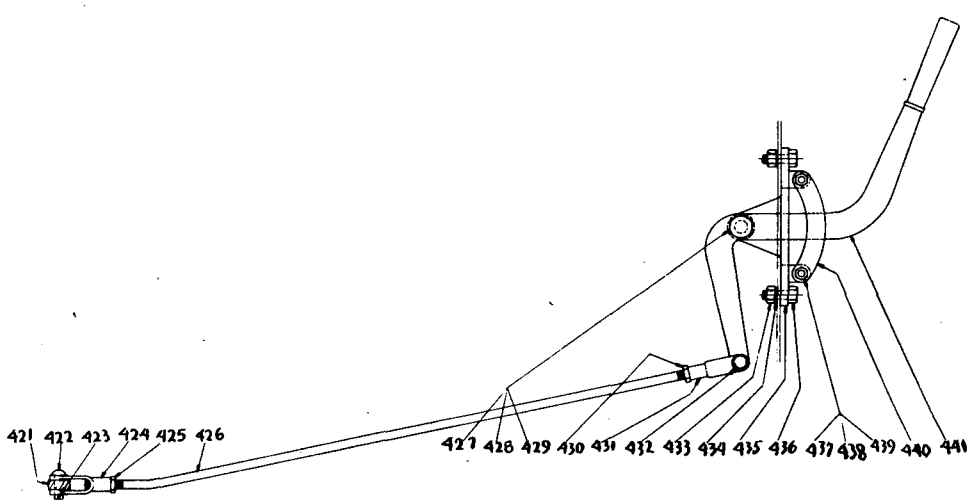
	RSA-21961	Lever - Differential Lock	1	
	M-157	Bolt 1/2" x 2-3/4" Mach. SAE.	1	
	M-75	Nut 1/2" SAE.	1	
	M-84	Lockwasher 1/2"	1	

SHIFTING PARTS – MASTER CLUTCH (Fig. 6)

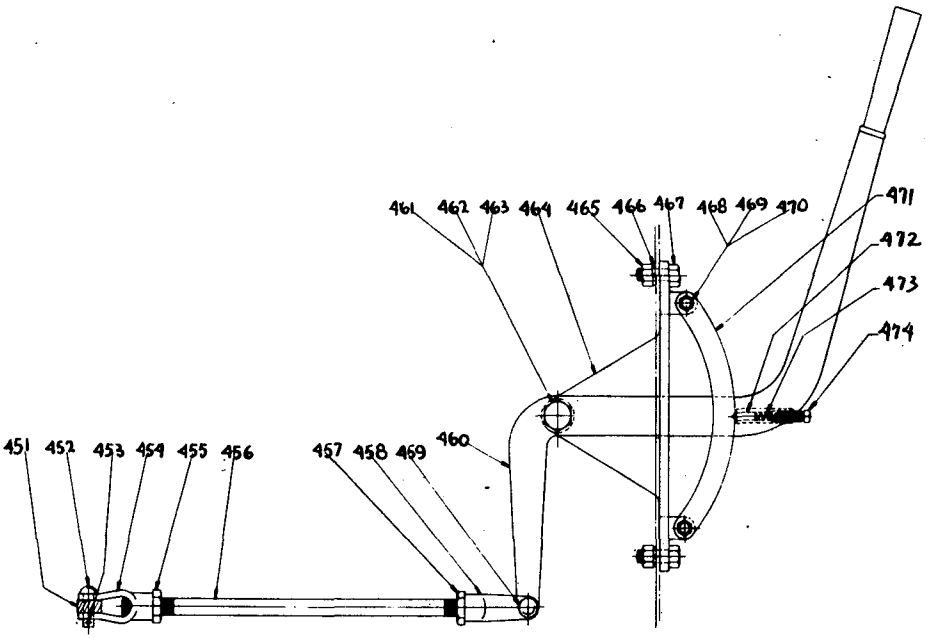
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
421	R-11149	Arm - Clutch Control	1	2.50
422	R-11816	Pin - Yoke	1	0.15
423	M-19	Cotter Pin 3/32" x 1" Lg.	2	0.007
424	R-10353	Yoke - Reach Rod	1	0.30
425	M-35	Jam Nut - 1/2" - Reach Rod	1	0.04
426	R-11425	Rod - Reach.	1	2.60
427	R-11166	Bolt - Shoulder.	1	0.45
428	M-74	Nut - 1/2" Hex U.S.S.	1	0.06
429	M-84	Lockwasher 1/2".	1	0.017
430	M-35	Jam Nut - 1/2" - Reach Rod	1	0.04
431	R-10353	Yoke - Reach Rod	1	0.30
432	R-11816	Pin - Yoke	1	0.15
433	M-74	Nut - 1/2" U.S.S. - Bracket to Cowl.	2	0.06
434	M-84	Lockwasher 1/2".	2	0.017
435	R-11363	Bracket - Clutch Lever	1	4.25
436	M-7	Capscrew - 1/2" x 1-1/2" U.S.S. - Brkt. to Cowl.	2	0.119
437	M-43	Machine Bolt - 3/8" x 2-1/4" - Quadrant.	2	0.10
438	M-73	Nut 3/8"	2	0.029
439	M-83	Lockwasher 3/8".	2	0.009
440	R-11124	Quadrant	2	1.00
441	RSA-11127	Lever - Master Clutch Shift.	1	7.00

The Following Shown on Fig. 18-19

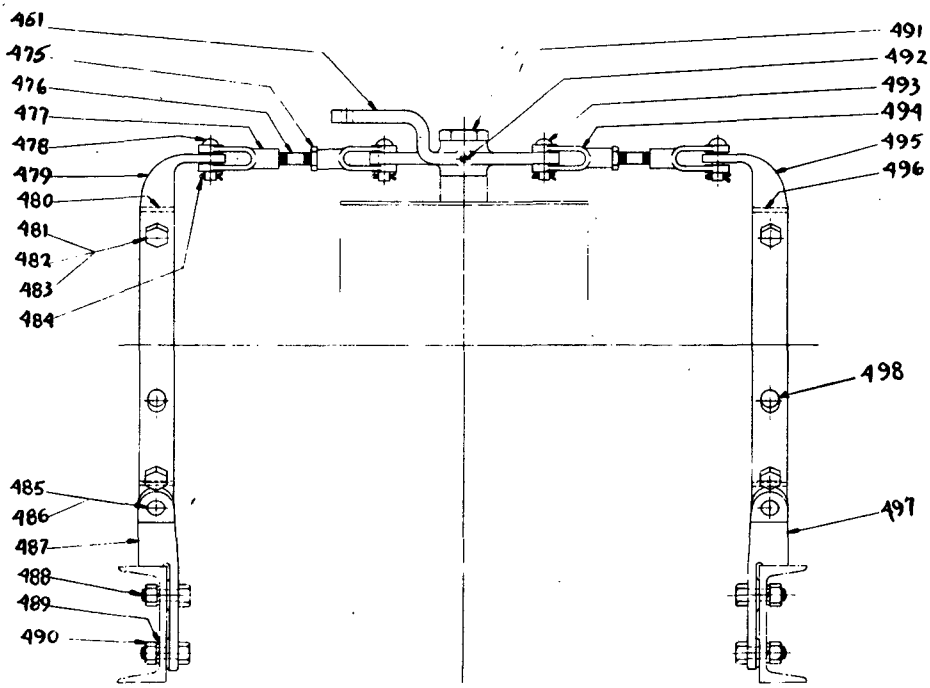
8	R-11153	Shaft - Throwout	1	0.25
9	R-11009-1037	Yoke - Throwout on Clutch.	1	1.75
10	M-9	Capscrew - 1/2" x 2"	6	0.151
11	M-84	Lockwasher - 1/2".	6	0.017
12	R-18459	Bracket - Throwout Shaft	1	3.00
	M-90	Key #15 Woodruff	3	
	M-91	Key #18 Woodruff	2	



MASTER CLUTCH CONTROL PARTS
(Fig. 6)



F. & R. CLUTCH CONTROL LEVER
(Fig. 7)



F. & R. CLUTCH CONTROL PARTS
(Fig. 8)

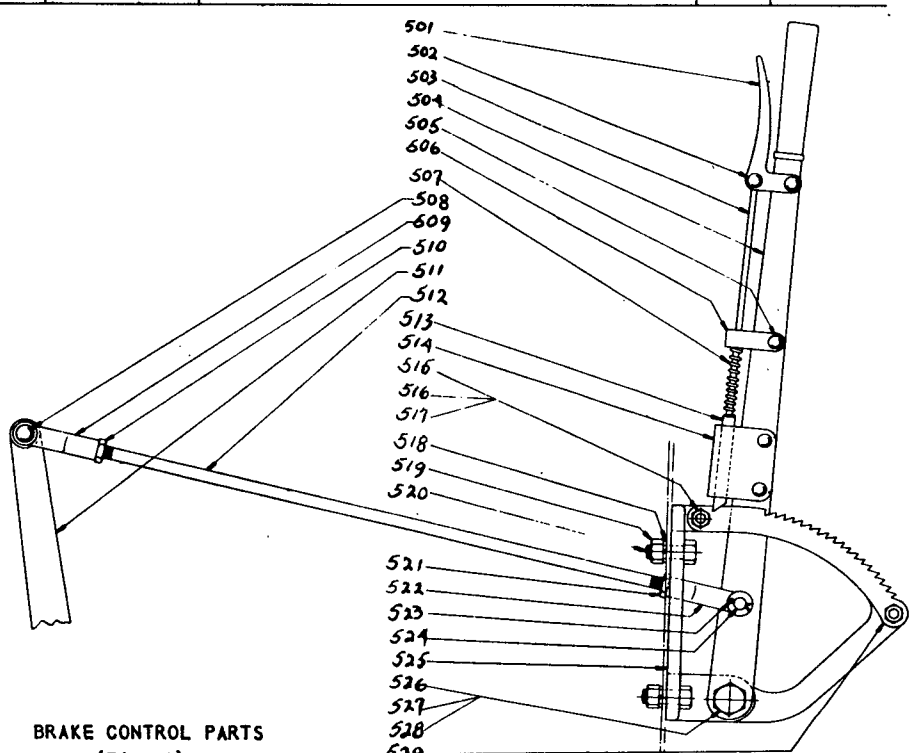
SHIFTING PARTS — FORWARD AND REVERSE CLUTCHES

(Figs. 7 & 8)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
451	R-11263	Arm - F. & R. Shifting	1	3.50
452	R-11816	Pin - Yoke	1	.15
453	M-19	Cotter Pin 3/32" x 1" Lg.	1	.007
454	R-17565	Yoke - Reach Rod	1	.65
455	M-38	Jam Nut - 3/4" U.S.S.	1	.11
456	R-11463	Rod - Reach.	1	2.25
457	M-38	Jam Nut - 3/4" U.S.S.	1	.11
458	R-17565	Yoke - Reach Rod	1	.65
459	R-11816	Pin - Yoke	1	.15
460	RSA-11254	Assembly - F. & R. Control Lever Includes R-11461 Guide and 25-8533 handle	1	9.00
461	R-11166	Bolt - Shoulder - F. & R. Lever.	1	.45
462	M-74	Nut - 1/2" Hex U.S.S.	1	.06
463	M-84	Lockwasher 1/2".	1	.017
464	R-11252	Bracket - F. & R. Lever.	1	8.25
465	M-74	Nut 1/2" Hex U.S.S.	2	.06
466	M-84	Lockwasher 1/2".	2	.017
467	M-7	Capscrew 1/2" x 1-1/2" Bracket to Cowl	2	.119
468	M-43	Bolt 3/8" x 2-1/4" Machine	2	.10
469	M-73	Nut - 3/8" U.S.S.	2	.029
470	M-83	Lockwasher 3/8".	2	.009
471	R-11253	Quadrant	2	1.65
472	R-11462	Latch - Control Lever.	1	
473	D-3555	Spring - Latch	1	.028
474	M-27	Setscrew - 1/2" x 1" U.S.S.	1	.094
475	M-35	Jam Nut 1/2" U.S.S. - Rod.	2	.04
476	R-11273	Rod - Shifting	2	.80
477	R-10353	Yoke - Rod	2	.30
478	R-11816	Pin - Yoke	2	.15
479	R-11268	Yoke - Clutch Shifting R.H.	1	3.75
480	R-11270	Cap - Shifting Yoke.	1	3.00
481	M-47	Bolt 1/2" x 1-1/2" Machine U.S.S.	4	.18
482	M-84	Lockwasher 1/2".	4	.017
483	M-74	Nut - 1/2" U.S.S. Hex.	4	.06
484	M-19	Cotter Pin 3/32" x 1".	4	.007
485	R-10114	Pin - yoke	2	.12
486	M-19	Cotter Pin 3/32" x 1".	2	.007
487	R-18469	Bracket - F. & R. Shifting Yoke L.H.	1	2.50
488	M-7	Capscrew 1/2" x 1-1/2" U.S.S.	4	.151
489	M-84	Lockwasher 1/2".	4	.017
490	M-74	Nut 1/2" U.S.S.	4	.06
491	R-11255	Bolt - Shoulder - Shifting Arm	1	1.00
492	1610	Fitting - 1/8" Zerk Grease Straight.	1	.03
493	R-11816	Pin - Yoke	2	.15
494	R-10353	Yoke - Rod	2	.30
495	R-11269	Yoke - Clutch Shifting L.H.	1	3.75
496	R-11270	Cap - Shifting Yoke.	1	3.00
497	R-18468	Bracket - F. & R. Shifting Yoke R.H.	1	2.50
498	RSA-11554	Assembly - F. & R. Shifting Collar	2	6.50

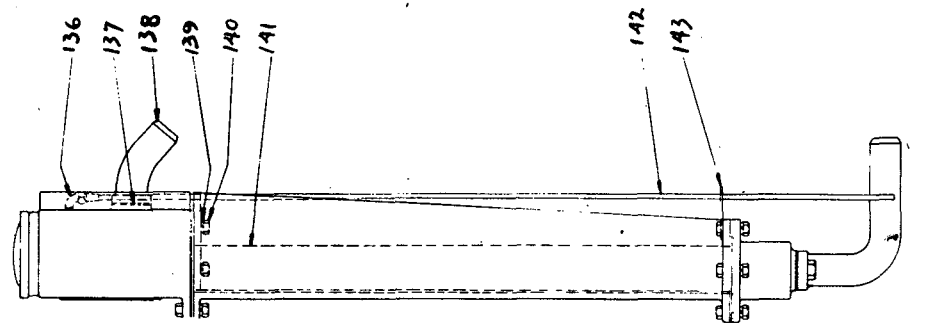
BRAKE CONTROL PARTS (Fig. 9)

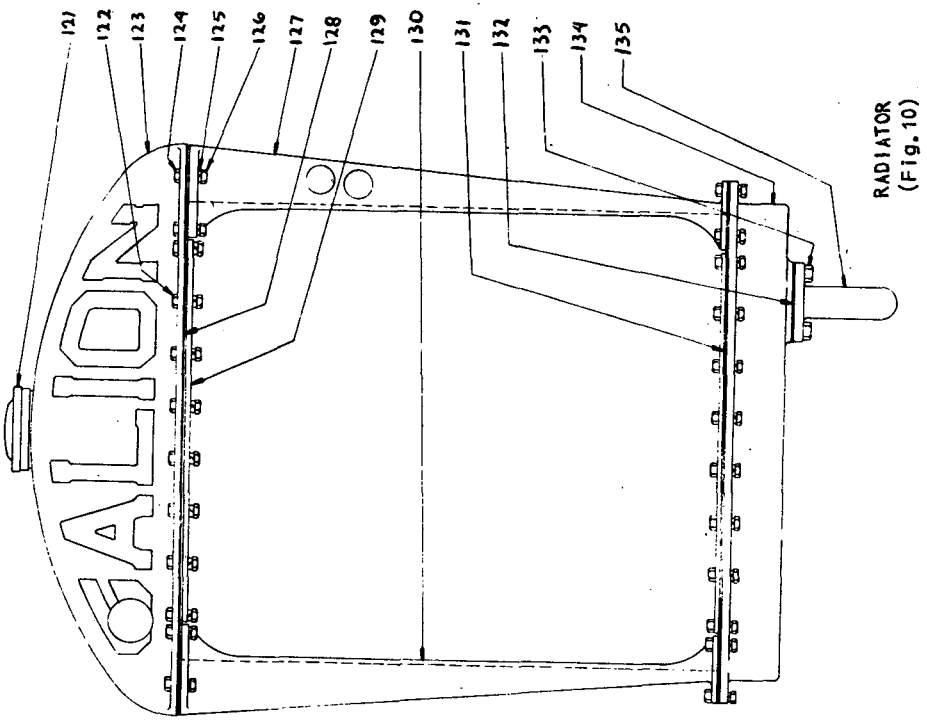
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
501	21-256	Handle - Latch	1	0.50
502	M-65	Rivet 1/4" x 1-1/4" R.H.	1	0.025
503	R-11135	Rod - Latch Reach.	1	0.25
504	RSA-11130	Lever Only - Brake	1	11.50
505	M-65	Rivet 1/4" x 1-1/4" R.H.	4	0.025
506	21-255	Guide - Reach Rod Dog.	1	0.25
507	21-259	Spring	1	0.03
508	R-11816	Pin.	1	0.15
509	R-10353	Yoke - Reach Rod	1	0.30
510	M-35	Nut - 1/2" Jam U.S.S.	1	0.04
511	R-11744	Arm - Brake (Refer to brake parts)		
512	R-11790	Rod Reach.	1	1.50
513	28-9304	Latch.	1	0.75
514	21-254	Guide - Dog.	1	1.25
515	M-43	Machine Bolt 3/8" x 2-1/4" for Bracket	2	0.10
516	M-73	Nut 3/8"	2	0.029
517	M-83	Lockwasher 3/8".	2	0.009
518	M-84	Lockwasher 1/2".	4	0.017
519	M-74	Nut 1/2" U.S.S. Brkt. Lever To Breast Plate	4	0.06
520	M-7	Capscrew 1/2" x 1-1/2" U.S.S. - Bracket Lever to Breast Plate.	4	0.119
521	M-35	Nut 1/2" Jam U.S.S.	1	0.04
522	R-10353	Yoke - Reach Rod	1	0.30
523	M-19	Cotter Pin 3/32" x 1".	2	0.007
524	R-11816	Pin.	1	0.15
525	R-11125	Bracket - Brake Lever.	1	9.25
526	R-11165	Bolt - Shoulder.	1	0.70
527	M-79	Nut 3/4" Hex	1	0.20
528	M-96	Flatwasher 3/4".	2	0.11
529	R-11126	Quadrant	1	1.25
	RSA-11131	Assembly - Brake Lever Includes Items 1, 2, 3, 4, 5, 6, 7, 13 and 14	1	11.60



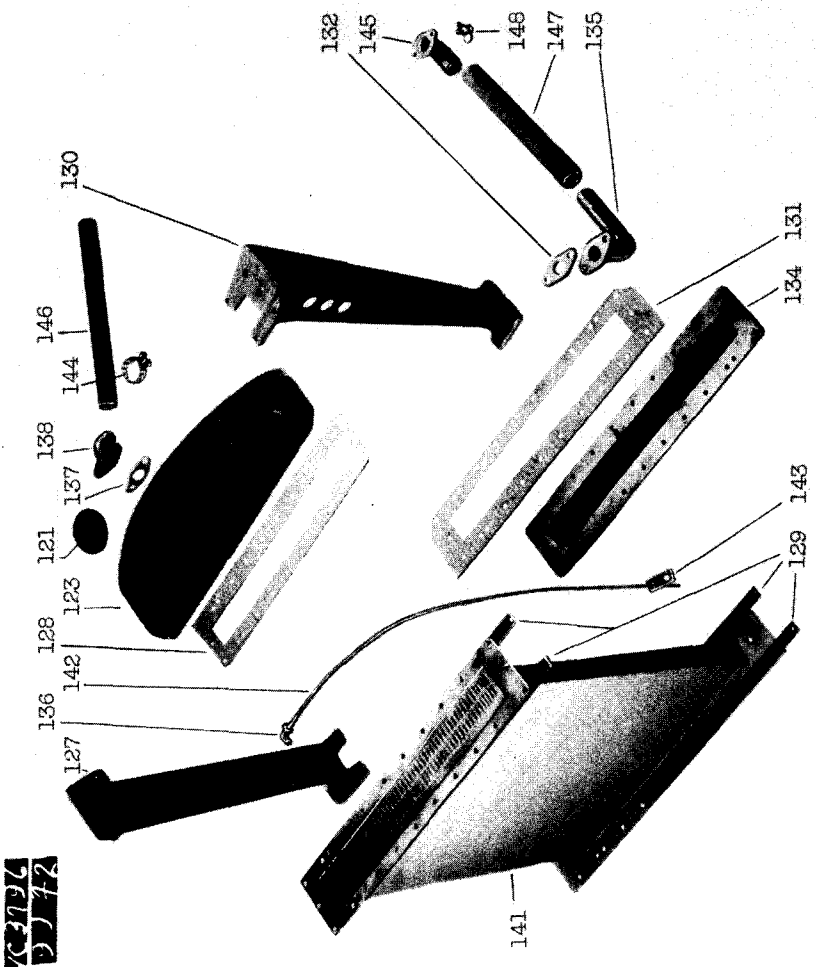
BRAKE CONTROL PARTS
(Fig. 9)

INDEX TO COOLING SYSTEM





RADIATOR
(Fig. 10)

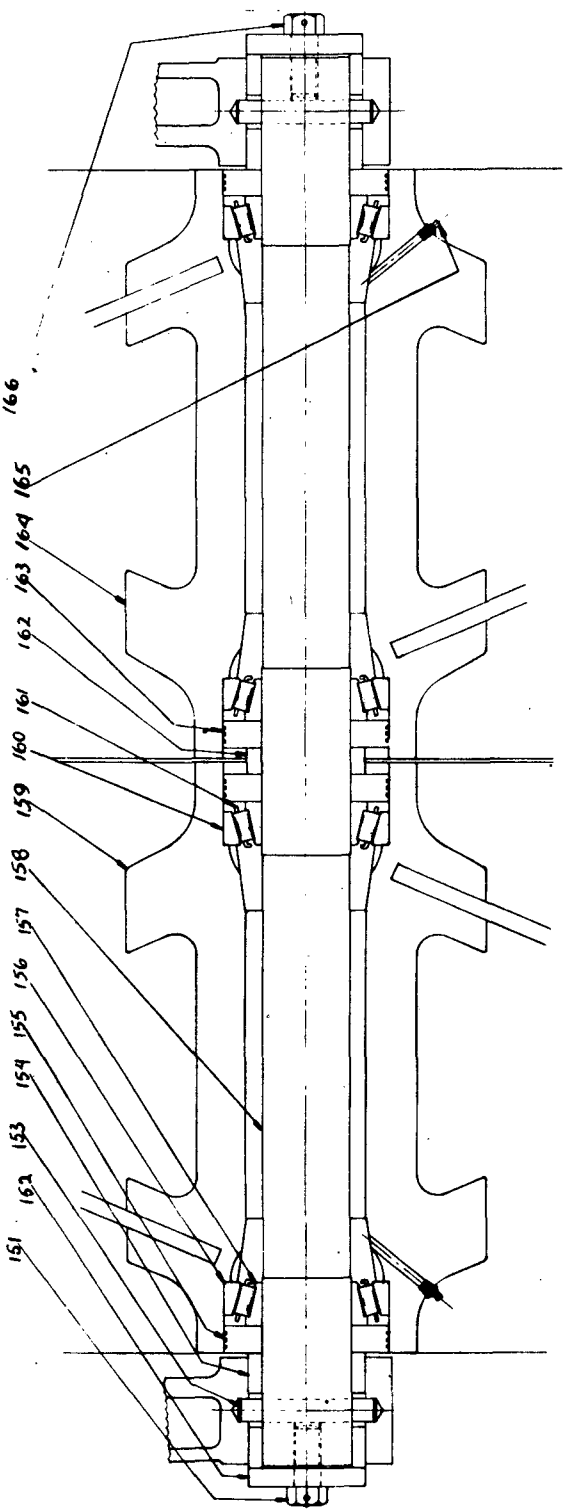


RADIATOR
(Fig. 11)

RADIATOR ASSEMBLY (Figs. 10 & 11)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
121	R-11305	Cap - Radiator	1	.50
122	M-2	Capscrew - 3/8" x 1-1/4" U.S.S.	14	.053
123	RSA-11799	Tank - Radiator Top	1	65.00
124	M-3	Capscrew - 3/8" x 1-1/2" U.S.S.	24	.059
125	M-83	Lockwasher 3/8"	52	.009
126	M-73	Nut 3/8" Hex U.S.S.	38	.029
127	R-11004	Side member - Right Hand	1	21.00
128	R-11371	Gasket - Top Tank	1	.20
129	R-11113	Header Strip - Radiator	4	1.30
130	R-11003	Side Member - Left Hand	1	21.00
131	R-11372	Gasket - Bottom Tank	1	.20
132	25-8193	Gasket - Radiator Outlet	1	.04
133	M-6	Capscrew 1/2" x 1-1/4" Radiator Inlet & Outlet	6	.105
134	R-23550	Tank - Radiator Bottom	1	33.80
135	R-11065	Outlet - Radiator Bottom	1	3.00
136	R-10036	Elbow - Overflow Pipe	1	.083
137	25-8193	Gasket - Radiator Inlet	1	.04
138	R-11064	Inlet - Radiator Top	1	1.50
139	M-83	Lockwasher 3/8"	52	.009
140	M-1	Capscrew - 3/8" x 1" U.S.S.	14	.045
141	R-11001	Core - Radiator	1	31.75
142	RSA-11420	Pipe - Radiator Overflow	1	.30
143	R-11709	Support - Overflow pipe	1	1.50
144	25-8294	Clamp - Hose	4	.05
145	R-12444	Inlet - Pump Connection	1	1.50
146	M-154	Hose - Radiator Inlet - Top 1-1/2" x 20" lg. See 25-8293	1	1.00
147	M-155	Hose - Radiator Outlet - Bottom 1-1/2" x 16" Lg. See 25-8293	1	.75
148	R-14764	Pet Cock - 1/8" - Radiator Drain	1	.20
	25-8293	Hose - 1-1/2" x 36" Lg. Sufficient for one machine when cut to 16" and 20" length	1	1.75
	R-11114	Bracket - Radiator Mounting	2	2.40
	R-11684	Bracket - Radiator Support	1	.17
	M-50	Bolt - 5/8" x 1-1/2" U.S.S. - Radiator Holding	2	.21
	M-86	Lockwasher 5/8"	2	.03
	M-94	Washer - plain 5/8"	2	.08

INDEX TO FRONT AXLE, ROLL, YOKE AND KING PIN



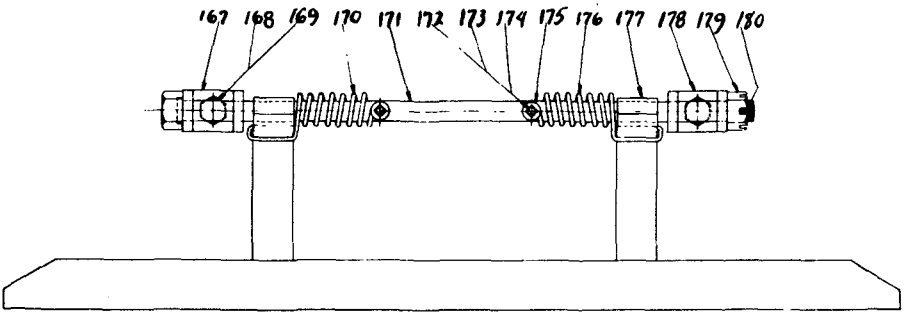
FRONT ROLLS & AXLE
(Fig. 12)

FRONT AXLE AND ROLL ASSEMBLY (Fig. 12)

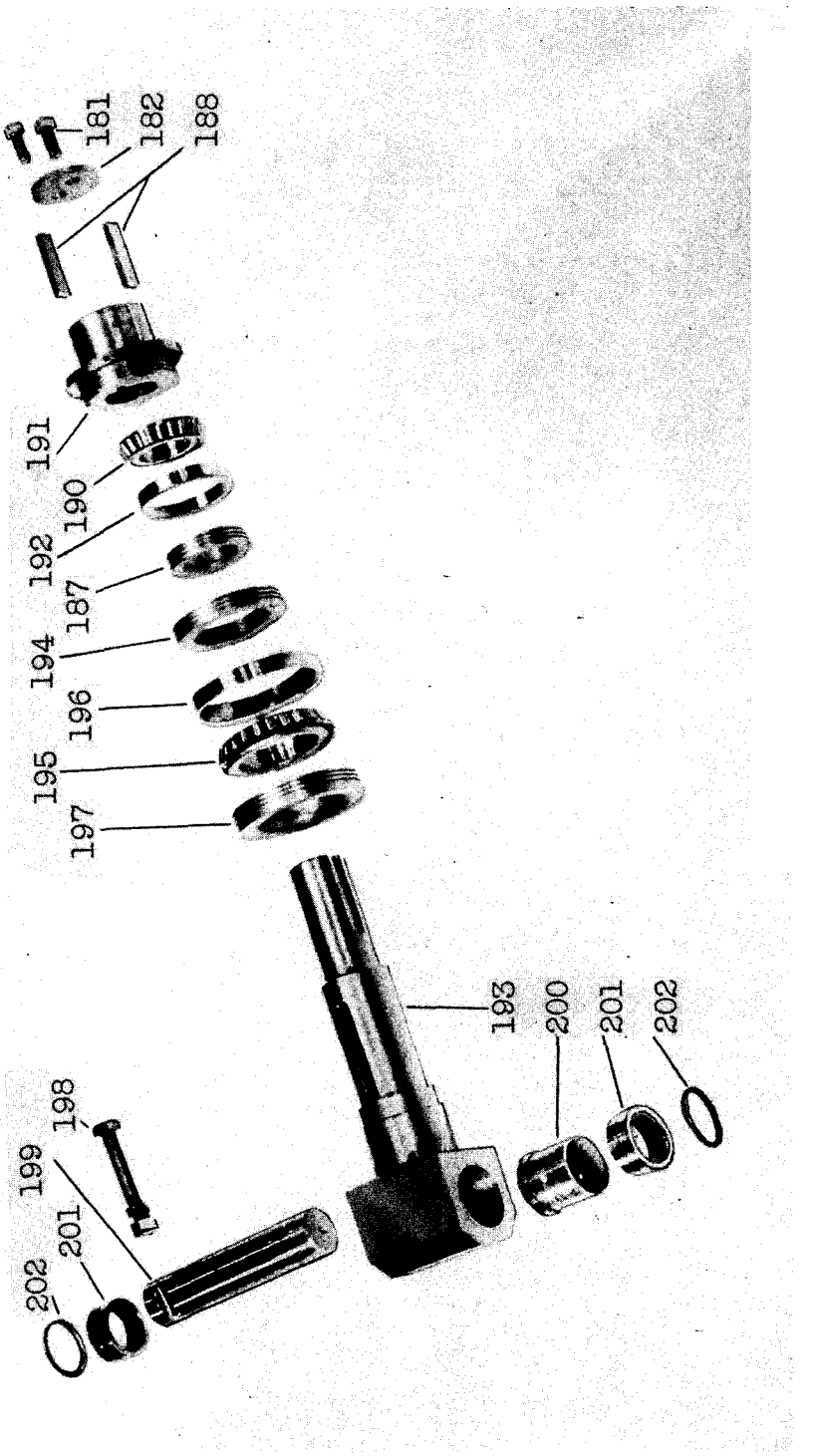
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
151	R-18085	Capscrew - 1" x 1-3/4" Lg.	2	0.05
152	R-14854	Washer - Adjusting Bushing	2	2.50
153	R-11445	Pin - Front Axle	2	0.80
154	R-11444	Bushing - Adjusting	2	7.30
155	R-11449	Collar - Dust.	2	4.80
156	R-10770	Cup - Roller Bearing - Timken #652	2	2.80
157	R-11468	Cone - Bearing - Timken #663	2	4.50
158	R-11442	Axle - Front	1	121.00
159	RSA-22441	Assembly - Front Roll.	1	1770.00
160	R-10770	Cup - Bearing - Timken #652.	2	2.80
161	R-11468	Cone - Bearing - Timken #663	2	4.50
162	R-11450	Spacer	1	1.70
163	R-11449	Collar - Dust.	2	4.80
164	RSA-22441	Assembly - Front Roll.	1	1770.00
165	1610	Alemite Lubricator 1/8" Straight	2	0.015
166	R-21123	Capscrew - Axle.	2	0.50

FRONT ROLL SCRAPERS (Fig. 13)

167	M-22	Cotter Pin 3/16" x 2".	2	0.016
168	D-3295	Nut - 1" Hex Slotted	2	0.33
169	R-15304	Bracket - Mounting	2	1.85
170	RSA-15540	Assembly - Scraper Blade	2	25.25
171	R-15305	Spring - Scraper - Right Hand.	2	0.30
172	M-92	Washer, Plain 3/8"	4	0.014
173	M-43	Machine Bolt 3/8" x 2-1/4" - Spring.	4	0.10
174	M-73	Nut - 3/8"	4	0.029
175	M-83	Lockwasher - 3/8".	4	0.009
176	RSA-15302	Bolt - Front Scraper Swivel.	2	7.25
177	R-15306	Spring - Scraper - Left Hand	2	0.30
178	M-17	Capscrew - 3/4" x 1-1/2" Scraper Mounting.	4	0.519
179	M-87	Lockwasher 3/4".	4	0.06
180	RSA-15303	Bracket - Scraper Mounting	2	1.87



FRONT SCRAPER
(Fig. 13)



KING PIN, SWIVEL PIN AND BEARINGS
(Fig. 14)

KING PIN HEAD, KING PIN, SWIVEL PIN, YOKE, & BEARING

(Figs. 14 & 15)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
181	R-15060	Capscrew - King Pin Cover	2	0.33
182	R-14207	Retainer - Cup	1	1.50
185	1610	Alemite Lubricator 1/8" Straight	4	0.015
186	R-18520	Head - King Pin	1	480.00
187	R-14211	Collar - Dust	1	2.30
190	R-14217	Cone - Bearing - Timken #495-A	1	2.75
191	R-13540	Cap - King Pin	1	15.25
192	29-8528	Cup - Bearing - Timken #493	1	1.10
193	R-14215	King Pin	1	80.00
194	R-14210	Collar - Dust	1	4.00
195	R-11783	Cone - Bearing - Timken #68450	1	4.25
196	R-11784	Cup - Bearing - Timken #68712	1	2.25
197	R-14209	Collar - Dust	1	7.20
198	R-11903	Bolt - Swivel Pin	1	1.50
199	R-14213	Pin - Swivel	1	21.125
200	R-15951	Spacer - Swivel Pin Bearing	1	1.375
201	R-14196	Bearing - R. B. A. 8476	2	1.50
202	R-14208	Washer - Swivel Pin	2	0.08
	M-70	Rivet - 3/4" x 2-3/4" R.H. King Pin Head to Frame	20	0.70
228	RSA-18499	Yoke - Front	1	480.00

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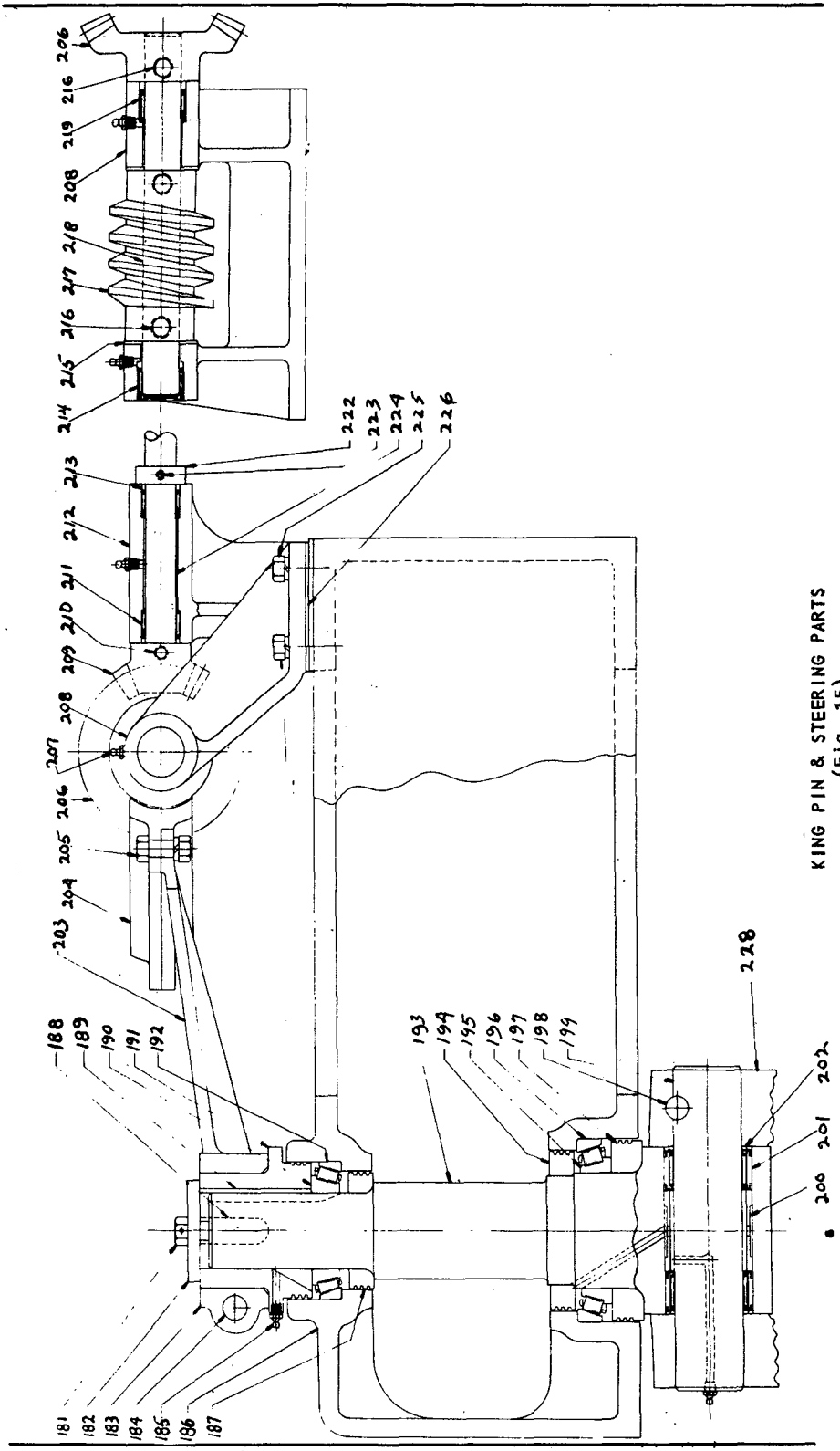
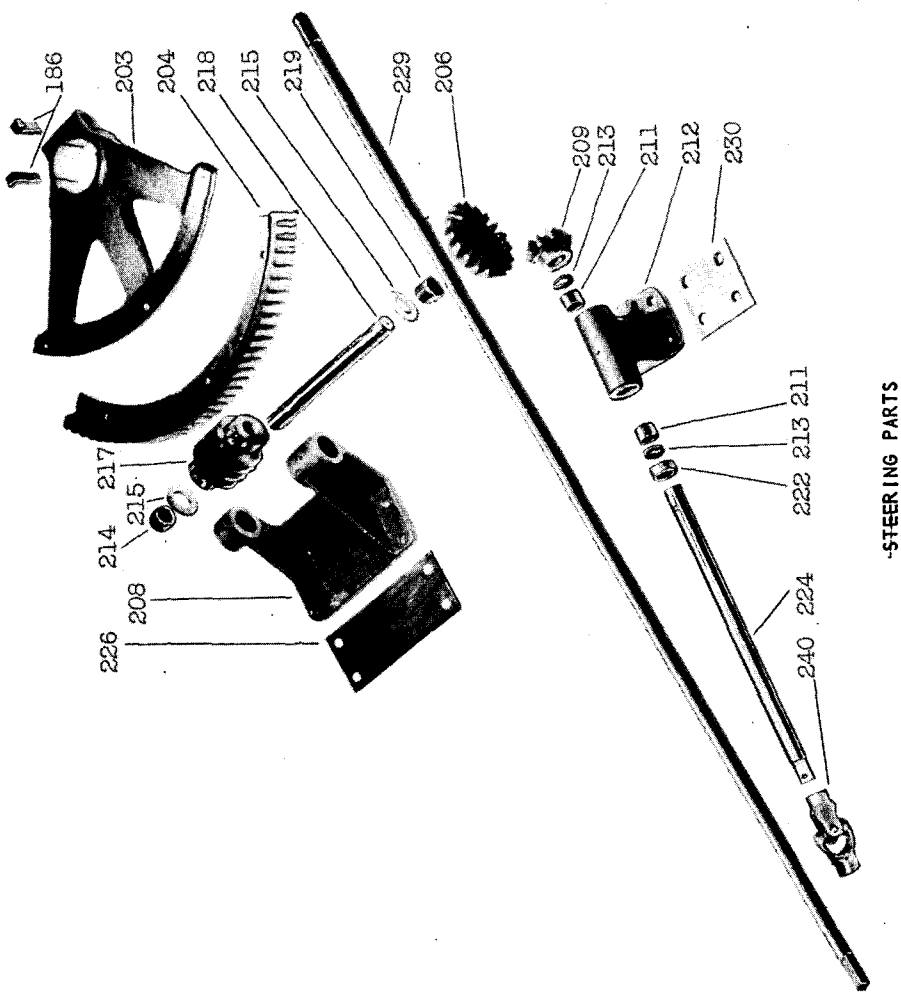
INDEX TO MANUAL STEERING PARTS



KING PIN & STEERING PARTS
(Fig. 15)



STEERING PARTS
(Fig. 16)

MANUAL STEERING PARTS (Fig. 15 & 16)

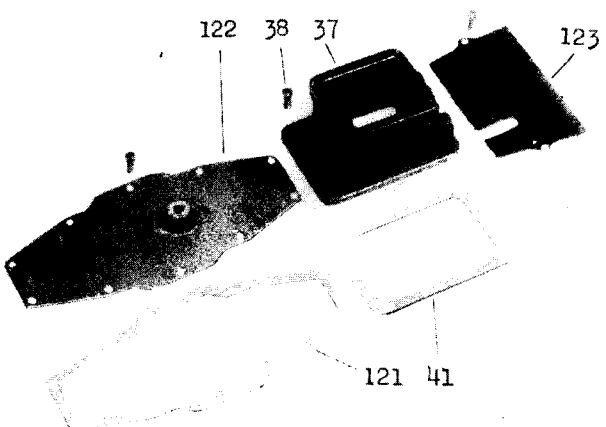
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	M-62	(Bolt - 1" x 6-1/4" U.S.S. Hex Machine	1	2.00
184	M-81	(Nut - 1" U.S.S.	1	0.37
	M-89	(Lockwasher 1"	1	0.08
185	1610	Lubrication Fitting 1/8" Straight.	1	0.015
188	R-18543	Key - Steering Spider.	2	0.50
189	R-15596	Key - 1" King Pin.	2	0.60
203	R-18541	Spider - Steering.	1	43.50
204	R-18542	Segment - Steering	1	30.50
	M-51	(Machine Bolt - 5/8" x 2" U.S.S.	3	0.25
205	M-77	(Nut - 5/8" U.S.S.	3	0.11
	M-86	(Lockwasher 5/8"	3	0.03
207	1610	Lubrication Fitting 1/8" Straight.	1	0.015
208	R-18514	Bracket - Steering Worm.	1	29.80
209	R-18510	Pinion - Steering Bevel.	1	2.10
210	M-32	Set Screw - Unbrake - 1/2" x 3/4".	1	0.01
211	R-18505	Bearing - Needle B-2016.	2	0.10
212	R-18508	Bracket - Steering Bevel Pinion Shaft.	1	12.00
213	R-18503	Felt - Seal.	2	
214	R-18517	Bearing - Needle for Worm - M24201	1	8.15
215	R-23437	Washer - Spacer.	2	
216	M-34	Set Screw - Unbrake - 3/4" x 3/4".	2	0.015
217	R-18512	Worm - Steering.	1	12.75
218	R-18513	Shaft - Worm	1	7.00
219	R-18516	Bearing - Needle for Worm - B-2420	1	0.25
206	R-18515	Gear - Steering Bevel.	1	8.15
222	R-18504	Collar - Bevel Pinion Shaft.	2	0.40
223	M-30	Set Screw - Unbrake - 1/4" x 3/8".	2	
224	R-18509	Shaft - Steering Bevel Pinion.	1	8.30
225	M-16	Capscrew - 5/8" x 3-3/4" SAE Steering Bracket.	4	0.40
226	R-23811	Shim - Steering Worm	4	1.00
227	M-14	Capscrew - 5/8" x 2-3/4" SAE Steering Bracket.	4	0.31
240	SAD-597	Universal Joint.	2	2.15
229	R-12065	Shaft - Steering - long.	1	19.20
230	R-23812	Shim - Bevel Gear Adjusting.	4	0.40
	M-7	Capscrew - 1/2" x 1-1/2" U.S.S. Bracket to Cowl.	2	0.119
	M-5	Capscrew - 1/2" x 1" U.S.S. Bracket to Cowl	1	0.094
	M-74	Nut - 1/2" Hex U.S.S.	3	0.06
	M-84	Lockwasher - 1/2".	3	0.017
	M-78	Nut - 5/8" S.A.E.	8	0.11
	M-86	Lockwasher - 5/8".	8	0.03
	M-94	Flat Washer - 5/8"	8	0.08

Note: For Steering Wheel Refer To Controls.

