

W1.35:3-376A ch.1

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TM 3-376A
*C 1

TECHNICAL MANUAL

PORTABLE FLAME THROWER M2-2

CHANGES }
No. 1 }

WAR DEPARTMENT
WASHINGTON 25, D. C., 16 May 1945

TM 3-376A, 16 May 1944, is changed as follows:

10. ITEMS WITH EACH FLAME THROWER.

* * * * *

b. *Kit, spare parts, for portable flame thrower M2-2, assembly B81-6-190.*

* * * * *

g. (Added). Army Service Forces Catalog CW 7-440114, Organizational Spare Parts and Equipment: 1st and 2d Echelons: for Flame Thrower, Portable, M2-2.

Fig. 8. Contents of tool kit:

* * * * *

B. 1 Wrench, hex, * * * set screws, H22-49-12.

2 Wrench, hex, 5/32-inch across flats for 5/16-inch socket-head set screws, H22-49-140.

* * * * *

Fig 9. Contents of spare parts kit:

F. (Added). 3 Tubes, deflector, A81-1-501. (See fig. 39.)

G. (Added). 3 Locknuts, pipe, hex, 1/8-inch, H98-5-382 (for use with deflector tube). (See fig. 39.)

H. (Added). 1 Support, diaphragm, A81-1-428. (See fig. 47.)

12. NEW EQUIPMENT.

* * * * *

m. (Added). New gun may be received with valve spring removed from barrel and valve assembly. Spring comes tied to barrel. This is done to prevent strain on valve diaphragm assembly caused by pressure of spring in gun during storage and shipment. When weapon is being prepared for operation, spring must be untied from barrel and installed in gun, as described in paragraph 75.

n. (Added). Pressure regulator may be shipped at zero adjustment to prevent possibility of strain on diaphragm during shipment and storage. A regulator shipped in this condition has a tag (tied to the

*These changes supersede TB 3-376A-1, 19 October 1944.

tank coupling) stating that the regulator is not set. When weapon is received in this condition, it must be adjusted as described in paragraph 67 before it can be operated.

15. TRAINING.

* * * * *

b. Use of water in training. Water may be used (instead of fuel) for elementary practice firing. Ignition cylinders are * * * piece, and lubricated (Par. 49). Use of water, however, should always be supplemented by firing ignited fuel because water does not give a correct impression of stream and flame characteristics.

* * * * *

17. CONNECTING TANK GROUP AND GUN GROUP.

* * * * *

a. Place the new * * * to 2 minutes. Slight pressure sometimes builds up in the fuel tanks, even though the pressure-tank valve has not been opened, and causes some overflow of fuel when the coupling plug is removed. This pressure may be relieved by—

(1) Standing the tank group upright.

(2) Slightly opening filling plug on top of fuel tanks to bleed the pressure.

(3) Closing the opening at filling plug and tightening it with wrench.

* * * * *

18. LOADING WITH IGNITION CYLINDER.

* * * * *

b. Precautions. Care must be * * * front of gun. Do not ignite the ignition cartridge until the weapon is to be fired at the target.

* * * * *

30. AFTER FIRING.

When the firer * * * mission, he should:

a. First, remove and discard the ignition cylinder, as the ignition cylinder should never be present when blowing out fuel or after blowing out fuel except when preparing for a new mission. To remove cylinder, proceed as follows:

* * * * *

b. Close the pressure-tank valve by turning valve handle clockwise (to conserve remaining pressure in pressure tank) only if additional shots are to be fired before refilling and recharging.

c. If no additional shots are to be fired before refilling and recharging, open pressure-tank valve by turning handle counterclockwise. Point the gun away from personnel and blow out the remaining fuel and pressure, if any, from the fuel tanks by squeezing the valve lever and grip safety until there is no further discharge. The trigger should not be used during this operation. Then close the pressure-tank valve to prevent entrance of foreign matter into the pressure system.

d. (Superseded). Carefully remove tank group from the back. This may be done most easily by sitting or squatting with back to a tree stump, flat rock, packing box, or other object. Release the body and shoulder straps and ease tank group off the back. Avoid dropping equipment on the ground as this may damage it.

* * * * *

31. IGNITION CYLINDER.

* * * * *

c. *Packing.* Ignition cylinders are * * * each flame thrower. Fifty cans (100 ignition cylinders) are contained in each ignition cylinder packing box. Wooden packing box with contents weighs approximately 50 to 55 pounds. Outside dimensions of the box are approximately 16 $\frac{1}{4}$ inches by 14 $\frac{3}{4}$ inches by 10 $\frac{1}{4}$ inches. Cubage is 1 $\frac{3}{12}$ cubic feet.

