

TM 5-9619

TM 5-9619

WAR DEPARTMENT TECHNICAL MANUAL

ARCHIVES  
CG FILE AV 26 20KAN

APR 27 1953

BUILDING,

ACCESSION NO \_\_\_\_\_  
DUPLICATE

PREFABRICATED, N. P. WARD,  
STEEL SHEET WITH  
UTILITIES, TROPICAL

Instructor's Free Copy  
To be returned

OBSOLETE

Copy III

WAR DEPARTMENT

JULY 1945

BUILDING,  
PREFABRICATED, N. P. WARD,  
STEEL SHEET WITH  
UTILITIES, TROPICAL

---



WAR DEPARTMENT

JULY 1945

---

WAR DEPARTMENT  
WASHINGTON 25, D. C., 31 July 1945

TM 5-9619, Building, Prefabricated, N. P. Ward, Steel Sheet with Utilities,  
Tropical, is published for the information and guidance of all concerned.

[AG 300.7 (28 Jun 1945)]

BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

EDWARD F. WITSELL  
*Major General*  
*Acting The Adjutant General*

G. C. MARSHALL  
*Chief of Staff*

DISTRIBUTION:

AAF (4); AGF (10); ASF (2); T of Opn (2); Dept (10); Base Comd (2);  
Arm & Sv Bd (1) except Eng Bd (10); S Div ASF (1); Tech Sv (2)  
except OCE (20); SvC (5); PC&S (ZI) (1); PE Attn: Port Eng (2);  
Dep 5 (10) except Granite City (25); ASF Dep (Eng Sec) (10); Dist  
5 (2); Div Eng (2); Gen & Sp Sv Sch (2) except Eng Sch (10); Lib of  
Congress (2); USMA (2); ASF Tng C (Eng Sec) (2); D (2); T/O & E  
5-157 (2); 5-247 (6); 5-267 (2); 5-357 (2); 5-377 (2); 5-567 (2).

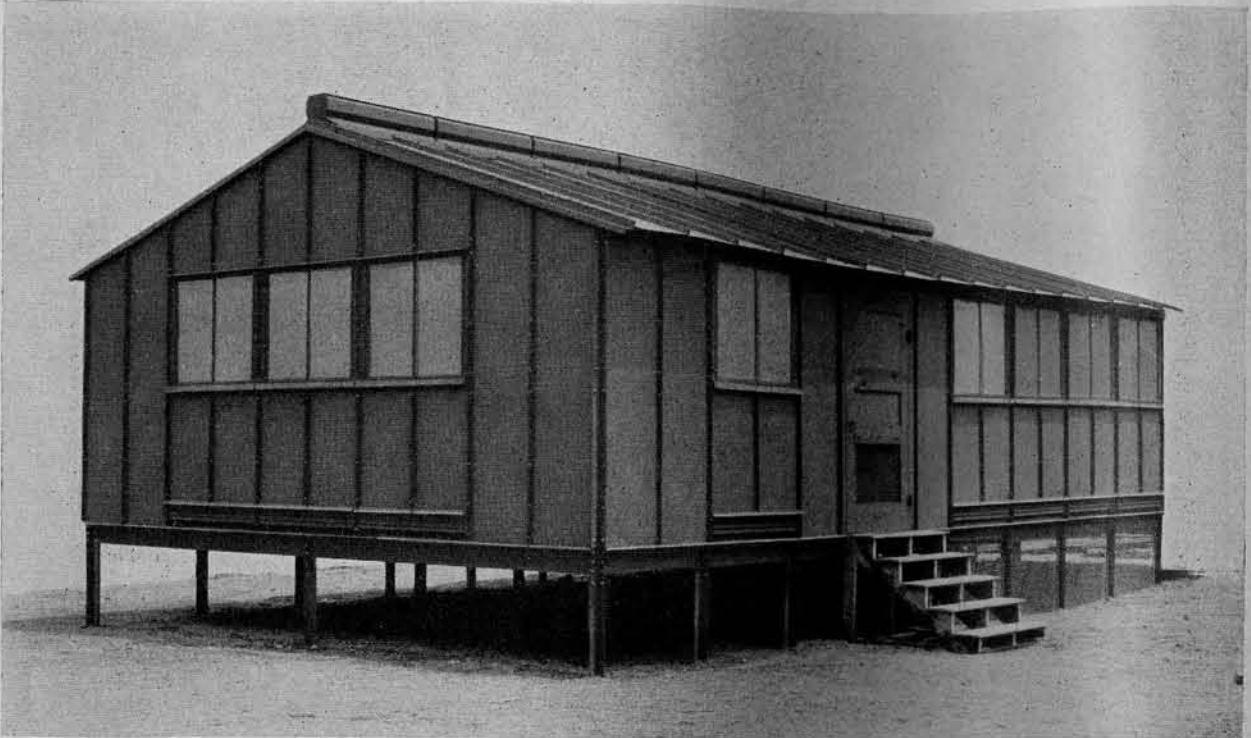
Refer to FM 21-6 for explanation of distribution formula.

## CONTENTS

Section		Paragraph	Page			Paragraph	Page
I. PRELIMINARY SURVEY.	Description of building.....	1	1	V. INTERIORS—WARD BUILDINGS.			
	General instructions for erection procedure.....	2	2				
II. LAYING OUT THE SITE.	General Instructions.....	3	5	VI. ERECTION PROCEDURE OF UTILITY BUILDING.			
III. PRINCIPLES OF ERECTION FOR KITCHEN AND OFFICE BUILDING.	Posts (foundations).....	4	8	General.....	35	31	
	Assembly and erection of floor joists.....	5	8	Foundation posts, joists and floor panels.....	36	31	
	Assembly of end wall units.....	6	11	Side walls and roof.....	37	31	
	Assembly of side wall units.....	7	13	Plumbing fixtures and pipes.....	38	31	
	Part assembly of truss and pre-erection preparation.....	8	15	Ceilings.....	39	31	
	Erection of walls.....	9	15	Cabinets and work tables.....	40	31	
	Erection of end gables.....	10	15	VII. ERECTION PROCEDURE FOR CORRIDORS.			
	Erection of trusses.....	11	15	General.....	41	38	
	Application of side wall panels at corners of building.....	12	15	Foundation posts, joists and purlins.....	42	38	
	Erection of trusses.....	13	17	Assembly of side wall units.....	43	38	
	Erection of roof rafters.....	14	17	Erection of framing panels.....	44	39	
	Application of roof panels.....	15	17	Interior finish.....	45	39	
	Ridge ventilators—Preerection assembly and erection.....	16	17	Electric wiring and fixtures.....	46	39	
	Application of wall panels.....	17	17	Roofing.....	47	39	
	Laying of plywood floors.....	18	19	Exterior finish.....	48	39	
	Installation of windows.....	19	19	VIII. HOSPITAL EQUIPMENT AND FURNITURE.			
	Installation of doors in end of buildings.....	20	19	Hospital equipment.....	49	41	
	Interior finish.....	21	19	Furniture—kitchen.....	50	41	
	Screens.....	22	20	Furniture—utility building.....	51	41	
	Partitions in kitchen and office building.....	23	20	IX. ELECTRIC AND PLUMBING.			
Fixtures.....	24	20	Electric wiring.....	52	42		
Step construction.....	25	20	Special switches.....	53	42		
IV. ERECTION PROCEDURE OF WARD BUILDINGS.			Plumbing and fixtures.....	54	42		
General.....	26	21	X. LIST OF PARTS AND MATERIALS.				
Foundation posts, joists and purlins.....	27	21	Kitchen—Office building.....	55	43		
Laying of floor.....	28	21	Ward building.....	56	44		
Assembly of end and side wall units.....	29	23	Interior of Ward building.....	57	44		
Erection of end, side wall units, and part of trusses.....	30	23	Utility building.....	58	45		
Application of finish of exterior walls.....	31	23	Interior of Utility building.....	59	46		
Erection of roof.....	32	25	Corridors.....	60	47		
			Other material.....	61	48		
			Plumbing material.....	62	50		
			Electric material.....	63	54		
			XI. MAINTENANCE, DISMANTLING AND REERECTION				
			Maintenance.....	64	55		
			Dismantling.....	65	55		
			Reerection.....	66	55		

Section I  
**PRELIMINARY SURVEY**

---



*Completed end of ward building.*

**1. Description of Building.**

*a.* This building is to be used for neuropsychiatric patients and consists of several metal buildings connected by corridors. The buildings and the partitions in the wards are metal, factory bent to shapes required, and are shipped in packages ready for assembly, first into sections and then into a building.

*b.* The component parts are angle-shaped posts, angle-shaped uprights and roof rafters, and covered on the exterior with sheet metal, all factory punched to permit bolting together. The erection is simple when precaution is taken that the various parts are placed in the proper position and all the holes of pieces to be bolted together, are aligned before inserting the bolts or screws.

*c.* The floor in the small building and corridors

are plywood. The floors in the ward buildings are also plywood, but in the single rooms are covered with canvas. The utility building floor is concrete.

*d.* The interior finish in the ward and utility buildings is metal, including the partitions, and in the office building is of a wall board covered by metal strips.

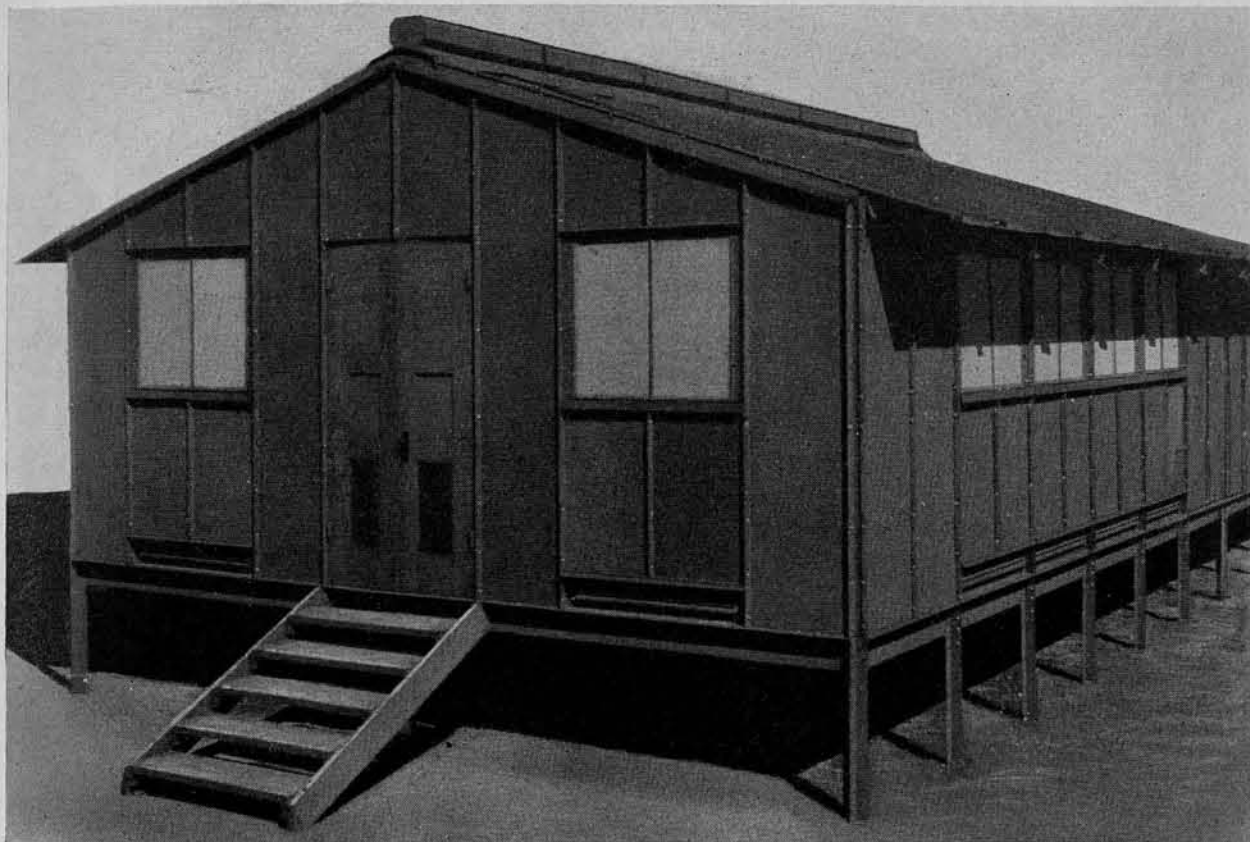
*e.* The plumbing, electric wiring, and materials for cabinets, etc., except equipment furnished by the Surgeon General's Office, for the kitchen and office building are furnished under a bill of materials and should be constructed and installed in accordance with accepted standard practices. The plumbing lines, plumbing fixtures, electric wiring, cabinets, etc., for the utility buildings are packaged with the building and should be installed in accordance with the details shown on the plates for these items.