INDEX TO TRANSMISSION

TRANSMISSION (Fig. 17)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
121	R-18451	Transmission Case Cover Gasket	1	
122	RSA-20514	Cover - Transmission Case	1	11.00
123	R-18496	Cover - Case Cover	1	5.10
	RSA-20033	Sub-Frame - Support Engine and Trans.	1	
94	R-18760	Transmission Case	1	530.00
	D-4872	Bolt - 1/2" x 2" S.A.E. - Engine to Trans.	10	0.16
	M-5	Capscrew - 1/2" x 1" U.S.S. - Clutch Cover Plate	2	0.094
	M-74	Nut - 1/2" Hex U.S.S. - Clutch Cover Plate	2	0.06
	M-84	Lockwasher 1/2" - Clutch Cover Plate	2	0.017
	M-4	Capscrew - 1/2" x 3/4" Trans. Case Cover	10	0.083
	M-84	Lockwasher - 1/2" - Trans. Case Cover	10	0.017
	M-139	Machine Bolt - 1/2" x 7" U.S.S. Transmission to Sub-frame	4	0.40
	M-47	Machine Bolt - 1/2" x 1-1/2" U.S.S. Transmission to Sub-frame	12	0.18
	M-97	Plug - Drain - 2-1/2"	2	1.50



TRANSMISSION COVERS AND GASKETS
(Fig. 17)

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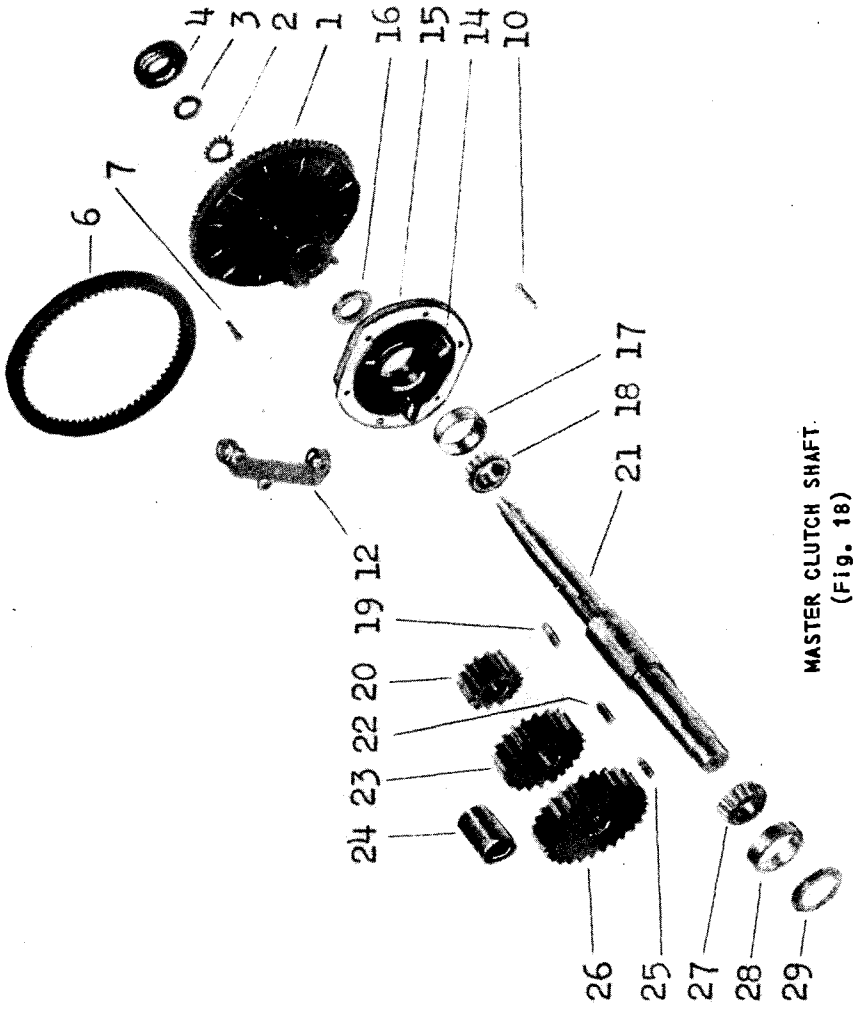
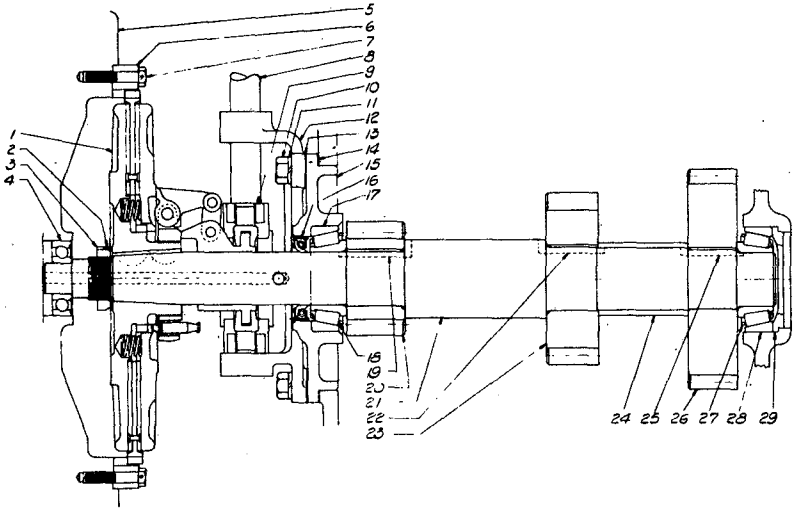


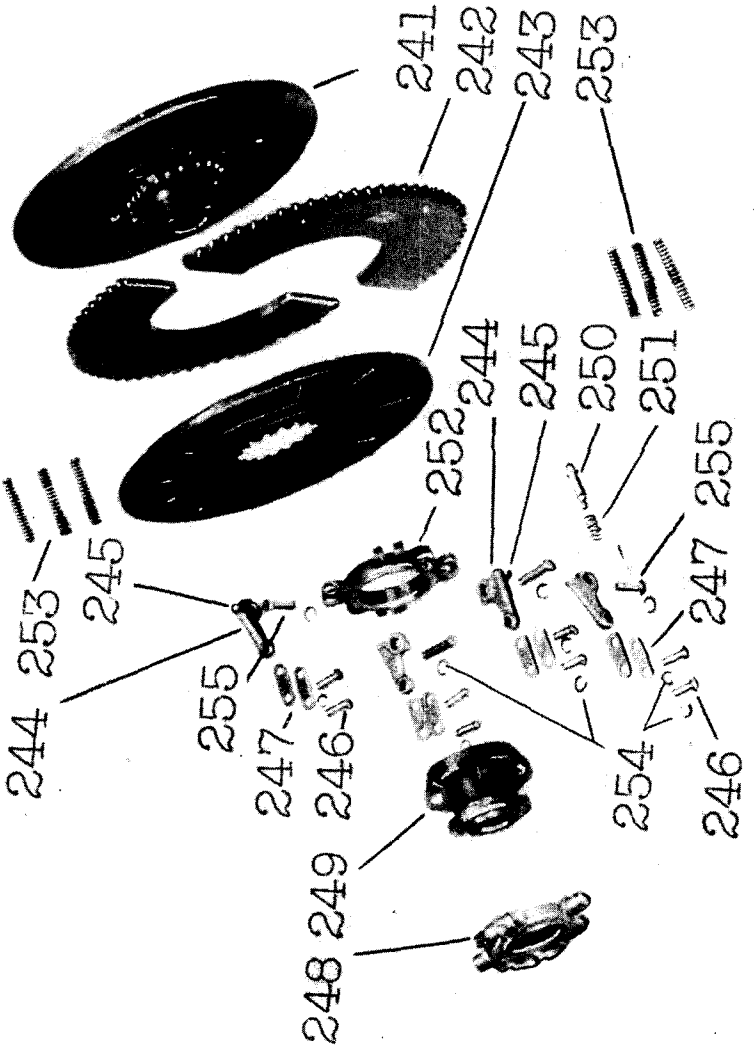
MASTER CLUTCH SHAFT
(Fig. 18)

MASTER CLUTCH SHAFT ASSEMBLY (Figs. 18 & 19)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
1	R-17064	Clutch - Master Complete	1	30.50
2	R-17067	Lockwasher - Clutch Shaft	1	
3	R-17066	Lock Nut - Clutch Shaft	1	0.20
4	R-11245	Bearing - Clutch Pilot #ND-7305	1	0.75
6	R-17065	Ring - Clutch Driver	1	8.50
7	R-17068	Capscrew - Clutch Driving Ring	8	0.05
12	R-18459	See page 5		
13	R-19394	Gasket - Yoke Bracket	3	
14	R-18478	Gasket	6	
15	R-18458	Cup - Clutch Shaft Bearing	1	9.80
16	R-18462	Oil Seal - #275124	1	0.20
17	D-7355	Cup - Bearing - Timken #3525	1	1.00
18	R-18485	Cone - Bearing - Timken #3578	1	1.25
19	R-18482	Key - 1/4" x 1/2" x 1-15/16" Lg.	1	0.07
20	R-18430	Pinion - Low Speed	1	2.90
21	R-18426	Shaft - Clutch	1	20.50
22	R-18483	Key - 1/4" x 1/2" x 1-11/16" Lg.	1	0.05
23	R-18429	Gear - Intermediate	1	8.25
24	R-18428	Spacer	1	1.00
25	R-18484	Key - 1/2" x 1/2" x 1-1/2" Lg.	1	0.05
26	R-18427	Gear - High Speed	1	14.25
27	R-18485	Cone - Bearing - Timken #3578	1	1.25
28	D-7355	Cup - Bearing - Timken #3525	1	1.00
29	R-21323	Plate - Bearing	1	0.33
	M-6	Capscrew - 1/2" x 1-1/4" Lg. U.S.S.	6	0.105
	M-84	Lockwasher - 1/2"	6	0.017



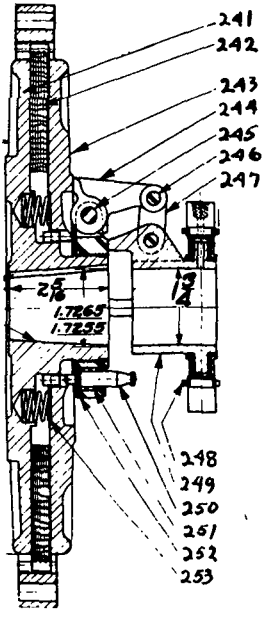
MASTER CLUTCH SHAFT
(Fig. 19)



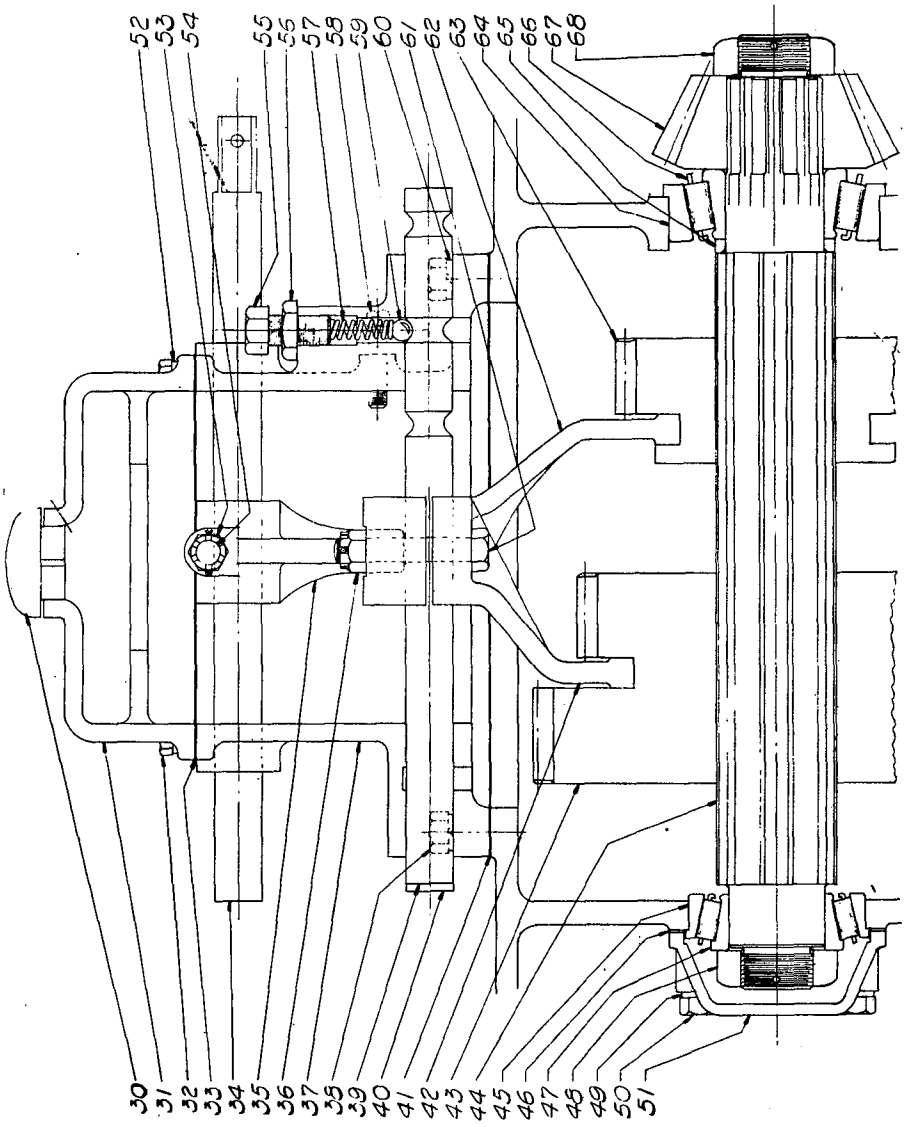
MASTER CLUTCH
(Fig. 20)

MASTER CLUTCH (Fig. 20 & 21)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
241	R-17064-6158	Hub and Back Plate	1	
242	R-17064-6340-C	Driving Plate or Disc (Moulded)	1	
243	R-17064-5791	Plate - Floating	1	
244	R-17064-103F	Lever - Finger	4	
245	R-17064-106A	Pin-Finger	4	
246	R-17064-1968A	Pin - Lever Link	8	
247	R-17064-119B2	Link - Lever	8	
248	R-17064-117C8S	Collar - Cone with Bolts & Nuts (Optional)	1	
	R-17064-117C8	Collar - Cone with Bolts & Nuts (Optional)	1	
249	R-17064-2137	Sleeve - Sliding	1	
250	R-17064-2245	Pin - Adjusting Lock	1	
251	R-17064-115	Spring - Adjusting Lock Pin	1	
252	R-17064-1990	Yoke - Adjusting	1	
253	R-17064-A-1069	Spring - Release	6	
254	R-17064-M642	Snap Ring	8	
255	R-17064-M641	Snap Ring	4	
	R-17064-A60 Optional	Assembly - Adjusting Yoke Includes 1990, 103F, 106A, M-641, 2245 and 115	1	
	R-17064-A3 Optional	Assembly - Adjusting Yoke Includes 1990, 103F, 106A, M-641, 2245 and 115	1	
	R-17064-S3 Optional	Assembly - Sliding Sleeve Includes 2137, 119B2, 1968A, M642 and 117C8	1	
	R-17064-S384 Optional	Assembly - Sliding Sleeve Includes 2137, 119B2, 1968A, M642 and 117C8S.	1	



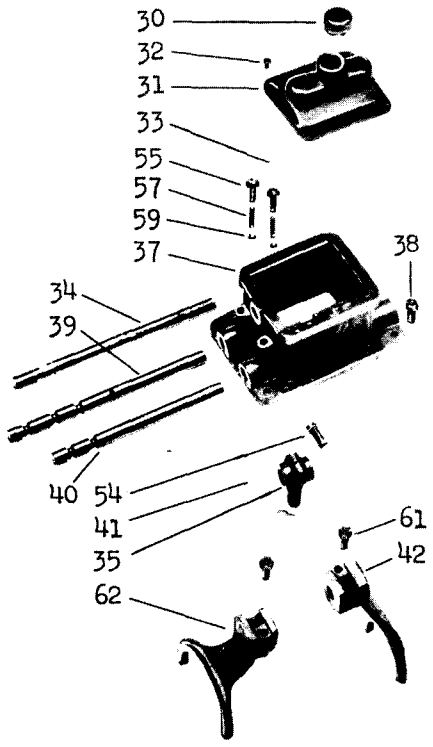
MASTER CLUTCH
(Fig. 21)



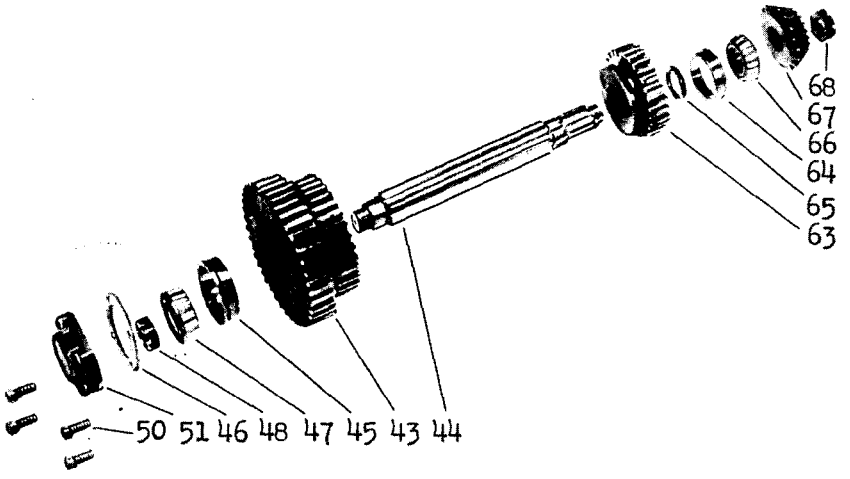
BACK GEAR SHAFT & SHIFT PARTS
(Fig. 22)

GEAR SHIFT BOX ON TRANSMISSION (Fig. 22 & 23)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
30	21-454	Breather Cap	1	0.15
31	R-11103	Cover - Gear Shift Box	1	11.25
32	M-1	Capscrew - 3/8" x 1" U.S.S.	6	0.045
33	R-11400	Gasket - Gear Shift Cover.	1	0.04
34	R-11156	Shaft - Gear Shift Arm	1	3.50
35	R-11097	Arm - Gear Shifter	1	2.00
36	M-74	Nut - 1/2"	1	0.06
37	R-18449	Housing - Gear Shift	1	33.25
38	M-7	Capscrew - 1/2" x 1-1/2" U.S.S.- Housing To Transmission.	10	0.119
39	R-11099	Shaft - Low and Intermediate Shifting.	1	3.25
40	R-11100	Shaft - High Shift Fork.	1	2.80
41	R-18450	Gasket - Gear Shift Housing.	1	
42	R-10997	Shifter - Intermediate and Low	1	5.00
52	M-83	Lockwasher - 3/8".	1	0.009
53	M-75	Nut and M-84 Washer 1/2" S.A.E.	1	0.077
54	R-11647	Capscrew - 1/2" x 2-3/4" S.A.E.	1	0.21
55	M-11	Capscrew - 5/8" x 1-1/4"	2	0.19
56	M-37	Nut - Jam - 5/8"	2	0.07
57	R-11339	Spring	2	0.028
58	M-26	Setscrew - 3/8" x 2" U.S.S. Cup Point.	2	0.10
59	29-8525	Ball 15/32" Diameter	2	0.50
60	M-84	Lockwasher - 1/2".	10	0.017
61	R-10109	Capscrew - 1/2" x 2-1/2" S.A.E. - Lever.	1	0.18
62	R-10996	Shifter - High Gear.	1	5.00
	M-12	Capscrew - 5/8" x 1-3/4" U.S.S. Shift Shaft	3	0.23
	M-43	Machine Bolt 3/8" x 2-1/4" U.S.S. - Lever.	1	0.10



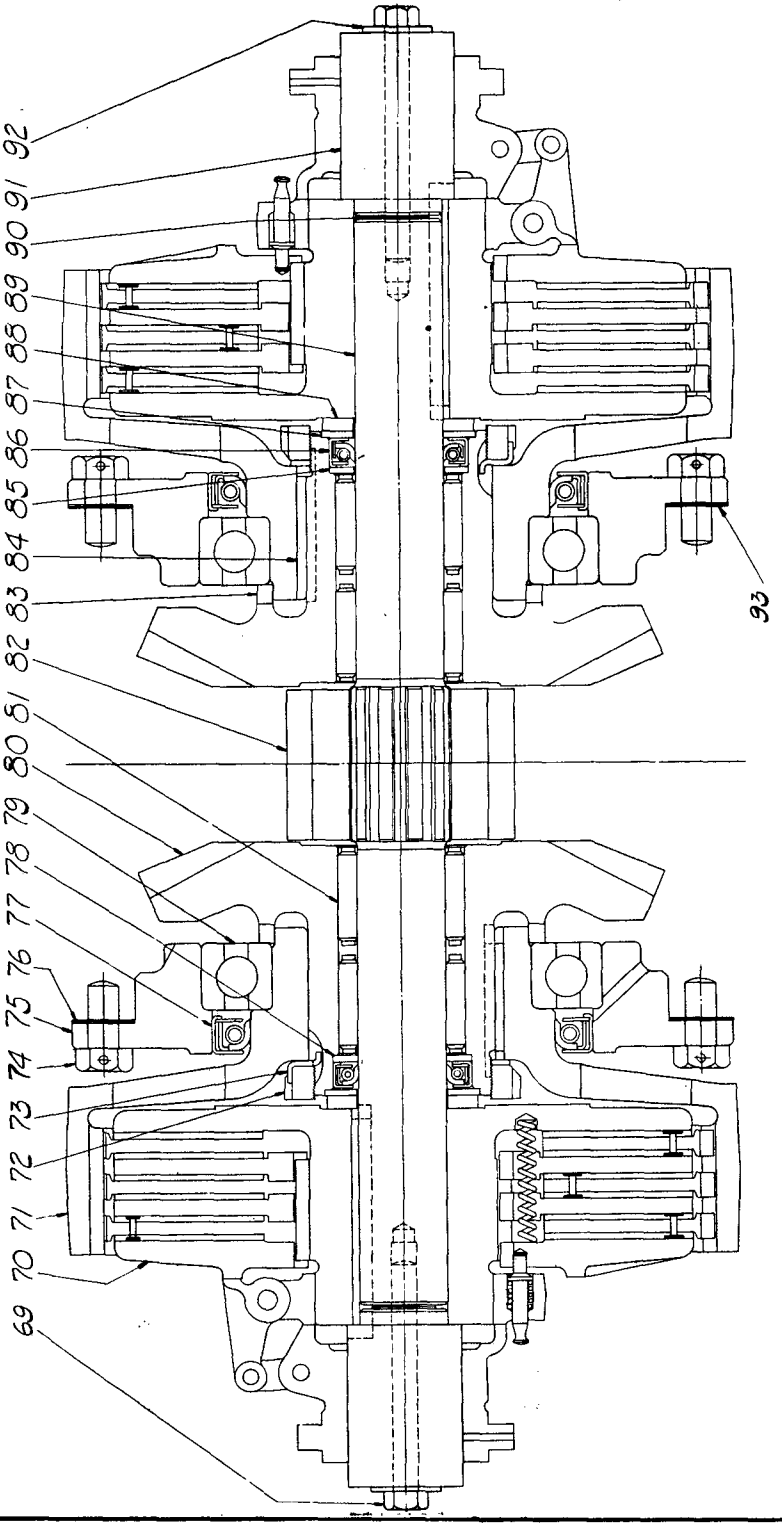
(Fig. 23) GEAR SHIFT BOX



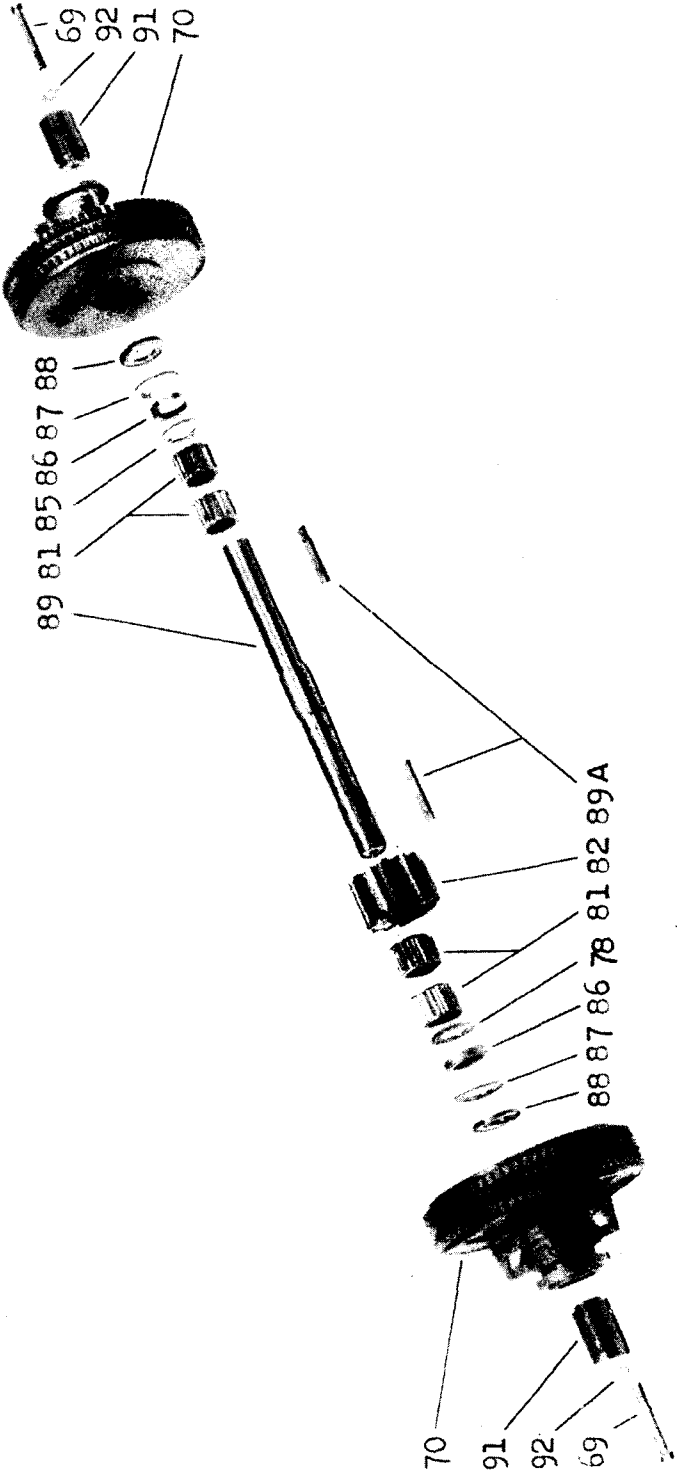
BACK GEAR SHAFT
(Fig. 24)

BACK GEAR SHAFT (Fig. 22 & 24)

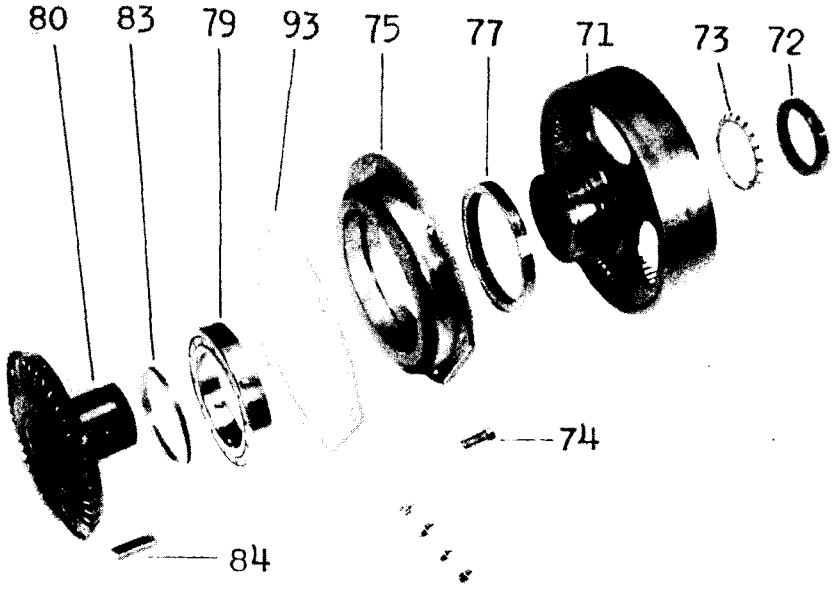
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
43	R-18453	Gear - Low and Intermediate Slide. . . .	1	63.00
44	R-18454	Shaft - Back Gear.	1	21.00
45	R-18487	Cup - Bearing - Timken 3720-B.	1	0.75
46	R-18461	Gasket - Bearing Cover	1	
47	R-18486	Cone - Bearing - Timken 3775	1	1.25
48	R-17409	Nut - 1-1/2" S.A.E. Slotted.	1	0.50
49	M-84	Lockwasher - 1/2".	6	0.017
50	M-9	Capscrew - 1/2" x 2" U.S.S.	6	0.151
51	R-18460	Cover - Bearing - Back Gear Shaft. . . .	1	3.50
63	R-18470	Gear - High Speed Slide.	1	14.30
64	R-18489	Cup - Bearing - Timken 532-B..	1	2.00
65	R-21326	Spacer - Back Gear Shaft	1	0.12
66	R-18488	Cone - Bearing - Timken 540.	1	2.25
67	R-18452	Pinion - Bevel	1	5.25
68	R-17409	Nut - 1-1/2" S.A.E. Slotted.	1	0.50



FIRST COUNTERSHAFT AND CLUTCHES
(Fig. 25)

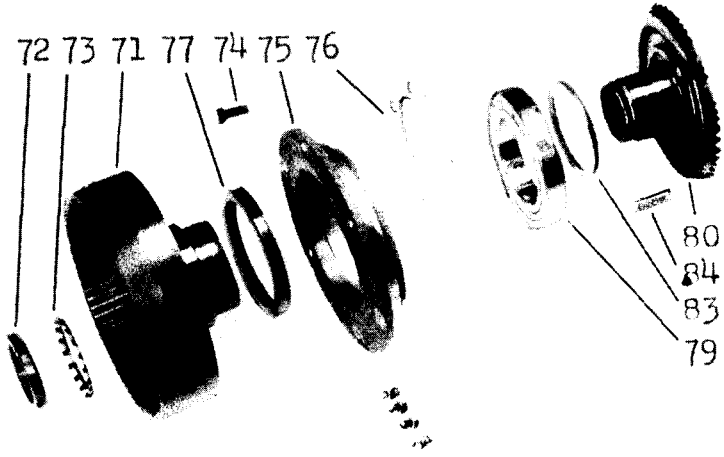


FIRST COUNTERSHAFT & CLUTCHES
(Fig. 26)



BEVEL GEAR & DRUM (RIGHT)

(Fig. 27)

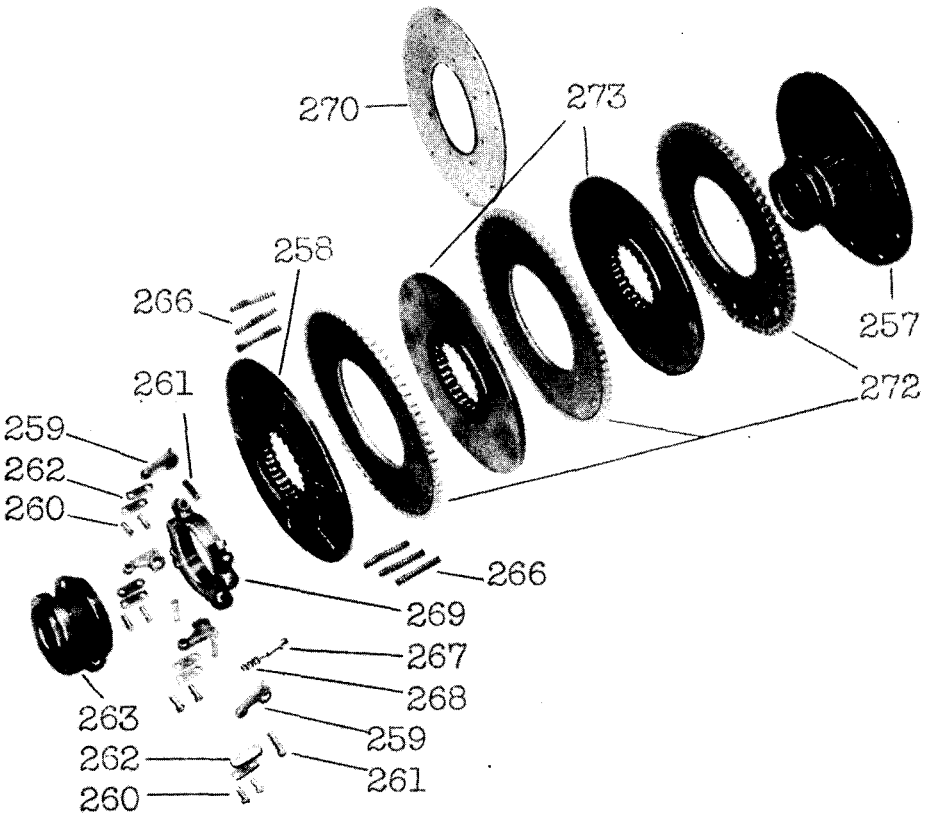


BEVEL GEAR & DRUM (LEFT)

(Fig. 28)

FIRST COUNTERSHAFT AND CLUTCHES (Fig. 25-28)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
69	M-10	Capscrew - 1/2" x 4-1/2" - Cts. Ext.	2	0.30
70	RSA-18474-A	Assembly - F & R Clutch Complete	2	65.00
71	R-18433	Wheel - Clutch	2	36.00
72	R-18440	Nut - Lock	2	1.25
73	R-18439	Lockwasher	2	0.125
74	R-11651	Capscrew	12	0.15
75	R-18437	Cup - Bearing	2	24.40
76	R-11316	Gasket - Thin - Bearing Cup	6	
77	R-18438	Seal - Oil No. 7506	2	1.30
78	R-18464	Plate - Bearing	1	0.20
79	R-18435	Bearing - SKF-6126	2	9.70
80	R-18432	Gear - Bevel	2	27.20
81	R-18490	Bearing - Roller - 2" long	4	1.00
82	R-18443	Pinion - First Countershaft	1	7.75
83	R-18434	Spacer	2	0.40
84	R-18495	Key - 3/8" x 3/4" x 2-1/2" Lg.	2	0.20
85	R-18464	Plate - Bearing	1	0.20
86	R-18462	Oil Seal - Countershaft #275124	2	0.20
87	R-18466	Retainer - Oil Seal - Bevel Gears	2	0.40
88	R-18465	Washer - Thrust	2	0.40
89	R-18442	Countershaft - First	1	14.50
89A	R-19165	Key - 3/8" x 9/16" x 4" Lg.	2	0.25
90	R-18687	Shim	8	
91	R-18444	Extension - Countershaft	2	4.00
92	M-93	Plain Washer 1/2"	2	0.035
93	R-11664	Gasket - Thick - Bearing Cup	2	
	R-11486	Capscrew	8	0.02