* * * * *

32. CHARGING PRESSURE TANK.

* * * * *

b. *Charging from air compressor.* Compressor, air, gasoline * * * cylinders as well. Instructions for use of the compressor will be found in TM 3-377.

* * * * *

Figure 23. Charging two pressure tanks, using charging and filling lines, and cylinders of compressed air or nitrogen. As many as four pressure tank and valve assemblies, on or off tank groups, can be charged at one time from cylinders coupled as shown in figure 24.

33. PRECAUTIONS WHEN PRESSURE-CHARGING.

* * * * *

m. (Added). Inspect carefully to be certain that no traces of grease, flame thrower fuel, oil, dirt, or other foreign matter are present in flame thrower pressure tanks, outlets of air compressor, connections, hose, or cylinders containing compressed air.

n. (Added). Hands and tools must be free of oil or grease when charging or servicing flame thrower pressure systems.

o. (Added). Discharge any remaining compressed air in flame thrower pressure tanks before recharging.

p. (Added). If compressed air is to be used, and if any grease, oil, or flame thrower fuel is detected by sense of smell or sight within pressure tank and valve assemblies or cylinders, return tanks or cylinders for cleaning to the appropriate third-echelon maintenance agency of Chemical Warfare Service.

35.1 PEPTIZED FUELS (Added).

a. Characteristics. (1) Pour more readily than usual thickened fuels.

(2) Give a larger diameter flame than thickened fuels.

(3) Give longer effective ranges than liquid fuels.

(4) Prepared more quickly in cool temperatures than thickened fuels.

b. Preparation. (1) Open 5¼-pound can or cans of thickener.

(2) Add 2 mess kit spoonfuls of water to each can of thickener. Stir until the water disappears in the thickener. It is not necessary to mix the water uniformly with all of the thickener.

(3) Proceed at once as directed in paragraph 35. Avoid accidental addition of any water to the thickener or fuel other than that stated in (2) above.

(4) Peptized fuels set a little more quickly than the usual thickened fuels, but their general appearance after setting is the same. After standing, however, peptized fuels spontaneously become thinner and may be poured without use of pressure. The time it takes for thinning to occur depends on the temperature of the fuel. At 75° Fahrenheit or higher, thinning occurs in approximately 1 to 2 hours. At temperatures below 60° Fahrenheit, thinning occurs several days after preparation of the peptized fuel.

(5) If water has accidentally gotten into fuel before addition of the thickener, peptizing action takes place, but the results are unpredictable because the quantity of water added is not controlled.

36. PREPARATION OF LIQUID FUELS.

a. Choice of ingredients. Thin fuels are * * * reaching the target. For this reason, liquid fuels should contain the lowest proportion of gasoline and the highest proportion of heavier fuels that permit easy ignition. In hot climates, * * * of great importance. The gasoline used can be any U. S. grade of motor fuel or aviation gasoline. Suitable blends are as follows:

* * * * *

(3) (Added). By volume, 20 to 25 percent gasoline and 75 to 80 percent light fuel oil.

* * * * *

40.1 USE OF PACKBOARDS (Added).

Detachable pressure tank and valve assemblies (par. 66.1) make possible the use of packboards for transporting pressure tanks, 5-gallon cans of fuel, wrenches, and additional ignition cylinders close to the front line of combat to troops using flame throwers. As packboards are not manufactured specifically for servicing flame throwers, standard quartermaster-issue packboards are used. Packboard transportation is practicable only with pourable fuel. (Pourable fuels include some thickened fuels and all liquid fuels.)

a. The following is a suggested procedure for packboard transportation:

(1) Lash all necessary filling and charging supplies for one flame thrower to packboard, using lashing rope and straps.

(2) Tie one pressure tank and valve assembly to top of one flat 5-gallon fuel can so that flexible shaft and handle hang down parallel to one side of the fuel can.

(3) Carry wrench with large enough opening to unscrew filling plugs from tops of fuel tanks and to tighten plugs after filling.

(4) Carry extra ignition cylinders.

b. Return empty pressure tank and valve assembly along with empty fuel can and wrench on packboard to flame thrower servicing point.

c. If a supply of flame thrower tank groups is available, they may be preferred to the packboard method of transportation. Tank groups are easy to carry, and a filled and charged tank group can replace an emptied one as quickly as packboard method can be used to service flame thrower.

* * * * *

48. SERVICE KIT.

* * * * *

a. Tools.

* * * * *

1 Screw driver, common, * * * blade diameter, H22-50-6.
(Fig. 8.)

2 Wrenches, hex, $\frac{5}{32}$ inch across flats (for $\frac{5}{16}$ -inch socket-head set screws), H22-49-140. (See B, fig. 8.)

2 Wrenches, hex, * * * set screws), H22-49-91.

* * * * *

b. Accessories and spare parts.