## 2. General Instructions for Erection Procedure.

a. A complete unit is composed of one steel building 20 feet by 24 feet kitchen and office building, one 20 feet by 32 feet utility building, two steel 20 feet by 128 feet ward buildings (right and left), and two covered walks connecting the buildings.

b. The kitchen and office building is based on the standards for a steel barracks, and the erection of

e. Check with shipping list to be certain that all the packages are available for immediate use. The lumber etc., is shipped separate and not included in the packages. It is suggested that, as the various packages are uncrated, the contents be segregated into groups comprising all material and parts bearing similar markings to facilitate locating them as required. Care should be used in uncrating the packages so that the crating lumber is not destroyed, as this material is used for the step construction, tem-



*Completed end of office building.*

these buildings can be expedited if several of the component parts are preerection assembled as described in section III, of this text.

c. The two larger buildings and utility building are similar to the standard for barracks but vary in the item markings and other details because of the special requirements for the interior finish. Departures from the erection of a standard building and other pertinent information is described in section IV and section VI.

d. The two covered walls are also constructed of metal and are described in section VII.

porary bracing, and scaffolding. Section X indicates the material required for each section or unit of the building.

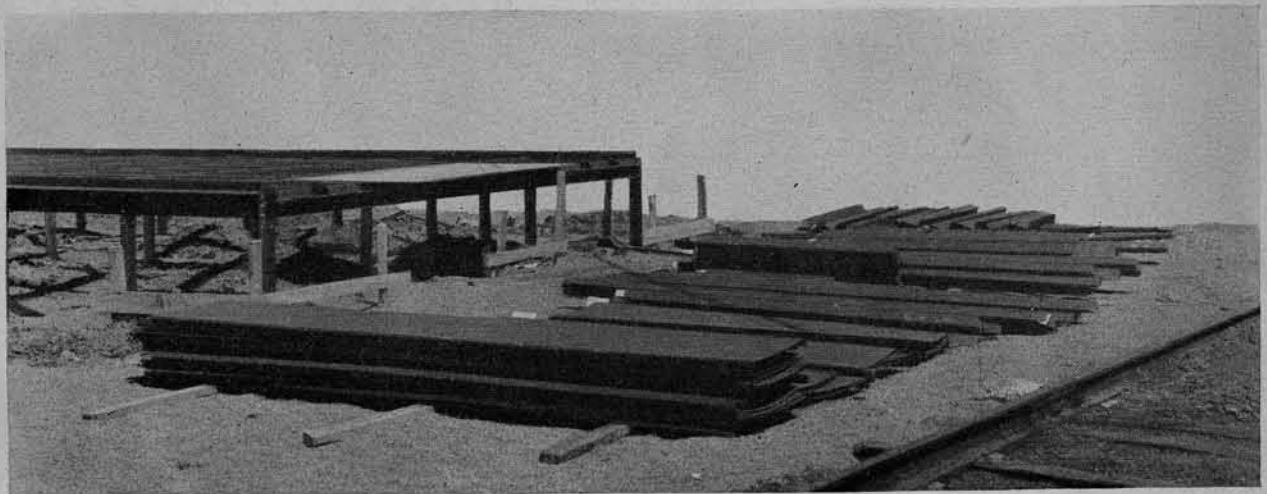
f. It is recommended that where preerection assembly is possible the sections be so assembled that the exterior or outside face is up or toward the workers. Bolts of  $\frac{3}{8}$ -inch length and sheet metal screws are used mostly for assembly and erection and can be installed with wrenches, screw drivers, drift pins, and hammers. Caution should be exercised that all nuts are started so that the slightly rounded head will be against the metal members and that the nut

rather than the head of the bolt be tightened sufficiently to bring the parts together without damage. The drive screws with smooth pilot point should be driven in by hammer only sufficiently to pierce the

metal and driven home by means of a screw driver. g. The plates Nos. 1 to 37 show details of plan-erection and assembly of the special features of the wards-utility and corridors.



*Completed interior of office building before installing partitions.*



*Figure 1. Materials segregated into groups according to markings.*

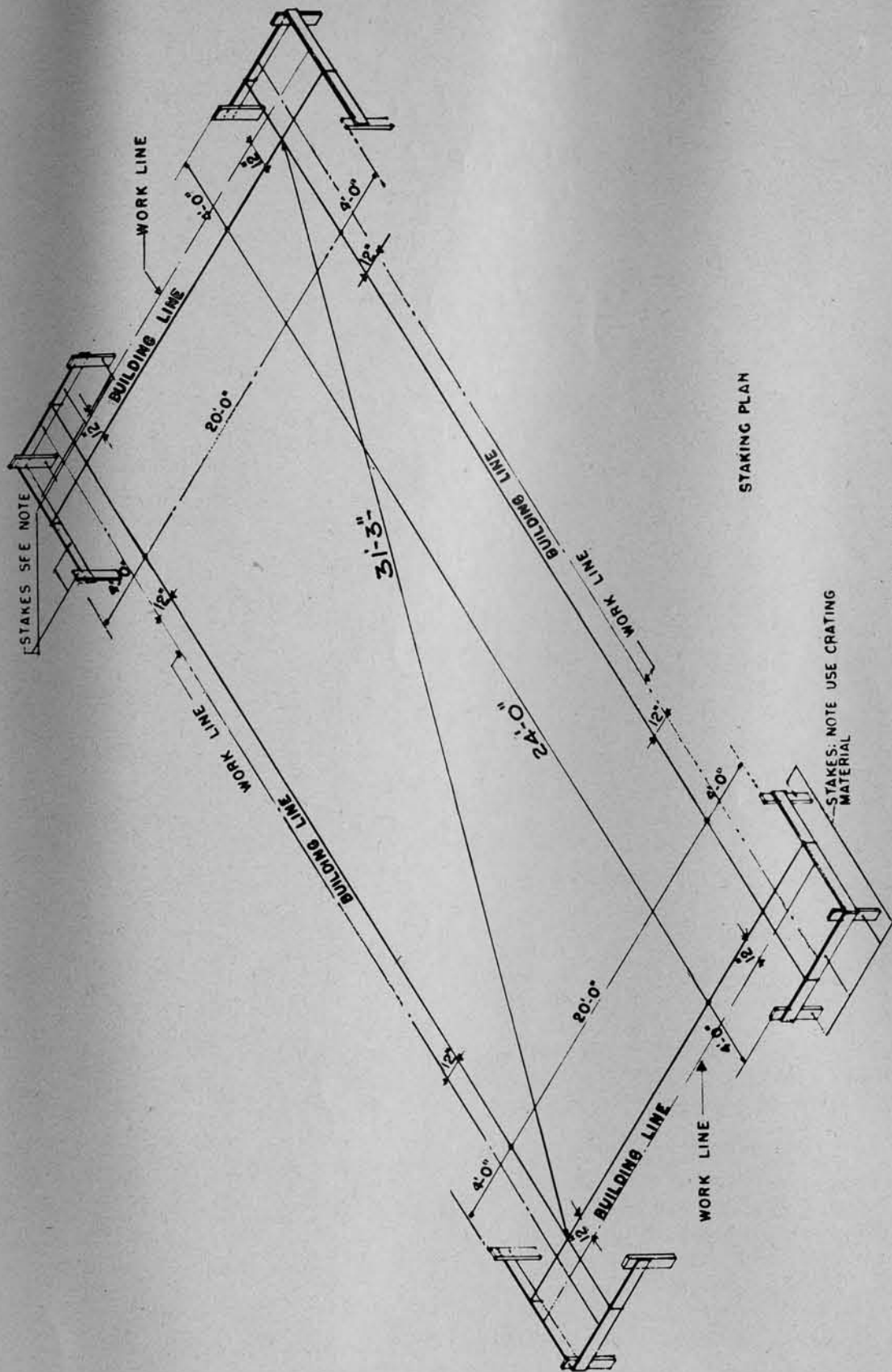


Figure 2. Lay-out for kitchen and office building.



## Section II

# LAYING OUT THE SITE

### 3. General Instructions (fig. 2).

*a.* In laying out the corners of the foundation posts, sufficient corner batter boards to which lines are tied should be made from crating material. Figure 3 shows one corner set up with batter boards and the staples driven into the ground. The batter boards should be located approximately 4 feet beyond what will be the outside wall of the building.

*b.* If a transit is not available a lay-out is illustrated for the two smaller buildings. Set up two parallel lines 20 feet apart, fastened to the batter boards. These lines can be placed at a height which will represent the height of the posts above grade. Cross these two lines with two other lines 24 feet apart. Check carefully for squareness by measuring the diagonal where the lines cross. The two diagonal dimensions must be exactly equal, otherwise the building will be out of square. It is suggested that the batter board be permanently marked to retain established position of lines for future reference.

*c.* The lay-outs for the larger buildings is similarly accomplished.

*d.* The locations of all posts and holes can be obtained from plate No. 1.

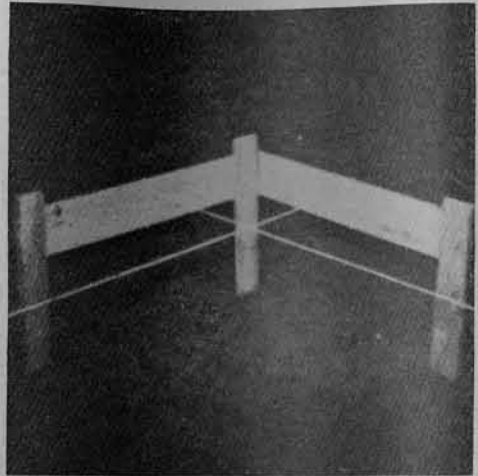


Figure 3. Corner batter boards.