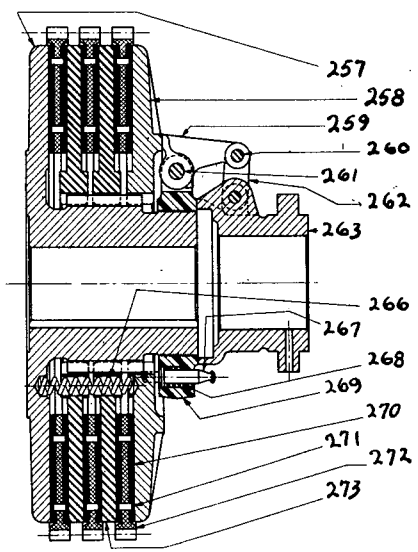


FORWARD AND REVERSE CLUTCH

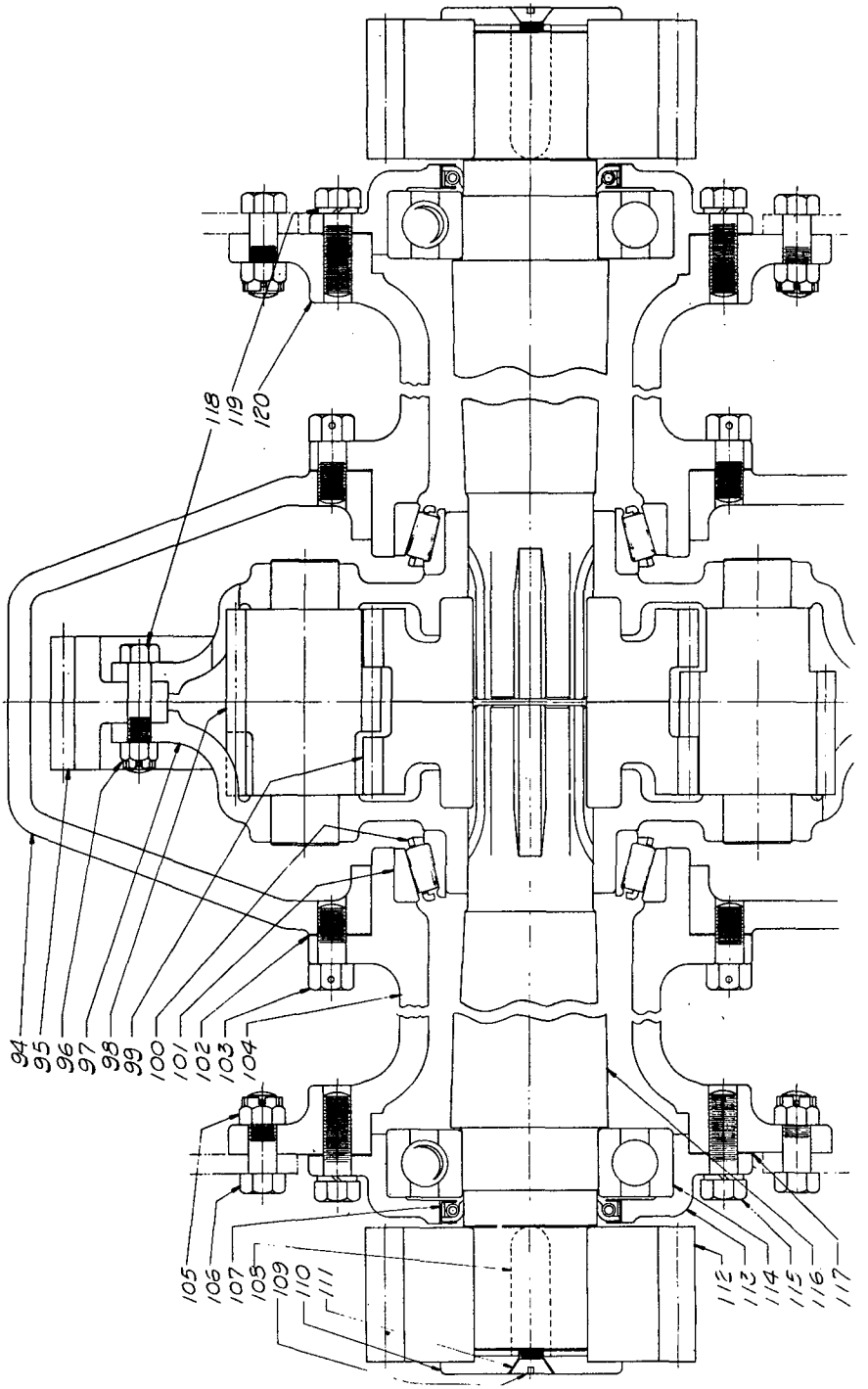
(Fig. 29)

FORWARD AND REVERSE CLUTCHES (Figs. 29&30)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
257	R-18474-A5122	Hub and Back Plate.	2	
258	R-18474-6497	Plate - Floating.	2	
259	R-18474-103F	Lever - Finger.	8	
260	R-18474-1968A	Pin - Finger Lever.	16	
261	R-18474-106A	Pin - Finger.	8	
262	R-18474-119B2	Link - Lever.	16	
263	R-18474-102FXG	Sleeve - Sliding.	2	
264	R-18474-M642	Snap Ring	16	
265	R-18474-M641	Snap Ring	8	
266	R-18474-2011	Spring - Release.	12	
267	R-18474-114	Pin - Adjusting Lock.	2	
268	R-18474-115	Spring - Adjusting Lock Pin	2	
269	R-18474-104-C10	Yoke - Adjusting.	2	
270	R-18474-A5223	Disc - Friction - Replaced by and interchangeable with R-18474-14 .	12	
	R-18474-112-B11½	Disc - Friction - Replaced by and interchangeable with R-18474-14 .	12	
	R-18474-14	Disc - Friction - Replaces and interchangeable with R-18474-A5223 and R-18474-112-B11½.	12	
271	R-18474-M116	Rivet - Disc 9/64" x 7/16".	144	
272	R-18474-06310G	Assembly - Driving Plate with Disc (interchangeable)	6	
	R-18474-06310A	Assembly - Driving Plate with Disc (interchangeable)	6	
273	R-18474-5273	Plate - Center.	4	
	R-18472-A4	Assembly - Adjusting Yoke Includes 104-C10, 103F, 106A, M641, 114 and 115	2	
	R-18474-S246	Assembly - Sliding Sleeve Includes 102FXG, 119B2, 1968A and M642 . .	2	



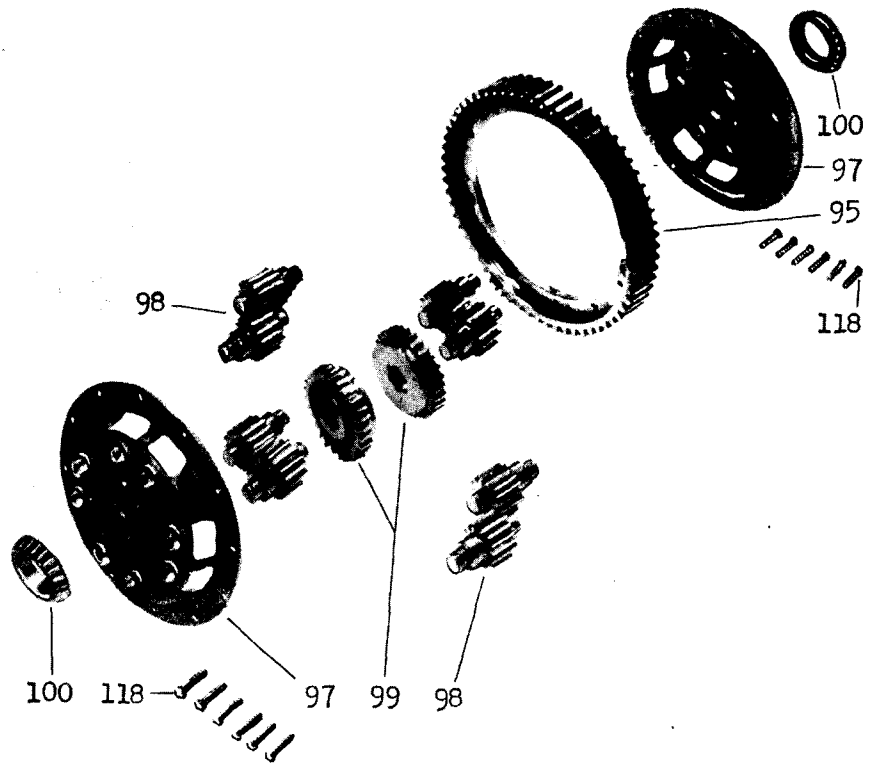
FORWARD AND REVERSE CLUTCH
(Fig. 30)



DIFFERENTIAL & SECOND COUNTERSHAFT
(Fig. 31)

DIFFERENTIAL ASSEMBLY (Fig. 31 & 32)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
95	R-10962	Gear - Ring	1	62.00
96	M-76	Nut - 1/2" S.A.E. Cast'l.	12	0.04
97	R-10967	Housing - Differential.	2	40.00
98	R-10963	Pinion - Differential	8	7.50
99	R-24444	Gear - Differential	2	15.00
100	29-8520	Cone - Bearing - Timken #594.	2	3.50
101	29-8529	Cup - Bearing - Timken #592	2	2.75
103	R-11651	Capscrew - 5/8" x 1-1/2" Lg.	12	0.15
118	R-11598	Capscrew - 1/2" x 2-1/4" S.A.E. Hex . .	12	0.165
	M-20	Cotter Pin - 1/8" x 1" Lg.	12	0.001

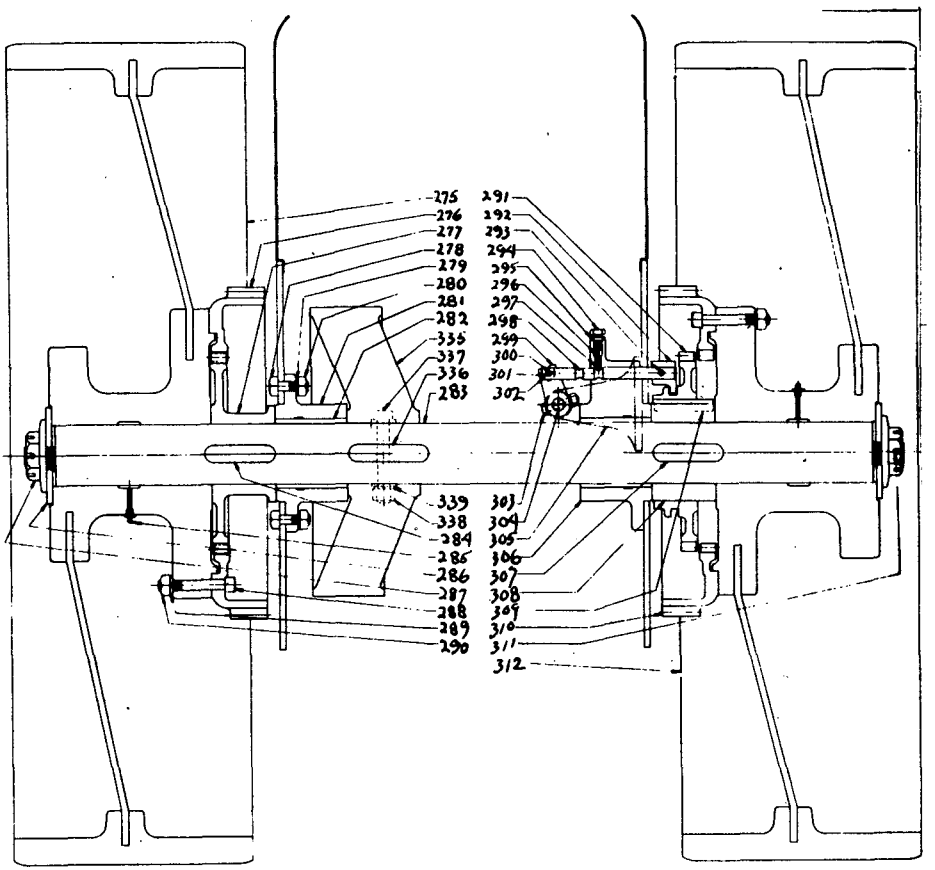


DIFFERENTIAL ASSEMBLY
(Fig. 32)

SECOND COUNTERSHAFT (Fig. 31)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
102	R-12336	Shim - Bearing Housing	As Req.	
104	R-11716	Housing - Bearing - Right Hand	1	66.00
105	M-78	Nut - SAE Hex 5/8" Countershaft to Frame	12	0.11
105	M-86	Lockwasher - 5/8" Countershaft to Frame.	12	0.03
106	M-53	Machine Bolt - 5/8" x 2" - SAE Countershaft to Frame	6	0.25
106	M-54	Machine Bolt - 5/8" x 2-3/4" SAE Countershaft to Frame	6	0.31
107	R-24226	Oil Seal No. 400230.	2	0.25
108	R-16129	Key 5/8" x 7/8" x 2-1/2" Lg.	2	0.40
109	M-98	Machine Screw -1/2-13 x 1-1/4" Cts. Hd..	2	
110	R-11741	Retainer - Bull Pinion	2	1.00
111	M-85	Lockwasher - Shakeproof 1/2"	2	
112	R-10970	Pinion - Drive	2	19.00
113	R-24220	Retainer - Bearing	2	10.00
114	R-24225	Bearing ND-1315.	2	7.50
115	M-12	Capscrew - 5/8" x 1-3/4"-Bearing Cup . .	12	.023
116	R-24221	Countershaft - Second.	2	36.50
117	R-11797	Gasket - Bearing Housing Retainer. . . .	4	
119	M-86	Lockwasher - 5/8"-Bearing Cup.	12	0.03
120	R-11715	Housing - Bearing - Left Hand.	1	66.00
	RSA-24222	Countershaft Assembly Complete	2	

INDEX TO REAR ROLL, DIFFERENTIAL LOCK AND REAR AXLE



REAR ROLLS - AXLE AND DIFFERENTIAL LOCK

(Fig. 33)

DIFFERENTIAL LOCK (Fig. 33)

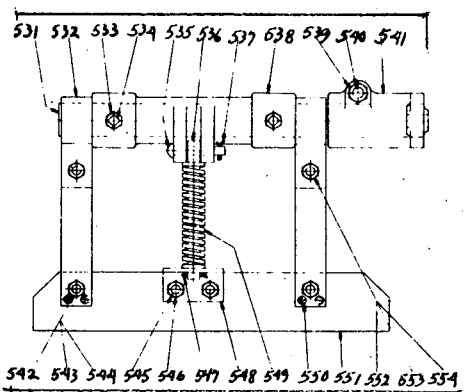
Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
291	R-21917	Lock - Differential	1	58.00
292	R-21927	Yoke - Differential Lock	1	5.70
293	M-48	Bolt - Machine 1/2" x 2-1/2" S.A.E. For Fork	1	0.20
294	M-11	Capscrew 5/8" x 1-1/4" U.S.S. - Lock Plunger	1	0.19
295	M-37	Nut 5/8" Jam Hex - Lock Plunger	1	0.07
296	R-11339	Spring	1	0.28
297	29-8525	Ball	1	0.50
298	R-21928	Shaft - Differential Shifter	1	2.25
299	R-21926	Yoke - Differential Shifter	1	2.40
300	21-306	Pin	1	0.20
301	M-18	Cotter Pin - 1/16" x 1"	1	0.001
302	M-93	Washer - Plain 1/2"	1	0.035
303	M-49	Bolt - Machine 1/2" x 2-3/4" U.S.S. for Lock Bracket Lever	1	0.24
304	R-21929	Shaft - Differential Rocker	1	4.30
305	R-21919	Bracket - Differential Rocker Shaft	1	23.00
	M-138	Bolt - Machine 1/2" x 2" U.S.S. for Bracket	4	0.212
	M-74	Nut - 1/2" Hex U.S.S.	6	0.06
	M-84	Lockwasher 1/2"	6	0.04
	1688	Alemite Fitting 45°	2	0.03

REAR ROLLS, AXLE AND DRIVE GEARS

275	RSA-21933	Roll - Rear	1	3,460.00
276	R-21934	Gear - Drive	1	162.00
277	R-21915	Drive - Rear Axle	1	
278	M-57	Bolt - Machine 3/4" x 2-1/2" U.S.S.	12	0.639
279	M-87	Lockwasher 3/4"	12	0.06
280	M-79	Nut - 3/4" Hex U.S.S.	12	0.20
281	R-11713	Bearing - Rear Axle - Left Hand	1	62.00
282	R-11738	Bushing - Rear Axle Bearing	2	11.50
283	R-21914	Axle - Rear	1	
284	R-25299	Key - Rear Roll - 1" x 1-1/2" x 4-3/8"	1	1.75
285	1610	Fitting - Grease 1/8" Zerk Straight	2	0.015
286	R-11739	Washer for Rear Axle	2	7.00
287	R-17891	Nut - Rear Axle	2	5.40
288	M-143	Machine Bolt 7/8" x 5-1/2" U.S.S.	12	1.15
289	M-88	Lockwasher 7/8"	12	0.07
290	M-80	Nut - 7/8" Hex	12	0.25
306	R-21918	Bearing - Rear Axle - Right Hand	1	66.00
307	R-25299	Key - Roll to Collar 1" x 1-1/2" x 4-3/8"	1	1.75
308	R-21916	Collar - Spacer Rear Axle	1	43.50
309	R-21932	Key - 1" x 1-1/2" x 4-1/4" Axle to Collar	1	1.75
310	R-21934	Gear - Drive	1	162.00
311	M-25	Cotter Pin - 1/4" x 3-1/2" Lg.	2	0.05
312	RSA-21933	Roll - Rear	1	3,460.00
	21-54	Cover - Gear Oiler	2	0.30
	R-16668	Plug - Rear Roll	24	
	R-16670	Pick - Rear Roll	24	
	R-22437	Gear Guard - Right Hand	1	
	R-22439	Gear Guard - Left Hand	1	
	M-99	Nipple - 1/8" x 1-1/2" - Rear Axle Brg. Grease	2	0.015

REAR ROLL SCRAPERS (Fig. 34)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
531	25-8322	Shaft - Scraper	4	17.50
532	21-301	Support - Blade	8	3.50
533	M-35	Jam Nut 1/2" U.S.S.	8	0.04
534	M-28	Set Screw 1/2" x 1-1/2"	8	0.119
535	21-306	Pin	4	0.20
536	21-303	Rod - Compression	4	1.20
537	M-21	Cotter Pin - 3/16" x 1"	4	0.01
538	21-299	Bracket - Swivel	4	12.50
539	M-77	Nut 5/8" U.S.S. Hex	4	0.11
540	M-56	Bolt 5/8" x 3-1/2" U.S.S. Machine	4	0.355
541	R-11088	Bracket - Scraper	4	9.80
542	M-47	Bolt 1/2" x 1-1/2" U.S.S.	8	0.18
543	M-74	Nut 1/2" U.S.S. Hex	8	0.06
544	M-84	Lockwasher 1/2"	8	0.017
545	M-45	Bolt - 1/2" x 1" U.S.S.	8	0.16
546	M-35	Jam Nut 1/2" U.S.S.	8	0.04
547	M-23	Cotter Pin 1/4" x 1-1/2"	8	0.025
548	21-302	Clip	4	0.75
549	21-305	Spring - Compression	4	0.80
550	M-64	Rivet R.H. 1/4" x 1"	16	0.02
551	21-300	Blade - Scraper 20" Right Hand Rear and Left Hand Front	2	7.75
	21-300½	Blade - Scraper 20" Left Hand Rear and Right Hand Front	2	7.75
552	M-47	Bolt 1/2" x 1-1/2" U.S.S.	8	0.18
553	M-74	Nut 1/2" U.S.S. Hex	8	0.06
554	M-84	Lockwasher 1/2"	8	0.017
	RSA-10021	Assembly Right Hand Scraper Includes 1-24	2	
	RSA-10022	Assembly Left Hand Scraper Includes Items 1 to 24	2	
	M-58	Bolt 3/4" x 2-3/4" U.S.S. Machine - Attaching Bracket to Frame - Front of Roll	4	0.544
	M-59	Bolt 3/4" x 3-1/4" U.S.S. Machine - Attaching Bracket to Frame - Rear of Roll	4	0.669
	M-79	Nut 3/4" U.S.S. Hex	8	0.20
	M-87	Lockwasher 3/4"	8	

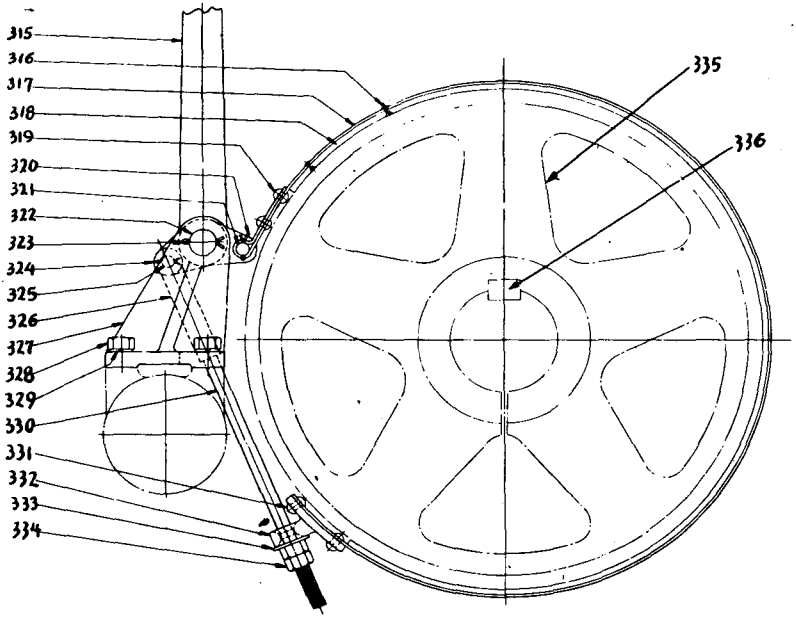


(Fig. 34) REAR ROLL SCRAPERS

INDEX TO BRAKE PARTS

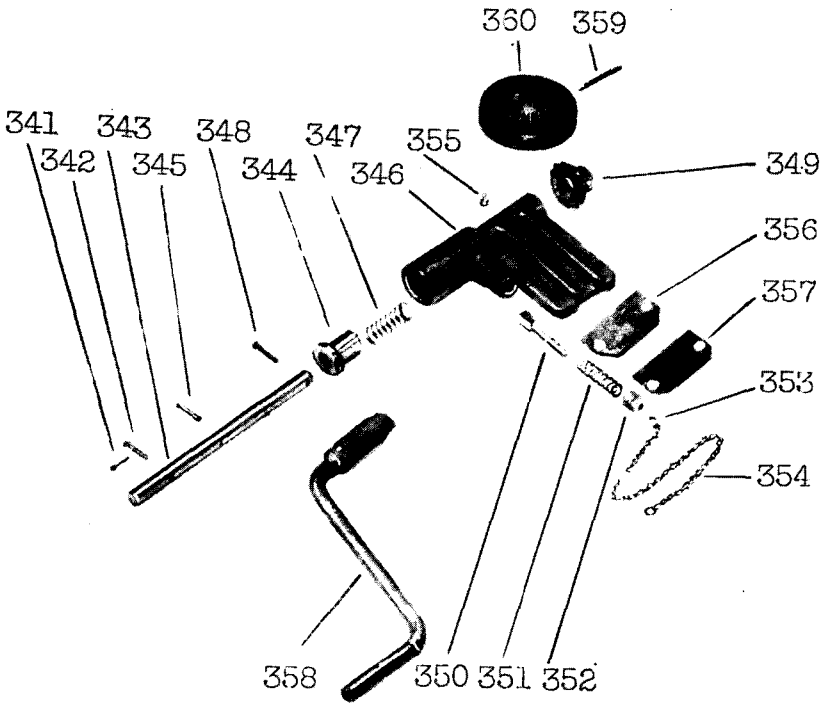
BRAKE PARTS (Fig. 33 & 35)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
315	R-11744	Brake Arm.	1	9.00
316	M-101	#9 x 3/4" Lg. Copper Rivet	33	
317	R-11749	End - Brake Band	1	11.5
318	R-11794-1	Lining Only - Brake 1/4" x 6" x 60" Lg..	1	5.60
319	M-67	Rivet - Round Head 3/8" x 5/8" Lg. . . .	5	
320	M-20	Cotter Pin 1/8" x 1"	1	
321	R-11789	Pin For Brake Band	1	.50
322	R-11779	Swivel Pin	1	2.00
323	M-24	Cotter Pin 1/4" x 2"	1	
324	M-20	Cotter Pin 1/8" x 1"	1	
325	R-11816	Pin For Yoke	1	0.15
326	25-8267	Yoke	1	.75
327	R-11745	Bracket - Brake.	1	16.50
328	M-12	Capscrew 5/8" x 1-3/4" - Brake Bracket To Trans	2	0.21
329	M-86	Lockwasher 5/8".	2	
330	RSA-11780	Rod Brake.	1	2.00
331	M-68	Rivet 3/8" x 7/8" Lg. R.D. Hd.	8	
332	R-11737	End Brake Band	1	3.60
333	M-94	Washer - Plain 5/8".	1	
334	M-77	Nut 5/8" Hex U.S.S.	1	
	RSA-11794	Assembly - Brake Band and Lining Includes items 31, 32, 33, 30, 45 and 46	1	24.00
335	R-11751	Brake Drum	1	201.00
336	R-25300	Key 1" x 1-1/2" x 5-1/4" Lg. Brake Drum.	1	2.25
337	M-63	Bolt 1" x 7" Lg. Mach. U.S.S. for Drum .	1	2.40
338	M-81	Nut 1" U.S.S. Hex for Drum	1	0.37
339	M-89	Lockwasher 1".	1	0.08



BRAKE DRUM & PARTS
(Fig. 35)

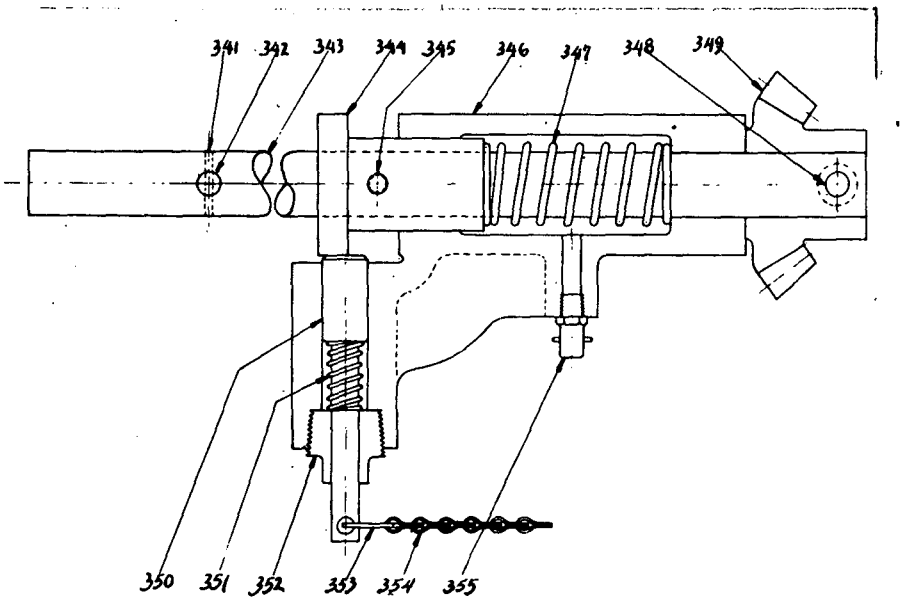
INDEX TO
ENGINE CRANKING PARTS



SIDE CRANK
(Fig. 36)

SIDE CRANKING ASSEMBLY (Fig. 36 & 37)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
341	24-5101	Pin - 1/8" x 1-3/8" Lg.	1	
342	24-5105	Pin	1	0.07
343	R-11829	Shaft - Cross Cranking.	1	3.70
344	D-7611	Collar - Cranking Shaft	1	1.00
345	M-156	Pin 1/4" x 1-1/2" Lg.	1	0.025
346	R-11825	Bracket - Side Crank.	1	16.50
347	3939	Spring - Cross Crank Shaft.	1	0.12
348	M-69	Rivet 3/8" x 2" Lg. Countersunk Head.	1	0.05
349	R-11827	Bevel - Starting Cross Shaft.	1	2.00
350	D-7658	Latch - Side Crank.	1	0.33
351	29-8536	Spring.	2	0.004
352	D-7659	Plug - Side Crank Latch	1	0.20
353	D-27111	Lockwasher - Special 5/8" x 3/16" x 1/16"	2	0.03
354	156	Chain - Sash 21" Lg.	1	0.20
355	1610	Lubrication Fitting 1/8".	1	0.015
356	R-12614	Shim - Cranking Bracket	3	0.25
357	R-23554	Shim - Side Crank	1	1.25
358	RSA-16958	Crank	1	8.00
359	R-23548	Pin - Starting Bevel on Engine.	1	0.12
360	R-23549	Bevel - Starting on Engine.	1	6.00



SIDE CRANK
(Fig. 37)

INDEX TO MISCELLANEOUS PARTS

COWL ASSEMBLY

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	25-8288	Hood Fastener	6	0.55
	25-8289	Handle	1	0.14
	R-21939	Extension - Breast Plate	1	11.30
	R-19788	Door - Cowl	1	22.25
	R-11593	Handle - Cowl	2	
	RSA-21937	Assembly - Cowl and Breast Plate	1	115.00
	R-18545	Cover - Breast Plate	1	0.30
	M-40	Bolt - 3/8" x 1" U.S.S. Mach. - Cowl To Frame	9	0.045
	M-42	Bolt - 3/8" x 1-1/2" U.S.S. Mach. - Cowl To Frame	2	0.09
	M-41	Bolt - 3/8" x 1-1/4" U.S.S. Mach. - Cowl To Frame	4	0.07
	M-73	Nut - 3/8" U.S.S. Hex	15	0.029
	M-83	Lockwasher - 3/8"	15	0.009

HOOD TOP AND SIDE DOOR ASSEMBLY

	25-8288	Hood Fastener	4	0.55
	25-8289	Hood Handle	2	0.14
	25-8290	Safety Hasp and Eye	2	0.50
	R-19779	Hood Side - Left Hand	1	16.50
	R-19780	Hood Side - Right Hand	1	16.50
	RSA-19774	Assembly - Hood Top	1	40.00
	R-14979	Bracket - Hood Side Door	8	0.07
	R-14980	Bracket - Hood Side Door	8	0.06
	M-39	Bolt - 1/4" x 1" U.S.S. Mach. - Hood Top	12	0.027
	M-72	Nut - 1/4" U.S.S. Hex Hood Top	12	
	M-82	Lockwasher - 1/4" Hood Top	12	0.002

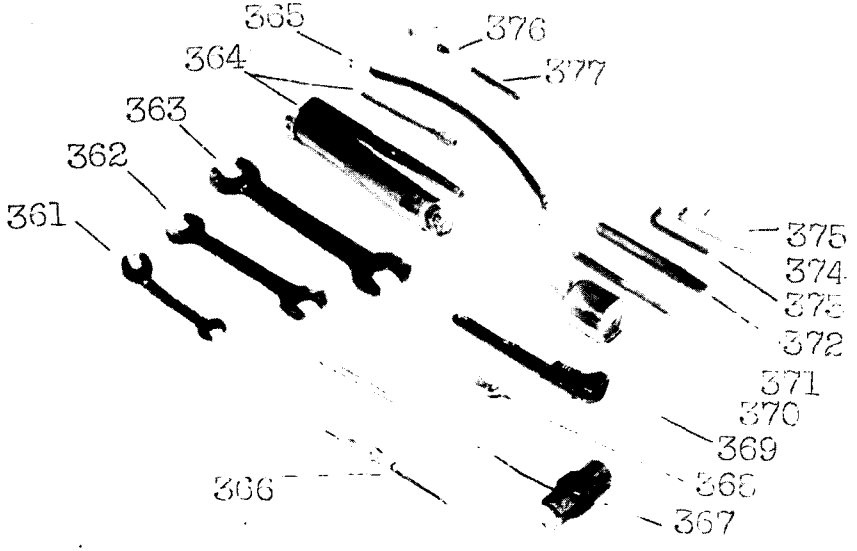
9

CAB AND CURTAINS

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	RSA-11629	Assembly - Cab Top	1	
	RSA-11631	Assembly - Side Curtain - Left Hand	1	4.50
	RSA-11632	Assembly - Side Curtain - Right Hand	1	4.50
	RSA-11633	Assembly - Rear Curtain	1	4.50
	RSA-18621	Assembly - Front Curtain	1	1.75
	R-18615	Post - Left Hand Rear	1	26.00
	R-18616	Post - Right Hand Rear	1	26.00
	R-18617	Post - Left Hand Front	1	10.20
	R-18618	Post - Right Hand Front	1	10.20
	R-18619	Support - Right Hand Front Cab Post	1	7.00
	R-18620	Support - Left Hand Front Cab Post	1	7.00
	M-50	Bolt - Machine 5/8" x 1-1/2"	4	0.21
	M-46	Bolt - Machine 1/2" x 1-1/4"	16	0.17
	M-6	Cap Screw 1/2" x 1-1/4"	4	0.105
	M-77	Nut - 5/8" Hex	4	0.11
	M-74	Nut - 1/2" Hex	20	0.06
	M-86	Lockwasher - 5/8"	4	0.03
	M-84	Lockwasher - 1/2"	20	0.017

TOOLS (Fig. 38)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
361	R-19549	Wrench #731 3/4" and 7/8" Opening . . .	1	0.75
362	37	Wrench - 1-1/16" and 1-1/4" Opening. . .	1	2.25
363	41	Wrench - 1-7/16" and 1-5/8" Opening. . .	1	4.75
364	6639	Alemite Gat Type Grease Gun.	1	3.60
365	6654	Grease Gun Hose.	1	0.50
366	M-102	Screwdriver 5-1/4"	1	0.30
367	M-103	Hammer 3#.	1	3.00
368	M-104	Pliers 6".	1	0.33
369	M-105	Monkey Wrench 11".	1	1.50
370	M-106	Oil Can.	1	0.25
371	M-107	Punch.	1	0.55
372	M-108	Chisel	1	1.25
373	M-109	Wrench - Allen 1/4".	1	
374	M-112	Wrench - Allen 3/4".	1	
375	M-111	Wrench - Allen 1/2".	1	
376	M-119	Coupling 1/8".	1	0.01
377	M-100	Nipple 1/8" x 4" Lg.	1	0.35
	M-1101	Spark Plug Wrench (not illustrated). . .	1	



TOOLS
(Fig. 38)

MISCELLANEOUS PARTS

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	29-8501	Towing Hook - Right Hand	1	4.25
	29-8502	Towing Hook - Left Hand	1	4.25
	RSA-11588	Support - Front Motor with Cap	1	7.65
	R-11776	Spacer - Front Motor Mounting	2	0.75
	R-11430	Bracket - Wire	1	0.30
	25-8177	Clamp - Oil Lines on Cowl	3	
	R-11723	Clamp	1	0.01
	R-19399	Clamp - Wire	14	
	R-11275	Pipe - Exhaust	1	4.60
	R-11409	Cap - Fuel Tank	1	0.35
	RSA-11421	Assembly - Fuel Line From Tank To Pump	1	1.70
	R-11431	Bracket - Carburetor Control Wire	1	
	R-11585	Support - Exhaust Pipe	1	0.40
	R-11586	Cap - Exhaust Pipe Support	1	0.25
	RSA-12079	Assembly - Oil Line To Motor Pressure Gauge	1	0.75
	R-14814	Shield - Exhaust Pipe	1	3.30
	RSA-18531	Assembly - Fuel Tank	1	140.00
	RSA-18566	Assembly - Tool Box Lid	1	8.50
	R-19164	Rivet - Tool Box Lid	2	0.05
		Cable - Armoured #16 - 8" Lg. with Terminals for Magneto Switch	1	
		Cable - Armoured #16 - 10'6" Lg. With Terminals Magneto To Instrument Panel.	1	
	1610	Zerk Fitting 1/8" Str.	4	0.015
	1688	Zerk Fitting 1/8" 45°	4	0.03
	M-17	Capscrew 3/4" x 1-1/2" U.S.S. - For Fuel Tank	4	0.519
	M-87	Lockwasher 3/4" For Fuel Tank	4	0.06
	M-124	Pad Lock	4	
	M-141	Bolt 5/8" x 2-3/4" U.S.S. - Tow Hook	2	0.31
	M-142	Bolt 5/8" x 3-3/4" U.S.S. - Tow Hook	2	0.375
	M-77	Nut 5/8" U.S.S.	4	0.11
	M-86	Lockwasher 5/8"	4	0.03
	M-44	Mach. Bolt 3/8" x 10-1/2" Front Motor Support	2	0.342

INDEX TO ENGINE PARTS

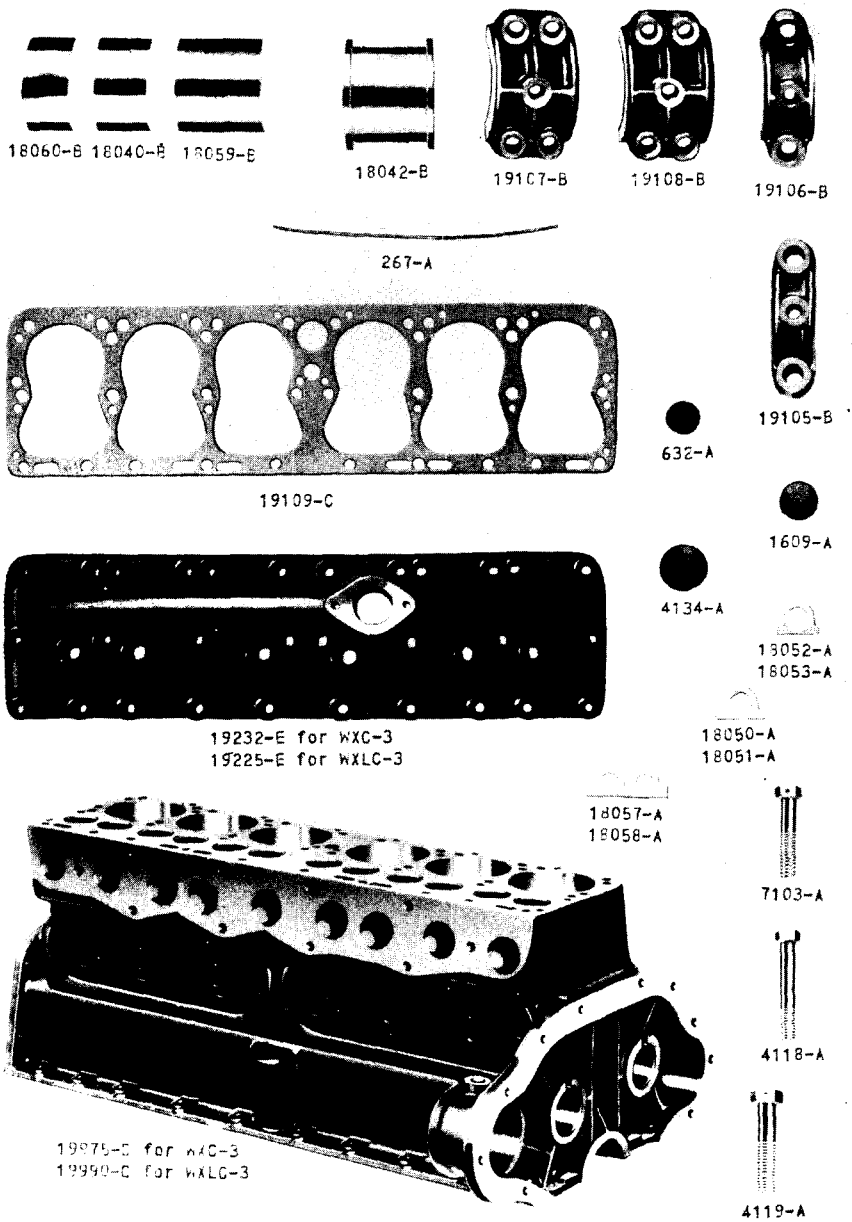


Fig. 1
CYLINDER HEAD, GASKET, BLOCK, MAIN BEARINGS, MAIN BEARING CAPS

ENGINE ASSEMBLY

Part No.	Description	No. Req'd.	Weight in Lbs.
RSA-11413	Assembly - Engine WXC-3 Galion Modification	1	
RSA-11413-A	Assembly - Engine WXLC-3 Galion Modification	1	