- * * * * *
- 1 Tank and valve, pressure, assembly (less valve shaft assembly, B81-1-883) B81-1-879. (See fig. 35.2.)
- 1 Shaft, valve, assembly B-81-1-883. (See fig. 35.2.)
- 2 Case, spring, assemblies B81-1-444. (Fig. 9.)
- * * * * *
- 1 Regulator, pressure, assembly (Grove type) B81-1-778. (Fig. 35.2.)
- 1 Compound, anti-seize, white * * * ¼-pound can, H99-3-12.
- 2 Gages, pressure * * * assembly B81-6-90. (Fig. 32.)
- 6 Tubes, deflector, A81-1-501. (See fig. 39.)
- 6 Locknuts, pipe, hex, 1/8-inch, H98-5-382. (See fig. 39.)
- 2 Supports, diaphragm, A81-1-428. (See fig. 47.)
- 6 Springs, R81-1-922 (for socket). (See fig. 35.8.)
- 6 Washers, backing, R81-1-924 (brass washer for socket). (See fig. 35.8.)
- 12 Washers, R81-1-923 (synthetic rubber washer for socket). (See fig. 35.8.)
- 6 Caps, plug, R81-1-926 (with chain) (dust cap for plug). (See fig. 35.3.)
- 12 Nuts, wing, A81-1-877. (See fig. 35.4.)
- 2 Army Service Forces Catalogs CW 6-445115, Sets of Tools, Equipment, and Similar Material: Kit, service, for Portable Flame Thrower, M2-2.
- 2 Army Service Forces Catalogs CW 7-440114, Organizational Spare Parts and Equipment: 1st and 2d Echelons: for Flame Thrower, Portable, M2-2.
- 2 War Department Technical Manuals 3-376A, Portable Flame Thrower M2-2.

49. LUBRICATION.

a. Gun group.

* * * * *

(2) *Frequency of lubrication.* The surfaces of * * * lubricated before reassembly. Do not soak or wash the spring case assembly in solvent because this may remove the grease which is factory packed in the spring case assembly. This grease cannot be replaced. To clean spring case assembly, wide outside surfaces with cloth saturated with solvent.

* * * * *

53. SERVICE WHEN FILLING AND CHARGING.

* * * * *

d. Testing for leaks in pressure system. After charging and * * * to test pressure. (Fig. 32.) To install gage, unscrew check-valve cap, **moisten end of check valve with water or saliva**, and screw gage in check-valve body. Use of water or saliva as lubricant prevents cutting of the rubber washer by the check valve. If pressure has * * * and then retested.

66. PRESSURE TANK AND VALVE ASSEMBLY.

a. Description and functioning. The pressure tank * * * assembly (Fig. 33) includes:

(1) *Pressure tank.* The pressure tank * * * the fuel tanks. The pressure-tank clamp may be adjusted to different out-

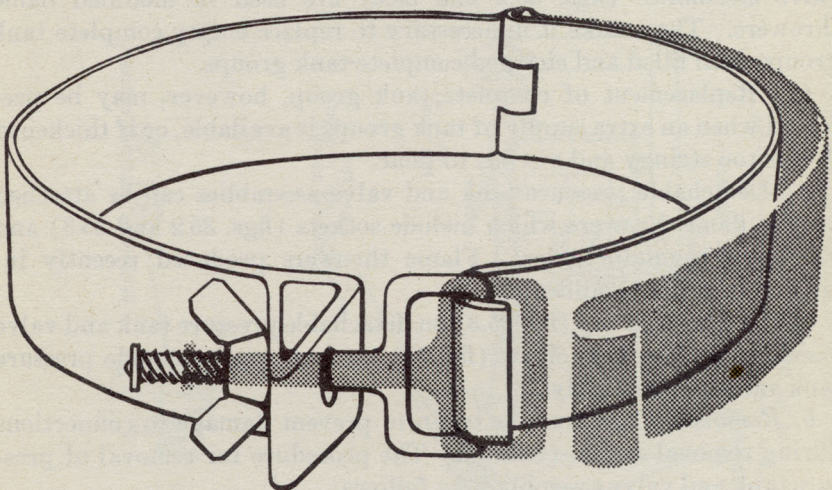


FIGURE 35.1. (Added.) Adjustable pressure tank clamp, showing use of nut and screw tightening device.

side diameters of pressure tanks by means of a nut and screw tightening device (fig. 35.1) or by means of a stepped ring at end of clamp.

* * * * *

b. Removal. (Fig. 33.)

* * * * *

(2) *Removal procedure.*

* * * * *

(*h*) (Added). To remove check valve, unscrew check valve cap and check valve body, using wrenches.

c. Installation. (Figs. 33 and 39.)