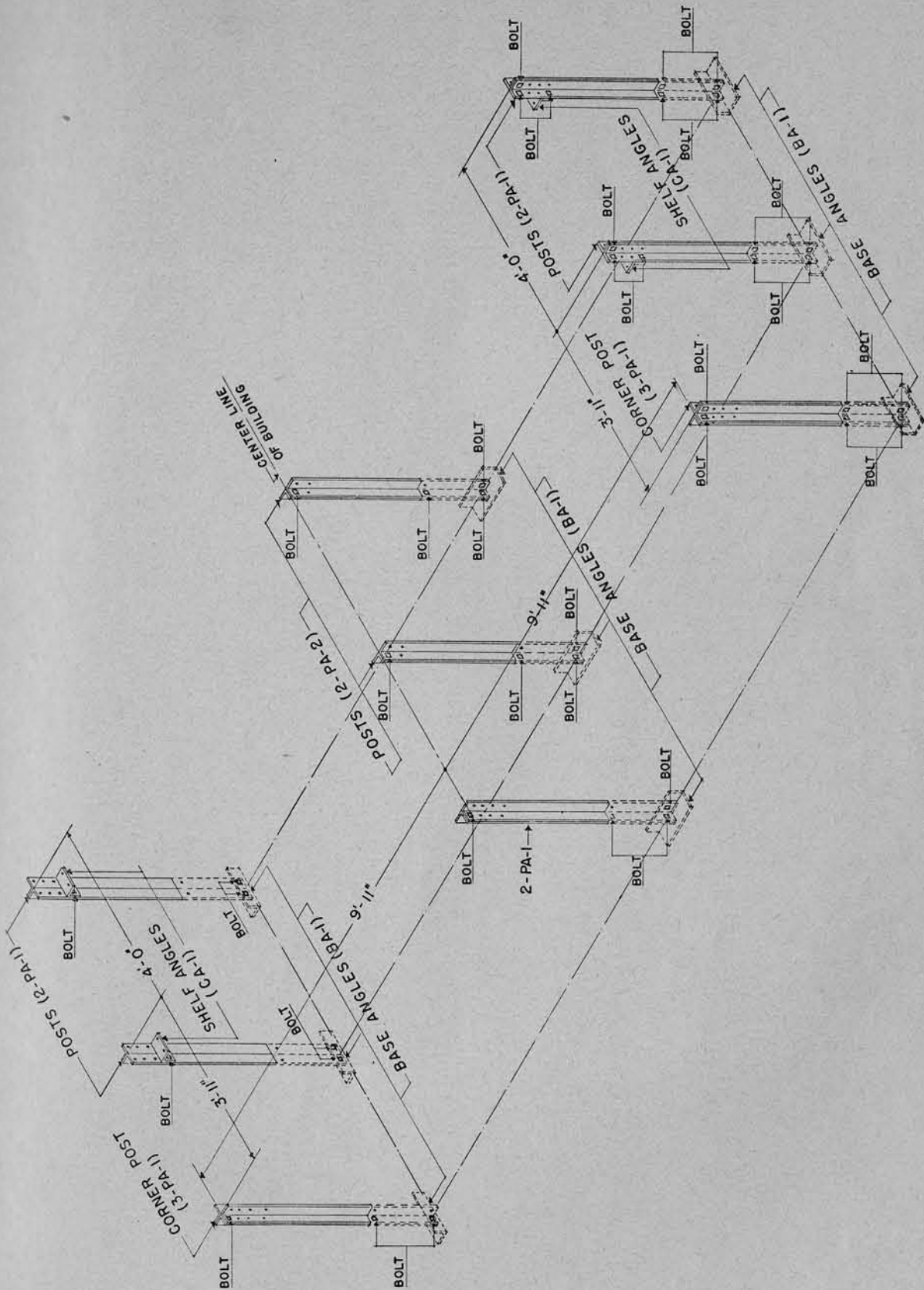


Figure 4. Foundation posts at ends of building.

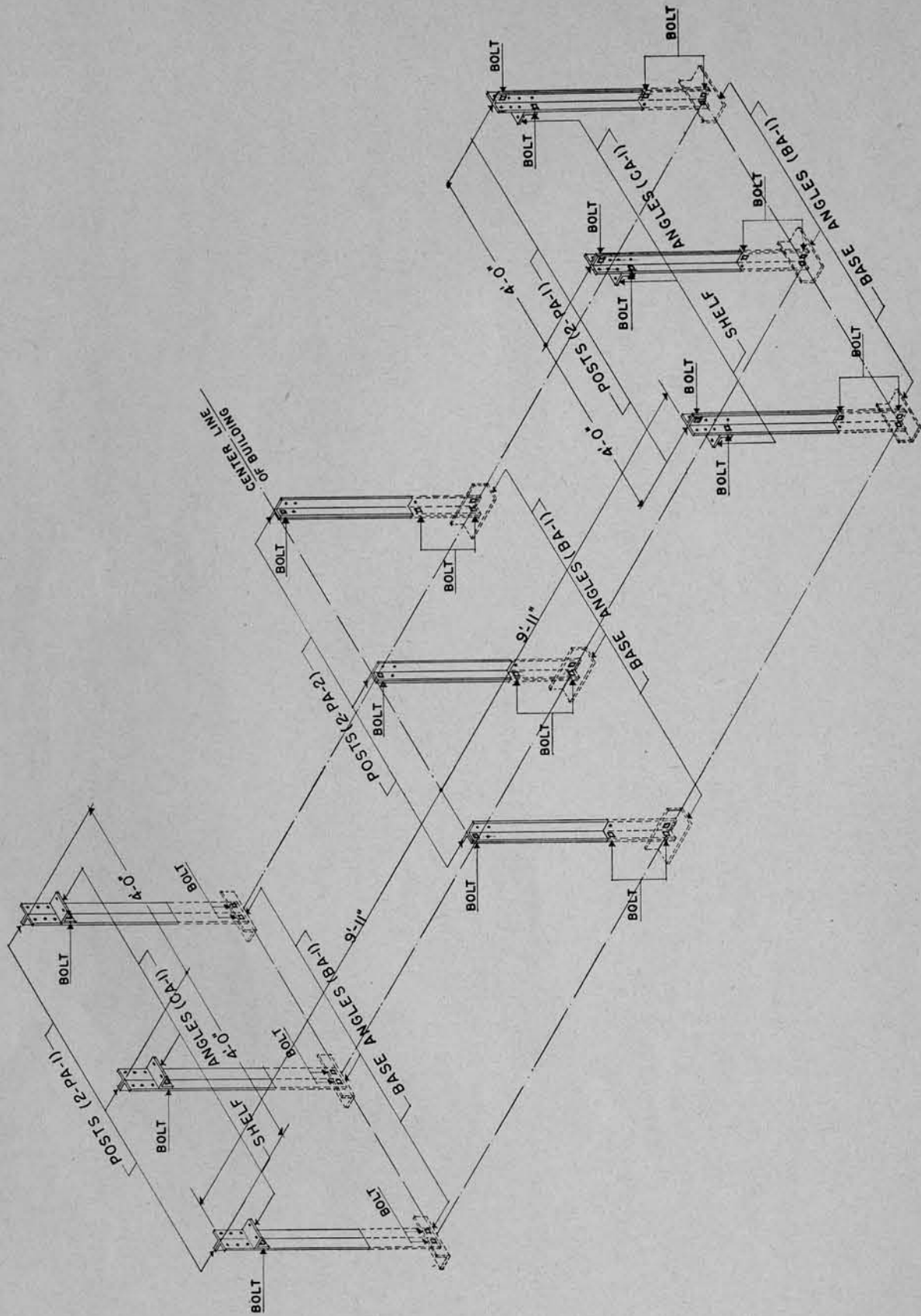


Figure 5. Foundation posts—Typical bay.

### Section III

## PRINCIPLES OF ERECTION FOR KITCHEN AND OFFICE BUILDING

#### 4. Posts (Foundations).

a. As the posts are approximately 4 feet 3 inches and 4 feet 6 inches long, holes should be dug after a point has been established that will be the finished floor level, and the bottom of the holes should be leveled at such varying depths as may be necessary to assure that the tops of all posts will be level. Caution should be exercised that the holes are not dug deeper than necessary, and, if they should be dug too deep, a suitable hard soil or gravel should be used to bring the bottom up to the proper level.

b. The back or inside face of the exterior posts will be located approximately 1 inch from the established building lines.

c. The exterior side wall posts are assembled with two PA-1's and with a base angle BA-1 at bottom and shelf angle CA-1 at top bolted tightly into position. (See figs. 4, 5, and 6.)

d. The interior posts are assembled of two mem-

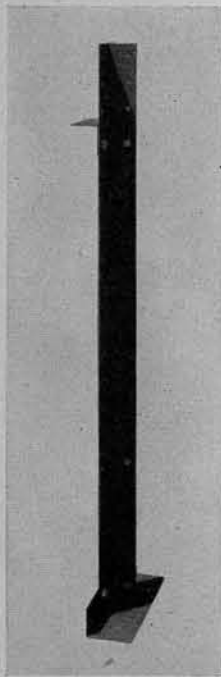


Figure 6. Side wall post.

bers marked PA-2, with one base angle BA-1, bolted tightly into position. (See figs. 4 and 5.)

e. The exterior end wall posts are assembled in a similar manner as the sidewall post, except that no shelf angle CA-1 is attached. (See fig. 4.)

f. The corner posts are assembled similar to the

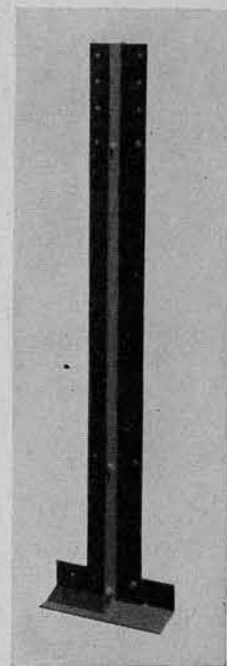


Figure 7. Corner post.

side wall except that three PA-1's are used. Two PA-1's are assembled as for a side wall post and the third PA-1 is fastened to the back of the base angle. (See figs. 4 and 7.)

#### 5. Assembly and Erection of Floor Joists.

a. Between the posts at side walls place the side wall girders in the following order: ZJ-4L (dimension of top holes of  $1\frac{3}{4}$  inches, 9 inches toward the corner post), ZJ-3, and ZJ-4R. (See fig. 7.)

b. Assemble joists for ends of buildings by fastening JA-2L to ZJ-2L and JA-2R to ZJ-2R. Note on ZJ-2L and ZJ-2R, the six holes close together