CYLINDER HEAD

See Fig. No. 1

829	Gasket - Water Outlet	1	‡
1075-A	Plug - Cylinder Head Pipe	1	0.062
1608-A	Capscrew - Cylinder Head	2	0.219
2465-B	Pipe - Water Outlet	1	2.171
4118-A	Capscrew - Cylinder Head 1/2" x 13" x 3-1/8"	28	0.187
19109-C	Gasket - Cylinder Head	1	0.765
19225-E	Head - Cylinder for WXLC-3 Engine	1	63.50
19232-E	Head - Cylinder for WXC-3 Engine	1	65.50

CYLINDER AND CRANKCASE FOR WXC-3 ENGINE

NOTE: Engine Serial Plate Will Specify Type Of Engine

See Fig. No. 1

60-A	Plug - Cylinder Pipe 1/4"	3	‡
267-A	Lockwire - Main Bearing	16	‡
632-A	Plug - Expansion 15/16"	4	‡
665-A	Plug - Expansion 5/8"	2	‡
981-A	Plug-- Expansion 1-1/8"	1	‡
1609-A	Plug - Expansion 1-1/4"	2	‡
4119-A	Screw - Center and Rear Main Bearing	8	0.171
4134-A	Plug - Expansion 1-1/2"	6	‡
4242-A	Lockwasher - Cylinder Oil Orifice	2	‡
4243-A	Screw - Cylinder Oil Orifice	2	‡
4251-A	Plug - Cylinder Oil Orifice	1	‡
4746-A	Plug - Pipe - Cylinder 3/4"	4	0.094
4790-A	Gasket - Generator Cover	1	0.562
7103-A	Screw - Front and Intermediate Main Bearing	10	0.312
15133-A	Gasket - Cylinder Oil Orifice	1	‡
15739-A	Orifice - Cylinder Oil	1	0.156
18040-B	Bearing - Front Upper Main	1	0.312
18042-B	Bearing - Rear Upper Main	1	0.687
18050-A	Shim - Front Main Bearing .002"	2	‡
18051-A	Shim - Front Main Bearing .003"	4	‡
18052-A	Shim - Intermediate Main Bearing .002"	6	‡
18053-A	Shim - Intermediate Main Bearing .003"	16	‡
18057-A	Shim - Center and Rear Main Bearing .002"	4	‡
18058-A	Shim - Center and Rear Main Bearing .003"	8	‡
18059-B	Bearing - Center Upper Main	1	0.50
18060-B	Bearing - Intermediate Upper	4	0.25
19105-B	Cap - Intermediate Main Bearing	4	1.25
19106-B	Cap - Front Main - Bearing	1	1.437
19107-B	Cap Rear Main Bearing	1	2.437

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

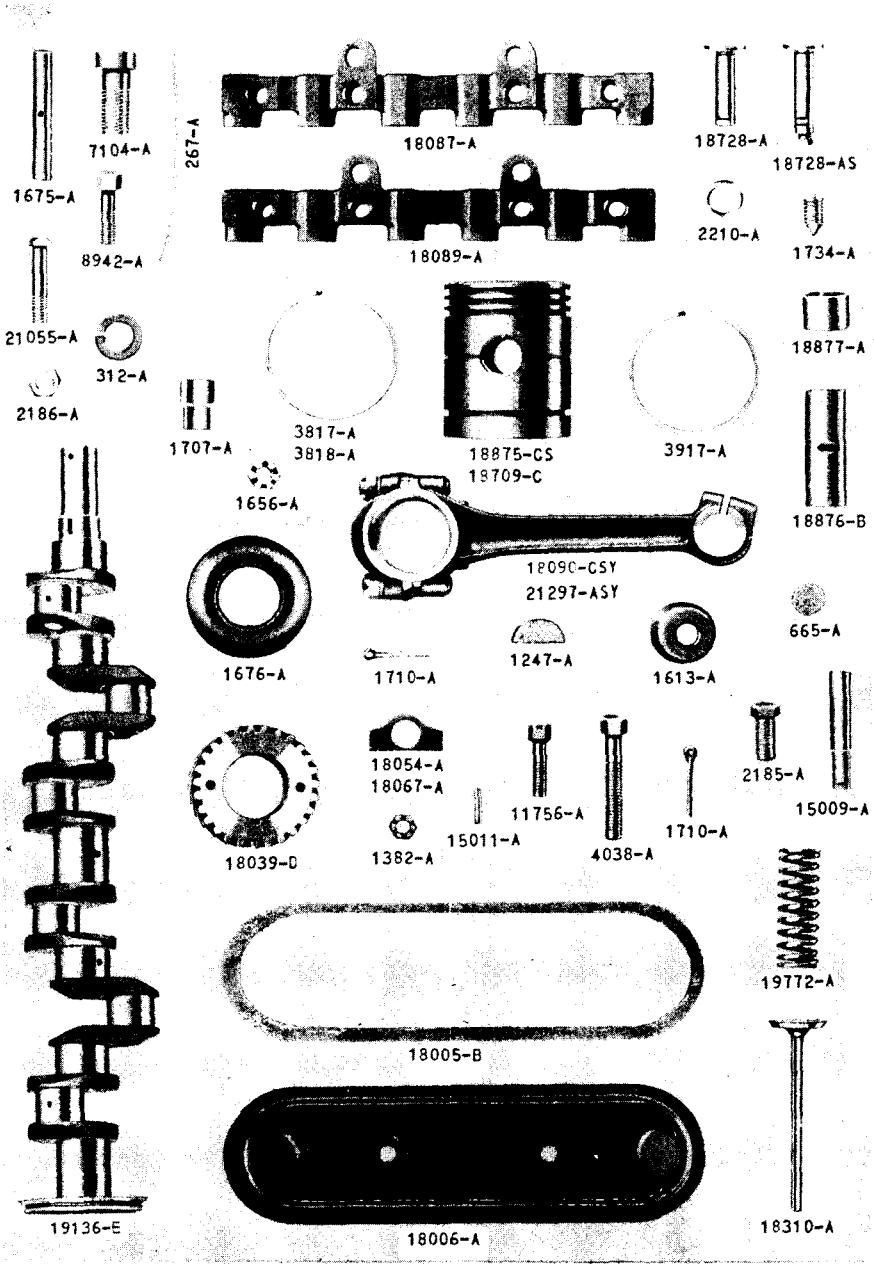


Fig. 2
CRANKSHAFT, CONNECTING ROD, PISTON, PISTON RINGS, PUSH ROD, AND VALVES

CYLINDER AND CRANKCASE FOR WXC-3 ENGINE - CONT.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	19108-B	Cap - Center Main Bearing	1	2.344
	19975-D	Block - Cylinder	1	278.00

CYLINDER AND CRANKCASE FOR WXLC-3 ENGINE

NOTE: Engine Serial Plate Will Specify Type Engine.
See Fig. No. 1

	60-A	Plug - Cylinder Pipe 1/4"	3	‡
	267-A	Lockwire - Bearings	16	‡
	632-A	Plug - Expansion 15/16"	4	‡
	665-A	Plug - Expansion 5/8"	2	‡
	763-A	Plug - Expansion 1-3/8"	2	‡
	981-A	Plug - Expansion 1-1/8"	1	‡
	1609-A	Plug - Expansion 1-1/4"	2	‡
	4134-A	Plug - Expansion 1-1/2"	6	‡
	4242-A	Lockwasher - Cylinder Oil Orifice	2	‡
	4243-A	Screw - Cylinder Oil Orifice	2	‡
	4251-A	Plug - Cylinder Oil Orifice	1	‡
	4746-A	Plug - Pipe - Cylinder 3/4"	4	0.094
	4765-A	Pin - Rear Main Bearing Thrust Washer Dowel	4	‡
	4790-A	Gasket - Generator Cover	1	0.562
	15133-A	Gasket - Cylinder Oil Orifice	1	‡
	15739-A	Orifice - Cylinder Oil	1	0.156
	19680-A	Rear Main Bearing Thrust Washer	4	0.156
	19990-C	Cylinder and Crankcase	1	‡
	20072-B	Bearing - Front Main	2	0.141
	20073-B	Bearing - Center Main	2	0.219
	20074-B	Bearing - Rear Main	2	0.203
	20075-B	Bearing - Intermediate Main	8	0.109
	20092-B	Cap - Front Main Bearing	1	3.25
	20093-B	Cap - Center Main Bearing	1	4.50
	20094-B	Cap - Rear Main Bearing	1	4.437
	20095-B	Cap - Intermediate Bearing	4	2.406
	20096-A	Screw - Front & Intermediate Main Bearing	10	0.40
	20097-A	Screw - Center and Rear Main Bearing	8	0.25
	35200-A	Shim - Front Main Bearing .002"	As Req.	‡
	35201-A	Shim - Rear Main Bearing .002"	As Req.	‡
	35202-A	Shim - Center Main Bearing .002"	As Req.	‡
	35203-A	Shim - Intermediate Main Bearing .002"	As Req.	‡
	35205-A	Shim - Front Main Bearing .003"	As Req.	‡
	35206-A	Shim - Rear Main Bearing .003"	As Req.	‡
	35207-A	Shim - Center Main Bearing .003"	As Req.	‡
	35208-A	Shim - Intermediate Main Bearing .003"	As Req.	‡

SHIM ASSEMBLY FOR BEARINGS FOR WXC-3 ENGINE WITH POURED TYPE BABBITT BEARINGS

	18056-AS	Assembly - Shims Includes the Following	1	0.062
		18050-A Shim - Front Main Bearing .002"	2	‡
		18051-A Shim - Front Main Bearing .003"	4	‡
		18052-A Shim - Inter. Main Bearing .002"	6	‡
		18053-A Shim - Inter. Main Bearing .003"	16	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

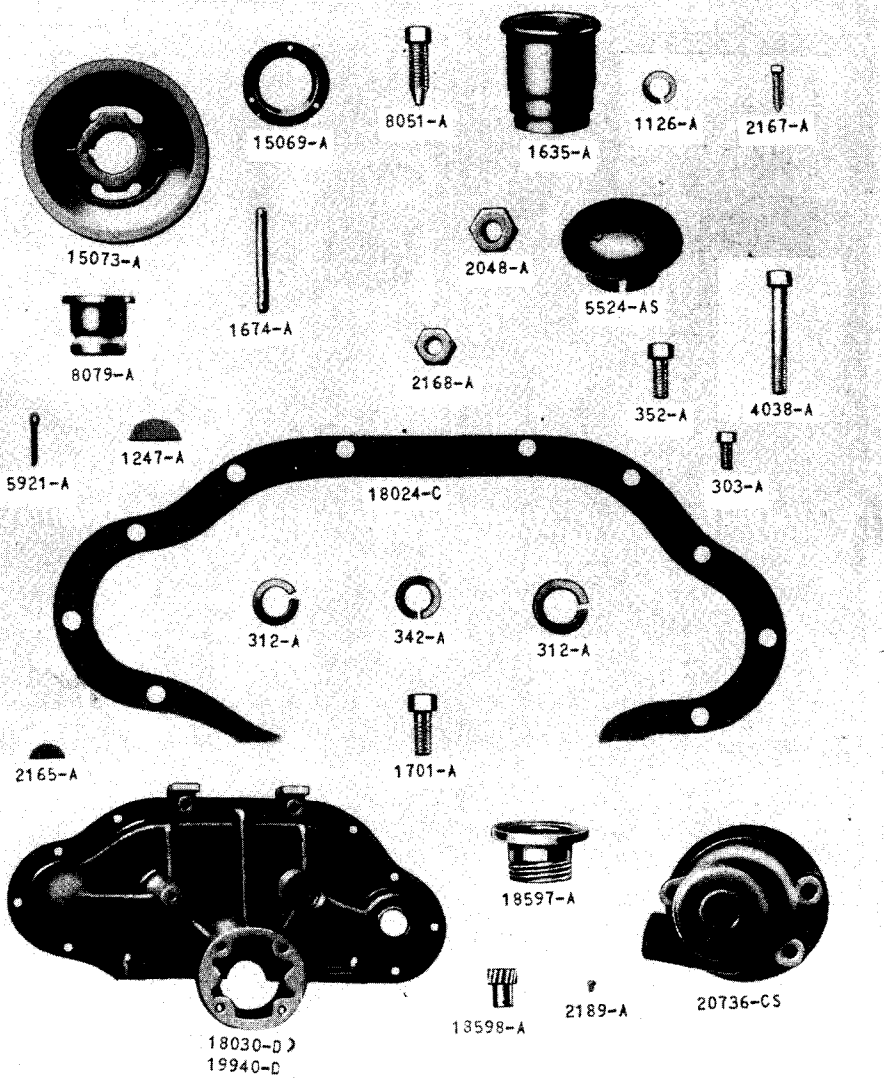


Fig. 3
GEAR COVER, BREATHER, FAN DRIVING PARTS AND MAGNETO EQUIPMENT.

SHIM ASSEMBLY FOR BEARINGS FOR WXC-3 ENGINE WITH POURED TYPE BABBITT BEARINGS - CONT.

Part No.	Description	No. Req'd.	Weight in Lbs.
	18054-A Shim - Connecting Rod .002" . .	18	‡
	18057-A Shim - Center and Rear Bearing .002".	4	‡
	18058-A Shim - Center and Rear Bearing .003".	8	‡
	18067-A Shim - Connecting Rod .002" . .	24	‡
	21054-A Shim - Connecting Rod .003" . .	24	‡
	21067-A Shim - Connecting Rod .002" . .	18	‡

SHIM ASSEMBLY FOR BEARINGS FOR WXLC-3 ENGINE WITH REMOVABLE SHELL TYPE BEARINGS

21068-AS	Assembly - Shims Includes The Following.	1	0.062
	18194-A Shim - Connecting Rod .002" . .	24	‡
	18196-A Shim - Connecting Rod .003" . .	18	‡
	35067-A Shim - Connecting Rod .002" . .	24	‡
	35068-A Shim - Connecting Rod .003" . .	18	‡
	35200-A Shim - Front Main Bearing .002"	4	‡
	35201-A Shim - Rear Main Bearing .002".	4	‡
	35202-A Shim - Center Main Bearing .002"	4	‡
	35203-A Shim - Inter. Main Bearing .002"	16	‡
	35205-A Shim - Front Main Bearing .003"	4	‡
	35206-A Shim - Rear Main Bearing .003".	4	‡
	35207-A Shim - Center Main Bearing .003"	4	‡
	35208-A Shim - Inter. Main Bearing .003"	16	‡

GASKET SET FOR WXC-3 OR WXLC-3 ENGINE

18022-AS	Assembly - Gasket Set Includes The Following.	1	0.75
	86-A Gasket - Water Pump Inlet . . .	1	‡
	829-A Gasket - Water Outler	1	‡
	2452-A Gasket - Oil Filter Shell . . .	1	‡
	8146-A Gasket - Oil Pan Strainer . . .	1	‡
	8575-A Gasket - Oil Filter Drain Plug.	2	‡
	15133-A Gasket - Oil Orifice.	1	‡
	15149-A Gasket - Water Pump Sleeve. . .	2	‡
	18005-B Gasket - Valve Cover.	2	‡
	18024-C Gasket - Gear Cover..	1	0.187
	18028-A Gasket - Companion Flange . . .	1	0.078
	18065-B Gasket - Bellhousing.	1	0.062
	18085-B Gasket - Oil Pan.	2	‡
	18164-A Gasket - Water Pump Cover . . .	1	‡
	18173-A Gasket - Water Pump	1	‡
	18241-A Gasket - Oil Pressure Regulator	1	‡
	18249-A Gasket - Oil Filter	1	‡
	18786-A Gasket - Cover Plate.	1	0.062
	19732-E Gasket - Manifold	1	0.437
	22564-A Gasket-- Fuel Pump.	1	‡

NOTE: Gasket set does not include head gasket.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

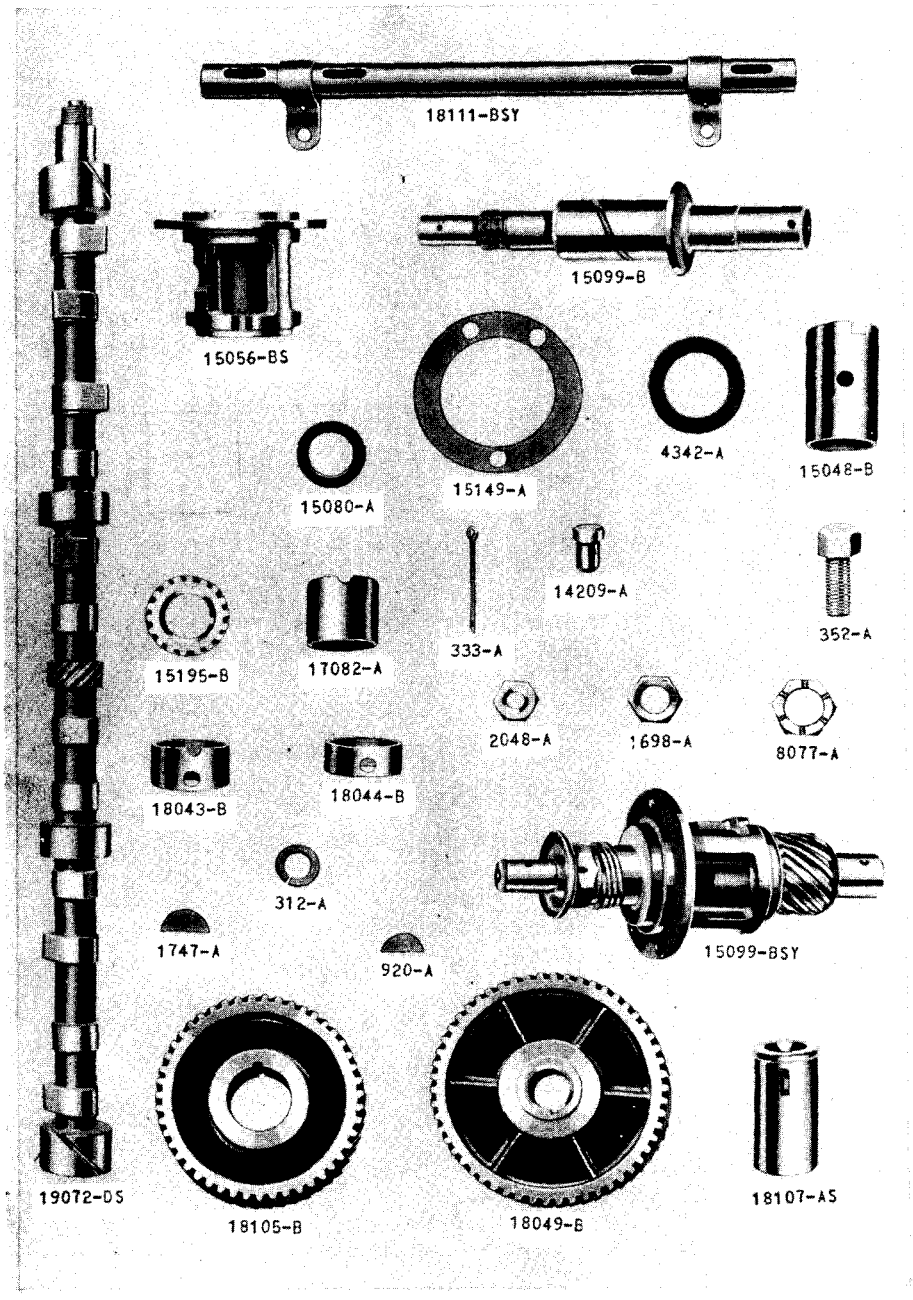


Fig. 4
CAMSHAFT, WATER PUMP DRIVE, CAMSHAFT BEARINGS IDLER GEAR AND CABLE TUBE.

CONNECTING ROD FOR WXC-3 ENGINE

NOTE: Engine Serial Plate Will Give Type Engine
See Fig. No. 2

Part No.	Description	No. Req'd.	Weight in Lbs.
1656-A	Nut - Connecting Rod Bolt.	12	‡
1710-A	Cotter Pin - Connecting Rod Bolt 1/8" x 1"	12	‡
11756-A	Lockscrew - Connecting Rod Piston Pin. .	6	0.094
15055-A	Bolt - Connecting Rod.	12	0.156
18054-A	Shim - Connecting Rod .003".	36	‡
18067-A	Shim - Connecting Rod .002".	As Req.	‡
18090-CSY	Assembly - Connecting Rod.	6	3.00
21229-A	Lockwasher - Connecting Rod 7/16" Std. .	6	‡

CONNECTING ROD FOR WXLC-3 ENGINE

NOTE: Engine Serial Plate Will Give Type Engine
See Fig. No. 2

301-A	Cotter Pin - Connecting Rod Bolt	12	‡
11756-A	Lockscrew - Connecting Rod Piston Pin. .	6	0.094
20198-B	Bearing - Connecting Rod	12	0.094
21055-A	Bolt - Connecting Rod.	12	0.125
21056-A	Nut Connecting Rod Bolt.	12	‡
21229-A	Lockwasher - Connecting Rod 7/16" Std. .	6	‡
21297-AS	Assembly - Connecting Rod.	6	3.125
35067-A	Shim - Connecting Rod .002".	As Req.	‡
35068-A	Shim - Connecting Rod .003".	18	‡

PISTON AND RINGS FOR WXC-3 ENGINE

NOTE: Engine Serial Plate Will Give Type Engine
See Fig. No. 2

3817-A	*	Ring - Compression	18	0.109
3917-A	*	Ring - Oil	6	0.078
18875-CSY	*	Piston (Cast Iron)	6	3.939
18876-B	*	Pin - Piston	6	0.562
18877-A		Bushing - Piston Pin	6	0.125

PISTON AND RINGS FOR WXLC-3 ENGINE

NOTE: Engine Serial Plate Will Give Type Engine
See Fig. No. 2

3818-A	*	Ring - Compression	18	0.07
3917-A	*	Ring - Oil	6	0.078
18709-C	*	Piston (Aluminum).	6	2.312
18876-B	*	Pin - Piston	6	0.562

* Pistons and rings are also available in oversize of .005, .010, .015, .020, .030 and .040. Pins are available in oversize of .003 and .005.

MANIFOLD

NOTE: Engine Serial Plate Will Give Type Engine
See Fig. No. 9

415-A	Intake Manifold Pipe Plug 3/8" Sq. Hd. .	1	0.062
794-A	Washer - Manifold Attaching Stud	10	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

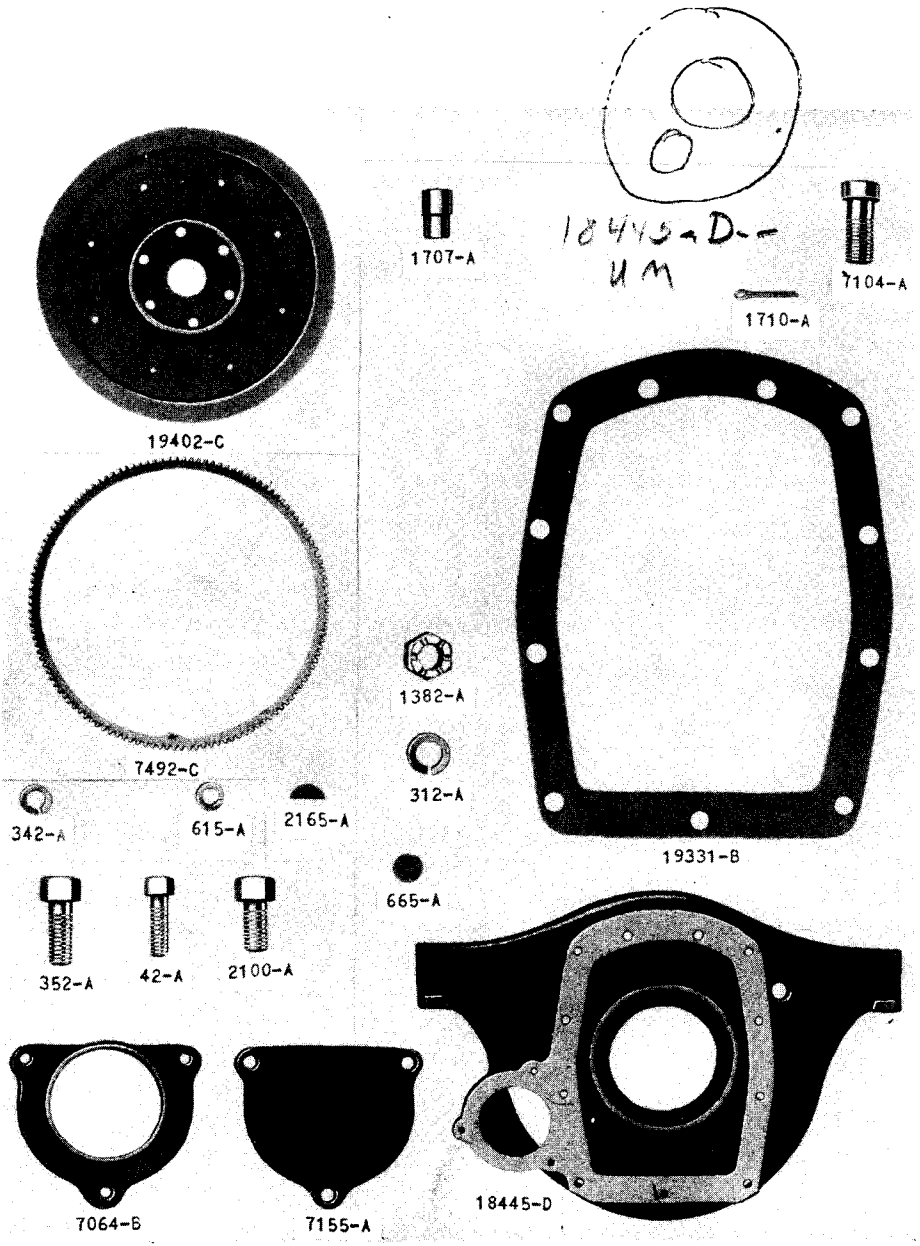


Fig. 5
FLYWHEEL, RING GEAR AND BELLHOUSING

MANIFOLD - CONT.

Part No.	Description	No. Req'd.	Weight in Lbs.
1317-A	Nut - Attaching Stud	10	‡
1388-A	Washer - Manifold Plug	1	‡
4079-A	Nut - Cover Plate Stud	4	‡
4150-A	Stud - Manifold Attaching	10	0.109
4588-A	Stud - Manifold Control Plate	4	‡
4640-A	Set Screw - Exhaust Flange	1	‡
4727-A	Plug - Manifold - Presses Into Shaft Hole	1	0.094
18733-E	Manifold	1	43.00
18786-A	Gasket - Manifold Heat Control Cover Plate	1	0.062
18845-B	Flange - Manifold Companion	1	1.924
18846-B	Gasket - Manifold Companion Flange	1	0.094
19732-D	Gasket - Manifold Attaching	1	0.437
40814-B	Plate - Manifold Heat Control Cover	1	1.203

VALVES

See Fig. No. 2

794-A	Washer - Valve Cover 7/8"	4	‡
795-A	Washer - Valve Cover 3/4"	4	‡
1613-A	Seat - Valve Spring	12	0.062
4038-A	Screw - Valve Cover 1/2" x 13" x 3-1/2"	4	0.235
15009-A	Guide - Valve	12	0.187
18005-B	Gasket - Valve Cover	2	‡
18006-A	Cover - Valve	2	1.312
18201-A	Valve - Intake	6	0.344
18310-A	Valve - Exhaust	6	0.312
18384-A	Insert - Exhaust Valve	6	0.125
19772-A	Spring - Valve	12	0.203
21011-A	Pin - Valve Spring Seat	12	‡

PUSH ROD

See Fig. No. 2

312-A	Lockwasher - Push Rod Cluster screw 1/2"	8	‡
2185-A	Screw - Push Rod	12	‡
2186-A	Nut - Push Rod Screw	12	‡
2210-A	Dowel - Push Rod Cluster	4	‡
8942-A	Screw - Push Rod Cluster 1/2" x 13" x 2" U.S.S.	8	0.125
18087-A	Cluster - Push Rod - Front	1	3.298
18089-A	Cluster - Push Rod - Rear	1	3.298
18728-A	Rod - Push	12	0.235
18728-ASY	Assembly - Push Rod	12	0.25

CRANKSHAFT AND FLYWHEEL

See Fig. No. 2 & 5

665-A	Plug - Flywheel Dowel 5/8" Expansion	2	‡
1247-A	Key - Crankshaft Gear (#15 Woodruff)	1	‡
1382-A	Nut - Flywheel Bolt 9/16" - 18 SAE	4	0.062
1675-A	Pin - Starting Crank 3/8" x 2-1/2"	1	0.078

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

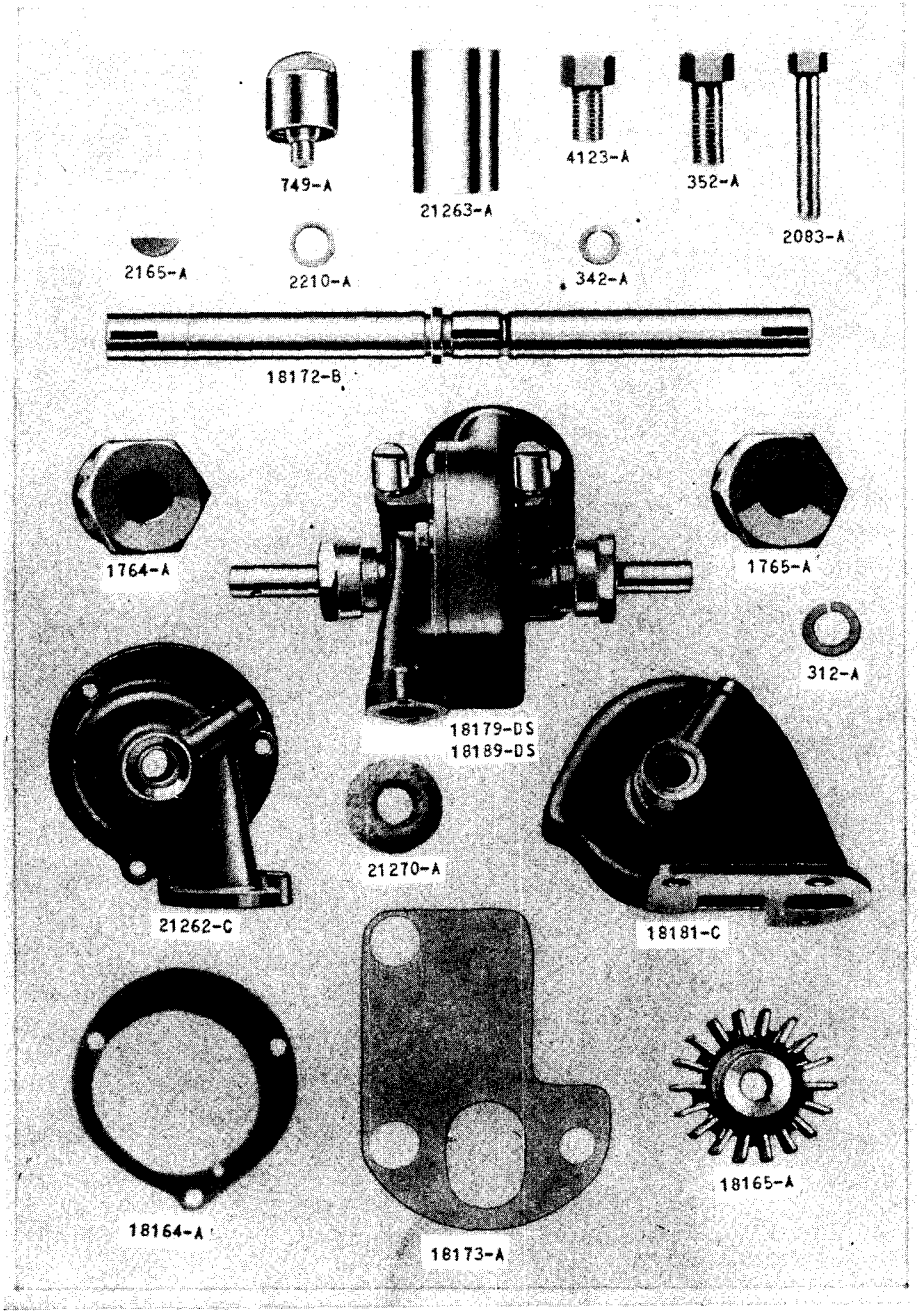


Fig. 6
WATER PUMP AND PARTS

CRANKSHAFT AND FLYWHEEL - CONT.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	1676-A	Oil Thrower - Crankshaft on WXC-3 Only	2	0.203
	1707-A	Dowel - Flywheel 1/2" x 5/8"	2	0.062
	1710-A	Cotter Pin - Flywheel Bolt Nut 1/8" x 1"	4	‡
	1739-A	Set Screw - Starting Crank Pin	1	‡
	7104-A	Bolt - Flywheel	4	0.109
	7492-C	Gear - Flywheel Ring	1	7.00
	14624-AS	Sleeve - Crankshaft Oil Wick With Wick	1	‡
	18039-D	Gear - Crankshaft	1	2.25
	19136-E	Crankshaft - WXLC-3 Engine	1	89.50
	19402-C	Flywheel	1	85.00
	19585-E	Crankshaft - WXC-3 Engine	1	111.75

NOTE: Engine Model Serial Plate Will Give Type Engine

CAMSHAFT

See Fig. No. 4

	1247-A	Key - Camshaft Bear (#15 Woodruff)	1	‡
	1698-A	Nut - Camshaft Gear	1	0.156
	2048-A	Nut - Camshaft Gear Thrust Adjusting Screw	1	‡
	4342-A	Washer - Camshaft Gear Thrust	1	0.094
	11039-A	Lockwasher - Camshaft Gear	1	‡
	14209-A	Plunger - Camshaft	1	‡
	14591-A	Plug - Fiber - Camshaft Gear Thrust Adjusting	1	‡
	14596-AS	Assembly - Camshaft Gear Thrust Adjusting Screw	1	0.062
	18043-B	Bearing - Camshaft - Front and Rear	2	0.328
	18044-B	Bearing - Camshaft - Center	2	0.25
	18049-B	Gear - Camshaft	1	5.971
	19072-D	Camshaft	1	15.25

IDLER GEAR

See Fig. No. 4

	920-A	Key - Idler Gear (#A Woodruff)	1	‡
	2048-A	Nut - Idler Gear Thrust Adjusting Screw	1	‡
	4342-A	Washer - Idler Gear Thrust	1	0.094
	14209-A	Plunger - Idler Gear	1	‡
	14591-A	Plug - Fiber - Idler Gear Thrust Adjusting	1	‡
	14594-AS	Assembly - Idler Adjusting Thrust Screw	1	‡
	17082-A	Bearing - Idler Shaft	1	1.344
	18105-B	Gear Idler	1	4.781
	18107-AS	Shaft - Idler Gear With Plunger	1	1.875

GEAR COVER

See Fig. No. 3

	312-A	Lockwasher - Gear Cover Screw - 1/2" Light	9	‡
	352-A	Screw - Gear Cover Short 1/2" x 13" x 1-1/4" U.S.S.	6	‡
	2189-A	Pin - Oil Cover Thrower	3	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

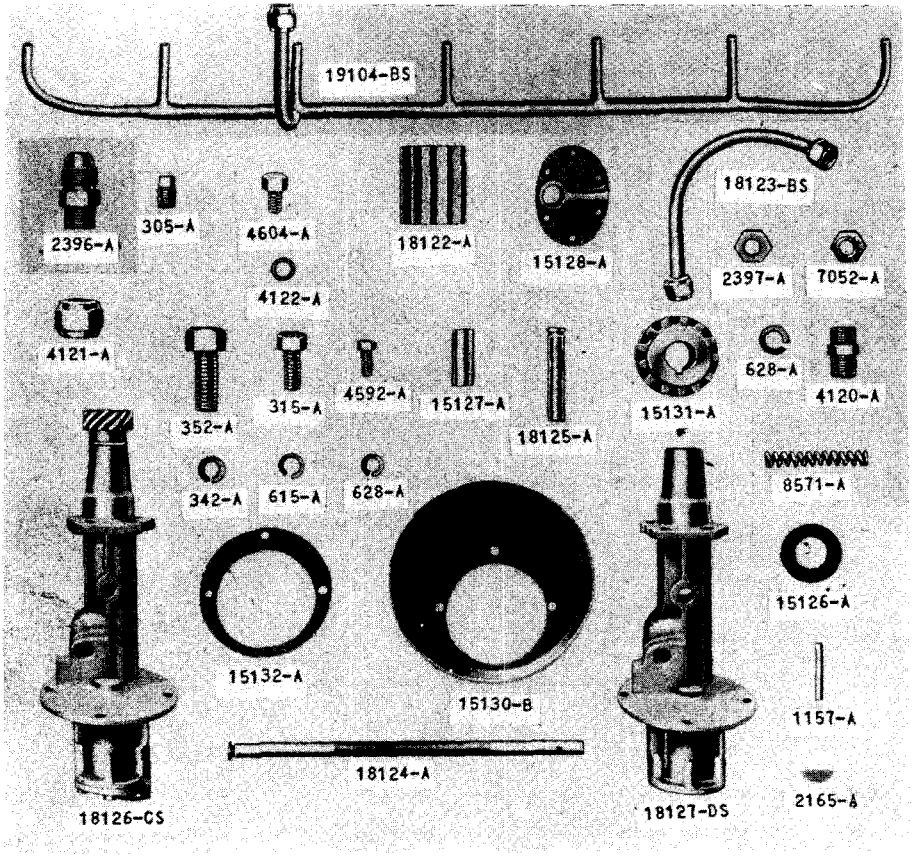


Fig. 7
OIL PUMP AND DRIVE, OIL LINES AND CONNECTIONS

GEAR COVER - CONT.