* * * * *

(7) (Added). To install check valve, apply thread compound lightly to threads of check valve body and screw into opening in pressure tank valve. Tighten check valve body in position, using wrench. Screw check valve cap on check valve body and tighten with wrench.

* * * * *

66.1 DETACHABLE PRESSURE TANK AND VALVE ASSEMBLIES (Added).

Newly developed detachable pressure tank and valve assemblies provide an improved and speedier method of servicing M2-2 portable flame throwers in forward combat zones.

a. Description and functioning. (1) Detachable pressure tank and valve assemblies (figs. 35.2 and 35.3) are used in modified flame throwers. They make it unnecessary to replace empty complete tank groups with filled and charged complete tank groups.

(2) Replacement of complete tank group, however, may be preferred when an extra supply of tank groups is available, or if thickened fuel is too stringy and viscous to pour.

(3) Detachable pressure tank and valve assemblies can be attached only to flame throwers which include sockets (figs. 35.2 and 35.3) and shortened regulator tubes. Flame throwers produced recently include this design modification.

(4) A plug and cap (fig. 35.3) on detachable pressure tank and valve assembly replace tube elbow (fig. 33) used on nondetachable pressure tank and valve assembly.

b. Removal. Care must be taken to prevent damage to connections during removal and installation. The procedure for removal of pressure tank and valve assembly is as follows:

(1) Close pressure-tank valve. Press valve lever and safety grip on gun to release all pressure from fuel system and gun.

(2) Unscrew wing nut from valve flexible shaft. (See fig. 35.4.) Be careful not to misplace wing nut.

(3) Pull clamp and shaft from stud which is welded on fuel tank.

(4) With one hand under pressure tank, unclamp but do not fully open pressure-tank clamp.

(5) Supporting pressure tank valve with top of right hand, push knurled socket in and away from pressure tank valve. Left hand may be placed at back of regulator tube so that tube does not bend away from socket. (See fig. 35.5.) Pull out pressure tank and valve assembly.

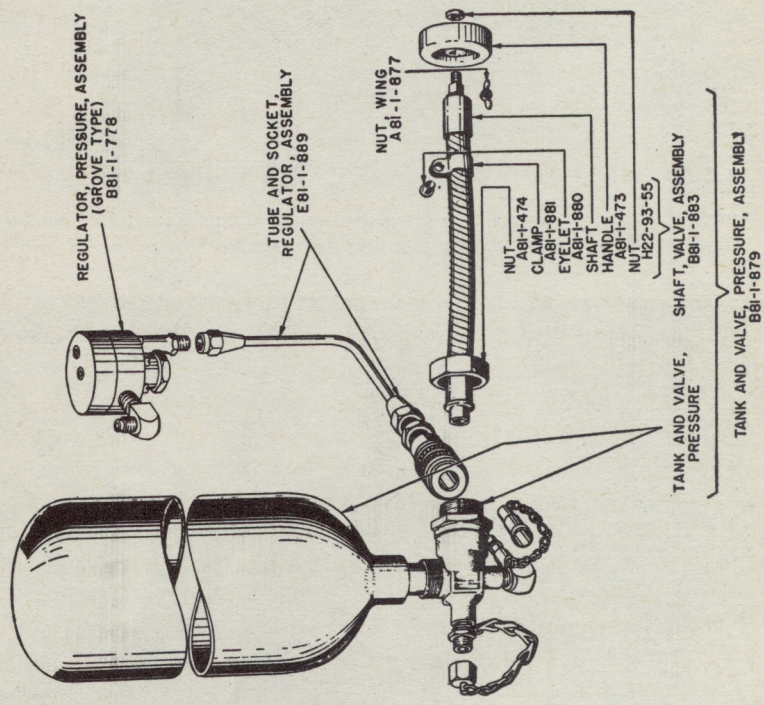
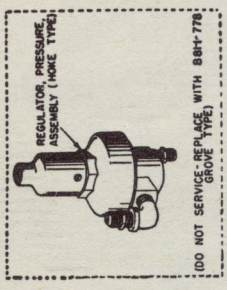


FIGURE 85.2. (Added.) Pressure system disassembled, showing removable pressure tank and valve assembly, nomenclature, and Chemical Warfare Service stock numbers.