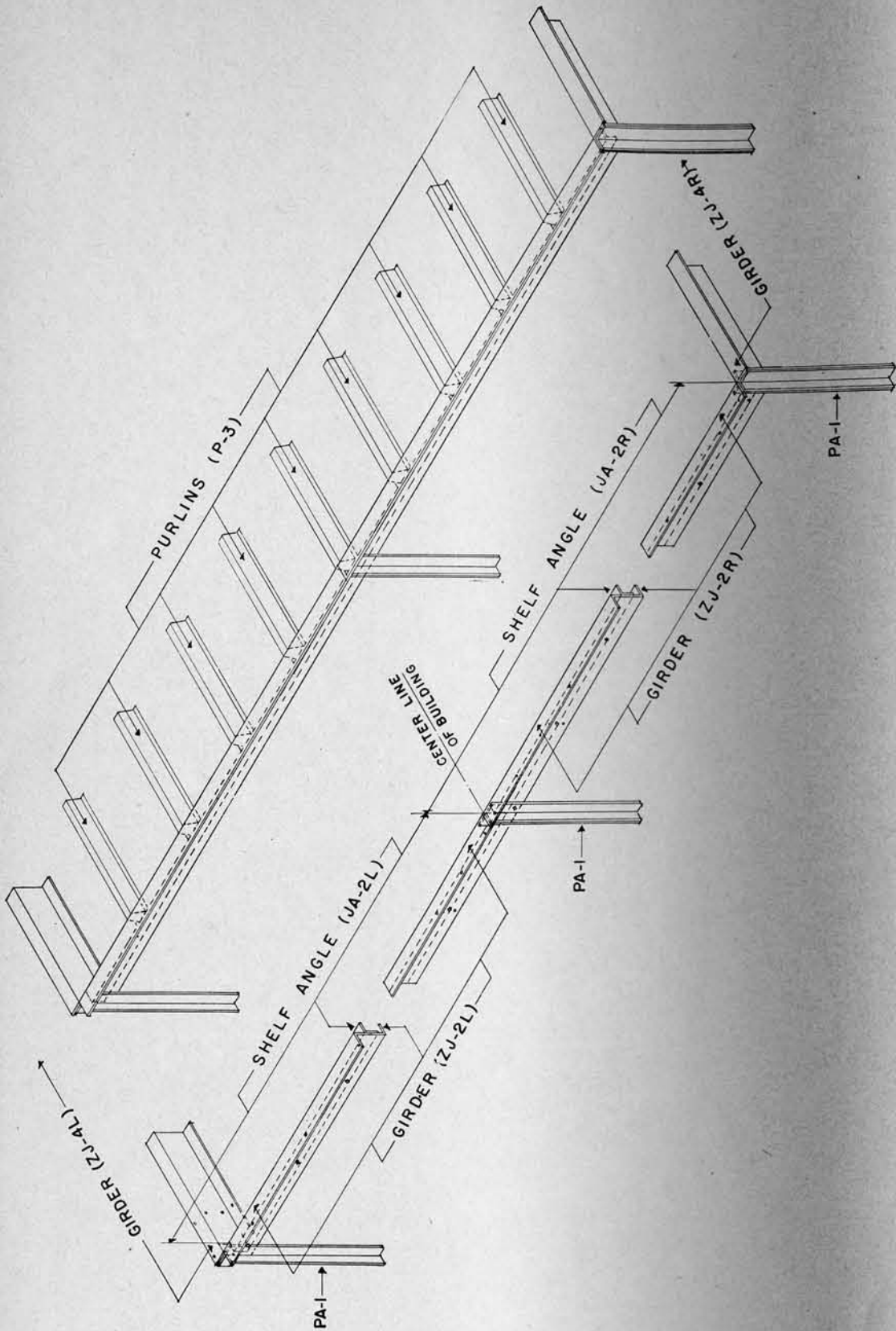


Figure 8. Floor framing at ends of building.

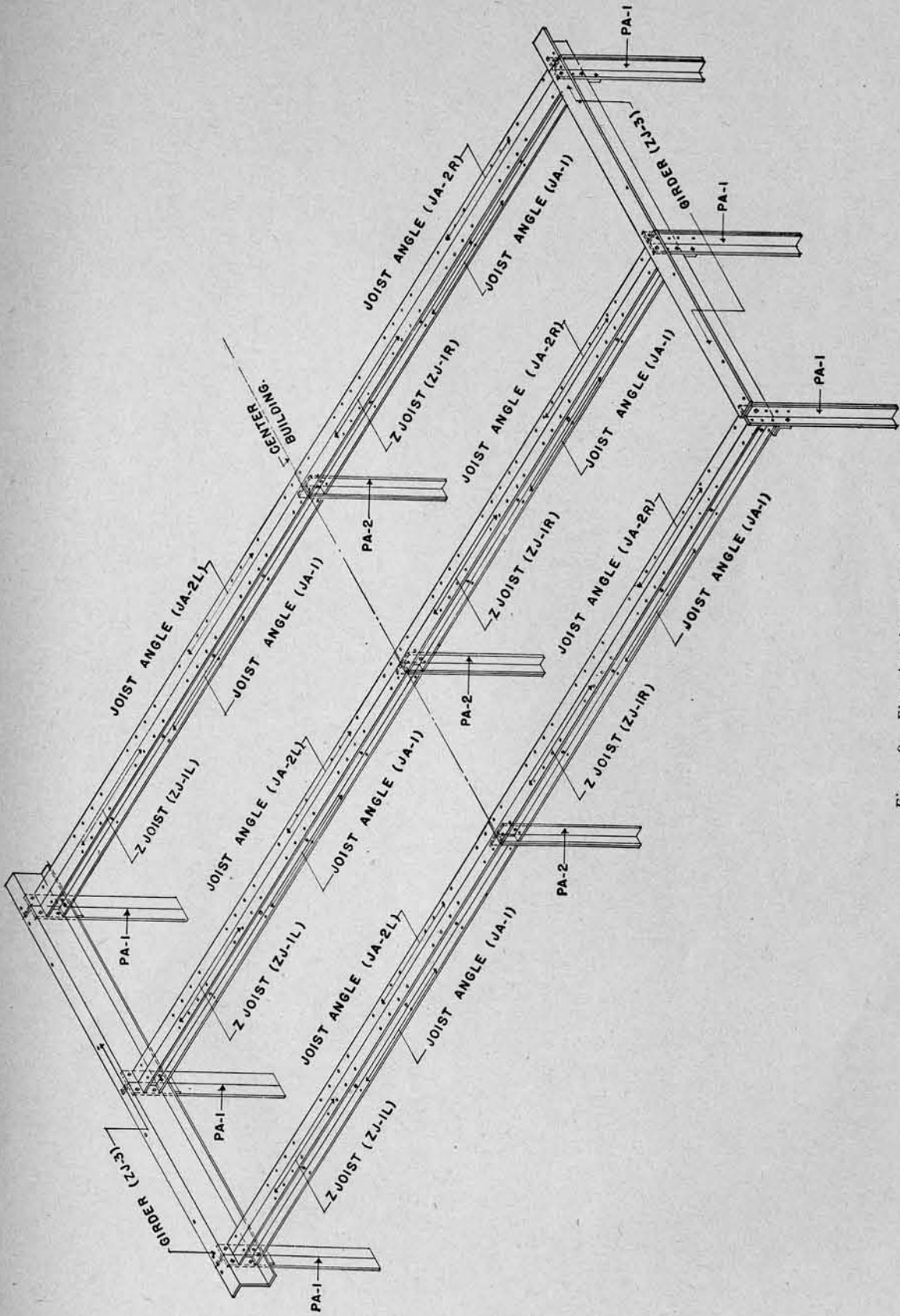


Figure 9. Floor framing typical bay.

are to the center of the building. Do not place bolts in end holes. (See fig. 8.)

c. Assemble intermediate 10-foot joists by bolting JA-2R and JA-1 on opposite sides of ZJ-1R.

*Note.* Do not place bolts in end which will be at the center of the building and on ZJ-1R the end (on which the first holes in the top series of holes is approximately 5" from the end) must go towards the outside of the building. (See fig. 9.)

d. The joist ZJ-1L is similarly assembled.

e. When all the cross joists have been assembled they should be placed into position by bolting them

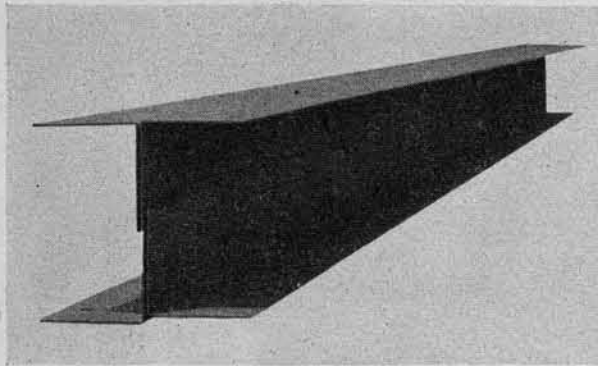


Figure 10. Joist assembly.

to the posts. The intermediate cross joists must be so placed that all the angles JA-1 are toward the same end of the building.

f. Place purlins P-3 for each end unit of building starting on center line of building and progressing toward the sides at 2 feet 0 inches spacings. P-2 purlins are used for intermediate units. Securely fasten purlins to the joists with self tapping sheet metal screws fitting into the series of holes on the top

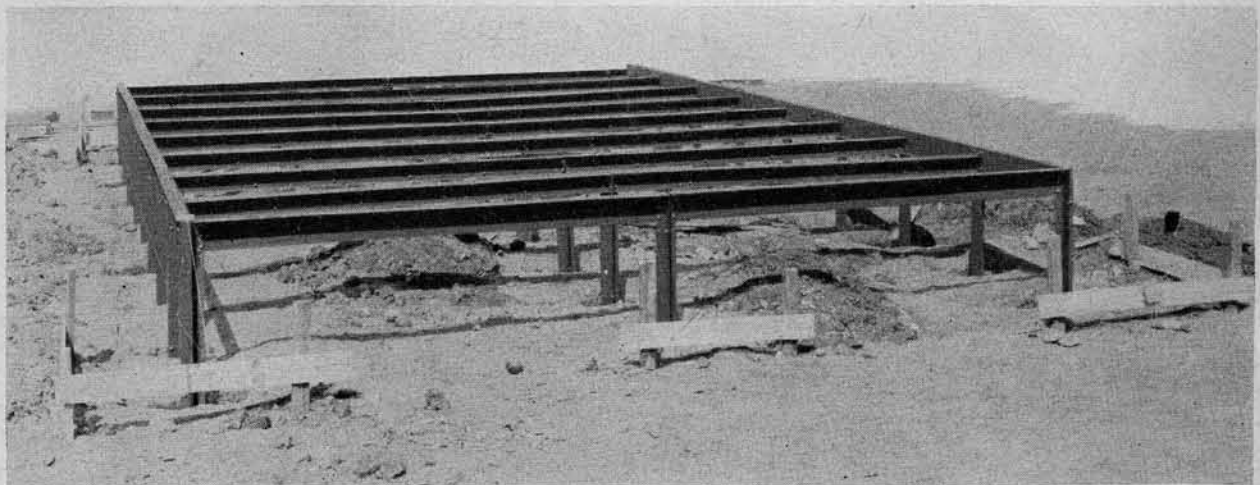


Figure 11. Girders and joists in place.

of ZJ-1R/L and angle JA-2L/R and at building ends. (See figs. 8, 9, and 12.)

g. Locate purlins P-1 on top of the intermediate joists and fasten with four screws.

h. Tighten all nuts securely as posts and joists are aligned, squared, and leveled. Check entire building for squareness and back-fill post holes.

i. By placing the larger pieces of the crating material across these purlins and joists a working platform can be made for the assembly of the wall panels.