Part No.	Description	No. Req'd.	Weight in Lbs.
4038-A	Screw - Gear Cover Long 1/2" x 13" x 3-1/2" U.S.S.	1	0.235
4578-A	Screw - Gear Cover Long 1/2" x 13" x 2" U.S.S.	2	0.156
11137-AS	Assembly - Gear Oil Seal Cover WXLC-3 Only	1	0.25
15061-A	Plug - Pilot Hole Cover - Governor	1	0.391
15069-A	Oil Thrower - Gear Cover	1	0.062
18024-C	Gasket - Gear Cover	1	0.187
18030-D	Cover - Gear - WXC-3 Only	1	24.00
19940-D	Cover - Gear - WXLC-3 Only	1	23.50

BELLHOUSING

See Fig. No. 5

42-A	Cover Screw	3	‡
312-A	Lockwasher - Bellhousing To Crankcase Screw	11	‡
342-A	Lockwasher - Starter Cover	3	‡
352-A	Screw - Bellhousing To Crankcase	2	‡
615-A	Lockwasher - Timing Hole Cover Plate	3	‡
1048-A	Screw - Timing Hole Cover Plate	3	‡
7064-B	Adapter - Bellhousing Starter	1	2.195
7155-B	Cover - Bellhousing Starter Adapter	1	0.437
14394-A	Screw - Bellhousing To Crankcase	9	0.094
18421-A	Plate - Timing Hole Cover	1	0.282
18445-D	Bellhousing	1	64.00
19331-B	Gasket - Bellhousing	1	0.07

OIL GAUGE

See Fig. No. 8

18144-AS	Gauge - Bayonet Oil WXC-3 Engine Only	1	0.179
18146-AS	Gauge - Bayonet Oil WXLC-3 Engine Only	1	0.25

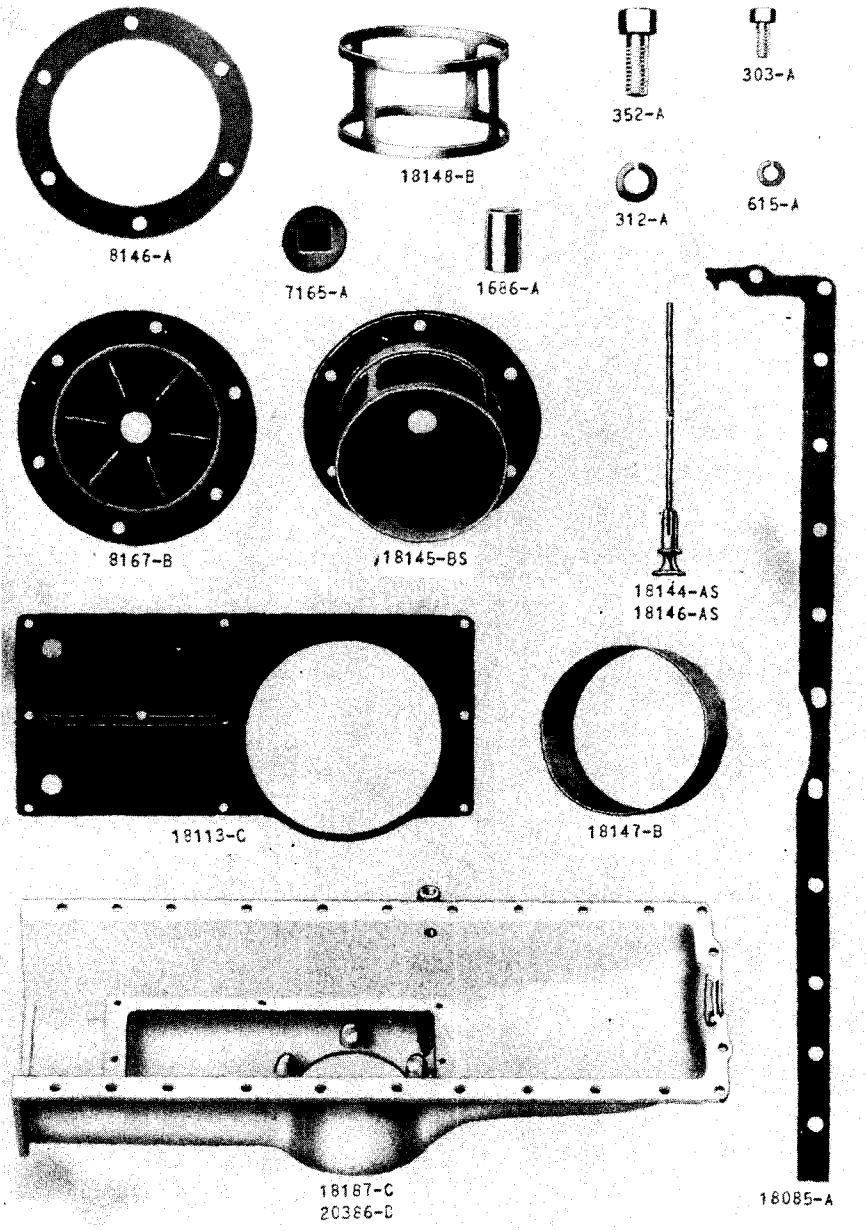
OIL PAN

NOTE: Engine Serial Plate Will Give Type Engine

See Fig. No. 8

303-A	Screw - Oil Pan Strainer Baffle Plate	8	‡
312-A	Lockwasher - Strainer Cap Screw 1/2"	6	‡
312-A	Lockwasher - Oil Pan Screw 1/2"	24	‡
352-A	Screw - Oil Pan 1/2" x 13" x 7/8"	23	‡
615-A	Lockwasher - Baffle Plate Screw	8	‡
1686-A	Bushing - Bayonet Oil Gauge	1	‡
2100-A	Capscrew - Strainer Cap 1/2" x 13" x 1" U.S.S.	6	0.094
4068-A	Capscrew - Oil Pan	1	0.171
7165-A	Pipe Plug - Oil Strainer Cap	1	0.187
8146-A	Gasket - Strainer Cap	1	‡
8167-B	Cap - Strainer	1	4.50
18085-B	Gasket - Oil Pan - WXC-3 Engine Only	2	‡
18113-C	Plate - Oil Pan Strainer Baffle	1	2.282

‡ Parts marked thus[illegible]gh less than 1 ounce (0.062 lbs.)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352-A
303-A
312-A
615-A
7165-A
1686-A
8167-B
18145-BS
18144-AS
18146-AS
18113-C
18147-B
18187-C
20386-D
18085-A

Fig. 8
OIL PAN

OIL PAN - CONT.

Part No.	Description	No. Req'd.	Weight in Lbs.
18145-BS	Assembly - Oil Strainer	1	4.50
18147-B	Gauze - Strainer	1	0.094
18148-B	Shell - Strainer	1	3.50
18187-C	Pan - Oil - WXC-3 Engine Only	1	75.25
19263-C	Gasket - Oil Pan WXLC-3 Only	2	‡
20386-D	Pan - Oil - WXLC-3 Only	1	75.00

BREATHER

See Fig. No. 3

1635-A	Pipe - Breather Extension	1	1.593
5524-AS	Assembly - Breather Cap	1	1.532

OIL PUMP AND DRIVE

See Fig. No. 7

266-A	Lockwire - Baffle Shell Screw	1	‡
266-A	Lockwire - Cover Screw	1	‡
305-A	Pipe Plug	1	‡
315-A	Screw - Body to Crankcase	4	‡
342-A	Lockwasher - Body Screw	4	‡
1157-A	Pin - Drive Gear	1	‡
2165-A	Key - Pump Gear	3	‡
4362-A	Snap Ring - Oil Pump	2	‡
4592-A	Screw - Pump Baffle Shell	3	‡
4604-A	Screw - Cover	6	‡
15126-A	Washer - Fiber - Driving Gear	1	‡
15127-A	Bushing - Oil Pump Body	2	0.25
15128-A	Cover - Oil Pump	1	0.50
15130-B	Baffle Shell - Oil Pump	1	1.437
15131-A	Gear - Oil Pump Driving	1	0.391
15132-B	Gasket - Oil Pump Baffle Shell	1	‡
18122-A	Gear - Oil Pump	2	0.375
18124-A	Shaft - Oil Pump Drive	1	1.054
18125-A	Shaft - Oil Pump Idle	1	0.312
18126-CS	Assembly - Oil Pump	1	9.00
18127-DS	Assembly - Oil Pump Body	1	8.908

OIL FILTER

See Fig. No. 10

59-A	Pipe Plug - Oil Filter	1	‡
312-A	Lockwasher - Oil Filter Attaching Screw	4	‡
1608-A	Screw - Oil Filter Attaching	4	0.219
* 2401-A	Tube - Outlet	1	‡
2402-BS	Assembly - Slug - Interchangeable With 35246-BS (Metal) (Felt Element Includes Parts*	1	1.015
* 2403-A	Washer - Felt	28	‡
* 2405-A	Coil - Spacer	1	0.156
* 2406-A	Washer - Felt Retaining Top	1	0.187
* 2407-A	Washer - Felt Retaining Bottom	1	0.187
* 2408-A	Washer - Cork	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

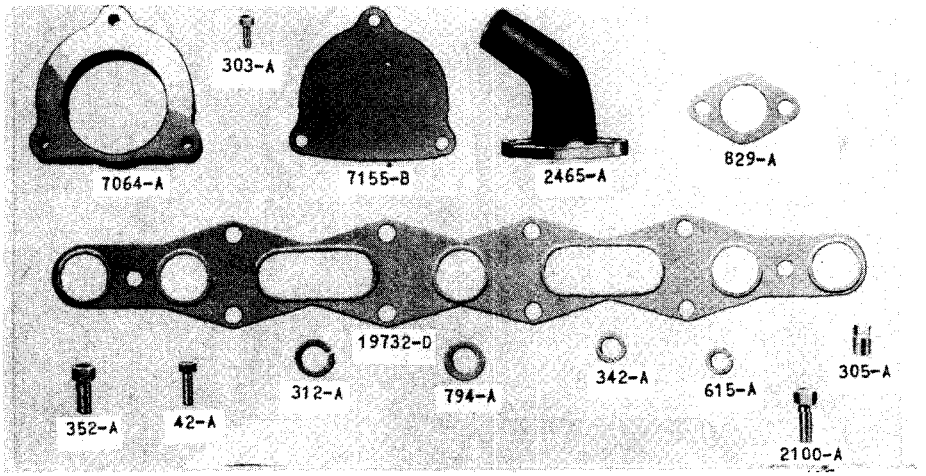


Fig. 9
MANIFOLD AND WATER PIPES

OIL FILTER - CONT.

See Fig. No. 10

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	* 2409-A	Washer - Cork Retining.	1	‡
	* 2410-A	Spring - Compression.	1	0.062
	* 2411-A	Nut - Felt Core Retaining	1	‡
	* 2412-A	Nut - Check Valve	1	‡
	* 2413-A	Ball Check Valve.	1	‡
	* 2414-A	Spring - Check Valve.	1	‡
	* 2415-A	Rivet - Check Valve	1	‡
	2445-A	Shell - Oil Filter.	1	1.954
	2447-A	Fitting - Oil Filter Clean Out.	1	0.062
	2448-A	Gasket - Oil Filter Clean Out	1	‡
	2449-A	Cap - Oil Filter Clean Out Fitting. . .	1	‡
	2450-A	Gasket - Oil Filter Clean Out Fitting Cap	1	‡ ‡
	2452-A	Gasket - Oil Filter Shell	1	‡
	2808-A	Plate - Name.	1	0.06
	8571-A	Spring - Pressure Regulating Valve. . .	1	0.06
	8572-A	Plug - Pressure Regulating Valve Adjusting	1	0.094
	8573-A	Lock Nut - Pressure Regulating Valve. .	1	‡
	8574-A	Nut - Pressure Regulating Valve Cap . .	1	0 282
	8575-A	Gasket - Drain Plug	1	‡
	8575-A	Gasket - Pressure Regulating Valve. . .	2	‡
	8576-A	Ball - Differential Valve	1	0.125
	8577-A	Spring - Differential Valve	1	‡
	8579-A	Plug - Drain.	1	0.532
	15243-A	Plunger - Pressure Regulating Valve . .	1	0.062
	15248-A	Plug - Differential Valve	1	0.062
	18240-CS	Assembly - Oil Filter Complete.	1	12.50
	18244-CS	Assembly - Base Includes Inlet Tube . .	1	7.50
	18249-A	Gasket - Oil Filter	1	‡
	35246-BS	Assembly - Metal Element - Interchangeable With 2402-BS	1	3.062

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

OIL LINES AND CONNECTIONS

See Fig. No. 7

Part No.	Description	No. Req'd.	Weight in Lbs.
305-A	Connection - Pressure Pipe 1/8"	1	‡
2396-A	Union - Oil Pipe	2	0.109
2397-A	Nut - Oil Pipe Union	1	0.062
4120-A	Union - Main Discharge Pipe	7	‡
4121-A	Nut - Main Discharge Pipe	7	‡
4122-A	Ferrule - Main Discharge Pipe	7	‡
4259-A	Union - Pump Outlet	1	0.062
4260-A	Nut - Pump Outlet Pipe	1	0.062
4261-A	Ferrule - Pump Outlet Pipe	1	‡
18123-B	Pipe - Pump Outlet 1/2" x 10-3/4" Lg.	1	0.219
19104-BS	Pipe - Pump Discharge With Nut WXC-3 Only	1	0.781
19171-BS	Pipe - Pump Discharge With Nut WXLC-3 Only	1	0.813

WATER PUMP - WXC-3 MODEL R-23555H AND WXLC-3 ENGINES MODEL R-27301

NOTE: Engine Serial Plate Will Specify Type Engine

See Fig. No. 6

61-A	Plug - Water Pump 3/8"	1	‡
312-A	Lockwasher - Water Pump Attaching	3	‡
342-A	Lockwasher - Cover Screw	3	‡
352-A	Screw - Water Pump Attaching	2	‡
749-A	Cup - Water Pump Grease	2	0.125
2083-A	Screw - Water Pump Cover	3	0.094
2100-A	Screw - Water Pump Attaching	1	0.094
2165-A	Key - Water Pump Impeller	1	‡
2210-A	Dowel - Water Pump	2	‡
18164-A	Gasket - Water Pump	1	‡
18165-A	Impeller - Water Pump	1	1.25
18166-A	Snap Ring - Water Pump Shaft	1	‡
18172-B	Shaft - Water Pump 10-15/32" Lg.	1	1.25
18173-A	Gasket - Water Pump Attaching	1	‡
18179-DS	Assembly - Water Pump	1	12.50
18181-C	Assembly - Body With Bushing	1	3.00
21262-C	Assembly - Cover With Bushing	1	4.50
21263-A	Bushing - Water Pump	2	0.328
21265-A	Gland - Water Pump Packing	2	0.125
21270-A	Packing - Water Pump	2	0.125
22177-A	Nut - Water Pump Packing L.H.	1	0.25
22178-A	Nut - Water Pump Packing R.H.	1	0.25

WATER PUMP FOR WXLC 3-ENGINE MODEL R-23555H

NOTE: Engine Serial Plate Will Specify Type Engine

See Fig. No. 6

61-A	Pipe Plug 3/8"	1	‡
312-A	Lockwasher - Water Pump Attaching	3	‡
342-A	Lockwasher - Cover Screw	3	‡
352-A	Screw - Attaching 1/2" x 13" x 1-1/4" Lg.	2	‡
749-A	Cup-Grease	1	0.125
2083-A	Screw - Cover	1	0.094
2165-A	Key - Water Pump	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

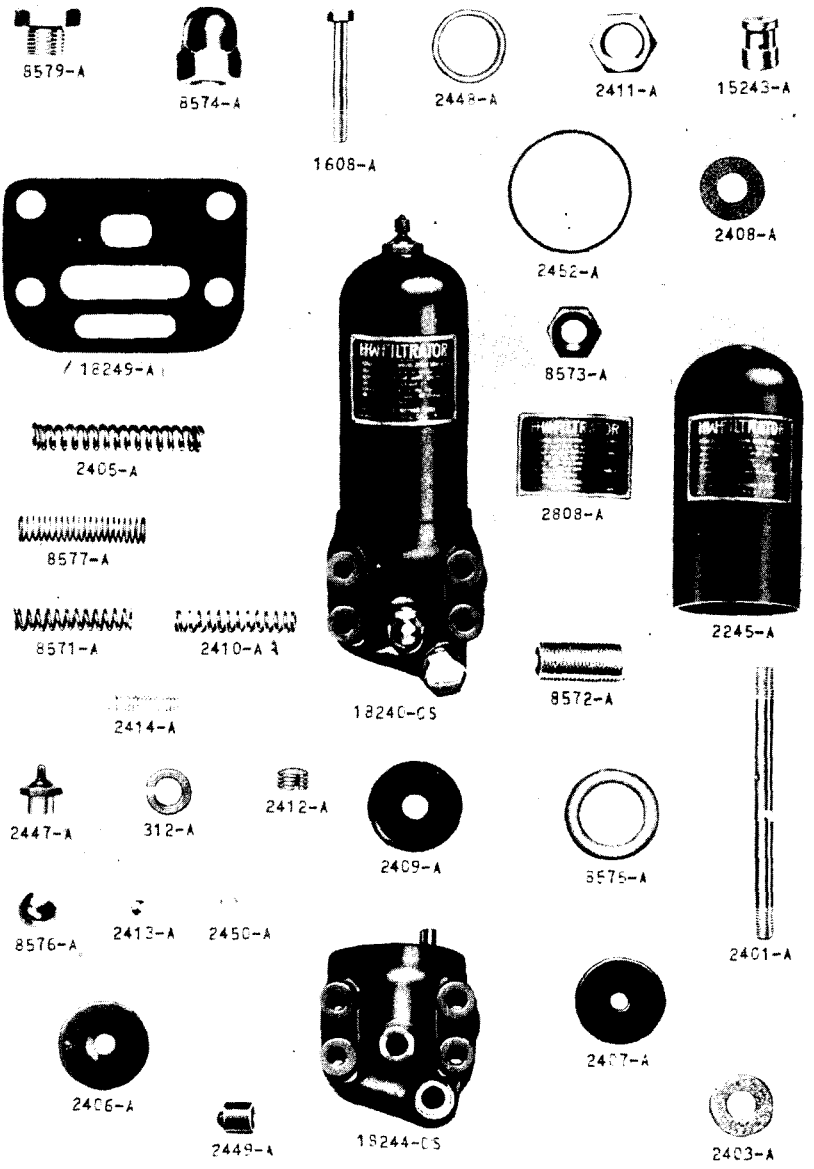


Fig. 10
OIL FILTRATOR

WATER PUMP FOR WXLC-3 ENGINE - CONT.

Part No.	Description	No. Req'd.	Weight in Lbs.
2210-A	Dowell - Water Pump	2	‡
18164-A	Gasket - Cover	1	‡
18166-A	Snap Ring - Pump Shaft	1	‡
18173-A	Gasket - Pump Attaching	1	‡
18189-DS	Assembly - Water Pump	1	11.50
18190-A	Shaft - Water Pump 7-1/8" Lg.	1	0.859
18960-C	Assembly - Cover With Bushing	1	4.094
18961-C	Housing - Water Pump	1	5.00
18971-A	Impeller	1	1.375
18973-A	Bushing - Water Pump Cover	1	0.312
21265-A	Gland - Water Pump Packing	1	0.125
21270-A	Packing - Water Pump	1	0.125
22177-A	Nut - Water Pump Packing	1	0.25

WATER PUMP DRIVE

See Fig. No. 4

333-A	Cotter - Water Pump Gear Shaft Adjusting Nut	1	‡
1247-A	Key - Water Pump Gear (#15 Woodruff)	1	‡
1701-A	Capscrew - Water Pump Shaft Sleeve 1/2" x 13" x 2" Lg. U.S.S.	3	0.187
2165-A	Key - Water Pump Drive Gear #8 Woodruff	1	‡
4342-A	Washer - Water Pump Gear Thrust	2	0.094
8077-A	Nut - Water Pump Gear Shaft Adjusting	1	0.219
15048-B	Bushing - Water Pump Gear Shaft	1	0.75
15056-BS	Assembly - Water Pump Gear Shaft Sleeve With Bushing	1	5.50
15080-A	Oil Thrower - Water Pump Drive Shaft	1	0.062
15096-A	Gear - Water Pump Drive	1	0.875
15099-B	Shaft - Water Pump Gear	1	6.391
15099-BSY	Assembly - Water Pump Drive Shaft	1	13.687
15149-A	Gasket - Water Pump Gear Shaft Sleeve	2	‡
15195-B	Gear - Water Pump Drive	1	1.125

WATER PUMP COUPLING

2165-A	Key - Coupling #8 Woodruff	2	‡
8084-A	Taper Pin - Coupling	2	0.625
16143-A	Chain Coupling	1	0.50
18354-AS	Assembly - Water Pump Coupling	1	1.908
18359-A	Sprocket - Coupling 3/4" Hub	1	0.657
18361-A	Link - Connecting - Coupling	1	‡
18362-A	Cover - Coupling Side	1	‡
18363-A	Lock - Coupling Spring	1	‡
18364-A	Sprocket - Coupling 1" Hub	1	0.657
18365-A	Roller Link - Coupling	1	‡

FAN DRIVING PARTS

See Fig. No. 3

1247-A	Key - Fan Pulley	1	‡
1674-A	Pin - Fan Pulley 5/16" x 3-1/16"	1	0.57
5921-A	Cotter Pin - Fan Pulley Pin 3/32" x 3/4"	2	‡
15073-B	Pulley - Fan Drive for V Belt	1	1.947

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

MEMORANDA

FAN ASSEMBLY AND BELT

	Part No.	Description	No. Req'd.	Weight in Lbs.
	1701-A	Screw - Fan Bracket Brace.	1	0.187
	15538-A	Belt - Fan	1	1.00
	18236-A	Brace - Fan Bracket.	1	‡
	19719-CS	Assembly - Fan (See Breakdown)	1	18.00

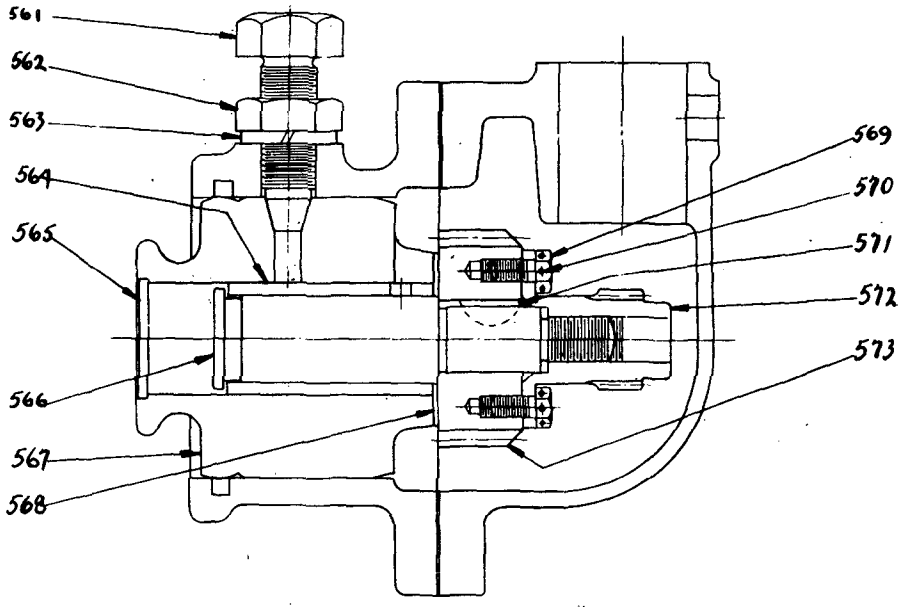


Fig. 11 - GOVERNOR DRIVE

GOVERNOR DRIVE ASSEMBLY (Fig. 11)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	15413-AS	Assembly - Governor Drive.	1	5.75
561	2167-A	Lock Screw - Governor Drive.	1	0.195
562	2168-A	Lock Nut - Drive Lock Screw.	1	0.078
563	1126-A	Lockwasher - Drive Lock Screw.	1	0.062
564	8173-A	Bushing - Governor Drive Shaft	1	0.422
565	763-A	Plug - Governor Expansion.	1	‡
566	15357-A	Shaft - Governor Drive	1	0.75
567	15355-A	Sleeve - Governor Drive.	1	3.00
568	15356-A	Washer - Governor Drive Shaft Thrust . .	1	‡
569	4253-A	Screw - Governor Driving Gear.	2	‡
570	267-A	Lockwire - Governor Gear Screw	1	‡
571	2165-A	Key - Governor Drive Gear.	1	‡
572	15787-A	Gear - Governor Drive.	1	0.36
573	15416-B	Gear - Governor Drive - Large Gear . . .	1	0.939
	15788-A	Gear - Governor Driven - On Bottom Of Governor (For Governor - See Breakdown)		0.125

GOVERNOR LUBRICATION

	1532-A	Nut - Oil Line	2	‡
	1659-A	Elbow - Oil Line	2	0.062
	4055-A	Street Ell - Oil Line.	1	0.062
	4280-A	Nipple - Oil Line.	1	‡
	14670-A	Tee - Oil Line	1	0.109
	305-A	Pipe Plug.	1	
	19369-AS	Assembly - Oil Line.	1	

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

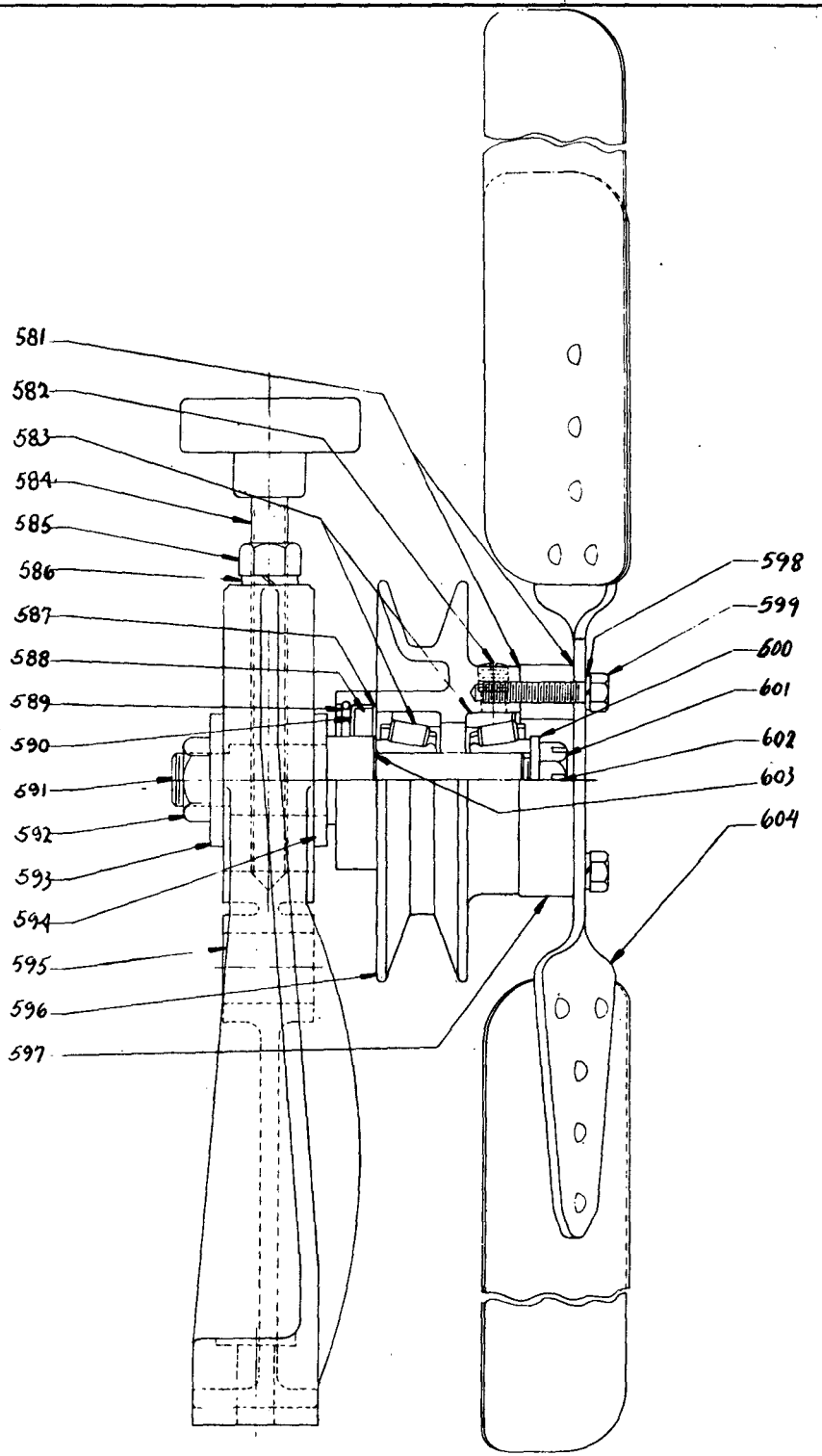


Fig. 12 - FAN ASSEMBLY

FAN ASSEMBLY 19719-CS (Fig. 12)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
581	2135-A	Gasket	2	‡
582	59-A	Oil Plug	1	‡
583	2132-A	Timken Bearing	2	0.219
584	16238-A	Adjusting Screw	1	‡
585	626-A	Lock Nut	1	‡
586	312-A	Lockwasher	1	‡
587	2138-A	Cork Retainer Washer	1	‡
588	2570-A	Cork Washer	1	‡
589	15298-A	Lockwire	1	‡
590	2137-A	Cork Retainer	1	0.062
591	19717-A	Spindle	1	‡
592	2028-A	Nut	1	0.062
593	2025-A	Clamp Washer	1	0.125
594	2024-A	Clamp Washer	1	0.109
595	15286-B	Bracket	1	6.50
596	19716-B	Hub	1	‡
597	20305-A	Spacer	1	0.125
598	615-A	Lockwasher	4	‡
599	14501-A	Cap Screw	4	‡
600	40529-A	Clamp Washer	1	0.125
601	2134-A	Slotted Nut	1	‡
602	298-A	Cotter	1	‡
603	45926-A	Oil Gasket	1	0.062
604	20304-BS	Blade Assembly	1	3.12
	40530-A	Cap Front	1	

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

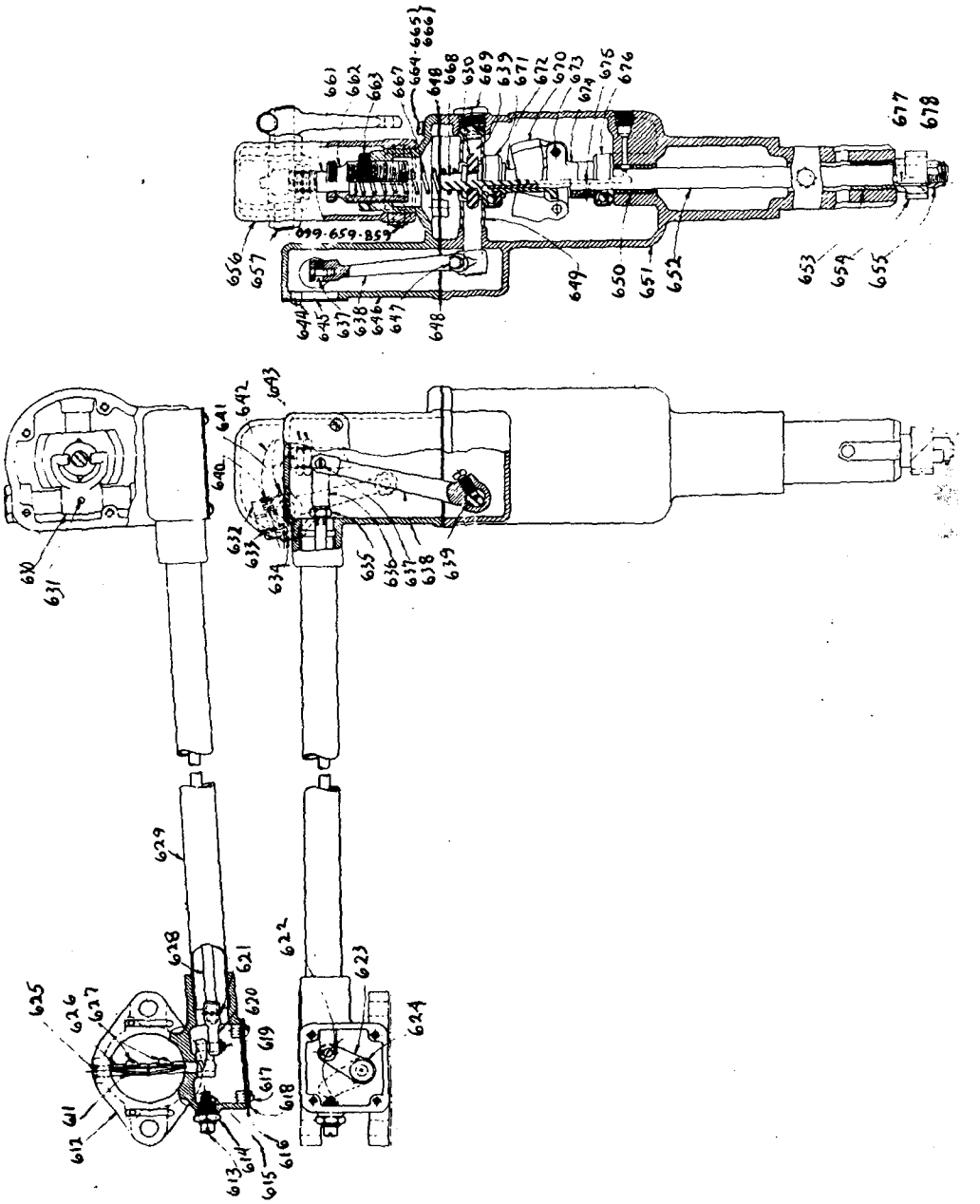


Fig. 13 - GOVERNOR

GOVERNOR (Fig. 13)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
611	42408-A	*Butterfly Valve	1	‡
612	19801-A	*Valve Box	1	‡
613	15775-A	*Bumper Screw	1	‡
614	5855-A	*Hex Nut 3/8" - 24	1	‡
615	15783-A	*Bumper Spring	1	‡
616	15863-A	*Valve Box Cover Gasket	1	‡
617	15868-A	*Rd. Head Screw 6-32 x 1/4"	4	‡
618	15879-A	*Valve Box Cover Plate	1	0.187
619	15862-A	*Bell Crank Pin	1	‡
620	15844-A	*Bell Crank Pin	1	‡
621	5898-A	*Bell Crank Link Pin 3/42" x 7/16"	1	‡
622	15877-A	*Cotter Key 1/16" x 7/16"	1	‡
623	15861-A	*Bell Crank	1	‡
624	15864-A	*Bell Crank Pin 3/32" x 3/4"	1	‡
625	15764-A	*Welch Plug 5/16"	1	‡
626	19807-A	*Valve Shaft	1	‡
627	15868-A	*Rd. Head Screw 6-32 x 1/4"	4	‡
628	19806-A	*Connecting Rod	1	‡
629	19812-A	*Connecting Rod Tube	1	‡
630	27584-A	*Yoke	1	0.094
631	4962-A	*Yoke Pin #1 x 1"	1	‡
632	18388-A	*Speed Change Lever	1	0.156
633	628-A	*Lockwasher 1/4"	2	‡
634	15764-A	*Welch Plug 5/16"	1	‡
635	1177-A	*Hex Nut 1/4" - 28	1	‡
636	15845-A	*Connecting Rod Link	1	‡
637	15852-A	*Push Rod Screw	1	‡
638	16987-A	*Rocker Arm	1	0.18
639	19809-A	*Rocker Shaft	1	0.156
640	1173-A	*Hex Head Cap Screw 1/4" - 28" x 7/8"	1	0.078
641	14168-A	*Pin #1 x 3/4"	1	‡
642	18398-A	*Speed Change Rocker Arm	1	0.156
643	14173-A	*Plunger Lock Nut	2	‡
644	15868-A	*Rd. Head Screw 6-32 x 1/4"	8	‡
645	19808-A	*Connecting Rod Cover	1	‡
646	19802-B	*Body Cap	1	‡
647	14166-A	*Set Screw - 1/4" - 20 x 1/2"	1	‡
648	15854-A	*Body Gasket	1	‡
649	19356-A	*Rocker Yoke Spacer	1	‡
650	16980-A	*Bearing	1	0.062
651	20806-C	*Body	1	‡
652	20805-B	*Drive Shaft	1	‡
653	16981-A	*Bearing	1	‡
654	15788-A	*Driven Gear	1	0.117
655	2-A	*Castle Nut 3/8" - 24	1	‡
656	18397-A	*Speed Change Housing	1	‡
657	18389-A	*Speed Change Shaft	1	‡
658	1327-A	*Capscrew 1/4" - 28 x 1-3/4"	1	‡
659	1-A	*Castle Nut 1/4" - 28	1	0.062
660	628-A	*Lock Washer	1	‡
661	19814-A	*Speed Plunger	1	‡
662	18393-A	*Adjusting Screw	1	0.187
663	15836-A	*Lock Nut Adjusting Screw	1	0.125
664	14219-D	*#10 - 24 Fil. Head Screw	2	‡
665	5891-A	*Fil. Hd. Mach. Screw 10 - 24 x 5/8"	2	‡
666	14909-A	*Lock Washer	4	‡
667	30768-A	*Governor Spring	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

GOVERNOR - CONT.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
668	19805-A	*Spring Collar	1	‡
669	19804-A	*Rocker Shaft Bearing	1	0.078
670	30728-A	*Weights	2	0.282
671	15871-A	*Bearing	1	0.094
672	15846-A	*Thrust Sleeve	1	0.094
673	30729-A	*Weight Pins	2	‡
674	16724-A	*Spider	1	0.187
675	4958-A	*Pin 1/8" x 7/8"	1	‡
676	30792-A	*Thrust Bearing	1	0.078
677	1179-A	*#2 Woodruff Key	1	‡
678	301-A	*Cotter 1/8" x 3/4"	1	‡
	19832-CS	Governor Assembly - Includes Parts Marked *	1	14.00
	4927-A	Governor Attaching Stud (For Valve Box)	2	0.109
	15787-A	Governor Driving Gear	1	0.109
	4253-A	Governor Driving Gear Screw	2	‡
	87-A	Governor Valve Box Gasket	1	‡
	752-A	Governor Valve Box Attach. Stud Nut	2	‡
	342-A	Governor Valve Box Attach. L'Washer	2	‡
	4123-A	Governor Attach. Screw (In Gear Cover) 1/2" - 13 x 7/8"	1	0.078
	312-A	Governor Attach. Screw L'Washer	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

MAGNETO SUPPORT HOUSING AND MAGNETO DRIVE

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	312-A	Lockwasher - Support Housing	3	‡
	1701-A	Screw - Support Housing	2	0.187
	4489-A	Screw - Support Housing	1	0.219
	4550-A	Oil Seal - Support Housing	1	0.187
	5813-A	Pin - Driven Gear on Magneto Shaft	1	‡
	15149-A	Gasket - Support Housing	1	‡
	16970-A	Magneto Adapter Collar	1	0.50
*	18597-A	Magneto Driving Gear on Water Pump Shaft	1	0.875
*	18598-A	Magneto Driven Gear on Magneto Shaft	1	0.094
*	20736-C	Housing - Magneto Support	1	4.75
	51423-A	Magneto Hold Down Arm Assembly	1	0.219

MAGNETO AND IGNITION CABLES

	18111-BSY	Assembly - Cable Tube	1	1.031
*	50280-A	Wire - Spark Plug	150-3/4"	0.171
	50283-A	End - Spark Plug Wire	6	‡
	50563-A	Spark Plug - Champion #0	6	0.25
	50651-A	End - Spark Plug Wire	6	‡
*	51422-CS	Wico Magneto - See Breakdown Under Accessories	1	6.50
*	#1	Cable - 18" Long - Magneto To Plug	1	0.187
*	#2	Cable - 15-3/4" Long - Magneto To Plug	1	0.187
*	#3	Cable - 24" Long - Magneto To Plug	1	0.187
*	#4	Cable - 27" Long - Magneto To Plug	1	0.187
*	#5	Cable - 31-3/4" Long - Magneto To Plug	1	0.187
*	#6	Cable - 34-1/4" Long - Magneto To Plug	1	0.187
*		Assembly - Cable Set (Includes Above 6 Wires)	1	1.062
		Cable - Magneto To Switch 10'6" Long #16 With Terminal	1	‡
		Cable - Switch Ground 8" Long #16 With Terminal	1	‡

The following parts replace parts marked * on roller Model R-27301 which is equipped with Bosch Magneto.