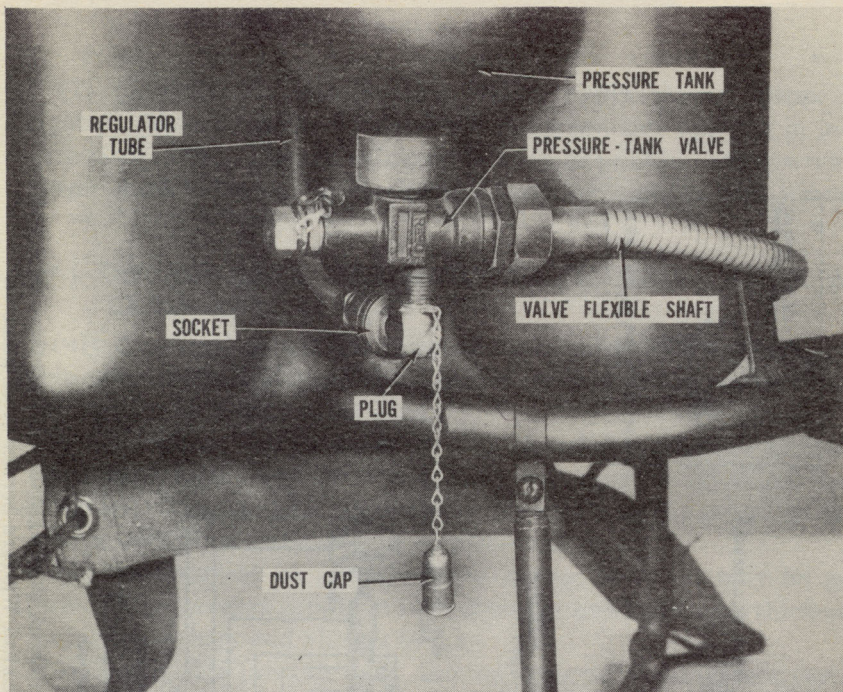


FIGURE 35.3. (Added.) Detachable pressure tank and valve assembly, connected to modified regulator tube assembly.

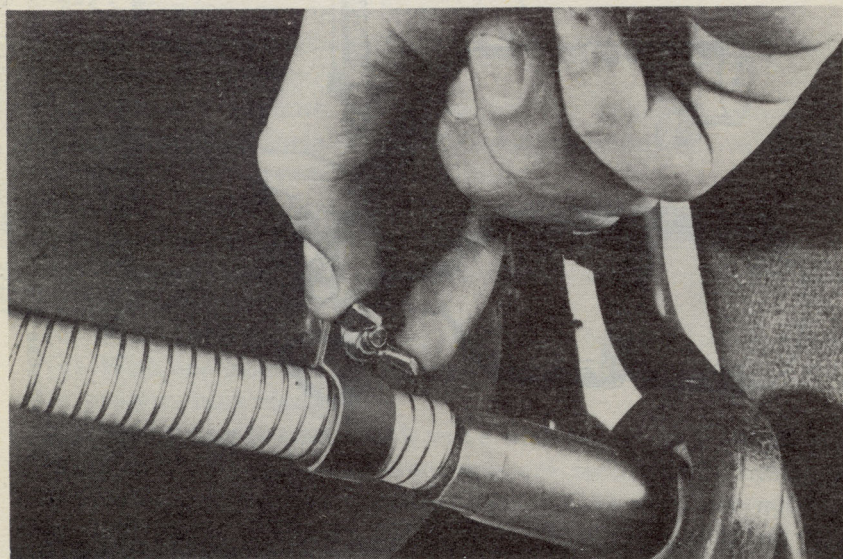


FIGURE 35.4. (Added.) Removing wing nut to free valve flexible shaft.