## 6. Assembly of End Wall Units (fig. 13).

a. The end walls are preerection assembled by bolting sill SA-4L (dimensions of holes from corner post are 3 inches, 9 inches, 2 feet 0 inches, etc.) to the bottom of uprights, one WA-7, two WA-2, two WA-4 and one WA-5. These upright members have the first two holes 2" and 8 $\frac{3}{4}$ " from the bottom. A louver unit is included where a window occurs and is fastened to WA-2 and WA-4 at the time that the sill angle, SA-4L is bolted. Insert member T-10 between the angle SA-4L and the uprights before tightening.

b. The louver unit is assembled by fastening, with screws, the louver plates LP-1 to the three louver vanes LV-1. Caution should be used so that the screw heads are to the inside of building. (See fig. 13D.)

c. The window members WJ-1 should be fastened to uprights WA-2 and WA-4 with the bolt nuts to the inside of the building. Fasten window sill WS-1 and T-9 in position and place window head WH-1, flashing strip, WF-1, and BC-3 to

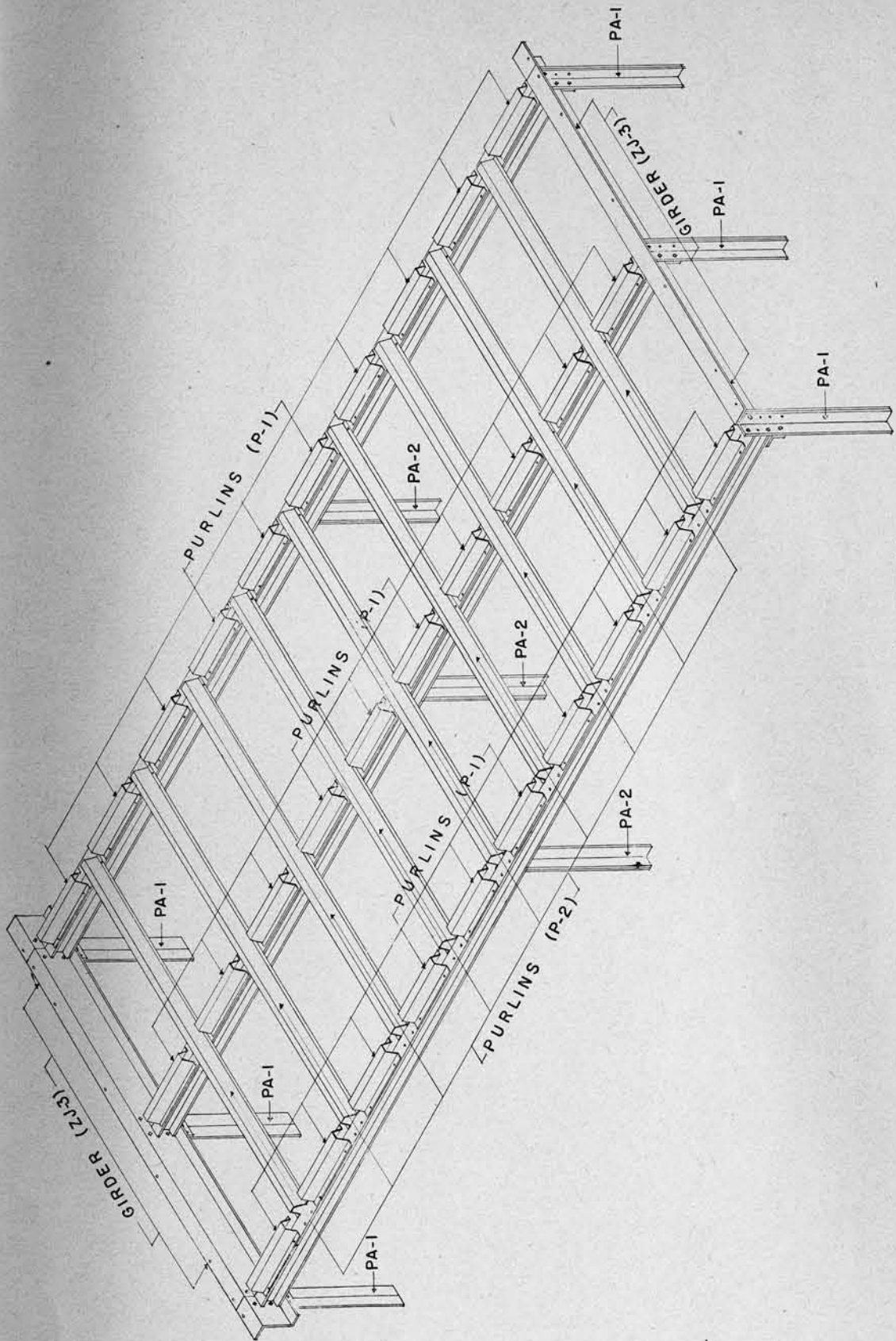


Figure 12. Floor purlins—Typical bay.



uprights, inserting T-10 between the uprights and BC-3. (See figs. 13, 13A, and 13E.)

d. Approximately 9 inches from bottom of uprights fasten louver angle LA-1 and T-11. In the center between WS-1 and LA-1 fasten two WA-8. (See fig. 13.)

e. Slide louver screens between T-10 and T-11 and apply screen clip, SC-1, with two bolts.

f. The unit for the portion on the other side of door is similarly assembled using SA-4R in lieu of the SA-4L.

## 7. Assembly of Side Wall Units.

a. The side walls are preerection assembled in units approximately 8 feet 0 inches long in the following manner:

For the units next to the corners, fasten an SA-4R (dimension of holes 3 inches, 9 inches, etc. toward corner posts) to the bottom of uprights WA-7, two WA-7, two WA-7 and one WA-6R, inserting T-10 between the angle and the uprights. A louver unit is included where windows occur. (See fig. 13D)

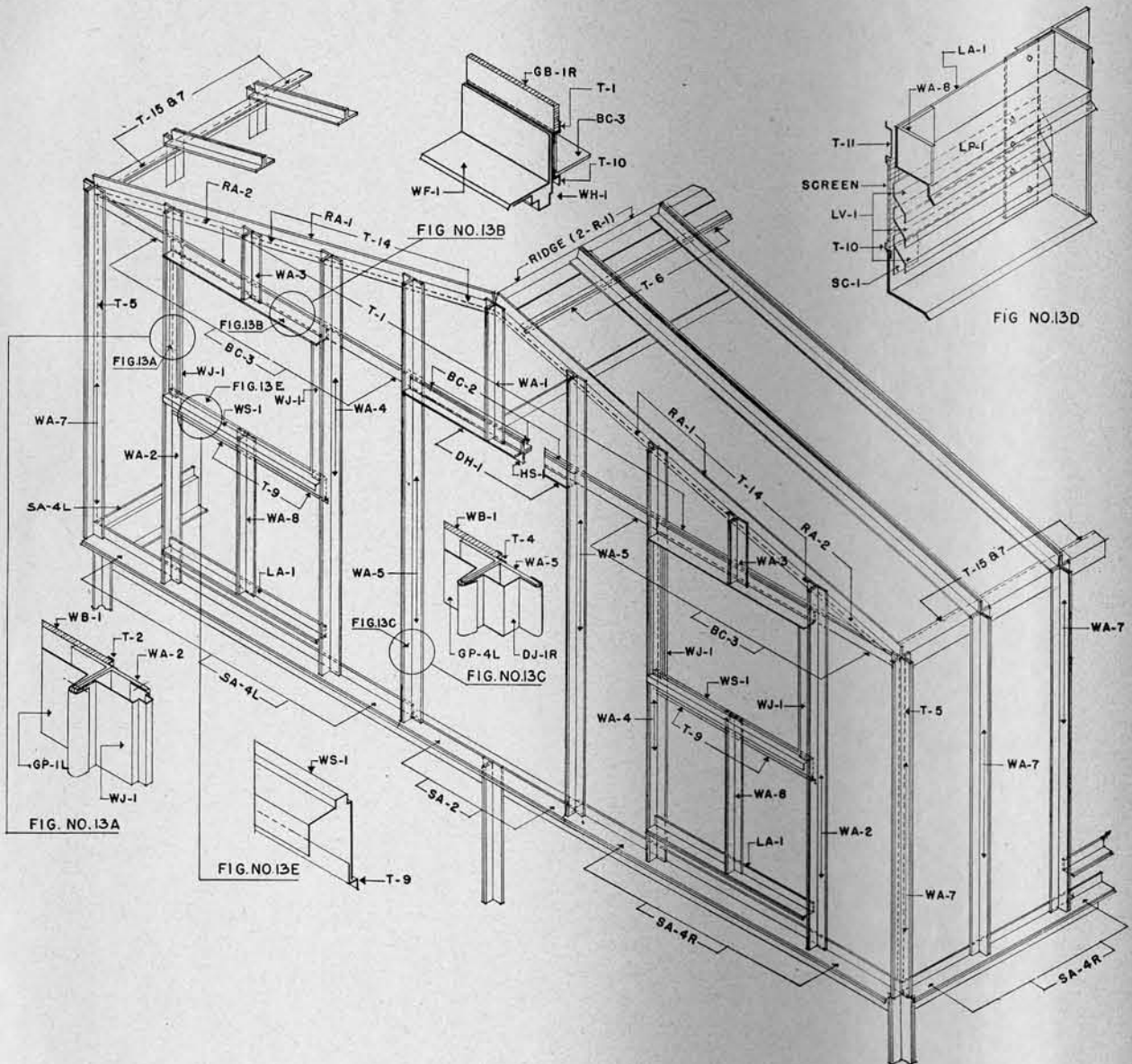


Figure 13. End wall framing.

for assembly.) At the top of these uprights is an eave angle, EA-1, but before attaching this angle, members of the windows must be placed.

b. Bolt window members WJ-1 R/L on uprights so that bolt nuts will be on the inside of the building. Fasten window sill WS-1 and T-9 between the WA-6L and the first WA-7 at bottom of attached window jambs. Attach window head WH-1 and eave angle EA-1 to the top of the uprights. Insert T-8 before final tightening. (See fig. 14A.)

c. Approximately 9 inches from the bottom fasten louver angle LA-1 with member T-11 on the inside face. Between WS-1 and LA-1 at the center, bolt two WA-8. (See fig. 14.)

d. It will be noted that the first unit directly across the building is similarly assembled using members with SA-4L and WA-6L in lieu of SA-4L and WA-6R mentioned above. (See fig. 13.)

e. Slide louver screens between T-10 and T-11 and apply screen clip, SC-1, with two bolts.

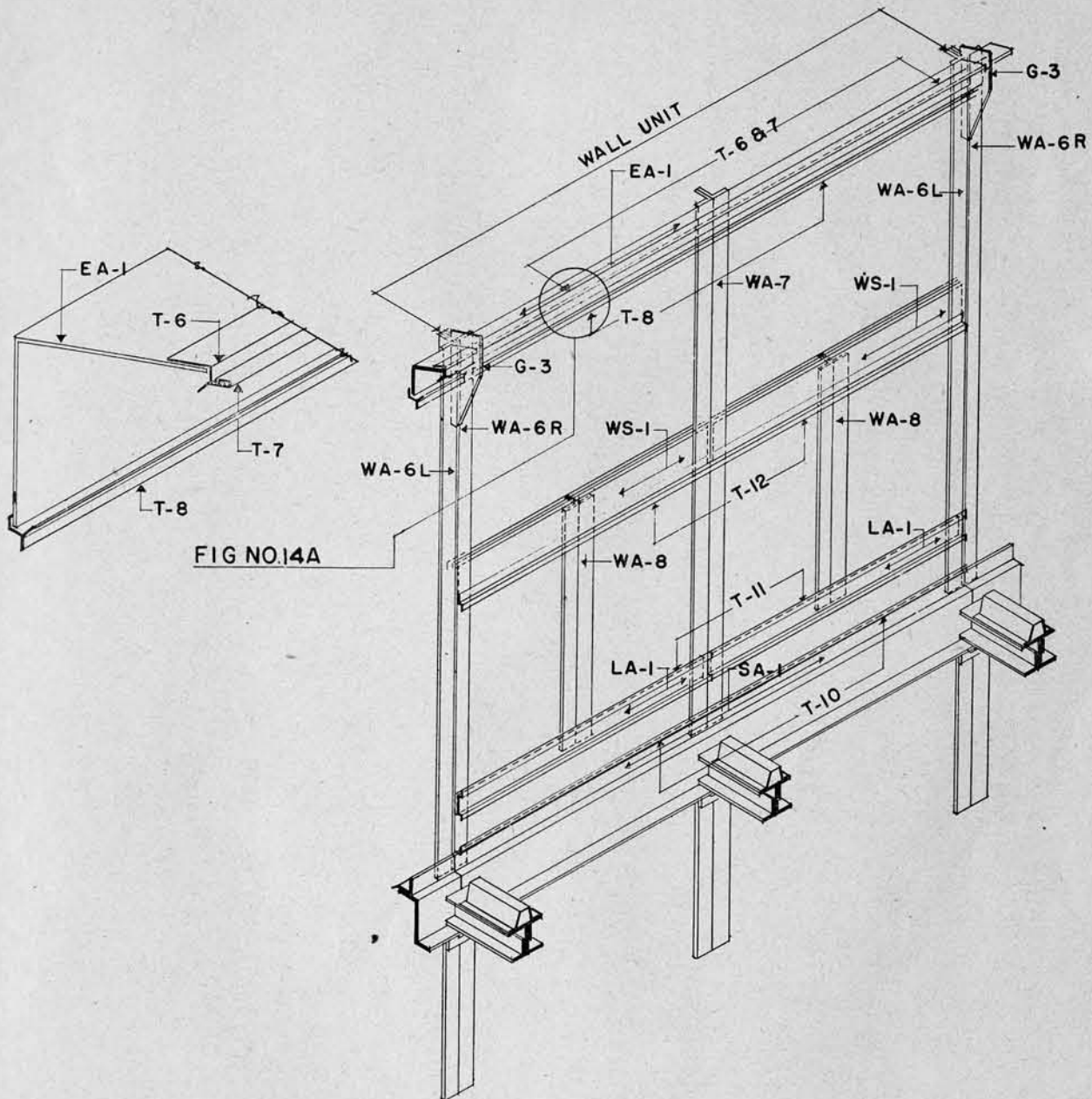


Figure 14. Typical side wall framing.