	15097-A	Gear on Water Pump Shaft	1
	15096-A	Driven Gear on Hour-meter	1
	16508-CS	Housing - Magneto holding	1
	50339-CS	Assembly Bosch Magneto MJC6-C101 - see breakdown	1
	51620-DS	Spark Plug wires - (set)	1
	51620-DS-1	Wire #1	1
	51620-DS-2	Wire #2	1
	51620-DS-3	Wire #3	1
	51620-DS-4	Wire #4	1
	51620-DS-5	Wire #5	1
	51620-DS-6	Wire #6	1

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

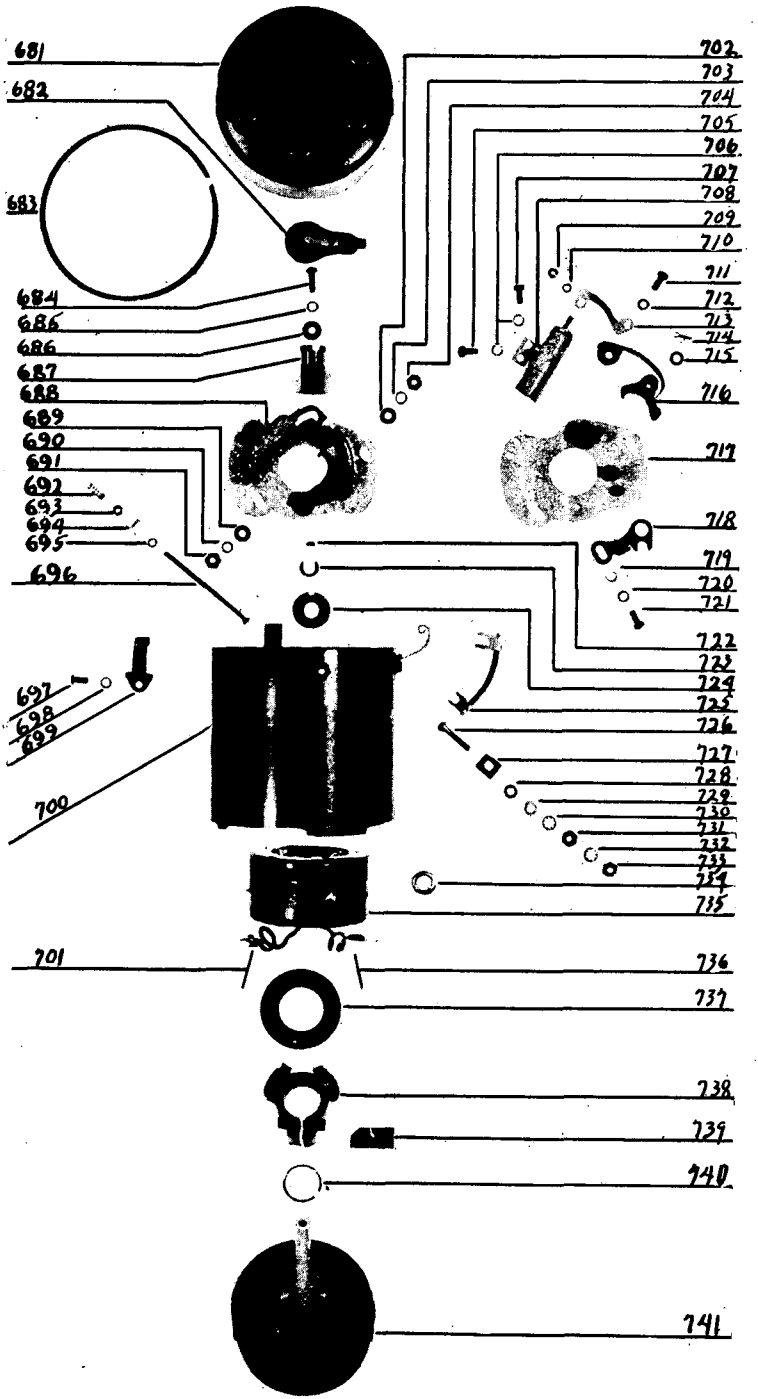


Fig. 14
MAGNETO PARTS

INFORMATION on this page covers WICO MAGNETO - If your roller is equipped with BOSCH MAGNETO refer to pages 81A-81D.

MAGNETO - WICO EOM-1612 OR EM-1340 INTERCHANGEABLE

(See Fig. 14)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
681	X-3287	Distributor Cap Group		0.437
682	X-3175	Distributor Arm Group		0.125
683	3279	Distributor Cap Gasket		‡
684	1902	Cam Screw		‡
685	M-55XA	Cam Screw Lock Washer		‡
686	1207	Cam Screw Washer		‡
687	3302	Cam CCW		0.125
688	X-3231	Assembly Breaker Plate		0.282
689	M-36X	Breaker Plate Clamp Nut Washer		‡
690	M-55XA	Breaker Plate Clamp Nut Lock Washer		‡
691	3230	Breaker Plate Clamp Nut		‡
692	3289	Secondary Interlead Spring		‡
693	M-71XA	Secondary Interlead Screw Nut		‡
694	3259	Coil Contact Spring		‡
695	M-52X	Secondary Interlead Screw Lock Washer		‡
696	3258	Secondary Interlead Screw		‡
697	16-738	Distributor Cap Clip Screw		‡
698	M-55XA	Distributor Cap Clip Screw Lock Washer		‡
699	X-1503	Distributor Cap Clip Assembly		‡
700	X-3732	Main Housing (Replacement Assembly		2.00
701	2264B	Coil Wedge		‡
702	M-36X	Breaker Plate Clamp Nut Washer		‡
704	3230	Connection Stud Nut		‡
705	M-31X	Condenser Clamp Screw		‡
706	M-55XA	Condenser Clamp Screw Lock Washer		‡
707	M-31X	Condenser Clamp Screw		‡
708	X3222	Condenser Assembly		‡
709	M-71XA	Condenser Connection Nut		‡
710	M-52X	Condenser Connection Nut Lock Washer		‡
711	M-31X	Breaker Spring Terminal Screw		‡
712	M-55XA	Breaker Spring Terminal Screw Lock Washer		‡
713	X-3334	Condenser Breaker Lead Group		‡
714	3220	Breaker Arm Pivot Cotter Pin		‡
715	3219	Breaker Arm Pivot Washer		‡
716	X-3215	Breaker Arm Group		‡
717	X-3733	Breaker Plate Group		0.187
718	3224	Fixed Contact		0.25
719	1XA-256	Fixed Contact Screw Washer		‡
720	M-55XA	Fixed Contact Screw Lock Washer		‡
721	M-31X	Fixed Contact Screw		‡
722	1146	Cam Key		‡
723	3298	Shaft Snap Ring		‡
724	3228	Cam Thrust Washer		‡
725	X-3336	Ground Connection Lead Group		‡
726	3945	Connection Stud		‡
727	3539	Connection Stud Lock		‡
728	1118	Connection Stud Washer (Leather)		‡
729	M-33X	Connection Stud Washer (Brass)		‡
730	2573	Connection Stud Clamp Nut Lock Washer		‡
733	2573	Connection Stud Clamp Nut Lock Washer		‡
734	3227	Rotor Bearing		‡
735	X-3430	Coil Group		1.00
736	2264B	Coil Wedge		‡
737	3277	Coil Gasket		‡
738	X-3275	Inner Core Group		0.25
739	3225	Inner Core Locating Key		‡
740	3280	Inner Core Group Snap Rings		‡
741	X-3913	Rotor Assembly		0.312

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 81A-81D.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

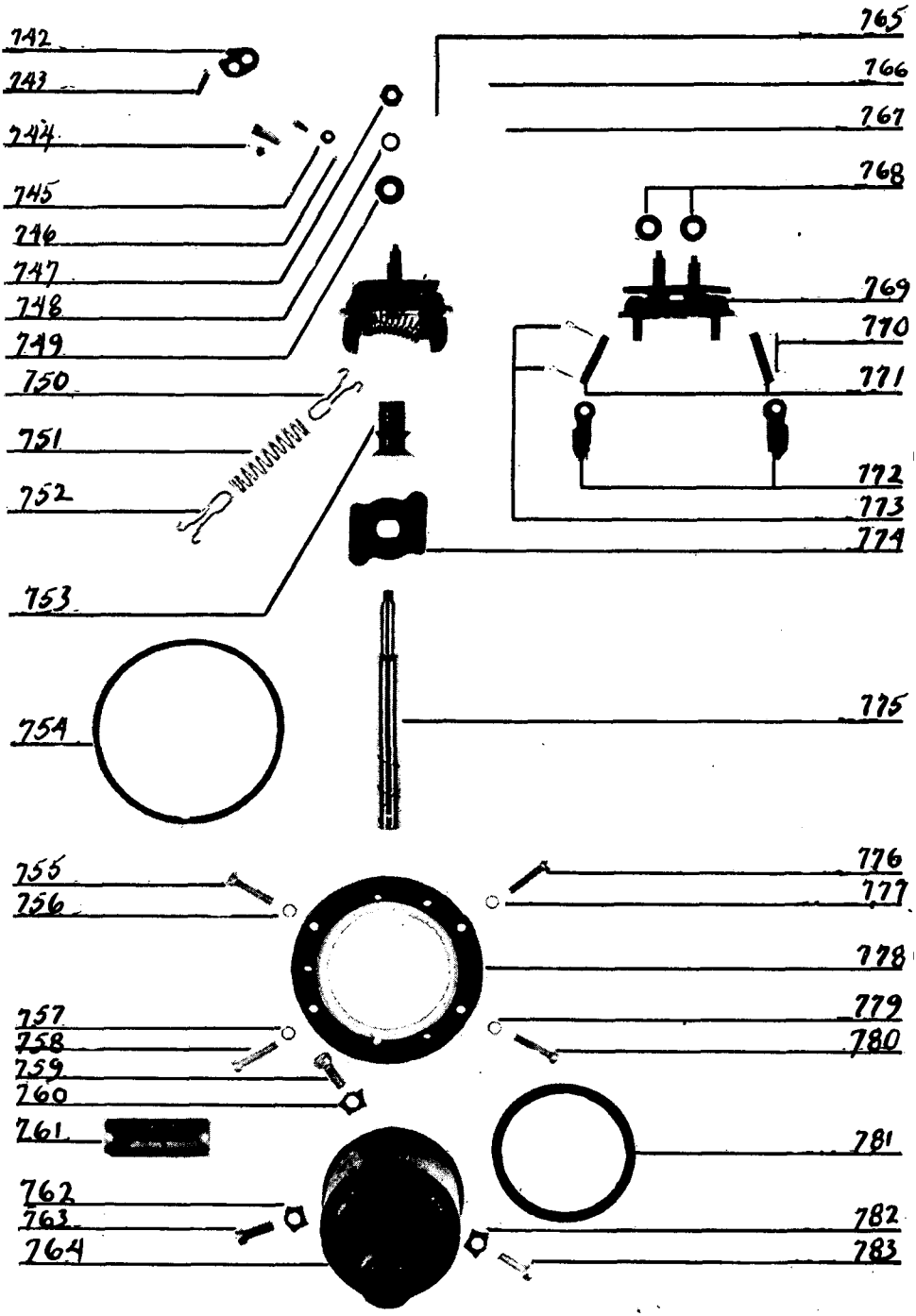


Fig. 15
WICO MAGNETO PARTS

INFORMATION on this page covers WICO MAGNETO - if your roller is equipped with BOSCH MAGNETO refer to pages 81A-81D.

WICO - MAGNETO CONT. (Fig. 15)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
742	3844	Yoke		‡
743	3836G	Advance Governing Spring		‡
744	X-4616	Advance And Support Plate Assembly CCW		0.50
745	3967-B	Advance Stop Ring		‡
746	3966	Lock Spring For Advance Stop Ring		‡
747	3823	Impulse Spacer Clamp Nut		‡
748	M-61X	Impulse Spacer Clamp Nut Lock Washer		‡
749	3821	Impulse Spacer Clamp Washer		‡
750	3800	Impulse Spring Guide		‡
751	3799	Impulse Spring		‡
752	3800	Impulse Spring Guide		‡
753	4099	Impulse Spacer		‡
754	3279	Intermediate Plate Gasket		‡
755	3921	Intermediate Plate Screw		‡
756	M-55XA	Intermediate Plate Screw Washer		‡
758	3921	Intermediate Plate Screw		‡
759	1130	End Plate Clamp Screw		‡
760	1127	End Plate Screw Clamp Lock		‡
761	3964	Name Plate		‡
762	1127	End Plate Screw Clamp Lock		‡
763	1130	End Plate Clamp Screw		‡
764	X-4093	End Plate Group CCW		1.50
765	3836G	Advance Governing Spring		‡
766	3844	Yoke		‡
767	X-4630	Advance Weight Replacement Group CCW (Includes One Weight With Pin And One Without Pin)		0.50
768	3837	Pivot Pin Spacer Washer		‡
769	X-4616	Advance And Support Plate Assembly CCW		0.50
770	M-95X	Trip Arm Pivot Cotter Pin		‡
771	3771	Trip Arm Pivot Pin		‡
772	4000	Trip Arm CCW		‡
773	M-95X	Trip Arm Pivot Cotter Pin		‡
774	4003	Cam Plate Group CCW		1.50
775	4206	Drive Shaft CCW		‡
776	3921	Intermediate Plate Screw		‡
778	3996	Intermediate Plate		0.50
780	3921	Intermediate Plate Screw		‡
781	3801	End Plate Gasket		‡
782	1127	End Plate Screw Clamp Lock		‡
783	1130	End Plate Clamp Screw		‡

INFORMATION on this page covers WICO MAGNETO - If your roller is equipped with BOSCH MAGNETO refer to pages 81A-81D.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

TYPE MJC 6C-101 FIXED-SPARK BOSCH MAGNETO

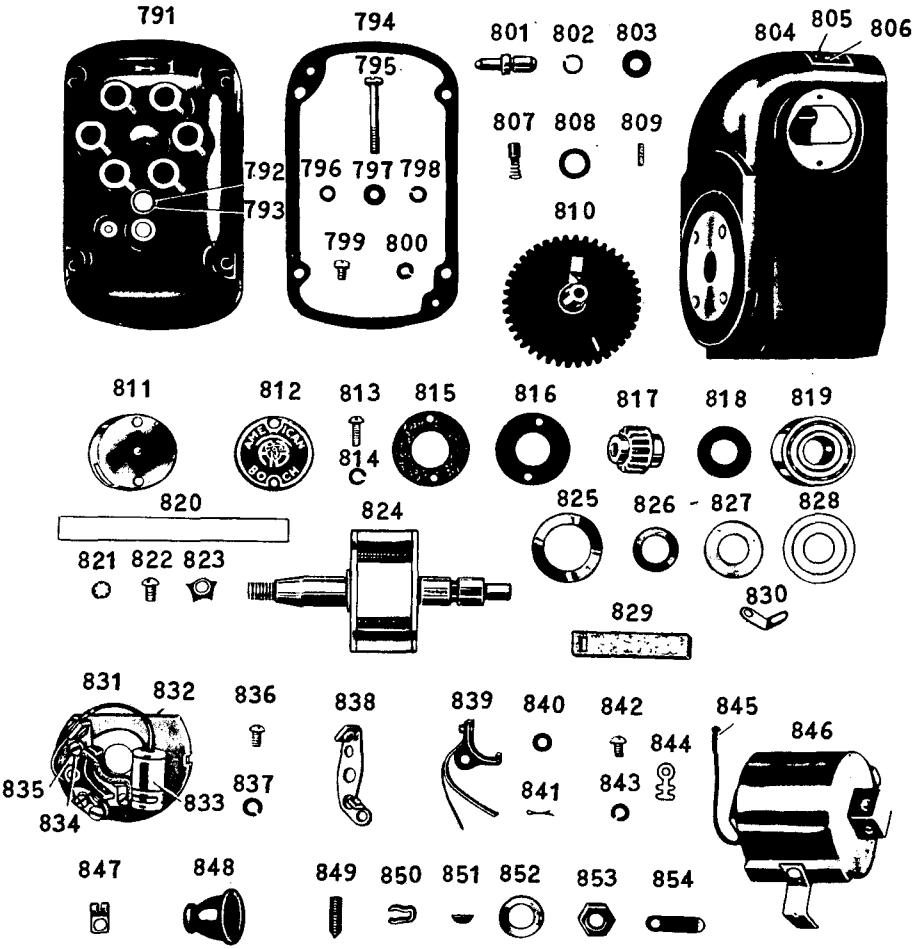


Fig. 15A

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 78-81.

AMERICAN BOSCH MAGNETO

MJC 6C 101 - (6 cylinder Base Mtg. Anti-clw. rotation, Fixed Spark)
(Fig. 15A)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
791	DP 52234	*Distributor plate with observation window:	1	‡
792	WN 521	Observation window.	1	‡
793	RG 5210	Ring for window	1	‡
794	GA 524	*Gasket for distributor plate.	1	0.562
795	SC 1037 CA	*Screw for fastening distributor plate	4	‡
796	WA 98922	Plain washer under fastening screw.	4	‡
797	WA 5280	*Sealing washer under fastening screw.	4	‡
798	WA 288	Lock washer under fastening screw	4	‡
799	SC 24-4 CA	Magneto grounding screw	1	‡
800	WA 288	Lock washer under grounding screw	1	‡
801	SD 5249	Rotor gear shaft.	1	‡
802	(SP 1021	Shaft spring ring-distributor plate end	1	‡
	(SP 5254	Shaft spring ring - gear end.	1	‡
803	WA 1070	Rotor gear spacing washer	1	‡
804	HG 5216	Magneto housing	1	4.312
805	NP 521	Name plate for type designation	1	‡
806	SC 121-4 CA	Screw for fastening name plate.	2	‡
807	BR 529	*Carbon brush and spring in dist. gear	1	‡
808	WA 528	Distributor gear spacing washer	1	‡
809	PN 1001	Distributor plate locating pin.	2	‡
810	GE 5283	*Distributor gear.	1	0.10
811	CV 52126	Ventilator cover.	2	‡
812	NP 5222	Name plate on ventilator cover.	2	‡
813	SC 37-8 CA	Ventilator cover fastening screw.	4	‡
814	WA 6-3 CA	Lock washer under fastening screw	4	‡
815	GA 5215	Gasket under ventilator cover	2	‡
816	WA 5281	Washer under ventilator cover	2	‡
817	GE 5251	Rotor gear - For MJC 6C 101 Mag. only	1	0.08
818	WA 81751	*Rotor felt washer	3	‡
819	BB 60226	*Ball bearing at either end.	2	0.07
820	IS 504	*Packing strip for ball bearing.	2	‡
821	WA 21-5	Lock washer for interrupter bracket fastening screw	2	‡
822	SC 41-8 CA	Screw for fastening interrupter bracket.	2	‡
823	PL 52125	Locking plate for interrupter bracket	2	‡
824	RT 5299	Magnet rotor - For MJC 6C 101 Mag. only	1	1.375
825	IS 222	*Paper washer for ball bearing (interrupter end)	1	‡
	(WA 61	*Bearing shim (.0126" thick)	As req'd	‡
826	(WA 106	*Bearing shim (.0071" thick)	As req'd	‡
	(WA 107	*Bearing shim (.0040" thick)	As req'd	‡
	(WA 1009	*Bearing shim (.0197" thick)	As req'd	‡
827	WA 1034	Bearing spacing washer.	2	‡
828	WA 5245	Rotor felt retaining washer	1	‡
829	WK 5231	Cam oiler wick.	1	‡
830	BK 5283	Wick retaining bracket.	1	‡
831	BK 5258	Interrupter assembly complete with points.	1	0.37
832	BK 5259	Interrupter bracket with riveted parts only.	1	0.28

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 78-81.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

AMERICAN BOSCH MAGNETO

MJC 6C 101 - (6 cylinder Base Mtg. Anti-clw. rotation, Fixed Spark)
(Fig. 15A)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
833	CW 5232	*Condenser.	1	‡
834	WA 21-4	Lock washer under contact bracket fastening screw.	2	‡
835	SC 39-5 CA	Screw for fastening contact bracket. .	2	‡
836	SC 39-5 CA	Screw for fastening condenser and wick retaining bracket.	1	‡
837	WA 5-4	Lock washer under condenser fastening screw.	1	‡
838	BK 566	*Contact bracket with point	1	‡
839	LE 5236	*Interrupter lever with point and springs.	1	‡
840	WA 1012	Plain washer for interrupter lever stud	1	‡
841	PN 1007	Cotter pin for interrupter lever stud.	1	‡
842	SC 37-5 CA	Screw for fastening conducting lead. .	1	‡
843	WA 6-3 CA	Lock washer under fastening screw. . .	1	‡
844	EC 1012	Terminal clip for conducting lead cable	1	‡
845	KL 100657	*Coil cable (specify length required. .		‡
846	CL 5238	*High-tension coil complete	1	0.939
847	EC 5224	Terminal clip for coil cable	1	‡
848	IS 82927	Rubber insulation nipple	1	‡
849	SC 1060	Lock screw for mounting coil	2	‡
850	FP 81953	Clip for distributor plate cable . . .	6	‡
851	KY 1004	Woodruff key - used with coupling. . .	1	‡
852	WA 2	Plain washer for rotor shaft	1	‡
853	NT 67446	Hexagon nut for rotor shaft.	1	‡
854	GG 522	Gauge for contact point setting. . . .	1	‡

IMPULSE COUPLING

BOSCH ICB2A-19-30° (Fig. 15B)

FOR BASE MOUNTED MAGNETOS

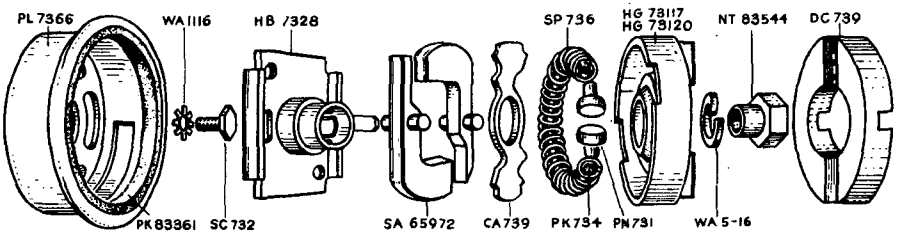


Figure 15B

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 78-81.

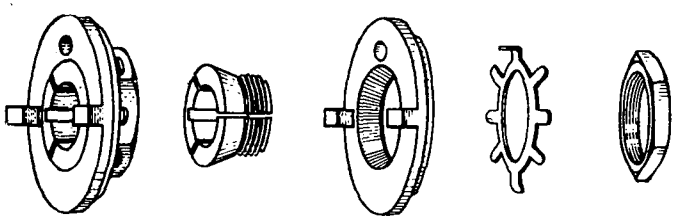
‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

IMPULSE COUPLING

BOSCH ICB2A-19-30° (Fig. 15B)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	ICB2A-19-30°	Assembly - impulse coupling		
	CA 739	Cam		‡
	*DC 739	Intermediate drive disc		0.08
	HB 7328	Coupling plate and hub assembly		0.21
	*HG 73117	Housing - for anti-clw. rotation		0.375
	NT 83544	Hexagon nut for rotor shaft - 3/4" across flats		‡
	*PK 734	Felt wick for spring		‡
	*PK 83361	Packing for arrester plate		‡
	PL 7366	Arrester plate with packing		0.344
	*PN 731	Pin for spiral spring		‡
	SA 65972	Weight - long		0.09
	*SC 732	Screw for fastening arrester plate		‡
	*SP 736	Spiral spring		‡
	WA 5-16	Lock washer under rotor shaft nut		‡
	WA 1116	Lock washer under arrester plate fastening screw		‡

ADJUSTABLE DRIVING MEMBER DATA FOR ICB IMPULSE COUPLINGS



855 856 857 858 859

Figure 15C

855	FL 7312	Assembly - adjustable driving member		0.50
856	FL 7323	Keyed hub		0.14
857	FL 7325	Adjustable coupling flange		0.298
858	WA 75863	Star lock washer		‡
859	NT 75768	Keyed hub nut		0.065

HOUR-METER

	13216CS	Assembly - hour meter Durant Mfg. Co. HM-749-12.	1	
	15045A	Support housing.	1	
	15097A	Gear on water pump shaft	1	
	15096A	Driven gear on hour meter.	1	

The above is special equipment used on rollers Model R-27301, furnished on P.). CI-1578 and P.O. CI-1760.

INFORMATION on this page covers BOSCH MAGNETO - if your roller is equipped with WICO MAGNETO refer to pages 78-81.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

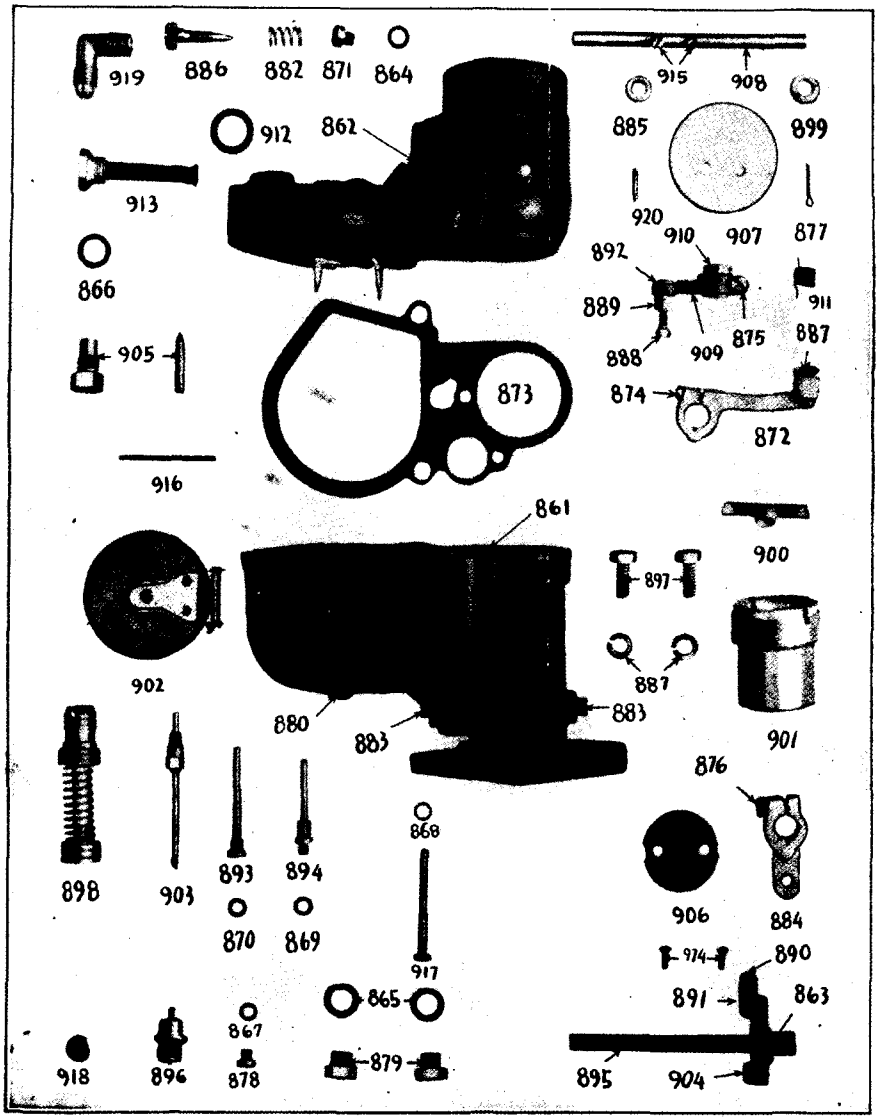


Fig. 16

CARBURETOR - ZENITH IN-156-B

(Fig. 16)

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	1869-BS	Assembly Carburetor 1-1/2" Zenith IN-156B Outline No. 0-6459 - interchangeable with Carburetor Assembly 20611-BS.		7.00
861	A1016x1	Fuel Body		3.252
862	A1017x1	Upper Body.		2.518
863	CT63-2	Throttle Stop Taper Pin		‡
864	T56-5	Channel Screw Fiber Washer.		‡
865	T56-23	Lower Plug Fiber Washer		‡
866	T56-13	Fuel Valve Fiber Washer		‡

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

CARBURETOR - ZENITH IN-156-B - CONT.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
867	T56-24	Compensating Jet Fiber Washer		‡
868	T56-24	Accelerating Jet Fiber Washer		‡
869	T56-24	Cap Jet Fiber Washer		‡
870	T56-46	Main Jet Fiber Washer		‡
871	C138-61	Channel Screw		‡
872	C109-7	Air Shutter Control Tube Bracket		0.092
873	C4419	Body To Bowl Assembly Gasket		‡
874	T1S8-10	Air Shutter Bracket Clamp Screw		‡
875	T8S8-7	Air Shutter Lever Clamp Screw		‡
876	T8S10-9	Throttle Lever Clamp Screw		‡
877	T61-4	Cotter Pin		‡
878	C52-3	Compensating Jet (Specify Size) #25		‡
879	C138-52	Lower Plug		‡
880	CT91-1	Drain Plug		‡
881	T43-103	Carburetor Assembly Screw Lockwasher		‡
882	C111-17	Idling Needle Valve Friction Spring		‡
883	C138-3	Priming Hole Screw		‡
884	C24-10	Throttle Lever		0.094
885	C130-4	Air Shutter Lever Thrust Washer		‡
886	C46-6	Idling Needle Valve		‡
887	T4S10-8	Air Shutter Control Tube Clamp Screw		‡
888	T8S8-10	Air Shutter Lever Swivel Screw		‡
889	CR134-2	Air Shutter Lever Swivel		‡
890	T8S10-13	Throttle Plate Adjusting Screw		‡
891	C111-62	Throttle Plate Adjusting Screw Spring		‡
892	CT52-1	Air Shutter Lever Swivel Washer		‡
893	D6680	Main Jet (Specify Size) #28		‡
894	C51-22	Cap Jet (Specify Size) #26		‡
895	D6390	Throttle Shaft		0.139
896	C97-10	Economizer Valve		‡
897	T8S31-12	Carburetor Assembly Screw		‡
898	C36-12	Accelerating And Economizer Piston Assembly		0.125
899	CR115-10	Air Shutter Lever Spring Retainer		‡
900	D6397	Deflector		‡
901	C4391	Venturi (Specify Size) #30		0.24
902	D6253	Float		0.086
903	C54-1	Idle Jet #16		‡
904	D6386	Throttle Stop Lever		0.094
905	C81-42	Fuel Valve Seat and Valve #55		‡
906	D6391	Throttle Plate		‡
907	C102-58	Air Shutter Plate		‡
908	C105-102	Air Shutter Shaft		‡
909	C106-70	Air Shutter Lever		‡
910	CR26-61	Air Shutter Lever Bushing		‡
911	C117-27	Air Shutter Lever Spring		‡
912	T56-10	Fuel Screen Fiber Washer		‡
913	D7171	Fuel Screen		‡
914	C136-6	Throttle Plate Set Screws		‡
915	C136-3	Air Shutter Plate Set Screw		‡
916	C120-26	Float Axle		‡
917	C57-6	Power and Accelerating Jet (Specify Size) #15		‡
918	C41-9	Check Valve		‡
919	T122-4	Gasoline Connection Elbow		‡
920	CT63-2	Air Shutter Washer Taper Pin		‡
921	CR121-10	Throttle Stop Pin (Not Illustrated)		‡
922	D4991	Float Bracket (Not Illustrated)		0.092
923	T73-15	Float Bracket Pin (Not Illustrated)		‡
924	C41-9	Accelerating Check Valve (Not Illustrated)		‡
	CR134-5	Throttle Lever Swivel		‡
	CT52-7	Throttle Lever Swivel Washer		‡
	T8S8-6	Throttle Lever Swivel Screw		‡
	C181-16	Assembly - Gasket Set		‡

NOTE: When ordering parts, specify Zenith outline Number (0-6459).

CARBURETOR INFORMATION on this page covers Rollers up to and including Serial No. USA846038.

‡Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

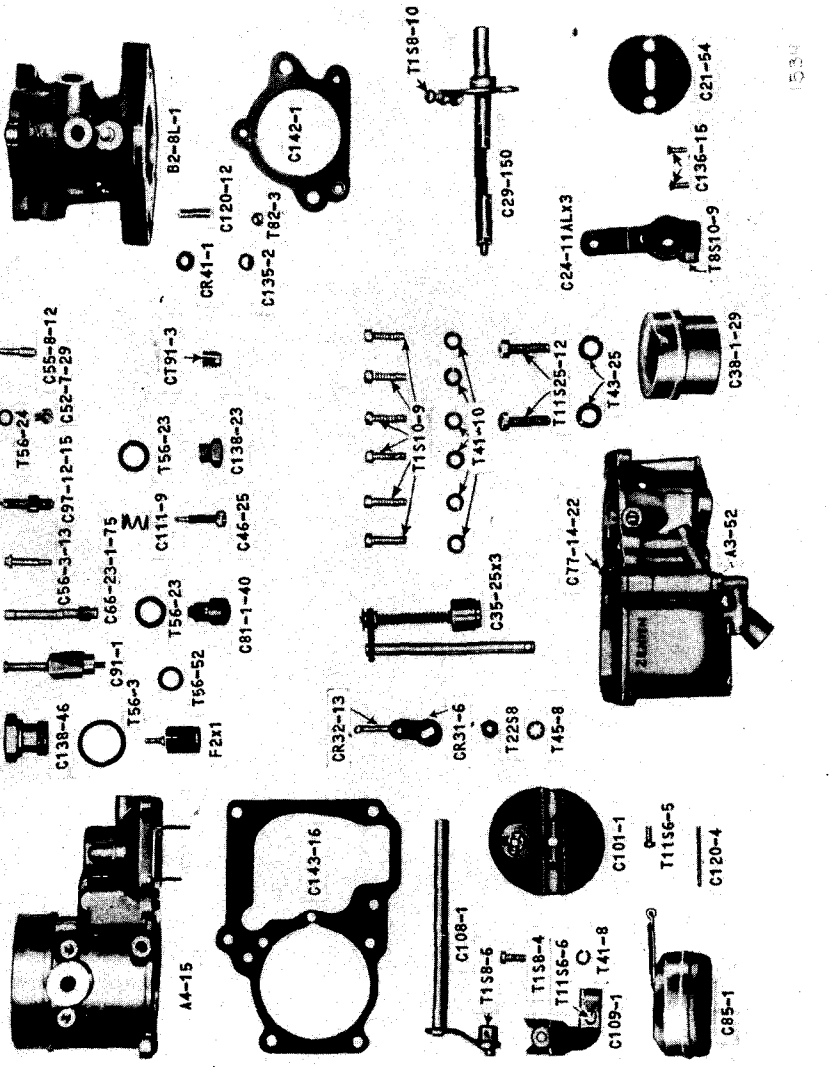


Fig. 16A

ZENITH CARBURETOR — MODEL 28BV12.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	20611-BS	Assembly - Carburetor Zenith 1½" 28BV12, Outline No. S-880-Interchangeable with Carburetor Assembly 18690-BS	1	
	A4-15	BODY-AIR INTAKE	1	0.89
	C108-1	Shaft & Lever - Air Shutter	1	‡
	T1S8-6	Screw - Swivel	1	‡
	C101-1	Plate - Air Shutter	1	‡
	T11S6-5	Screw - Air Shutter	1	‡
	C109-1	Bracket - Air Shutter	1	‡
	T11S6-6	Screw - Tube Clamp	1	‡
	T31S6	Nut - Clamp Screw	1	‡
	T1S8-4	Screw - Bracket Assembly	1	‡
	T41-8	Lockwasher - Bracket Assembly	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

ZENITH CARBURETOR — MODEL 28BV12 — CONT.

Ref. No.	Part No.	Description	No. Req'd.	Weight in Lbs.
	C46-25	Screw - Idle Adjusting	1	‡
	C111-9	Spring - Idle Adjusting Screw	1	‡
	C138-46	Head - Filter	1	0.065
	T56-3	Washer - Filter Head Fibre	1	‡
	F2x1	Element - Filter	1	‡
	C91-1	Cylinder - Vacuum	1	‡
	T56-52	Washer - Vacuum Cylinder Fibre	1	‡
	C85-1	Float	1	‡
	C120-4	Axle - Float	1	‡
	C143-16	Gasket - Bowl to Intake	1	‡
	T1S10-9	Screw - Bowl to Intake Assembly	6	‡
	T41-10	Lockwasher-Bowl to Intake Screw	6	‡
	A3-52	BOWL - FUEL	1	1.25
	CR137-37	Plug - Bowl Channel	4	‡
	C55-8-12	Jet - Accelerator	1	‡
	C137-31	Plug - Accelerator Jet Channel	1	‡
	T82-3	Ball-Pump Refill Check	1	‡
	C120-12	Weight-Refill Check Ball	1	‡
	C135-2	Washer-Weight Retainer	1	‡
	CR41-1	Valve-Pump Check	1	‡
	CR41-1	Valve-Air Vent Check	1	‡
	CT91-3	Plug - Bowl Drain	1	‡
	C142-1	Gasket - Bowl to Body	1	‡
	T11S25-12	Screw-Bowl to Body Assembly	2	‡
	T43-25	Lockwasher-Bowl to Body Assembly Screw	2	‡
	C138-23	Plug-Discharge Jet Passage	1	‡
	T56-23	Washer-Passage Plug Fibre	1	‡
	B2-8L-1	BODY - THROTTLE	1	1.04
	C29-150	Shaft & Lever - Throttle	1	0.102
	T1S8-10	Screw-Lever Stop	1	‡
	C21-54	Plate-Throttle	1	‡
	C136-15	Screw-Throttle Plate	2	‡
	C24-11ALx3	Lever-Throttle Clamp	1	0.083
	T8S10-9	Screw-Lever Clamp	1	‡
	CR31-6	Lever - Pump	1	‡
	CR32-13	Link-Pump Lever	1	‡
	C114-10	Retainer-Link	1	‡
	T22S8	Nut-Throttle Shaft	1	‡
	T45-8	Lockwasher-Shaft Nut	1	‡
	C138-38	Screw-Vacuum Channel	1	‡
	C38-1-29	Venturi	1	0.137
	C52-7-29	Jet-Main #C-29	1	‡
	T56-24	Washer-Main Jet Fibre	1	‡
	C56-3-13	Jet - Idling #C-13	1	‡
	C97-12-15	Valve-Power Jet	1	‡
	C66-23-1-75	Jet-Discharge #C-75-1	1	‡
	C77-14-22	Jet-Well Vent #C-22	1	‡
	C35-25x3	Pump & Rod-Accelerating	1	‡
	C81-1-40	Valve & Seat-Fuel	1	‡
	T56-23	Washer-Fuel Valve Seat Fibre	1	‡
	C141-4-2	Gasket-Flange (Not Illustrated)	1	‡
	C181-126	KIT - GASKET (Not Illustrated) includes following: T56-3, T56-52, C143-16, C142-1, T56-26, T56-24, T56-23 and C141-4-2		
	C182-483	KIT - REPAIR PARTS (Not Illustrated) includes the following: T11S6-5, T11S6-6, T31S6, T1S8-4, T41-8, T56-3, C91-1, T56-52, C120-4, C143-16, T1S10-9, T41-10, CR137-37, C137-31, T82-3, C120-12, C135-2, CR41-1, C142-1, T56-23, C136-15, CR31-6, CR32-13, C114-10, T22S8, T45-8, T56-24, C97-12-15, C81-1-40 and C141-4-2		0.255

NOTE: When ordering parts, please specify the Zenith Outline Number (S-880).

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

CARBURETOR INFORMATION on this page covers Rollers beginning with Serial No. USA846039.