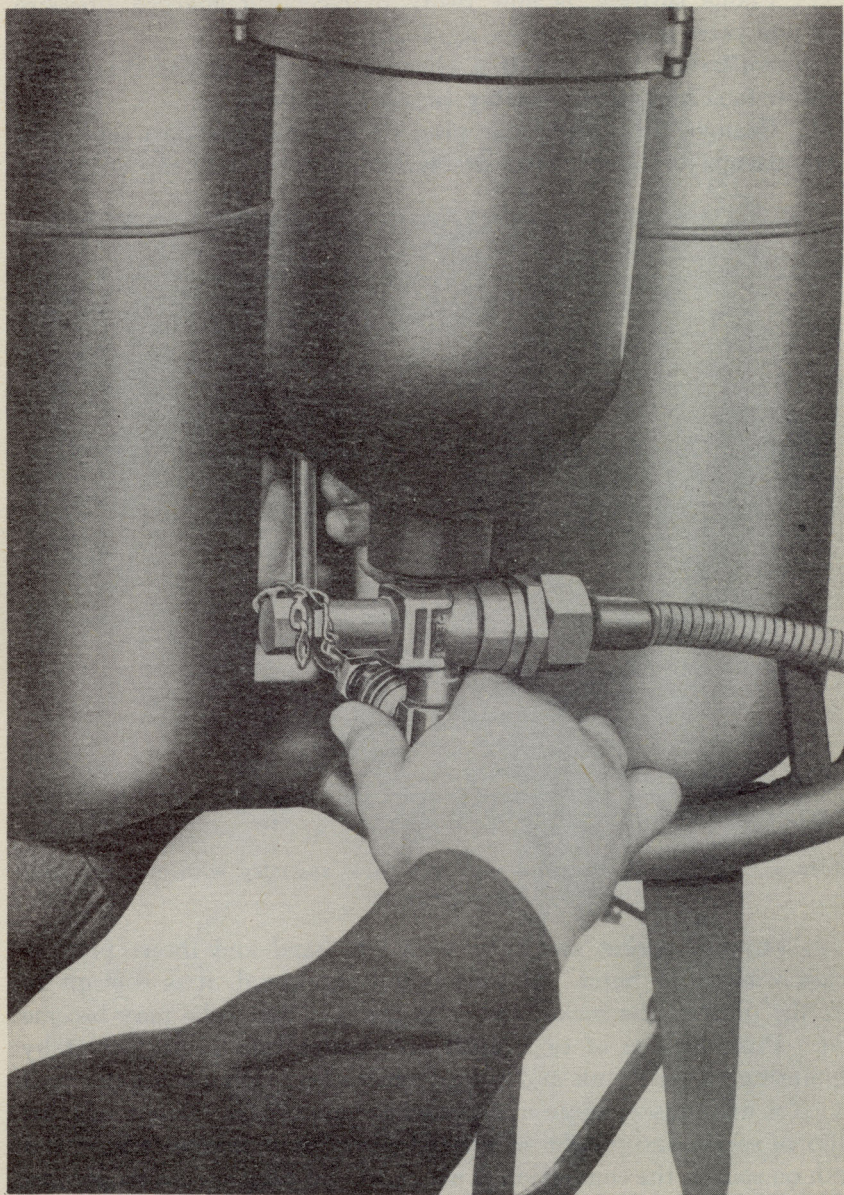


FIGURE 35.5. (Added.) Pushing knurled socket away from pressure tank, permitting pressure tank and valve assembly to be removed from tank group.

(6) Put cap as far as it will go over opening of the plug. (See fig. 35.6.) This prevents dust and other foreign matter from entering empty pressure tank.

(7) Flame thrower is now ready to receive a charged pressure tank and valve assembly. (See fig. 35.7.)

c. Installation. To install a charged or replacement detachable pressure tank and valve assembly, proceed as follows:

(1) Remove dust cap from plug of charged pressure tank and valve assembly. (Never open pressure-tank valve with cap on plug.)

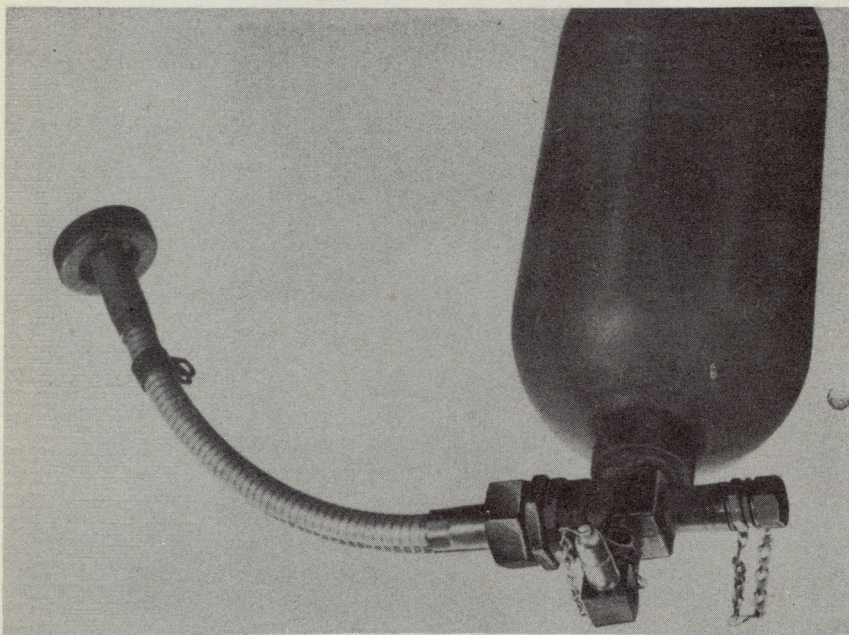


FIGURE 35.6. (Added.) Pressure tank and valve assembly with dust cap over plug opening.

(2) Support socket and tube with left hand and insert plug in socket with right hand. If tube is not supported, it is difficult to lock the plug in the socket and it is possible that tube may become bent. Press bottom of tank until plug snaps into socket. Test by attempting to pull tank and plug from socket. Plug must not pull out; if it does, insert again and press bottom of tank. Grasp knurled collar of socket and test for end play. If collar slides freely back and forth on socket, the connection is not tight and plug should be pressed in farther.