f. The intermediate wall units are assembled similarly as follows:

Fasten a sill angle SA-1 to the bottom of uprights WA-6R, two WA-7 and WA-6L with louver unit. Window members are placed similar to *b* above using T-12 in lieu of T-9. Place eave angle EA-1 with T-8, louver angle LA-1 with T-11 and members WA-8. (See figs. 14 and 17.)

g. The wall units as completed should be placed at the points where they will be erected.

## 8. Part Assembly of Truss and Preerection Preparation.

a. While the wall sections are being assembled, the bottom chord of the trusses should be assembled, as follows:

The bottom chord is comprised of four BC-1 and one gusset plate G-1 and G-2. Bolt two BC-1 together back to back and connect the two sections into one member approximately 20 feet long by using gusset plate G-1 as a connector. Fasten gusset plate G-2 on bottom at the same point, figure 15.

*Note.* Place bolts in G-2 in the extreme end holes only and place G-2 in proper position to receive TT-1, which changes position between trusses alternately with each succeeding truss.

b. Before erection is started, place gusset plate G-3 at each point around building where a truss will occur in order to have it on hand. Also have members TT-1 and the assembled bottom truss chords on hand. It is also recommended that a temporary platform be constructed from the crating material and that a temporary support also be made from crating material to be placed under gusset plate G-2 to support the bottom chord during erection. See figure 25 for suggested size and shape of platforms.

## 9. Erection of Walls.

a. The erection of the wall units should be started on both sides and from one end of the building and progress toward the other end in preference to starting both ends toward the middle.

b. The end wall units are raised into position and immediately bolt the sill to the joist below. A WA-7 should be loosely bolted at each corner to assist in keeping the end units and the first side wall units together. Temporary bracing from the crating material may be used to brace the two units. Place the BC-2 fastened at the same height as the erected BC-3 to a WA-5 on each side and join the two end units temporarily with loose bolts. Place

HS-1 to the bottom of BC-2, DH-1 to outside of BC-2 and to upright on each side of door opening. (See fig. 13.)

c. Raise the first side wall units on each side of building and temporarily bolt the loose corner WA-7 to the end. Immediately bolt the sill to the joist below. (See fig. 13.)

d. As the third unit on each side of the building is raised, place gusset plate G-3 between the WA-6 uprights and bolt the gusset and two wall units together. Before final tightening of these bolts be certain the two holes in G-3 that receive the bottom chord of the truss are squared with the uprights. (See fig. 14.)

e. When the two units and gusset G-3 have been securely bolted, the assembled bottom chord of the truss should be bolted to G-3 on each side of the building. The temporary support should be placed under the center of the bottom chord. The truss tie TT-1 should be bolted from BC-2 on end wall to the bottom chord.

f. Continue erecting side wall units with gussets, bottom chords, and ties until entire building and opposite end wall are erected.

## 10. Erection of End Gables.

Bolt end roof angle RA-2 R/L and T-14 in position on WA-2, WA-4, and WA-5. Insert and bolt in place members WA-3 between RA-2 and BC-3, and WA-1 between RA and BC-2, loosening previously placed bolts sufficiently to insert T-1. Bolt RA-1 on top of RA-2 R/L. (See fig. 13.)

## 11. Erection of Trusses.

With the temporary support again in place under the center of the previously erected bottom chord, fasten the two truss angles TT-2 to gusset G-1. From the end of building place the two ridge angles R-1. When the R-1's are in place apply and bolt TA-1 R/L and also to gusset plate G-3, inserting eave flashing EF-1 and T-15 R/L before bolting to the eave angle EA-1. (See figs. 13 and 15.)

## 12. Application of Side Wall Panels at Corners of Building.

Before proceeding further with the roof framing, the building should be braced by applying some of the side wall and end wall panels. Place into position a WP-2 at a right hand exterior corner and

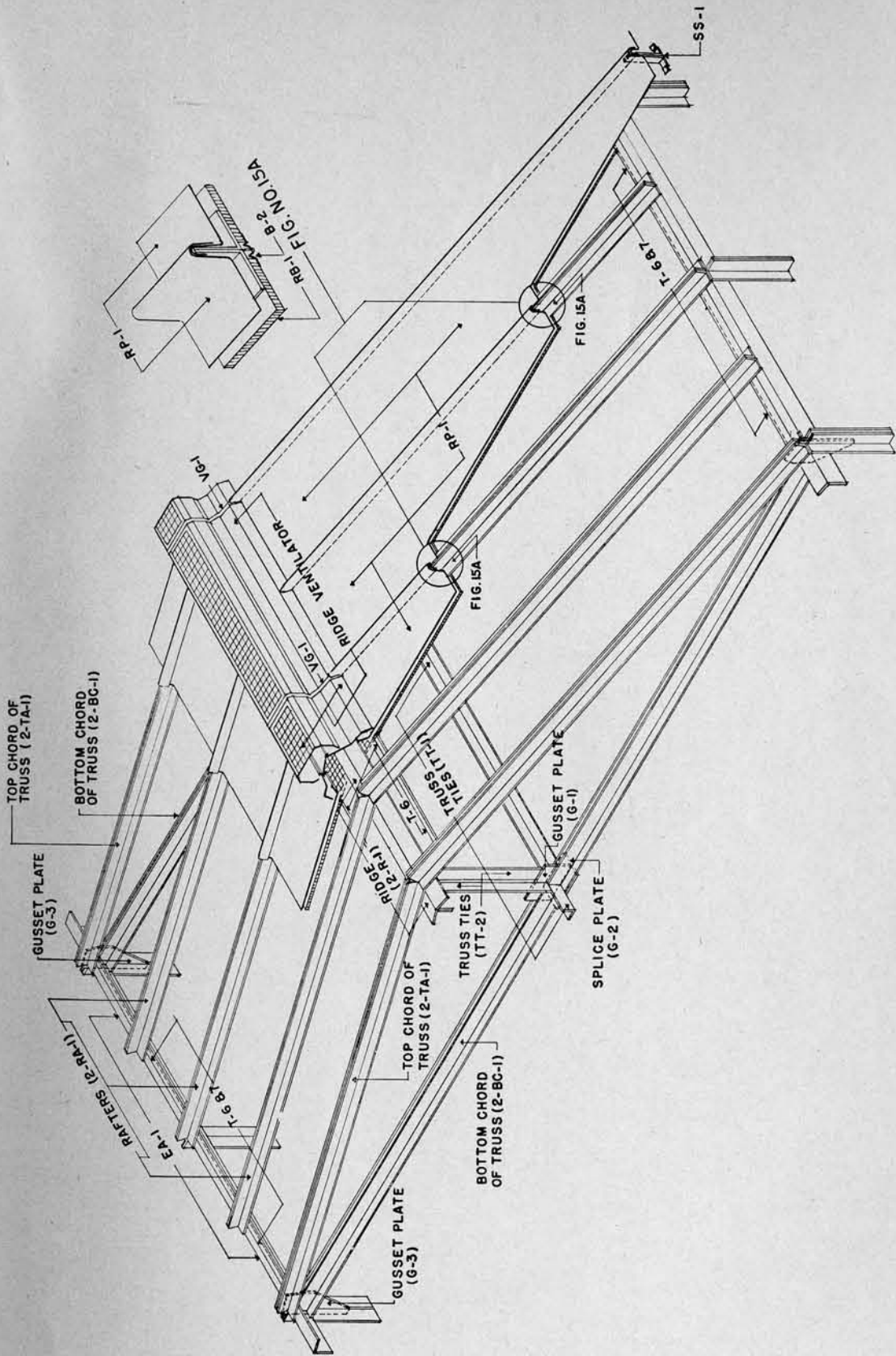


Figure 15. Roof framing typical bay.

securely bolt the panel and the previously loosely fastened WA-7 together. A second WP-2 is placed into position and the two panels securely bolted together on the WA-7. The other edge of panel is only loosely fastened until the balance of the panels are erected. Place similar panels on opposite diagonal corner. On the ends of building place GP-1 bolted securely to the corner WA-7, but only loosely fastened to the WA-2. Panels at other corners are similarly applied.

### 13. Erection of Trusses.

Continue the erection of roof trusses and ridge angles as described in paragraph 8 using T-6 in lieu of T-15.

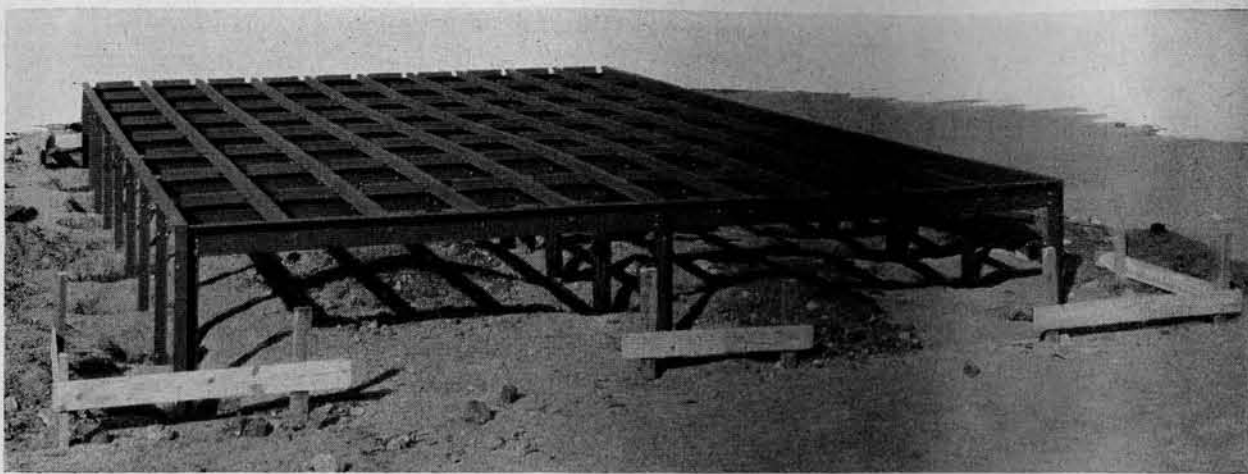


Figure 16. Foundation completed.

### 14. Erection of Roof Rafters (fig. 15).

The roof rafters are erected by fastening two RA-1 to the ridge R-1 and eave angle EA-1 about every 2 feet.