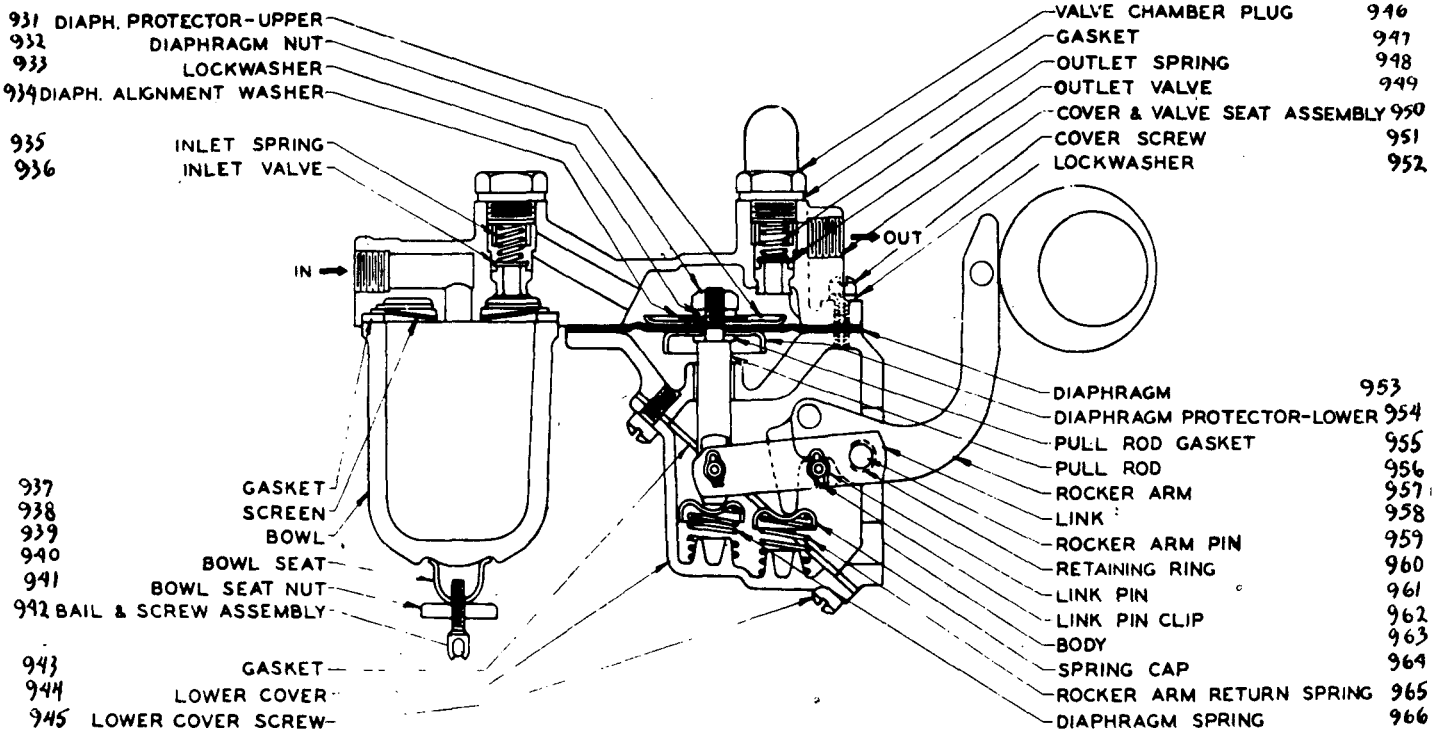


Fig. 17
FUEL PUMP

FUEL PUMP

Series "B" AC Fuel Pump 1537712 - Hercules #19569-CS

Ref. No.	Part No.	Description	No. Req'd.	Pk'd. only in Qty's. Of	Weight in Lbs.
931	1521194	Upper Diaphragm Protector	1	15	‡
932	855213	Pull Rod Nut	1	10	‡
933	855390	Pull Rod Lockwasher	1	100	‡
934	855029	Diaphragm Alignment Washer	1	50	‡
935	856270	Valve Spring	1	100	‡
936	855003	Valve	1	50	‡
937	854003	Bowl Gasket	1	50	‡
938	854009	Screen	1	10	‡
939	1522092	Metal Bowl	1	10	0.156
940	854005	Bowl Seat	1	10	‡
941	855763	Bail Thumb Nut	1	10	‡
942	1522090	Bail & Screw Assembly	1	2	‡
943	855229	Bottom Cover Gasket	1	50	‡
944	855228	Bottom Cover	1	2	0.125
945	132108	Bottom Cover Screw	3	50	‡
946	855789	Air Dome	1	5	‡
947	855136	Valve Plug Gasket	2	100	‡
948	856270	Valve Spring	1	100	‡
949	855003	Valve	1	50	‡
950	1523358	Top Cover & Valve Seat Assy.	1	1	0.75
951	855493	Top Cover Screw	6	50	‡
952	855064	Lockwasher - Top Cover Screw	6	100	‡
953	855035	Diaphragm (4 Pieces)	1	10	‡
954	855078	Lower Diaphragm Protector	1	15	‡
955	855012	Pull Rod Gasket	1	100	‡
956	855250	Pull Rod	1	5	‡
957	856242	Rocker Arm	1	1	0.125
958	855374	Link	2	5	‡
959	1521289	Rocker Arm Pin	1	10	‡
960	1521288	Rocker Arm Pin Washer	1	100	‡
961	855016	Link Pin	2	50	‡
962	855017	Link Pin Clip	4	100	‡
963	1523352	Body	1	1	0.813
964	855532	Spring Cap	2	25	‡
965	855253	Rocker Arm Spring	1	50	‡
966	855253	Diaphragm Spring	1	50	‡
	855135	Valve Plug	1	5	‡
	1537712	Assembly - Fuel Pump	1	1	2.171

FUEL PUMP AND CONNECTIONS

	303-A	Screw - Fuel Pump Attaching	2	‡
	615-A	Lockwasher - Fuel Pump Attaching	2	‡
	3557-A	Ell - In Fuel Pump	1	‡
	3680-A	Union - Fuel Pipe	2	0.078
	11480-A	Clamp - Fuel Pipe	1	0.062
	19569-CS	Pump - Fuel (See Breakdown AC 1537712)	1	2.171
	19570-AS	Assembly - Fuel Pipe	1	0.406
	22564-A	Gasket - Fuel Pump Attaching	1	‡

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

AIR CLEANER

Part No.	Description	No. Req'd.	Weight in Lbs.
342-A	Lockwasher - 3/8" SAE	3	‡
342-A	Lockwasher - Brace to Air Cleaner Bracket 3/8" SAE	1	‡
628-A	Lockwasher - Air Cleaner to Bracket 1/4" SAE	4	‡
628-A	Lockwasher - For Elbow 1/4" SAE	1	‡
669-A	Capscrew - Air Cleaner to Bracket 1/4" - 28 x 5/8"	4	‡
752-A	Hex Nut - Brace to Air Cleaner Bracket 3/8" - 24	1	‡
1177-A	Hex Nut - Air Cleaner to Bracket 1/4" - 28	4	‡
1864-A	Capscrew 3/8" - 16 x 1" For Elbow	3	‡
4325-A	Capscrew - Brace to Air Cleaner Bracket 3/8" - 24 x 7/8"	1	‡
4384-A	Cylinder Head Capscrew - Replaces 4 Std. 4118-A 1/2" - 13 x 3-3/8"	4	0.203
4479-A	Hose for Tube 2-1/4" ID x 2-5/8" OD x 2"	2	0.171
4520-A	Clamp - Hose 2-5/8" ID	4	0.187
4531-A	Screw - 1/4" - 20 x 3" Rd. Hd. for Bracket	2	‡
4655-A	Clamp Screw for Elbow 1/4" - 20 x 1-1/8"	1	‡
4968-A	Air Cleaner Tube	1	1.437
5034-A	Nut 1/4" - 20 Square	2	‡
*10553-C	Vortox Air Cleaner #386	1	7.50
*10554-A	Bracket for Air Cleaner	2	0.875
*10555-B	Elbow - Outlet Return - Vortox #1404	1	0.062
10556-A	Gasket for Elbow - Vellumoid	1	‡
10596-AS	Air Cleaner and Bracket Assembly (Includes Parts Marked *)	1	8.00
18691-B	Carburetor Intake Elbow - Attach To Carburetor	1	0.75
18818-B	Air Cleaner Bracket - Air Cleaner To Cylinder Head	1	3.939
18819-B	Brace - For Air Cleaner Bracket	1	0.687

‡ Parts marked thusly weigh less than 1 ounce (0.062 lbs.)

Numerical Index and Price List

ALL PRICES LISTED ARE NET F.O.B. FACTORY AND SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Description	Page	Price
1	Cable 18" long - magneto to plug	77	.66
1-A	Castle nut 1/4"-28	75	.04
M-1	Cap screw 3/8"x1" USS.		2.30c
2	Cable 15-3/4" long - magneto to plug	77	.54
2-A	Castle nut 3/8"-24	75	.04
ICB-2-A-19-30°	Assembly - impulse coupling.	81D	9.75
M-2	Cap screw 3/8" x 1-1/4" USS.		2.50c
WA-2	Plain washer for rotor shaft	81C	.05
3	Cable 24" long - magneto to plug	77	.80
M-3	Cap screw 3/8" x 1-1/2" USS.		2.70c
4	Cable 27" long - magneto to plug	77	.90
M-4	Cap screw ½" x 3/4" USS.		4.70c
5	Cable 31-3/4" long - magneto to plug	77	1.08
M-5	Cap screw ½" x 1" USS.		5.10c
WA-5-4	Lock washer under condenser fastening screw.	81C	.05
WA-5-16	Lock washer under rotor shaft nut.	81D	.05
6	Cable 34-1/4" long - magneto to plug	77	1.14
M-6	Cap screw ½" x 1-1/4" USS.		5.50c
T8S8-6	Throttle lever swivel screw.	83	.05
WA-6-3CA	Lock washer under fastening screw.	81B	.05
M-7	Cap screw ½" x 1½" USS		5.90c
T8S8-7	Air shutter lever clamp screw.	83	.05
M-8	Cap screw ½" x 1-3/4" USS.		6.30c
T4S10-8	Air shutter control tube clamp screw	83	.05
M-9	Cap screw ½" x 2" USS.		6.70c
T8S10-9	Throttle lever clamp screw	83	.05
M-10	Cap screw ½" x 4½" USS		13.40c
T8S8-10	Air shutter lever swivel screw	83	.05
T1S8-10	Air shutter bracket clamp screw.	83	.05
M-11	Cap screw 5/8" x 1-1/4" USS.		9.20c
M-12	Cap screw 5/8" x 1-3/4" USS.		10.40c
T8S31-12	Carburetor assembly screw.	83	.10
T8S10-13	Throttle plate adjusting screw	83	.05
M-14	Cap screw 5/8" x 2-3/4" SAE.		12.80c
M-16	Cap screw 5/8" x 3-3/4" SAE.		17.50c
M-17	Cap screw 3/8" x 1½" USS		14.10c
M-18	Cotter pin 1/16" x 1".		.15c
M-19	Cotter pin 3/32" x 1".		.15c
M-20	Cotter pin 1/8" x 1"		.15c
M-21	Cotter pin 3/16" x 1".		.30c
WA-21-4	Lock washer under contact bracket fastening screw	81C	.05
WA-21-5	Lock washer for interrupter bracket fastening screw.	81B	.05
M-22	Cotter pin 3/16" x 2".		.50c
M-23	Cotter pin 1/4" x 1½".		.65c
C24-10	Throttle lever	83	1.20
M-24	Cotter pin 1/4" x 2"		.85c
SC-24-4CA	Magneto grounding screw.	81B	.05
M-25	Cotter pin 1/4" x 3-1/2"		1.25c
CR26-61	Air shutter lever bushing.	83	.15
M-26	Set screw 3/8" x 2" cup point.		4.10c
M-27	Set screw ½" x 1" cup point.		4.30c
M-28	Set screw ½" x 1½" cup point		5.20c
M-29	Set screw ½" x 1-3/4" cup point.		5.65c
M-30	Set screw 1/4" x 3/8" unbrake.		6.00c
M-31X	Condenser clamp screw.	79	.05
M-32	Set screw ½" x 3/4" unbrake.		10.00c

NOTE: SEE PAGE 110 FOR SUPPLEMENT COVERING ZENITH CARBURETOR MODEL 28BV12 (OUTLINE S-880)

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Part No.	Description	Page	Price
M-33X	Connection stud washer	79	.05
M-34	Set screw 3/4" x 3/4" unbrake		14.00c
M-35	Jam nut ½" USS		2.50c
M-36X	Breaker plate clamp nut washer	79	.05
C36-12	Accelerating and Economizer piston assembly	83	.95
37	Wrench 1-1/16" and 1-1/4" opening	47	1.50
M-37	Jam nut 5/8" USS		3.50c
SC-37-5CA	Screw for fastening conducting lead	81C	.05
SC-37-8CA	Ventilator cover fastening screw	81B	.05
M-38	Jam nut 1/4" x 1"		6.00c
M-39	Machine bolt 1/4" x 1"		.95c
SC-39-5CA	Screw for fastening contact bracket	81C	.05
SC-39-5CA	Screw for fastening condenser & wick retaining bracket	81C	.05
M-40	Machine bolt 3/8" x 1"		1.95c
41	Wrench 1-7/16" and 1-5/8" opening	47	2.75
C41-9	Check valve	83	.25
M-41	Machine bolt 3/8" x 1-1/4"		2.05c
SC-41-8CA	Screw for fastening interrupter bracket	81B	.05
42-A	Cover screw	63	.03
M-42	Machine bolt 3/8" x 1½"		2.15c
M-43	Machine bolt 3/8" x 2"		2.65c
T43-103	Carburetor assembly screw lock washer	83	.05
M-44	Machine bolt 3/8" x 10½"		7.90c
M-45	Machine bolt ½" x 1"		3.85c
C46-6	Idling needle valve	83	.35
M-46	Machine bolt ½" x 1-1/4"		4.00c
M-47	Machine bolt ½" x 1-1/2"		4.15c
M-48	Machine bolt ½" x 2½" SAE		7.70c
M-49	Machine bolt ½" x 2-3/4"		5.15c
M-50	Machine bolt 5/8" x 1½"		7.15c
C51-22	Cap jet (specify size) #26	83	.75
M-51	Machine bolt 5/8" x 2"		7.60c
C52-3	Compensating jet (specify size) #25	83	.45
CT52-1	Air shutter lever swivel washer	83	.05
CT52-7	Throttle lever swivel washer	83	.05
M-52X	Condenser connecting nut lock washer	79	.05
M-53	Machine bolt 5/8" x 2" SAE		11.00c
21-54	Cover - gear oiler	39	.50
C54-1	Idle jet #16	83	.60
M-54	Machine bolt 5/8" x 2-3/4" SAE		12.80c
M-55XA	Distributor cap clip screw lock washer	79	.05
M-55XA	Intermediate plate screw washer	81	.05
M-56	Machine bolt 5/8" x 3½"		8.85c
T56-5	Channel screw fiber washer	82	.05
T56-10	Fuel screening fiber washer	83	.05
T56-13	Fuel valve fiber washer	82	.05
T56-23	Lower plug fiber washer	82	.05
T56-24	Cap jet fiber washer	83	.05
T56-46	Main jet fiber washer	83	.05
C57-6	Power and accelerating jet #15	83	.15
M-57	Machine bolt 3/4" x 2½"		10.20c
M-58	Machine bolt 3/4" x 2-3/4"		10.75c
59-A	Pipe plug - oil filter	65	.02
59-A	Oil plug	73	.02
M-59	Machine bolt 3/4" x 3-1/4"		11.30c

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Part No.	Description	Page	Price
60-A	Plug - cylinder pipe 1/4"	51,53	.04
61-A	Plug - water pump 3/8"	67	.04
M-61X	Impulse spacer clamp nut lock washer	81	.05
T61-4	Cotter pin	83	.05
WA-61	Bearing shim (.0126" thick)	81B	.05
M-62	Machine bolt 1" x 6-1/4"		28.95c
CT63-2	Throttle stop taper pin	82	.05
CT63-2	Air shutter washer taper pin	83	.05
M-63	Machine bolt 1" x 7"		29.90c
M-64	Rivet R.H. 1/4" x 1"		.44c
M-65	Rivet R.H. 1/4" x 1-1/4"		.52c
M-66	Rivet R.H. 1/4" x 1-3/4"		.68c
M-67	Rivet R.H. 3/8" x 5/8"		.85c
M-68	Rivet R.H. 3/8" x 7/8"		1.05c
M-69	Rivet ctsk. hd. 3/8" x 2"		1.60c
M-70	Rivet R.H. 3/4" x 2-3/4"		10.00c
M-71-XA	Secondary interlead screw nut	79	.05
M-72	Nut hex USS 1/4"		.50c
M-73	Nut hex USS 3/8"		1.10c
T73-15	Float bracket pin	83	.05
M-74	Nut hex USS ½"		2.20c
M-75	Nut hex SAE ½"		2.50c
M-76	Nut castle SAE ½"		3.10c
M-77	Nut hex USS 5/8"		3.50c
M-78	Nut hex SAE 5/8"		4.20c
M-79	Nut hex USS 3/4"		5.00c
M-80	Nut hex USS 7/8"		7.50c
C81-42	Fuel valve seat and valve #55	83	1.25
M-81	Nut hex USS 1"		12.20c
M-82	Lock washer 1/4"		.25c
M-83	Lock washer 3/8"		.35c
M-84	Lock washer ½"		.50c
M-85	Lock washer shockproof		2.00c
M-86	Lock washer 5/8"		1.00c
87-A	Governor valve box gasket	76	.02
M-87	Lock washer 3/4"		1.70c
M-88	Lock washer 7/8"		2.70c
M-89	Lock washer 1"		5.25c
M-90	Woodruff key #15		.05
CT91-1	Drain plug	83	.10
M-91	Woodruff key #18		.08
M-92	Flat washer 3/8"		.35c
M-93	Flat washer 1/2"		.50c
M-94	Flat washer 5/8"		1.00c
M-95X	Trip arm pivot cotter pin	81	.05
M-96	Flat washer 3/4"		1.70c
C97-10	Economizer valve	83	.80
M-98	Machine screw ctsk. ½"-13 c 1-1/4"		5.10c
M-99	Pipe nipple 1/8" x 1½"		5.85c
M-100	Pipe nipple 1/8" x 4" long		8.65c
M-101	Rivet copper #9 x 3/4"		.65c
C102-58	Air shutter plate	83	.35
M-102	Screwdriver 5-1/4"	47	.35
M-103	Hammer #3	47	1.35
M-104	Pliers 6"	47	.40
C105-102	Air shutter shaft	83	.60

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Part No.	Description	Page	Price
M-105	Monkey wrench 11"	47	.75
C106-70	Air shutter shaft	83	.65
M-106	Oil can	47	.25
WA-106	Bearing shim (.0071" thick)	81B	.05
M-107	Punch	47	.25
WA-107	Bearing shim (.0040" thick)	81B	.05
M-108	Chisel	47	.50
C109-7	Air shutter control tube bracket	83	.85
M-109	Wrench - Allen 1/4"	47	.05
C111-17	Idling needle valve friction spring	83	.10
C111-62	Throttle plate adjusting screw spring	83	.10
M-111	Wrench - Allen 1/2"	47	.10
M-112	Wrench - Allen 3/4"	47	.25
C-117-27	Air shutter lever spring	83	.10
M-119	Pipe coupling 1/8"		.18
C120-26	Float axle	83	.10
CR121-10	Float Bracket	83	.05
SC-121-4CA	Screw for fastening name plate	81B	.05
T122-4	Gasoline connection elbow	83	.15
M-124	Padlock and keys		1.85
C130-4	Air shutter lever thrust washer	83	.05
CR134-2	Air shutter lever swivel	83	.20
CR134-5	Throttle lever swivel	83	.20
C136-3	Air shutter lever swivel	83	.05
C136-6	Throttle plate set screw	83	.05
C138-3	Priming hole screw	83	.05
C138-52	Lower plug	83	.05
C138-61	Channel screw	83	.05
M-138	Machine bolt 1/2" x 2" USS		4.45c
M-139	Machine bolt 1/2" x 7" USS		8.85c
M-141	Machine bolt 5/8" x 2-3/4" USS		8.40c
M-142	Machine bolt 5/8" x 3-3/4" USS		9.25c
M-143	Machine bolt 7/8" x 5 1/2" USS		19.90c
M-154	Hose - radiator inlet - top 1 1/2" x 20" long	12	.47
M-155	Hose - radiator inlet - bottom 1 1/2" x 16" long	12	.38
156	Chain - sash 21" long	44	.30
M-156	Pin 1/4" x 1-1/2" long	44	.05
M-157	Machine bolt 1/2" x 2-3/4" SAE		7.85c
C181-16	Assembly - gasket set	83	.70
IS-222	Paper washer for ball bearing (Interrupter end)	81B	.05
21-254	Guide - dog	8	.75
21-255	Guide - reach rod dog	8	.35
21-256	Handle - latch	8	.45
1XA-256	Fixed contact screw washer	79	.05
21-259	Spring	8	.20
266-A	Lockwire - baffle shell screw	65	.02
267-A	Lockwire - main bearing	51	.02
267-A	Lockwire - bearing	53	.02
267-A	Lockwire - governor gear screw	71	.02
WA-288	Lockwire under fastening or grounding screw	81B	.05
298-A	Cotter	73	.02
21-299	Bracket - swivel	40	2.75
21-300	Blade - scraper 20" right hand rear and left hand front	40	1.25
21-300½	Blade - scraper 20" left hand rear and right hand front	40	1.25

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Part No.	Description	Page	Price
21-301	Support - blade	40	.85
301-A	Cotter pin - connecting rod bolt	57	.02
301-A	Cotter 1/8" x 3/4"	76	.02
21-302	Clip	40	.45
21-303	Rod- compression	40	1.30
303-A	Screw - oil pan strainer baffle plate	63	.03
303-A	Screw - fuel pump attaching	85	.03
21-305	Spring - compression	40	.70
305-A	Pipe plug	67,71	.02
305-A	Connection - pressure pipe 1/8"	67	.02
21-306	Pin	39,40	.10
312-A	Lockwasher - push rod cluster screw ½"	59	.02
312-A	Lockwasher - gear cover screw ½" light	61	.02
312-A	Lockwasher - strainer cap screw ½"	63	.02
312-A	Lockwasher - oil filter attaching screw	65	.02
312-A	Lockwasher - water pump attaching	67	.02
312-A	Lockwasher	73	.02
312-A	Governor attaching screw lockwasher	76	.02
312-A	Lockwasher - support housing	77	.02
315-A	Screw - body to crank case	65	.03
333-A	Cotter - water pump gear shaft adjusting nut	69	.02
342-A	Lockwasher - starter cover	63	.02
342-A	Lockwasher - body screw	65	.02
342-A	Lockwasher - cover screw	67	.02
342-A	Governor valve box attaching lockwasher	76	.02
342-A	Lockwasher - 3/8" SAE	86	.02
352-A	Screw - gear cover short ½" x 13" 1-1/4" USS	61	.04
352-A	Screw - bellhousing to crankcase	63	.04
352-A	Screw - water pump attaching	67	.04
415-A	Intake mainfold pipe plug 3/8" Sq.Hd.	57	.04
21-454	Breather cap	27	.50
IS-504	Packing strip for ball bearing	81B	.05
NP-521	Name plate for type designation	81B	.10
WN-521	Observation window	81B	.05
GG-522	Gauge for contact point setting	81C	7.20
GA-524	Gasket for distributor plate	81B	.15
WA-528	Distributor gear spacing washer	81B	.05
BR-529	Carbon brush and spring in distributor gear	81B	.25
BK-566	Contact bracket with point	81C	.85
SAD-597	Universal joint	4,20	4.65
615-A	Lockwasher - timing hole cover plate	63	.02
615-A	Lockwasher	73	.02
615-A	Lockwasher - fuel pump attaching	85	.02
626-A	Lock nut	73	.04
628-A	Lockwasher 1/4"	75	.02
628-A	Lockwasher for elbow 1/4" SAE	86	.02
632-A	Plug - expansion 15/16"	51,53	.02
665-A	Plug - expansion 5/8"	51,53	.02
665-A	Plug - flywheel dowel 5/8" expansion	59	.02
669-A	Capscrew - air cleaner to bracket 1/4" - 28 x 5/8"	86	.04
PN-731	Pin for spiral spring	81D	.05
SC-732	Screw for fastening arrester plate	81D	.10
PK-734	Felt wick for spring	81D	.05
SP-736	Spiral spring	81D	.75
16-738	Distributor cap clip screw	79	.05
CA-739	Cam	81D	.50

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Part No.	Description	Page	Price
DC-739	Intermediate drive disc	81D	1.00
749-A	Grease cup - water pump	67	.20
752-A	Hex nut - brace to air cleaner bracket 3/8"-24	86	.03
752-A	Governor valve box attaching stud nut	76	.03
763-A	Plug - expansion 1-3/8"	53	.03
763-A	Plug - governor expansion	71	.03
794-A	Washer - manifold attaching stud	57	.03
794-A	Washer - valve cover 7/8"	59	.03
795-A	Washer - valve cover 3/4"	59	.10
829	Gasket - water outlet	51	.02
920-A	Key - idler gear (#A woodruff)	61	.02
981-A	Plug - expansion 1-1/8"	51,53	.02
PN-1001	Distributor plate locking pin	81B	.05
KY-1004	Woodruff key - used with coupling	81C	.05
PN-1007	Interrupter lever stud cotter pin	81C	.05
WA-1009	Bearing shim (.0197" thick)	81B	.05
EC-1012	Terminal clip for conducting lead cable	81C	.05
WA-1012	Plain washer for interrupter lever stud	81C	.05
A-1016-XI	Fuel body	82	12.00
A-1017-XI	Upper body	82	9.50
SP-1021	Shaft spring ring - distributor plate end	81B	.05
WA-1034	Bearing spacing washer	81B	.05
SC-1037CA	Screw for fastening distributor plate	81B	.05
1048A	Screw - timing hole cover plate	63	.03
SC-1060	Lock screw for mounting coil	81C	.05
WA-1070	Rotor gear spacing washer	81B	.05
1075-A	Plug - cylinder head pipe	51	.04
M-1101	Spark Plug Wrench	47	.55
WA-1116	Lockwasher under arrester plate fastening screw	81D	.05
1118	Connecting stud washer (leather)	79	.05
1126-A	Lockwasher - drive lock screw	71	.02
1127	End plate screw clamp lock	81	.05
1130	End plate clamp screw	81	.05
1146	Cam key	79	.05
1157-A	Pin - drive gear	65	.06
1173-A	Hex head cap screw 1/4"-28 x 7/8"	75	.04
1177-A	Hex nut 1/4"-28	75	.02
1177-A	Hex nut - air cleaner to bracket 1/4"-28	86	.02
1179-A	#2 Woodruff key	76	.02
1207	Cam screw washer	79	.05
1247-A	Key (#15 Woodruff) - crankshaft gear	59	.02
1247-A	Key (#15 Woodruff) - camshaft bearing	61	.02
1247-A	Key (#15 Woodruff) - water pump gear	69	.02
1317-A	Nut - attaching rod	59	.04
1327-A	Cap screw 1/4"-28 x 1-3/4"	75	.04
1382-A	Nut - flywheel bolt 9/16"-18SAE	59	.04
1388-A	Washer - manifold plug	59	.02
X-1503	Distributor cap clip assembly	79	.30
1532-A	Nut - oil line	71	.06
1608-A	Cap screw - cylinder head	51	.08
1608-A	Screw - oil filter attaching	65	.08
1609-A	Plug - expansion 1-1/4"	51,53	.02
1610	Zerk fitting - straight		.15
1613	Zerk fitting - angle type 90°		.15
1613-A	Seat - valve spring	59	.12
1635-A	Pipe - breather extension	65	1.20
1656-A	Nut - connecting rod bolt	57	.04

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Part No.	Description	Page	Price
1659-A	Elbow - oil line	71	.08
1674-A	Pin - fan pulley 5/16" x 3-1/16"	69	.14
1675-A	Pin - starting crank 3/8" x 2½"	59	.14
1676-A	Oil thrower - crankshaft on WXC-3 only	61	.20
1686-A	Bushing - bayonet oil gauge	63	.18
1688	1/8" 45° zerk hydraulic fitting #1688		.15
1698-A	Nut - camshaft gear	61	.10
1701-A	Cap screw - water pump shaft sleeve ½"-13 x 2" long USS	69	.06
1701-A	Screw - fan bracket brace	71	.06
1701-A	Screw - support housing	77	.06
1707-A	Dowel - Flywheel ½" x 5/8"	61	.12
1710-A	Cotter pin - connecting rod bolt 1/8" x 1"	57	.02
1710-A	Cotter pin - flywheel bolt nut 1/8" x 1"	61	.02
1739-A	Set screw - starting crank pin	61	.02
1864-A	Cap screw 3/8"-16 x 1" for elbow	86	.03
1902	Cam screw	79	.05
2024-A	Clamp washer	73	.20
2025-A	Clamp washer	73	.16
2028-A	Nut	73	.20
2048-A	Nut - camshaft gear thrust adjusting screw	61	.03
2083-A	Screw - cover	67	.04
2100-A	Cap screw - strainer cap ½"-13 x 1" USS	63	.04
2100-A	Screw - water pump cover	67	.04
2132-A	Timken bearing	73	.96
2134-A	Slotted nut	73	.14
2135-A	Gasket	73	.14
2137-A	Cork retainer	73	.38
2138-A	Cork retainer washer	73	.26
2165-A	Key - pump gear	65	.02
2165-A	Key - water pump impeller	67	.02
2165-A	Key - water pump drive gear #8 Woodruff	69	.02
2165-A	Key - governor drive gear	71	.02
2167-A	Lock screw - governor drive	71	.22
2168-A	Lock nut - drive lock screw	71	.08
2185-A	Screw - push rod	59	.04
2186-A	Nut - push rod screw	59	.03
2189-A	Pin - oil thrower cover	61	.02
2210-A	Dowel - push rod cluster	59	.06
2210-A	Dowel - water pump	67,69	.06
2264-B	Coil wedge	79	.05
2396-A	Union - oil pipe	67	.12
2397-A	Nut - oil pipe union	67	.08
2401-A	Tube - outlet	65	.16
2402-BS	Assembly - slug (metal)	65	4.20
2403-A	Washer - felt	65	.14
2405-A	Coil spacer	65	.32
2406-A	Washer - felt retaining top	65	.12
2407-A	Washer - felt retaining bottom	65	.12
2408-A	Washer - cork	65	.10
2409-A	Washer - cork retaining	66	.06
2410-A	Spring - compression	66	.20
2411-A	Nut - felt core retaining	66	.08
2412-A	Nut - check valve	66	.10
2413-A	Ball - check valve	66	.08
2414-A	Spring - check valve	66	.10

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2415-A	Rivet - check valve	66	.04
2445-A	Shell - oil filter	66	2.30
2447-A	Fitting - oil filter clean out	66	.50
2448-A	Gasket - oil filter clean out	66	.04
2449-A	Cap - oil filter clean out	66	.10
2450-A	Gasket - oil filter clean out	66	.03
2452-A	Gasket - oil filter shell	66	.08
2465-B	Pipe - water outlet	51	1.42
2570-A	Cork washer	73	.16
2573	Connection stud clamp nut lockwasher	79	.05
2808-A	Plate - name	66	.12
X-3175	Distributor arm group	79	.50
X-3215	Breaker arm group	79	1.35
3219	Breaker arm pivot washer	79	.05
3220	Breaker arm pivot cotter pin	79	.05
X3222	Condenser assembly	79	1.65
3224	Fixed contact	79	.55
3225	Inner core locking key	79	.05
3227	Coil gasket	79	.80
3228	Cam thrust washer	79	.15
3230	Connection stud nut	79	.05
X-3231	Assembly breaker plate	79	5.20
3258	Secondary interlead screw	79	.05
3259	Coil contact spring	79	.05
X-3275	Inner core group	79	.80
3277	Coil gasket	79	.05
3279	Distributor cap gasket	79	.05
3279	Intermediate plate gasket	81	.05
3280	Inner core group snap rings	79	.05
X-3287	Distributor cap group	79	3.30
3289	Secondary interlead spring	79	.05
D3295	Nut - 1" hex slotted	15	.15
3298	Shaft snap ring	79	.05
3302	Cam CCW	79	1.10
X-3334	Condenser breaker head group	79	.10
X-3336	Ground connection head group	79	.10
X-3430	Coil group	79	4.65
3539	Connection stud lock	79	.05
D-3555	Spring - latch	79	.50
3557-A	Ell in fuel pump	85	.26
3680-A	Union - fuel pump	85	.14
X-3732	Main housing (replacement assembly)	79	10.10
X-3733	Breaker plate group	79	1.10
3771	Trip arm pivot pin	81	.15
3799	Impulse spring	81	.30
3800	Impulse spring guide	81	.10
3801	End plate gasket	81	.05
3817-A	Ring - compression	57	.28
3818-A	Ring - compression	57	.28
3821	Impulse spacer clamp guide	81	.05
3823	Impulse spacer clamp nut	81	.05
3836-G	Advance governing spring	81	.30
3837	Pivot pin spacer washer	81	.05
3844	Yoke	81	.30
X-3913	Rotor assembly	79	12.10
3917-A	Ring - oil	57	.50

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3921	Intermediate plate screw	81	.05
3939	Spring - cross crank shaft	44	.55
3945	Connection stud	79	.10
3964	Name plate	81	.20
3966	Lock spring for advance stop ring	81	.05
3967-B	Advance stop ring	81	.15
3996	Intermediate plate	81	2.75
4000	Trip arm CCW	81	.65
4003	Cam plate group CCW	81	1.10
4038-A	Screw - valve cover ½" x 3½"	59	.06
4038-A	Screw - gear cover long ½"-13 x 3½" USS	63	.06
4055-A	Street ell - oil line	71	.14
4068-A	Cap screw - oil pan	63	.04
4079-A	Nut - cover plate stud	59	.04
X-4093	End plate group CCW	81	4.40
4099	Impulse spacer	81	1.10
4118-A	Cap screw - cylinder head ½"-13 x 3-1/8"	51	.06
4119-A	Screw - center and rear main bearing	51	.10
4120-A	Union - main discharge pipe	67	.08
4121-A	Nut - main discharge pipe	67	.04
4122-A	Ferrule - main discharge pipe	67	.02
4123-A	Governor attaching screw ½"-13 x 7/8"	76	.05
4134-A	Plug - expansion 1½"	51,53	.02
4150-A	Stud - manifold attachment	59	.12
4206	Drive shaft CCW	81	2.20
4242-A	Lockwasher - cylinder oil orifice	51,53	.02
4243-A	Screw - cylinder oil orifice	51,53	.02
4251-A	Plug - cylinder oil orifice	51,53	.02
4253-A	Screw - governor driving gear	71,76	.06
4259-A	Union - pump outlet	67	.28
4260-A	Nut - pump outlet pipe	67	.12
4261-A	Ferrule - pump outlet pipe	67	.06
4280-A	Nipple - oil line	71	.08
4325-A	Cap screw - brace to air cleaner bracket	86	.04
4342-A	Washer - camshaft gear thrust	61	.34
4342-A	Washer - water pump gear thrust	69	.34
4362-A	Snap ring - oil pump	65	.04
4384-A	Cylinder head capscrew	86	.06
C-4391	Venturi #30	85	2.40
C-4419	Body to bowl assembly gasket	83	.35
4479-A	Hose for tube 2-1/4" ID x 2-5/8" OD x 2"	86	.08
4489-A	Screw support housing	77	.06
4520-A	Clamp - hose 2-5/8" ID	86	.10
4531-A	Screw - 1/4"-20 x 3" Rd. Hd. for bracket	86	.04
4550-A	Oil seal - support housing	77	.66
4578-A	Screw - gear cover long ½"-13 x 2" USS	63	.06
4588-A	Stud - manifold control plate	59	.08
4592-A	Screw - pump baffle shell	65	.04
4604-A	Screw - cover	65	.04
X-4616	Advance and support plate assembly CCW	81	4.40
X-4630	Advance weight replacement group CCW (Includes 1 with and 1 without pin)	81	1.30
4640-A	Set screw - exhaust flange	59	.03
4655-A	Clamp screw for elbow 1/4"-20 x 1-1/8"	86	.10
4727-A	Plug - manifold - presses into shaft hole	59	.10
4746-A	Plug - pipe - cylinder 3/4"	51,53	.06

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4765-A	Pin - rear main bearing thrust washer dowel.	53	.10
4790-A	Gasket - generator cover	51,53	.04
D-4872'	Bolt ½" x 2"SAE - engine to transmission	21	.15
4927-A	Governor attaching stud (for valve box).	76	.12
4958-A	Pin 1/8" x 7/8".	76	.18
4962-A	Yoke pin #1 x 1"	75	.18
4968-A	Air cleaner tube	86	1.06
D-4991	Float bracket.	83	.35
5034-A	Nut 1/4"-20 square	86	.02
24-5101	Pin 1/8" x 1-3/8" long	44	.10
24-5105	Pin.	44	.15
RG-5210	Ring for window.	81B	.05
GA-5215	Gasket under ventilator cover.	81B	.05
HG-5216	Magneto housing.	81B	8.25
NP-5222	Name plate on ventilator cover	81B	.10
EC-5224	Terminal clip for coil cable	81C	.05
WK-5231	Cam oiler wick	81B	.05
CW-5232	Condenser.	81C	.70
LE-5236	Interrrupter lever with point and spring	81C	.60
CL-5238	High tension coil complete	81C	5.15
WA-5245	Rotor felt retaining washer.	81B	.05
SD-5249	Rotor gear shaft	81B	.10
GE-5251	Rotor gear - for MHC 6C 101 magneto only	81B	.65
SP-5254	Shaft spring ring - gear end	81B	.05
BK-5258	Interrupter assembly complete with points.	81B	3.50
BK-5259	Interrupter bracket with riveted parts only.	81B	1.30
WA-5280	Sealing washer under fastening screw	81B	.05
WA-5281	Washer under ventilator cover.	81B	.05
BK-5283	Wick retaining bracket	81B	.05
GE-5283	Distributor gear	81B	2.10
RT-5299	Magneto rotor for MJC 6C 101 magneto only.	81B	11.75
5524-AS	Assembly breather cap.	65	.50
5813-A	Pin - driven gear on magneto shaft	77	.04
5855-A	Hex nut 3/8"-24.	75	.04
5891-A	Fil. hd. machine screw 10-24 x 5/8"	75	.04
5898-A	Bell crank link pin 3/32" 7/16".	75	.04
5921-A	Cotter pin - fan pulley pin 3/32" x 3/4"	69	.02
D6253	Float.	83	1.10
D6386	Throttle stop lever.	83	.65
D6390	Throttle shaft	83	.75
D6391	Throttle plate	83	1.10
D6397	Deflector.	83	.95
6639	Alemite gat type grease gun.	47	6.75
6654	Grease gun hose.	47	3.10
D6680	Main jet #28	83	.95
7064-B	Adapter - bellhousing starter.	63	2.00
7103-A	Screw front - intermediate main bearing.	51	.20
7104-A	Bolt - flywheel.	61	.40
7155-B	Cover - bellhousing starter adapter.	63	.15
7165-A	Pipe plug - oil strainer cap	63	.06
D7171	Fuel screen.	83	.65
FL-7312	Adjustable driving member assembly	81D	2.50
FL-7323	Keyed hub.	81D	.85
FL-7325	Adjustable coupling flange	81D	1.25
HB-7328	Coupling plate and hub assembly.	81D	1.50
D-7355	Cup - bearing - Timken #3578	23	1.50

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PL-7366	Arrester plate with packing	81D	2.00
7492-C	Gear - flywheel ring	61	6.40
D-7611	Collar - cranking shaft	44	1.45
D-7658	Latch - side crank	44	.65
D-7659	Plug - side crank latch	44	.15
8077-A	Nut - water pump gear shaft adjusting	69	.30
8084-A	Taper pin - coupling	69	.02
8146-A	Gasket - strainer cap	63	.12
8167-B	Cap - strainer	63	4.50
8173-A	Bushing - governor drive shaft	71	1.30
25-8177	Clamp - oil lines on cowl	48	.40
25-8193	Gasket - radiator inlet	12	.30
25-8267	Yoke	42	2.45
25-8288	Hood fastener	45	.25
25-8289	Handle	45	1.25
25-8290	Safety hasp and eye	45	.35
25-8293	Hose 1-1/4" x 36" long - sufficient for one machine when cut to 16" and 20" lengths	12	.85
25-8294	Clamp - hose	12	.10
25-8322	Shaft - scraper	40	1.65
29-8501	Towing hook - right hand	48	5.10
29-8502	Towing hook - left hand	48	5.10
29-8520	Cone - bearing - Timken #594	36	6.65
29-8525	Ball 15/32" diameter	27,39	.10
29-8528	Cup - bearing - Timken #493	17	2.90
29-8529	Cup - bearing - Timken #592	36	5.55
29-8536	Spring	44	.20
8571-A	Spring - pressure regulating valve	66	.06
8572-A	Plug - pressure regulating valve adjusting	66	.30
8573-A	Lock nut - pressure regulating valve	66	.06
8574-A	Nut - pressure regulating valve cap	66	.18
8575-A	Gasket - drain plug	66	.04
8576-A	Ball - differential valve	66	.10
8577-A	Spring - differential valve	66	.14
8579-A	Plug - drain	66	.60
8942-A	Screw - push rod cluster ¼"-13 x 2" USS	59	.04
28-9304	Latch	8	1.55
RSA-10021	Assembly - right hand scraper	40	10.90
RSA-10022	Assembly - left hand scraper	40	10.90
R-10036	Elbow - overflow pipe	12	.40
R-10109	Capscrew ½" x 2½" SAE - lever	27	.15
R-10114	Pin - yoke	7	.10
R-10353	Yoke - rod	7	1.00
R-10353	Yoke - reach rod	5,8	1.00
10553-C	Vortox air cleaner #386	86	26.00
10554-A	Bracket for air cleaner	86	.84
10555-B	Elbow - outlet return-- Vortox #1404	86	4.80
10556-A	Gasket for elbow - Vellumaid	86	.12
10596-AS	Air cleaner and bracket assembly	86	27.20
B-10770	Cup - bearing - Timken #652	15	4.70
R-10962	Gear - ring	36	73.95
R-10963	Pinion - differential	36	10.95
R-10967	Housing - differential	36	32.00
R-10970	Pinion - drive	37	17.90
R-10996	Shifter - high gear	27	5.05