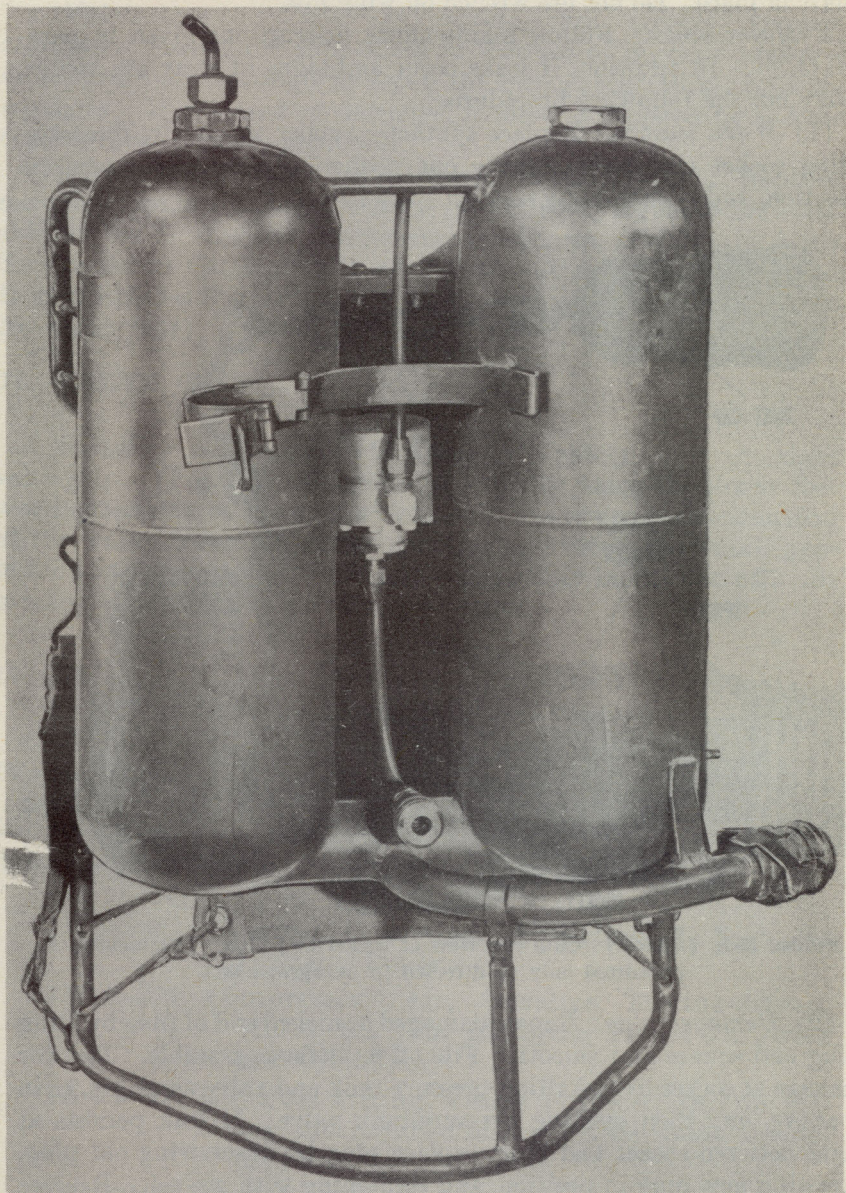


FIGURE 35.7. (Added.) Tank group, ready to receive a charged pressure tank and valve assembly.

(3) Replace small clamp (valve-stem clamp) over stud projecting from fuel tank, and screw wing nut on stud to secure valve flexible shaft in place. Do not use wrench on wing nut.

d. Maintenance. Follow maintenance instructions given in paragraph 66. In addition, if leaks occur and signs of wear are visible, carry out the following procedures:

(1) *Worn washer.* Replace synthetic rubber washer by disassembling socket (fig. 35.8), prying out washer, placing new washer in position, and reassembling socket.