### 15. Application of Roof Panels.

The roof panels RP-1 must be placed by starting on one side of the ridge and from the right-hand end of the building and proceeding toward the left end of building. Place ridge flashing RE-1, GF-1 and GF-2 before bolting first and last roof panel. The roof on the opposite side of the ridge may be laid at the same time but must be also started from the right-hand end of that side. It will be noted that the small bent end on the RP-1 is always towards the ridge. Apply window stops at end of roof panels. (See par. 19c and fig. 15.)

### 16. Ridge Ventilators—Preerection Assembly and Erection.

The ridge ventilators should be preerection assembled as shown in figure 18.

a. The ridge ventilator is assembled by holding one end cap in a vertical position attaching flashing by pushing tabs through slots in the end cap and folding tabs over. Caution should be taken that flashing laps over the edge of the end cap and does not butt. The baffles and ridge cap should be attached in like manner to the end cap. The other end cap is attached to the various parts in the same manner and the top insect screen installed.

b. The ventilators are erected by placing the vent gutter VG-1 over the rafters, approximately every

4 feet 0 inches, and the vent flashing VG-2 at the ends. The ventilator is held in place by bolting the slotted clips to the rafters.

### 17. Application of Wall Panels (figs. 17 and 19).

a. The application of wall panels should now be continued, using WP-1 under windows, starting again from the right hand end of the building. (See fig. 17B.) When the left end of building is reached the temporarily fastened bolts of WP-2 are removed and WP-2 must be lifted sufficiently to permit the last WP-1 to slip under.

b. It will be noted that at the uprights between the windows a cover batten EB-1 is applied. (See fig. 17A.)

c. The application of the end wall panels should

be started from each corner. (See fig. 19.) See plate No. 3 for panels over door and corridor connection.

d. Place door sill SA-2 and door jambs DJ-1-R/L before bolting wall panels to WA-5. Fasten door jamb to sill and head at clip angles.

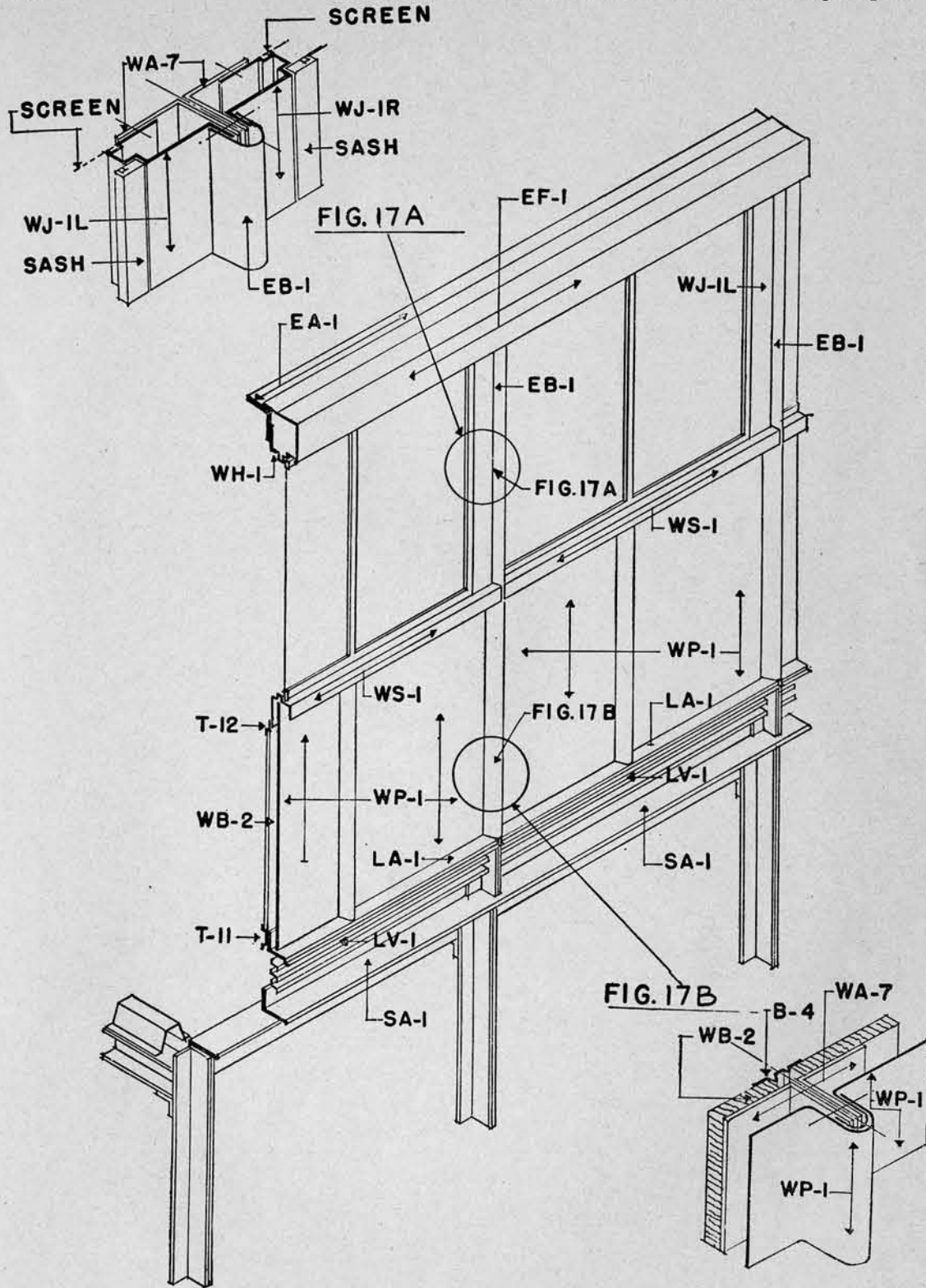


Figure 17. Exterior-finish-typical bay.

## 18. Laying of Plywood Floors.

Check floor framing and purlins for alignment before placing the plywood with the marked "bottom" side down. It is suggested that the entire floor be placed before any panels are fastened. The 4 feet 0 inches dimension of the boards run the length of the building. The boards are fastened to the purlins by 1½ inch drive screws with smooth pivot point, approximately 18 inches o. c. around the edge and approximately ½ inch from the edge.

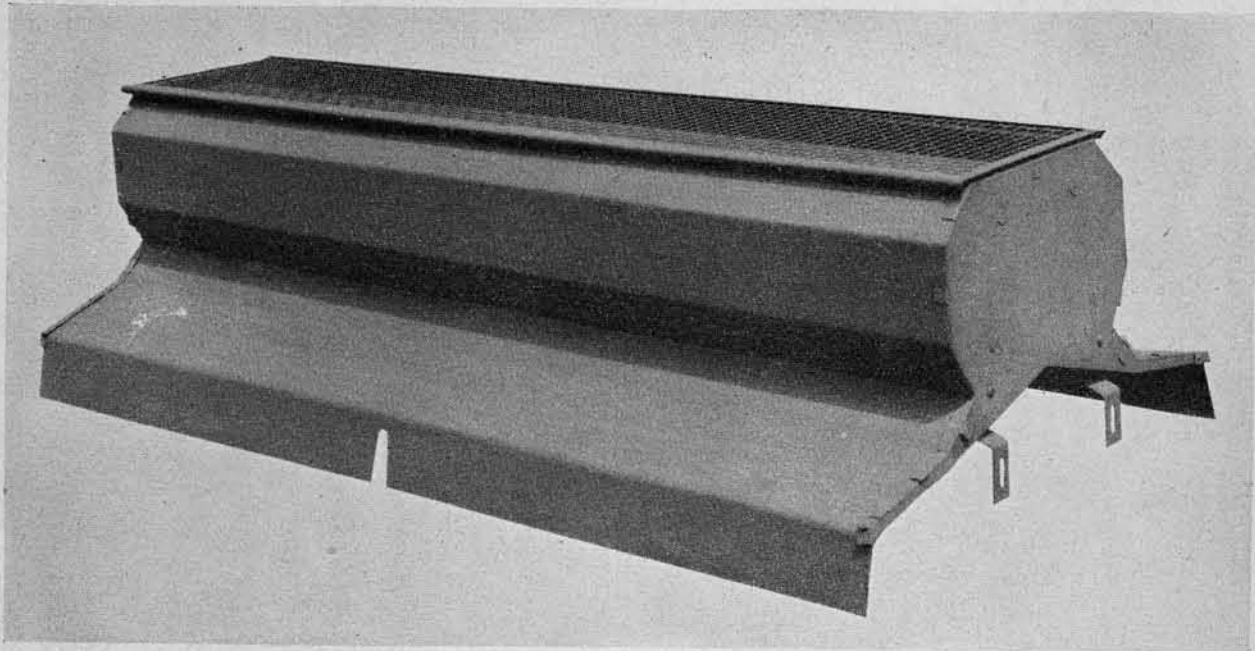


Figure 18. Assembled ridge ventilator.

## 19. Installation of Windows.

a. The windows have the hinges applied at the factory and are applied to window head WH-1 by four sheet metal screws. It will be noted that the four windows for the ends of the building are pro-

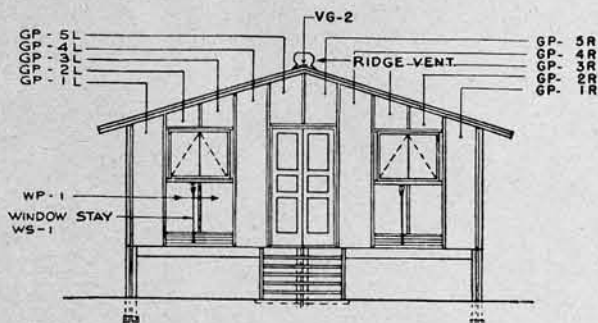


Figure 19. End elevation kitchen-office building.

vided with a slot in the center of the bottom rail for a window stay WS-1.

b. The window stay WS-1 is applied to the metal panel by two sheet metal screws at a point which will give the maximum opening.

c. The windows along the sides of the building are held open by a stop bolted at the end of the roof panels. Use a double stop SS-1 between two windows and a single SS-2 at the ends. (See fig. 15.)

## 20. Installation of Doors in End of Buildings.

The hinges for the doors are factory welded to the door jambs, DJ-1R/L. Install the lock into position with screws and apply door knobs. The doors are set in a closed position and fastened to the hinges. It is recommended that several thicknesses of wrapping paper (not over ⅛ inch) be put under bottom edge of the door when setting in place to provide clearance.

## 21. Interior Finish.

a. The interior finish is held in place by "T" and "B" members. The "B" (battens) and members T-2, T-3 R/L and T-4 are fastened with 2 inch drive screws, placed in the holes provided and driven between the framing members. In most cases the end of the "B" members are held in place by the "T" members.

b. The roof finish RB-1 is approximately 1 foot 10 inches by 9 feet 6 inches and is held in place by a T-6 (T-15 at ends of building) at the bottom and a T-6 bolted at the top to the rafters. The long edges of the finish are held up by the interior battens B-2.

c. The side wall finish WB-1 is approximately 1 foot 10 inches by 6 feet 0 inch and is held in place by a T-10 at the bottom and a T-8 at the top. The finish is also held by the application of the battens B-1. The finish under the windows is WB-2 and held at top by T-9, bottom T-11 and B-5 at sides. Where a window and finish WB-1 butt, T-2 is used.

d. Finish WB-3 is placed between side wall and roof and is held by T-8 at bottom and T-7 at top.

e. The end walls have a WB-1 on each side of window and a WB-2 under each window. The members are marked, T-5 for corner, T-2 and B-5 at sides of windows, B-4 under windows and T-4 on each side of door. In the gable are the following finishes and battens: GB-1, B-6, GB-2, B-7, GB-3, B-3, GB-3, B-7, GB-2, B-6 and GB-1.