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R-10997	Shifter - intermediate and low	27	5.55
R-11001	Core - radiator	12	33.50
R-11003	Side member - left hand	12	6.80
R-11004	Side member - right hand	12	6.80
R-11009-1037	Yoke - throwout on clutch	5	2.30
11039-A	Lockwasher - cam shaft	61	.02
R-11064	Inlet - radiator top	12	.60
R-11065	Outlet - radiator bottom	12	.50
R-11088	Bracket - scraper	40	2.50
R-11097	Arm - gear shifter	27	1.90
R-11099	Shaft - low and intermediate shifting	27	1.70
R-11100	Shaft - high shift fork	27	2.15
R-11103	Cover - gear shift box	27	3.85
R-11113	Header strip - radiator	12	.50
R-11114	Bracket - radiator mounting	12	.35
R-11124	Quadrant	5	.15
R-11125	Bracket - brake lever	8	1.75
R-11126	Quadrant	8	.30
RSA-11127	Lever - master clutch shift	5	3.75
RSA-11130	Lever only - brake	8	3.35
RSA-11131	Assembly - brake lever	8	8.65
R-11135	Radiator - latch reach	8	.70
11137-AS	Assembly - gear oil seal cover WXLC-3 only	63	1.60
RSA-11140	Assembly - gear shift handle	4	3.20
R-11149	Arm - clutch control	5	2.50
R-11150	Shaft - gear shift	4	1.10
R-11152	Shaft - gear shift	4	1.55
R-11153	Shaft - throwout	5	1.00
R-11156	Shaft - gear shift arm	27	1.50
R-11165	Quadrant	8	1.10
R-11166	Bolt - shoulder	5	.75
R-11166	Bolt - shoulder - F and R lever	7	.75
R-11245	Bearing - clutch pilot - #ND-7305	23	3.25
R-11252	Bracket - F and R lever	7	2.50
R-11253	Quadrant	7	.25
RSA-11254	Assembly - F and R control lever	7	4.60
R-11255	Bolt - shoulder - shifting arm	7	1.80
R-11263	Arm - F and R shifting	7	3.80
R-11268	Yoke - clutch shifting R.H	7	1.95
R-11269	Yoke - clutch shifting L.H	7	1.95
R-11270	Cap - shifting yoke	7	.55
R-11273	Rod - shifting	7	.50
R-11275	Pipe - exhaust	48	3.75
R-11305	Cap - radiator	12	1.40
R-11316	Gasket thin - bearing cup	32	.05
R-11339	Spring	27,39	.30
R-11363	Bracket - clutch lever	5	1.00
R-11371	Gasket - top tank	12	.35
R-11372	Gasket - bottom tank	12	.35
R-11386	Assembly - instrument panel	1	35.00
R-11386-1	Gauge - engine oil pressure	1	3.60
R-11386-3	Gauge - motor-meter	1	6.00
R-11386-5	Switch - magneto (used with Wico magneto)	1	4.50
R-11386-6	Choke - throttle control	1	3.00
R-11386-8	Choke - ignition control	1	3.00
R-11386-9	Choke - carburetor control	1	3.00

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R-11400	Gasket - gear shift cover.	27	.25
R-11409	Cap - fuel tank.	48	.45
RSA-11413	Assembly - engine WXC-3 Galion modification.	51	
RSA-11413-A	Assembly - engine WXLC-3 Galion modification	51	
RSA-11420	Pipe - radiator overflow	12	1.35
RSA-11421	Assembly - fuel line from tank to pump	48	4.20
R-11425	Rod - reach.	5	.50
R-11430	Bracket - wire	48	1.50
R-11431	Bracket - carburetor control wire.	48	.95
R-11442	Axle - front	15	25.50
R-11444	Bushing - adjusting.	15	5.90
R-11445	Pin - front axle	15	.45
R-11449	Collar - dust.	15	3.50
R-11450	Spacer	15	2.65
R-11462	Latch - control lever.	7	.30
R-11463	Rod - reach.	7	1.60
R-11468	Cone - bearing - Timken #663	15	6.90
R-11478	Rod - governor control	2	.70
11480-A	Clamp - fuel pipe.	85	.64
R-11486	Capscrew	32	.10
RSA-11554	Assembly - F and R shifting collar	7	9.00
R-11585	Support - exhaust pipe	48	.65
R-11586	Cap - exhaust pipe support	48	.50
RSA-11588	Support - front motor with cap	48	4.45
R-11593	Handle - cowl.	45	1.00
R-11598	Capscrew ½" x 2-1/4" SAE hex	36	.15
RSA-11629	Assembly - cab top	46	39.80
RSA-11631	Assembly - side curtain - left hand.	46	10.80
RSA-11632	Assembly - side curtain - right hand	46	10.80
RSA-11633	Assembly - rear clutch	46	10.45
R-11647	Capscrew ½" x 2-3/4" SAE	27	.20
R-11651	Capscrew 5/8" x 1½" long	32	.20
R-11651	Capscrew 5/8" x 1½" long	36	.20
R-11664	Gasket thick - bearing cap	32	.10
R-11684	Bracket - radiator support	12	.25
R-11709	Support - overflow pipe.	12	.20
R-11710	Bracket	2	.25
R-11713	Bearing - rear axle - left hand.	39	17.00
R-11715	Housing - bearing - left hand.	37	20.25
R-11716	Housing - bearing - right hand	37	20.25
R-11723	Clamp.	48	.05
R-11737	End - brake band	42	2.90
R-11738	Bushing - rear axle bearing.	39	14.55
R-11739	Washer for rear axle	39	1.10
R-11741	Retainer - bull pinion	37	1.60
R-11744	Arm - brake.	8,42	3.95
R-11745	Bracket - brake.	42	7.20
R-11749	End brake band	42	3.90
R-11751	Brake drum	42	52.00
11756-A	Lock screw - connecting rod piston pin	57	.08
R-11776	Spacer - front motor mounting.	48	.30
R-11779	Swivel pin	42	1.80
R-11783	Cone - bearing - Timken #68450	17	9.20
R-11784	Cup - bearing - Timken #68712.	17	5.95
R-11789	Pin for brake band	42	.40
R-11790	Rod - reach.	8	.50

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RSA-11794	Assembly - brake band and lining	42	18.75
R-11794-1	Lining only - brake - 1/4" x 6" x 60" long	42	10.50
R-11797	Gasket - bearing housing retainer	37	.05
RSA-11799	Tank - radiator top	12	33.50
R-11806	Bracket - gear shift	4	2.85
R-11816	Pin - yoke	5,7	.20
R-11816	Pin	8	.20
R-11816	Pin for yoke	42	.20
R-11825	Bracket - side crank	44	4.50
R-11827	Bevel - starting cross shaft	44	2.10
R-11829	Shaft - cross cranking	44	1.45
R-11903	Bolt - swivel pin	17	.30
R-12065	Shaft long - steering	20	3.90
RSA-12074	Assembly - governor adjusting knob	2	1.75
RSA-12079	Assembly - oil line to motor pressure gauge	48	2.45
R-12234-5	Switch - magneto (used with Bosch magneto)	1	4.50
R-12336	Shim - bearing housing	37	.05
R-12444	Inlet - pump connection	12	1.40
R-12614	Shim - cranking bracket	44	.20
13216-CS	Assembly - hour meter - Durant Mfg. Co. HM-749-12	81D	47.00
14166-A	Set screw 1/4"-20 x ½"	75	.10
14168-A	Pin #1 x 3/4"	75	.06
14173-A	Plunger lock nut	75	.08
R-14196	Bearing - RBA 8476	17	10.25
R-14207	Retainer - cup	17	.80
R-14208	Washer - swivel pin	17	.80
R-14209	Collar - dust	17	3.65
R-14209-A	Plunger - camshaft	61	.30
R-14210	Collar - dust	17	3.00
R-14211	Collar - dust	17	2.50
R-14213	Pin - swivel	17	18.25
R-14215	King pin	17	73.35
R-14217	Cone - bearing - Timken #495-A	17	4.90
14219-D	#10-24 fil. hd. screw	75	.08
14394-A	Screw - bellhousing to crankcase	63	.03
14501-A	Cap screw	73	.03
14591-A	Plug - fiber - camshaft gear thrust adjusting	61	.06
14594-AS	Assembly - idler adjusting thrust screw	61	.20
14596-AS	Assembly - camshaft gear thrust adjusting screw	61	.32
14624-AS	Sleeve - crankshaft oil wick with wick	61	.36
14670-A	Tee - oil line	71	.16
R-14764	Pet cock 1/8" - radiator drain	12	2.00
R-14814	Shield - exhaust pipe	48	1.00
R-14854	Washer - adjusting bushing	15	2.80
14909-A	Lockwasher	75	.04
R-14979	Bracket - hood side door	45	.15
R-14980	Bracket - hood side door	45	.15
15009-A	Guide - valve	59	.20
15045-A	Support housing	81D	1.50
15048-B	Bushing - water pump gear shaft	69	1.92
15055-A	Bolt - connecting rod	57	.28
15056-BS	Assembly - water pump gear shaft sleeve with bushing	69	7.70
R-15060	Capscrew - king pin cover	17	.25
15061-A	Plug - governor pilot hole cover	63	.74
15069-A	Oil thrower - gear cover	63	.12
15073-B	Pulley - fan drive for V belt	69	3.30

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15080-A	Oil thrower - water pump drive shaft	69	.10
15096-A	Driven gear on hour meter	77,81D	2.30
15097-A	Gear on water pump shaft	77,81D	.80
15099-B	Shaft - water pump gear	69	9.50
15099-BSY	Assembly - water pump drive shaft	69	24.70
15126-A	Fiber washer - driving gear	65	.12
15127-A	Bushing - oil pump body	65	.80
15128-A	Cover - oil pump	65	.80
15130-B	Baffle shell - oil pump	65	.60
15131-A	Gear - oil pump driving	65	2.60
15132-B	Gasket - oil pump baffle shell	65	.04
15133-A	Gasket - cylinder oil orifice	51,53	.02
15149-A	Gasket - water pump gear shaft sleeve	69	.06
15149-A	Gasket - support housing	77	.06
15195-B	Gear - water pump drive	69	2.40
15243-A	Plunger - pressure regulating valve	66	.10
15248-A	Plug - differential valve	66	.18
15286-B	Bracket	73	3.90
15298-A	Lockwire	73	.06
RSA-15302	Bolt - front scraper swivel	15	1.85
RSA-15303	Bracket - scraper mounting	15	1.30
R-15304	Bracket - mounting	15	1.30
R-15305	Spring - scraper - right hand	15	1.00
R-15306	Spring - scraper - left hand	15	1.00
15355-A	Sleeve - governor drive	71	2.60
15356-A	Washer - governor drive shaft thrust	71	.14
15357-A	Shaft - governor drive	71	3.50
15413-AS	Assembly - governor drive	71	13.60
15416-B	Gear large - governor	71	2.50
15538-A	Belt - fan	71	2.86
RSA-15540	Assembly - scraper blade	15	3.75
R-15596	Key - 1" pin	20	.30
15739-A	Orifice - cylinder oil	51,53	.70
15764-A	Welch plug 5/16"	75	.04
15775-A	Bumper screw	75	.36
15783-A	Bumper spring	75	.18
15787-A	Gear - governor drive	71,76	3.40
15788-A	Gear on bottom of governor	71	1.40
15788-A	Driven gear	75	1.40
15836-A	Lock nut adjusting screw	75	.54
15844-A	Bell crank pin	75	.78
15845-A	Connecting rod link	75	1.00
15846-A	Thrust sleeve	76	2.30
15852-A	Push rod screw	75	.30
15854-A	Body gasket	75	.36
15861-A	Bell crank	75	.36
15862-A	Bell crank pin	75	.18
15863-A	Valve box cover gasket	75	.08
15864-A	Bell crank pin 3/32" x 3/4"	75	.08
15868-A	Rd. hd. screw 6-32 x 1/4"	75	.04
15871-A	Bearing	76	.95
15877-A	Cotter key 1/16" x 7/16"	75	.04
15879-A	Valve box cover plate	75	.30
R-15951	Spacer - swivel pin bearing	17	1.25
D-16129	Key 5/8" x 7/8" x 2½" long	37	.20
16143-A	Chain coupling	69	1.22

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16238-A	Adjusting nut	73	1.40
16508-CS	Housing - magneto holding	77	5.20
R-16668	Plug - rear roll	39	.75
R-16670	Pick - rear roll	39	1.60
16724-A	Spider	76	2.10
RSA-16958	Crank	44	4.85
16970-A	Magneto adapter collar	77	2.70
16980-A	Bearing	75	.80
16981-A	Bearing	75	.80
16987-A	Rocker arm	75	.80
R-17064	Clutch - master complete	23	35.75
R-17064-A3	Assembly - adjusting yoke	25	7.15
R-17064-S3	Assembly - sliding sleeve	25	11.00
R-17064-A60	Assembly - adjusting yoke	25	7.10
R-17064-103F	Lever - finger	25	.55
R-17064-106A	Pin - finger	25	.15
R-17064-115	Spring - adjusting lock pin	25	.10
R-17064-117C8	Collar - cone with bolts and nuts	25	3.30
R-17064-117C8S	Collar - cone with bolts and nuts	25	3.30
R-17064-119B2	Link - lever	25	.20
R-17064-S384	Assembly - sliding sleeve	25	10.10
R-17064-M641	Snap ring	25	.01
R-17064-M642	Snap ring	25	.01
R-17064-A-1069	Spring - release	25	.15
R-17064-1968A	Pin - lever link	25	.15
R-17064-1990	Yoke - adjusting	25	3.65
R-17064-2137	Sleeve - sliding	25	3.85
R-17064-2245	Pin - adjusting lock	25	.25
R-17064-5791	Plate - floating	25	6.60
R-17064-6158	Hub and back plate	25	7.70
R-17064-6340-C	Driving plate or disc (moulded)	25	9.50
R-17065	Ring - clutch driver	23	8.15
R-17066	Lock nut - clutch shaft	23	.75
R-17067	Lockwasher - clutch shaft	23	.15
R-17068	Capscrew - clutch driving ring	23	.10
17082-A	Bearing - idler shaft	61	2.50
R-17409	Nut ½" SAE slotted	28	.35
R-17565	Yoke - reach rod	7	1.30
R-17891	Nut - rear axle	39	2.45
18005-B	Gasket - valve cover	59	.10
18006-A	Cover - valve	59	.50
18022-AS	Assembly - gasket set	55	2.20
18024-C	Gasket - gear cover	63	.12
18030-D	Cover - gear - WXC-3 only	63	14.60
18039-D	Gear - crankshaft	61	3.20
18040-B	Bearing - front upper main	51	1.00
18042-B	Bearing - rear upper main	51	2.00
18043-B	Bearing - camshaft front and rear	61	1.50
18044-B	Bearing - camshaft center	61	1.00
18049-B	Gear - camshaft	61	4.10
18050-A	Shim - front main bearing .002"	51	.02
18051-A	Shim - front main bearing .003"	51	.02
18052-A	Shim - intermediate main bearing .002"	51	.02
18053-A	Shim - intermediate main bearing .003"	51	.02
18054-A	Shim - connecting rod .003"	57	.02
18056-AS	Assembly - shims	53	1.50

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Part No.	Description	Page	Price
18057-A	Shim - center and rear bearing .002"	51	.02
18058-A	Shim - center and rear bearing .003"	51	.02
18059-B	Bearing - center upper main.	51	1.60
18060-B	Bearing - intermediate upper	51	1.00
18067-A	Shim - connecting rod .002".	57	.02
R-18085	Capscrew 1" x 1-3/4" long.	15	.40
18085-B	Gasket - oil pan - WXC-3 engine only.	63	.10
18087-A	Cluster - push rod - front	59	5.00
18089-A	Cluster - push rod - rear.	59	5.00
18090-CSY	Assembly - connecting rod.	57	10.00
18105-B	Idler gear	61	4.00
18107-AS	Shaft - idler gear with plunger.	61	3.10
18111-BSY	Assembly - cable tube.	77	.90
18113-C	Plate - oil pan strainer - baffle.	63	1.10
18122-A	Gear - oil pump.	65	2.00
18123-B	Pipe - pump outlet ½" x 10-3/4" long	67	1.32
18124-A	Shaft - oil pump drive	65	2.40
18125-A	Shaft - oil pump idle.	65	1.36
18126-CS	Assembly - oil pump.	65	14.60
18127-DS	Assembly - oil pump body	65	7.70
18144-AS	Gauge - bayonet oil - WXC-3 engine only.	63	.86
18145-BS	Assembly - oil strainer.	65	4.20
18146-AS	Gauge - bayonet oil - WXLC-3 engine only	63	.86
18147-B	Gauge - strainer	65	.18
18148-B	Shell - strainer	65	.32
18164-A	Gasket - cover	69	.08
18164-A	Gasket - water pump.	67	.08
18165-A	Impeller - water pump.	67	4.40
18166-A	Snap ring - water pump shaft	67	.08
18166-A	Snap ring - pump shaft	67	.08
18172-B	Shaft - water pump 10-15/32" long.	67	5.20
18173-A	Gasket - water pump attaching.	67,69	.04
18179-DS	Assembly - water pump.	67	21.00
18181-C	Assembly - body with bushing	67	6.00
18187-C	Pan - oil - WXC-3 engine only.	65	78.40
18189-DS	Assembly - water pump.	69	15.50
18190-A	Shaft - water pump 7-1/8" long	69	4.20
18201-A	Valve - intake	59	.92
18236-A	Brace - fan bracket.	71	62.60
18240-CS	Assembly - oil filter complete	66	18.00
18244-CS	Assembly - base - includes inlet tube.	66	5.50
18249-A	Gasket - oil filter.	66	.03
18310-A	Exhaust valve.	59	1.40
18354-AS	Assembly - water pump coupling	69	4.32
18359-A	Sprocket - coupling 3/4" hub	69	1.62
18361-A	Link - connecting - coupling	69	.16
18362-A	Cover - coupling - side.	69	.06
18363-A	Lock - coupling spring	69	.02
18364-A	Sprocket - coupling 1" hub	69	1.62
18365-A	Roller link - coupling	69	.14
18384-A	Insert - exhaust valve	59	.60
18388-A	Speed change lever	75	.70
18389-A	Speed change shaft	75	.60
18393-A	Adjusting screw.	75	2.46
18397-A	Speed change housing	75	4.20
18398-A	Speed change rocker arm.	75	.60

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18421-A	Plate - timing hole cover	63	.06
R-18426	Shaft - clutch	23	25.50
R-18427	Gear - high speed	23	18.10
R-18428	Spacer	23	.60
R-18429	Gear - intermediate	23	12.50
R-18430	Pinion - low speed	23	9.20
R-18432	Gear - bevel	32	62.50
R-18433	Wheel clutch	32	21.30
R-18434	Spacer	32	.50
R-18435	Bearing - SKF-6126	32	38.00
R-18437	Cup - bearing	32	9.30
R-18438	Oil seal - No. 7506	32	7.30
R-18439	Lockwasher	32	.30
R-18440	Nut - lock	32	2.50
R-18442	Countershaft - first	32	33.50
R-18443	Pinion - first countershaft	32	9.50
R-18444	Extension - countershaft	32	2.60
18445-D	Bellhousing	63	36.14
R-18449	Housing - gear shaft	27	11.90
R-18450	Gasket - gear shaft housing	27	.95
R-18451	Gasket - transmission case cover	21	1.40
R-18452	Pinion - bevel	28	31.20
R-18453	Gear - low and intermediate slide	28	65.90
R-18454	Shaft - back gear	28	18.00
R-18458	Cup - clutch shaft bearing	23	5.00
R-18459	Bracket - throwout shaft	5,23	1.65
R-18460	Cover - bearing - back gear shaft	28	1.75
R-18461	Gasket - bearing cover	28	.40
R-18462	Oil seal - #275124	23	1.00
R-18462	Oil seal - countershaft #275124	32	1.00
R-18464	Plate - bearing	32	.60
R-18465	Washer - thrust	32	.50
R-18466	Retainer - oil seal - bevel gears	32	.60
R-18468	Bracket - F and R shifting yoke - right hand	7	1.80
R-18469	Bracket - F and R shifting yoke - left hand	7	1.80
R-18470	Gear - high speed slide	28	18.90
RSA-18474-A	Assembly - F and R clutch complete	32	69.50
R-18474-A4	Assembly - F and R adjusting yoke	34	8.25
R-18474-102FXG	Sleeve - sliding	34	6.00
R-18474-103F	Lever - finger	34	.55
R-18474-104-C10	Yoke - adjusting	34	4.40
R-18474-106A	Pin - finger	34	.15
R-18474-112-B11½	Disc - friction	34	2.00
R-18474-114	Pin - adjusting lock	34	.25
R-18474-115	Spring - adjusting lock	34	.10
R-18474-M116	Rivet - disc 9/64" x 7/16"	34	.01
R-18474-119B2	Link - lever	34	.20
R-18474-S246	Assembly - sliding sleeve	34	9.50
R-18474-M641	Snap ring	34	.01
R-18474-M642	Snap ring	34	.01
R-18474-1968A	Pin - finger lever	34	.10
R-18474-2011	Spring - release	34	.10
R-18474-A5122	Hub and back plate	34	33.00
R-18474-A5223	Disc - friction	34	1.50
R-18474-5273	Plate - center	34	4.90
R-18474-06310A	Assembly - driving plate with disc	34	9.25

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Part No.	Description	Page	Price
R-18474-06310G	Assembly - driving plate with disc	34	9.25
R-18474-6497	Plate - floating	34	5.50
R-18478	Gasket	23	.50
R-18482	Key - 1/4" x ½" x 1-15/16" long.	23	.15
R-18483	Key - 1/4" x 1/2" x 1-11/16" long.	23	.15
R-18484	Key - ½" x ½" x 1½" long	23	.15
R-18485	Cone - bearing - Timken #3578.	23	2.45
R-18486	Cone - bearing - Timken #3775.	28	2.70
R-18487	Cup - bearing - Timken #3720-B	28	2.30
R-18488	Cone - bearing - Timken #540	28	3.65
R-18489	Cup - bearing - Timken #532-B.	28	3.75
R-18490	Bearing - roller 2" long	32	2.50
R-18495	Key - 3/8" x 3/4" x 2½" long	32	.20
R-18496	Case cover	21	1.30
R-18499	Yoke - front	17	166.65
R-18501	Bracket - rear steering shaft.	3	7.00
R-18502	Shaft - rear steering.	3	6.00
R-18503	Felt seal.	3,20	.20
R-18504	Collar - steering shaft.	3	.70
R-18504	Collar - bevel pinion shaft.	20	.70
R-18505	Bearing - needle B-2016.	3,20	1.30
R-18508	Bracket - steering bevel pinion shaft.	20	8.50
R-18509	Shaft - steering bevel pinion.	20	9.00
R-18510	Pinion - steering bevel.	20	2.70
R-18512	Worm - steering.	20	12.45
R-18513	Shaft - worm	20	5.10
R-18514	Bracket - steering worm.	20	22.10
R-18515	Gear - steering bevel.	20	4.80
R-18516	Bearing - needle for worm - B2420.	20	1.05
R-18517	Bearing - needle for worm - M24201.	20	1.05
R-18520	Head - king pin.	17	104.60
RSA-18531	Assembly - fuel tank	48	21.55
R-18540	Cap - kin pin.	17	12.75
R-18541	Spider - steering.	20	30.75
R-18542	Segment - steering	20	15.30
R-18543	Key - steering	20	1.00
R-18545	Cover - breast plate	45	.45
RSA-18566	Assembly - tool box lid.	48	2.00
18597-A	Magneto driving gear on water pump shaft	77	2.62
18598-A	Magneto driven gear on magneto shaft	77	1.12
R-18615	Post - left hand rear.	46	2.40
R-18616	Post - right hand rear	46	2.40
R-18617	Post - left hand front	46	1.20
R-18618	Post - right hand front.	46	1.20
R-18619	Support - right hand front cab post.	46	1.00
R-18620	Support - left hand front cab post	46	1.00
RSA-18621	Assembly - front curtain	46	6.00
R-18687	Shim	32	.05
18690-BS	Assembly - carburetor 1½" Zenith IN-156B outline #0-6459.	82	30.00
18691-B	Carburetor intake elbow - attach to carburetor	86	6.34
18709-C	Piston (aluminum).	57	8.75
18728-A	Rod - push	59	1.00
18728-ASY	Assembly - push rod.	59	1.20
18733-E	Manifold	59	27.68
R-18760	Transmission case.	21	168.50
18786-A	Gasket - manifold heat control cover plate	59	.10

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18818-B	Air cleaner bracket - air cleaner to cylinder head	86	3.60
18819-B	Brace - for air cleaner bracket	86	2.70
18845-B	Flange - manifold companion	59	1.10
18846-B	Gasket - manifold companion flange	59	.20
18875-CYS	Piston (cast iron)	57	5.40
18876-B	Pin - piston	57	.70
18877-A	Bushing - piston pin	57	.40
18960-C	Assembly - cover and bushing	69	5.30
18961-C	Housing - water pump	69	3.80
18971-A	Impeller	69	4.50
18973-A	Bushing - water pump cover	69	1.60
19072-D	Camshaft	61	20.00
19104-BS	Pipe - pump discharge with nut - WXC-3 only	67	3.90
19105-B	Cap - intermediate main bearing	51	3.40
19106-B	Cap - front main bearing	51	3.96
19107-B	Cap - rear main bearing	51	5.90
19108-B	Cap - center main bearing	53	5.60
19109-C	Gasket - cylinder head	51	1.60
19136-E	Crankshaft - WXLC-3 engine	61	125.10
R-19164	Rivet - tool box lid	48	.10
R-19165	Key - 3/8" x 9/16" x 4" long	32	.20
19171-BS	Pipe - pump discharge with nut - WXLC-3 only	67	4.40
19225-E	Head - cylinder for WXLC-3 engine	51	25.00
19232-E	Head - cylinder for WXC-3 engine	51	25.00
19263-C	Gasket - oil pan WXLC-3 only	65	.12
19331-B	Gasket - bellhousing	63	.22
19356-A	Rocker - yoke spacer	75	.18
R-19394	Gasket - yoke bracket	23	.05
R-19399	Clamp - wire	48	.05
19402-C	Flywheel	61	29.00
R-19549	Wrench #731 - 3/4" and 7/8" opening	47	1.00
19569-CS	Pump - fuel	85	8.50
19570-AS	Assembly - fuel pipe	85	1.60
19585-E	Crankshaft - WXC-3 engine	61	149.50
19680-A	Rear main bearing thrust washer	53	1.00
19716-B	Hub	73	5.50
19717-A	Spindle	73	4.30
19719-CS	Assembly - fan	71	35.00
19732-D	Gasket - manifold attachment	59	.50
19772-A	Spring - valve	59	.24
RSA-19774	Assembly - hood top	45	8.80
R-19779	Hood side - left hand	45	2.95
R-19780	Hood side - right hand	45	2.95
R-19788	Door - cowl	45	3.60
19801-A	Valve box	75	15.00
19802-13	Body cap	75	7.50
19804-A	Rocker shaft bearing	76	1.00
19805-A	Spring collar	76	1.24
19806-A	Connecting rod	75	1.90
19807-A	Valve shaft	75	1.10
19808-A	Connecting rod cover	75	.44
19809-A	Rocker shaft	75	.36
19812-A	Connecting rod tube	75	1.20
19814-A	Speed plunger	75	1.26
19832-CS	Governor assembly	76	62.50
19940-D	Cover - gear - WXLC-3 only	63	15.80

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19975-D	Block - cylinder	53	230.00
19990-C	Cylinder and crankcase	53	262.00
RSA-20033	Sub-frame - support engine and transmission	21	16.00
20072-B	Bearing - front main	53	.96
20073-B	Bearing - center main	53	1.40
20074-B	Bearing - rear main	53	1.34
20075-B	Bearing - intermediate main	53	.92
20092-B	Cap - front main bearing	53	7.80
20093-B	Cap - center main bearing	53	7.80
20094-B	Cap - rear main bearing	53	12.90
20095-B	Cap - intermediate bearing	53	5.20
20096-A	Screw - front and intermediate main bearing	53	.18
20097-A	Screw - center and rear main bearing	53	.14
20198-B	Bearing - connecting rod	57	.60
20304-BS	Blade assembly	73	3.80
20305-A	Spacer	73	1.60
20386-D	Oil pan - WXLC-3 only	65	68.00
RSA-20514	Cover - transmission	21	3.30
20736-C	Housing - magneto support	77	6.00
20805-B	Drive shaft	75	2.60
20806-C	Body	75	18.00
21011-A	Pin - valve spring seat	59	.08
21055-A	Bolt - connecting rod	57	.36
21056-A	Nut - connecting rod bolt	57	.04
21068-AS	Assembly - shim	55	1.80
R-21123	Capscrew - axle	15	.70
21229-A	Lockwasher - connecting rod 7/16" std	57	.02
21262-C	Assembly - cover with bushing	67	6.20
21263-A	Bushing - water pump	67	1.20
21265-A	Gland - water pump packing	67,69	.52
21270-A	Packing - water pump	67,69	.22
21297-AS	Assembly - connecting rod	57	12.20
R-21323	Plate - bearing	23	2.25
R-21326	Spacer - back gear shaft	28	1.10
R-21914	Axle - rear	39	82.00
R-21915	Drive - rear axle	39	37.25
R-21916	Collar - spacer rear axle	39	27.35
R-21917	Lock - differential	39	31.25
R-21918	Bearing - rear axle - right hand	39	20.65
R-21919	Bracket - differential rocker shaft	39	6.10
R-21926	Yoke - differential shifter	39	3.10
R-21927	Lock - differential lock yoke	39	8.30
R-21928	Shaft - differential shifter	39	2.15
R-21929	Shaft - differential rocker	39	1.00
R-21932	Key - 1" x 1½" x 4-1/4" - axle to collar	39	.50
RSA-21933	Roll - rear	39	510.00
R-21934	Gear - drive	39	105.00
RSA-21937	Assembly - cowl and breast plate	45	30.75
R-21939	Extension breast plate	45	1.85
RSA-21961	Lever - differential lock	4	3.90
22177-A	Nut - water pump packing L.H.	67,69	.90
22178-A	Nut - water pump packing R.H.	67	.90
R-22437	Gear guard - right hand	39	21.40
R-22439	Gear guard - left hand	39	21.40
RSA-22441	Assembly - front roll	15	253.75
22564-A	Gasket - fuel pump attaching	85	.03

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R-23437	Washer - spacer	20	1.50
RSA-23439	Assembly - steering wheel	3	11.10
R-23548	Pin - starting bevel on engine	44	.20
R-23549	Bevel - starting on engine	44	16.95
R-23550	Tank - radiator bottom	12	11.50
R-23554	Shim - side crank	44	.45
R-23811	Shim - steering worm	20	.40
R-23812	Shim - bevel gear adjusting	20	.20
R-24220	Retainer - bearing	37	7.35
R-24221	Countershaft - second	37	40.85
RSA-24222	Assembly - countershaft complete	37	88.15
R-24225	Bearing - ND-1315	37	19.00
R-24226	Oil seal #400230	37	1.25
R-24444	Gear - differential	36	20.00
R-25299	Key - rear roll - 1" x 1½" x 4-3/8"	39	.40
R-25300	Key 1" x 1½" x 5-1/4" long - brake drum	42	.50
27111	Lockwasher - special 5/8" x 3/16" x 1/16"	44	.01
27584-A	Yoke	75	1.90
30728-A	Weights	76	1.50
30729-A	Weight pins	76	.30
30768-A	Governor spring	75	.54
30792-A	Thrust bearing	76	1.20
35067-A	Shim - connecting rod .002"	57	.02
35068-A	Shim - connecting rod .003"	57	.02
35200-A	Shim - front main bearing .002"	53	.02
35201-A	Shim - rear main bearing .002"	53	.02
35202-A	Shim - center main bearing .002"	53	.02
35203-A	Shim - intermediate main bearing .002"	53	.02
35205-A	Shim - front main bearing .003"	53	.02
35206-A	Shim - rear main bearing .003"	53	.02
35207-A	Shim - center main bearing .003"	53	.02
35208-A	Shim - intermediate main bearing .003"	53	.02
35246-BS	Assembly - metal element - interchangeable with 2402-BS	66	7.00
40529-A	Clamp washer	73	.16
40530-A	Cap front	73	1.50
40814-B	Plate - manifold heat control cover	59	1.50
42408-A	Butterfly valve	75	.70
45926-A	Oil Gasket	73	.08
50208-A	Wire - spark plug	77	.05 ft.
50283-A	End - spark plug wire	77	.04
50339-CS	Bosch magneto - MJC 6C 101 (complete assembly)	77	50.00
50563-A	Spark plug - Champion #0	77	.65
50651-A	End - spark plug wire	77	.08
51422-CS	Wico magneto (complete assembly)	77	35.00
51423-A	Magneto hold down arm assembly	77	.90
51620-DS	Spark plug wires (set)	77	6.00
51620-DS-1	Wire #1	77	1.00
51620-DS-2	Wire #2	77	1.00
51620-DS-3	Wire #3	77	1.00
51620-DS-4	Wire #4	77	1.00
51620-DS-5	Wire #5	77	1.00
51620-DS-6	Wire #6	77	1.00
PL-52125	Locking plate for interrupter bracket	81B	.05
CV-52126	Ventilator cover	81B	.15
DP-52234	Distributor plate with observation window	81B	3.85

NUMERICAL INDEX & PRICE LIST

ALL PRICES LISTED ARE NET F.O.B. FACTORY AND SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Description	Page	Price
BB-60226	Ball bearing at either end	81B	1.55
SA-65972	Weight - long	81D	.50
NT-67446	Hex nut for rotor shaft	81C	.05
HG-73117	Housing - for anti CLW rotation	81D	2.60
NT-75768	Keyed hub nut..2	81D	.15
WA-75863	Star lockwasher	81D	.05
WA-81751	Rotor felt washer	81B	.05
FP-81953	Clip for distributor plate cable	81C	.05
IS-82927	Rubber insulation nipple	81C	.05
PK-83361	Packing for arrester plate	81D	.25
NT-83544	Hex nut for rotor shaft - 3/4" across flats	81D	.20
WA-98922	Plain washer under fastening screw	81B	.05
KL-100657	Coil cable	81C	.05
132108	Bottom cover screw	85	.50c
854003	Bowl gasket	85	.40c
854005	Bowl seal	85	.01
854009	Screen	85	.05
855003	Valve	85	1.70c
855012	Pull rod gasket	85	.01
855016	Link pin	85	.02
855017	Link pin clip	85	.20c
855029	Bottom cover gasket	85	.60c
855035	Diaphragm (4 pieces)	85	.25
855064	Lockwasher - top cover screw	85	.15c
855078	Lower diaphragm protector	85	.05
855135	Valve plug	85	.10
855136	Valve plug gasket	85	.50c
855213	Pull rod nut	85	.05
855228	Bottom cover	85	.30
855229	Bottom cover gasket	85	.02
855250	Pull rod	85	.15
855253	Diaphragm spring	85	.02
855374	Link	85	.02
855390	Pull rod lockwasher	85	.01
855493	Top cover screw	85	.60c
855532	Spring cap	85	.01
855763	Bail thumb nut	85	.05
855789	Air dome	85	.20
856242	Rocker arm	85	.60
856270	Valve spring	85	.50c
1521194	Upper diaphragm protector	85	.03
1521288	Rocker arm pin washer	85	.55c
1521289	Rocker arm pin	85	.15
1522090	Bail and screw assembly	85	.10
1522092	Metal bowl	85	.35
1523352	Body	85	1.35
1523358	Top cover and valve seat assembly	85	1.30
1537712	Assembly - fuel pump	85	7.30

NOTE: SEE SUPPLEMENT ON PAGE 110 COVERING ZENITH CARBURETOR MODEL 28BV12 (OUTLINE S-880).

SUPPLEMENT TO NUMERICAL INDEX COVERING ZENITH CARBURETOR MODEL 28BV12

Part No.	Description	Page	Price
T1S8-4	Screw - bracket assembly		$ .05
T1S8-6	Screw - swivel		.05
T1S8-10	Screw - lever stop		.05
T1S10-9	Screw - bowl to intake assembly		.05
B28L-1	Body - throttle		4.00
F2x1	Element - filter		.45
A3-52	Bowl - Fuel		6.00
A4-15	Body - air intake		4.00
T8S10-9	Screw - lever clamp		.05
T11S6-5	Screw - air shutter		.05
T11S25-12	Screw - bowl to body assembly		.05
C21-54	Plate - throttle		.95
T22S8	Nut - throttle shaft		.05
C24-11ALx3	Lever - throttle clamp		1.00
C29-150	Shaft and lever - throttle		1.35
CR31-6	Lever - pump		.20
T31S6	Nut - Clamp screw		.05
CR32-13	Link - pump lever		.05
C35-25x3	Pump and rod - accelerating		1.10
C38-1-29	Venturi		1.20
CR41-1	Valve - pump check		.30
CR41-1	Valve - air vent check		.30
T41-8	Lockwasher - bracket assembly		.05
T41-10	Lockwasher - bowl to intake screw		.05
T43-25	Lockwasher - bowl to body assembly screw		.05
T45-8	Lockwasher - shaft nut		.05
C46-25	Screw - idle adjusting		.30
C52-7-29	Jet - main #C-29		.45
C55-8-12	Jet - accelerator		.60
C56-3-13	Jet - idling #C-13		.50
T56-3	Washer - filter head fibre		.05
T56-23	Washer - fuel valve seat fibre		.05
T56-23	Washer - passage plug fibre		.05
T56-24	Washer - main jet fibre		.05
T56-52	Washer - vacuum cylinder fibre		.05
C66-23-1-75	Jet - discharge #C-75-1		.75
C77-14-22	Jet - well vent #C -22		.25
C81-1-40	Valve and seat - fuel		.75
T82-3	Ball - pump refill check		.10
C85-1	Float		1.00
C91-1	Cylinder - Vacuum		.90
CT91-3	Plug - bowl drain		.10
C97-12-15	Valve - power jet		.80
C101-1	Plate - air shutter		.75
C108-1	Shaft and lever - air shutter		.75
C109-1	Bracket - air shutter		.35
C111-9	Spring - idle adjusting screw		.10
C114-10	Retainer - link		.05
C120-4	Axle - float		.10
C120-12	Weight - refill check ball		.05
C135-2	Washer - weight retainer		.05
C136-15	Screw - throttle plate		.05
C137-31	Plug - accelerator jet channel		.05
CR137-37	Plug - bowl channel		.05
C138-23	Plug - discharge jet passage		.35
C138-38	Screw - vacuum channel		.05
C138-46	Head - filter		.50
C141-4-2	Gasket - flange		.10
C142-1	Gasket - bowl to body		.10
C143-16	Gasket - bowl to intake		.10
C181-126	Kit - Gasket		.55
C182-483	Kit - Repair parts		4.70
20611-BS	Assembly - carburetor Zenith 28BV12, outline number S-880		21.00