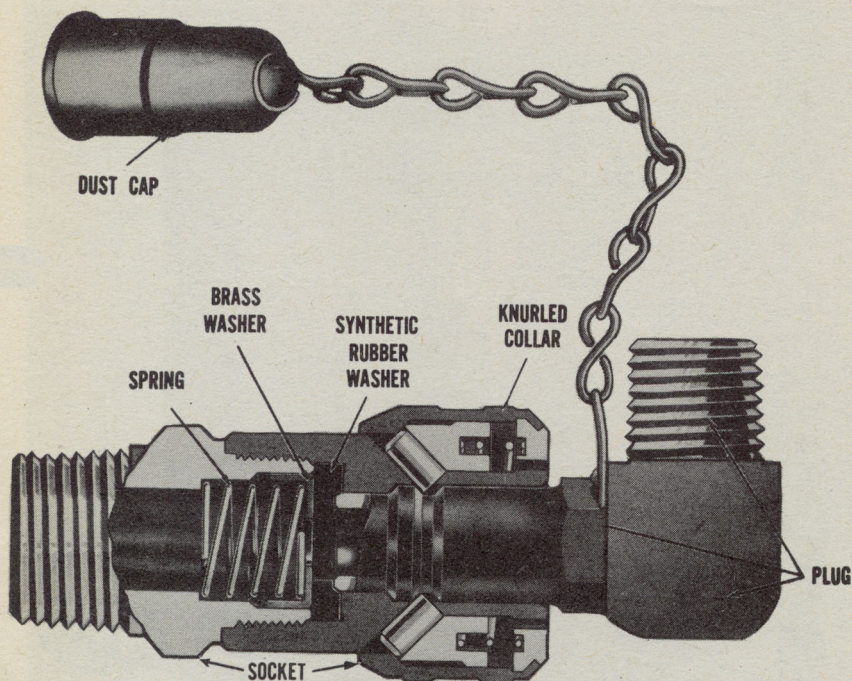


FIGURE 35.8. (Added.) Cutaway view of socket and plug. Disassembly is permitted only as directed in paragraph 66.1.

(2) *Damaged plug.* Repair damaged or nicked end of plug by filing plug end square and smooth. File off as little as possible. Test for leakage at socket by installing pressure tank and valve assembly, as in *c* above, and then opening pressure-tank valve. If leak persists at joint between socket and plug, replace plug by unscrewing old plug, screwing new plug in position, and tightening with wrench. Replace entire plug. Do not attempt to unscrew the cylindrical portion from the square portion.

67. PRESSURE REGULATOR.

* * * * *
e. Maintenance (Added). (1) *Spring type (Hoke) pressure regulator*. Except for adjustment to increase or decrease pressure, do not attempt to maintain or repair the spring type (Hoke) pressure regulator. If damaged or defective, it must be replaced by a dome type (Grove) pressure regulator.

(2) *Dome type (Grove) pressure regulator (B81-1-778)*. Replacement parts for maintaining the dome type (Grove) regulator are available for use by chemical maintenance companies, as shown in Army Service Forces Catalog CW 9-440114, List of All Service Parts and Higher Echelon Spare Parts for Flame Thrower, Portable, M2-2 (25 November 1944).

74. VALVE GRIP.

* * * * *
c. Installing valve grip. (1) Place grip safety * * * right valve grip. (Fig. 48.) Do not accidentally place the lower forward extension of the grip safety over the lower rear extension of the valve lever. If this overlapping occurs, the small projection at the bottom of the grip safety may be broken off. Be sure the * * * of grip safety.

77. SHIPMENT AND STORAGE.

* * * * *
c. Class of supply (Added). The portable flame thrower is a class IV supply item.

78. REFERENCES.

Reference pertaining to * * * flame throwers include:

- * * * * *
TM 9-850 Cleaning, Preserving, Lubricating * * * the Ordnance Department
TM 3-377, Compressor, Air, Gasoline Engine-driven, 7CFM, M1 (For Charging Flame Throwers and Cylinders)
TB CW 18, Kit, Fuel Filling, Flame Thrower, E6 (for filling mechanized and portable flame throwers)*
TB CW 20, Cleaning Interiors of Compressed Gas Cylinders, Tanks, and Accessories*
TB ENG 39, Safe Handling of Compressed Gases*

*Technical Bulletins are to be superseded by appropriate War Department manuals or changes to manuals.

ASF Catalog CW 7-440114, Organizational Spare Parts and Equipment: 1st and 2d Echelons: for Flame Thrower, Portable, M2-2 (25 November 1944)

ASF Catalog CW 9-440114, List of all Service Parts and Higher Echelon Spare Parts for Flame Thrower, Portable, M2-2

ASF Catalog CW 6-445115, Sets of Tools, Equipment, and Similar Material: Kit, Service, for Portable Flame Thrower, M2-2

ASF Catalog CW 9-445115, List of all Parts and Higher Echelon Spare Parts for Kit, Service, for Portable Flame Thrower, M2-2

FS 3-33, Portable Flame Thrower M2-2, Part 1, Nomenclature and Operation.

[AG 300.7 (11 Apr 45)]

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OFFICIAL:

J. A. ULIO

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The Adjutant General

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Chief of Staff

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Refer to FM 21-6 for explanation of distribution formula.