## 22. Screens.

a. The window screens are installed on the interior of the building and are held in place by eight  $\frac{5}{8}$  inch sheet metal screws with a  $\frac{3}{8}$  inch washer.

b. The insect screens at ridge ventilator are held in place with  $3\frac{1}{2}$  inch battens.

## 23. Partitions in Kitchen and Office Building.

The interior partitions in the kitchen and office building are constructed from the material furnished under a bill of materials and according to details shown on plate No. 3.

## 24. Fixtures.

The sinks and counters are constructed from the material furnished under a bill of materials and as detailed on plate No. 2.

## 25. Step Construction.

The steps are field constructed from crating material using 2 inch material of the wider sizes. The steps should not be fastened to the building but should set approximately 2 inches away.

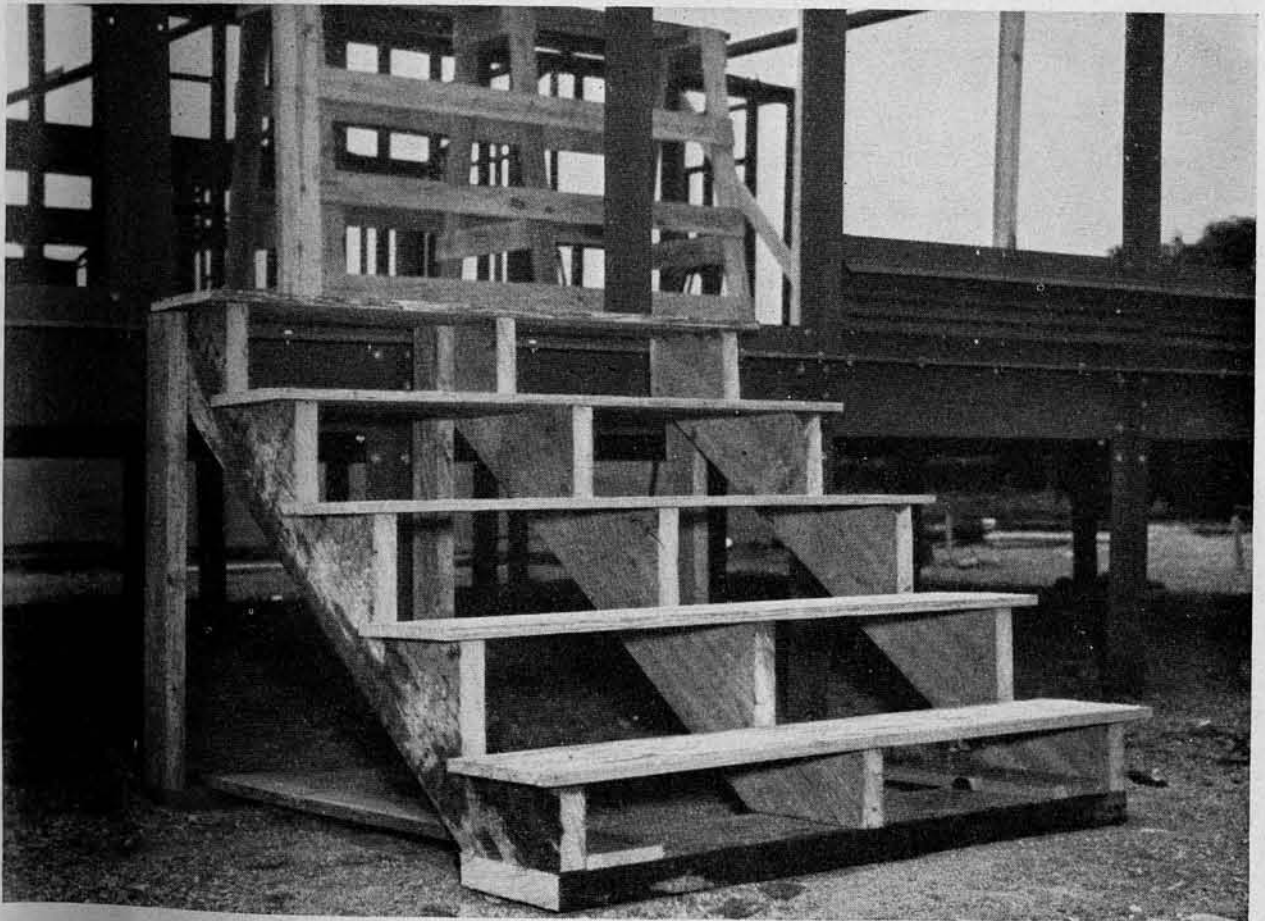


Figure 20. Step construction.



## Section IV

# ERECTION PROCEDURE OF WARD BUILDINGS

### 26. General.

a. The general principles of erection described in section III, are applicable to the ward wings; however, as the interior lining of these buildings is also metal, slight departures are considered necessary. It will be noted that component members of these ward buildings are generally similar to those for the building in section III and are prefixed with the letter *W*. For piece markings to be used in the ward buildings (see plates 1 through 37 inclusive).

b. The photographs indicate typical conditions and were made from a pilot model 32 feet long. The views of the interiors were taken before a coat of paint had been applied, the wall panels do not show perforations at the windows and the photos are inserted only to indicate position of partitions, ceiling panels, and general conditions.

### 27. Foundation Posts, Joists and Purlins.

The foundation posts, floor joists, and purlins are assembled and should be erected as described in section III. Where the exercise court occurs, plate

No. 1 wire mesh panels are provided and will require a trench for application. These panels must be applied when the joists and girders are in place and before the holes are back-filled.

### 28. Laying of Floor.

a. When the metal floor joists and purlins are in place, a departure from the standard procedure must be observed. The plywood floors, particularly in the single rooms in the wards, must be installed and covered with canvas before the exterior wall finishes are applied. It is recommended that the sill angles, WSA-, be temporarily bolted in position to help in placing the plywood panels. The end of the plywood panels should be placed against the sill angle, the center edges placed together and lowered into place. The plywood panels should be fastened down with 1½-inch drive screws approximately 12 inches on center where covered with canvas, to bring the surface of the plywood flush and avoid a future cracking of the canvas. All screw heads must be flush or slightly below the surface

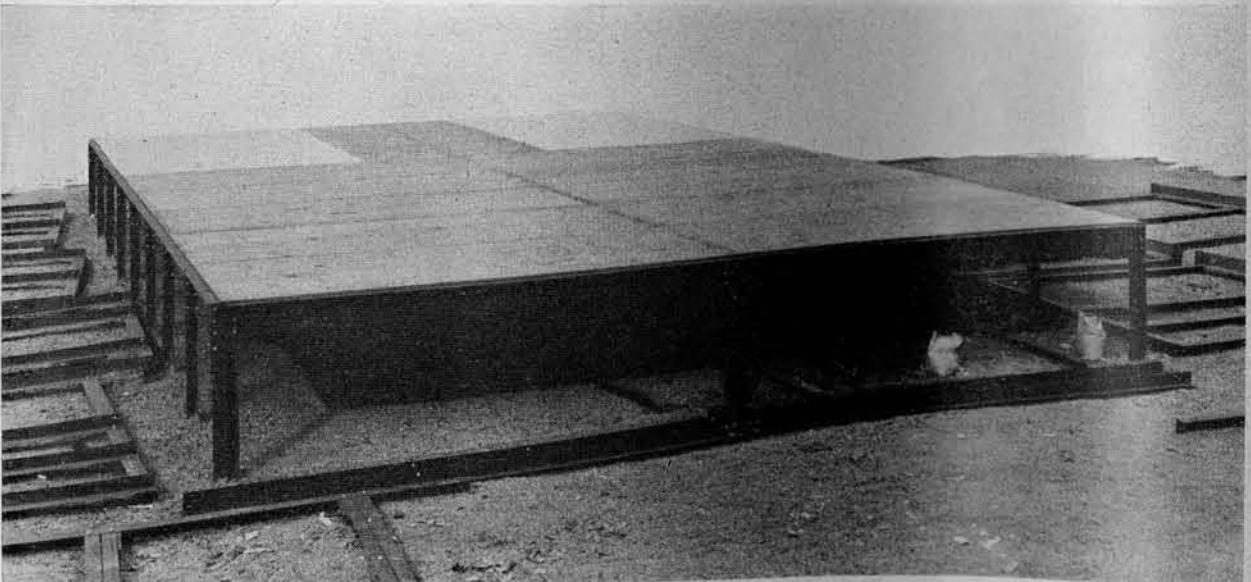
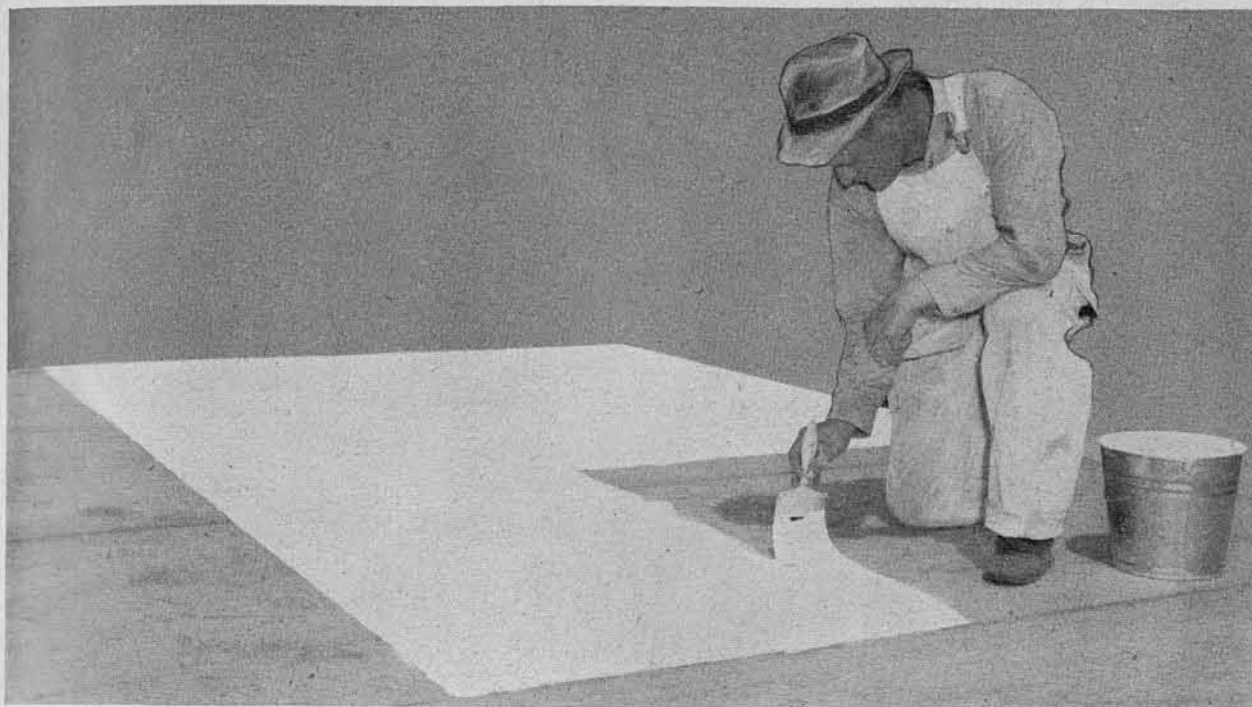


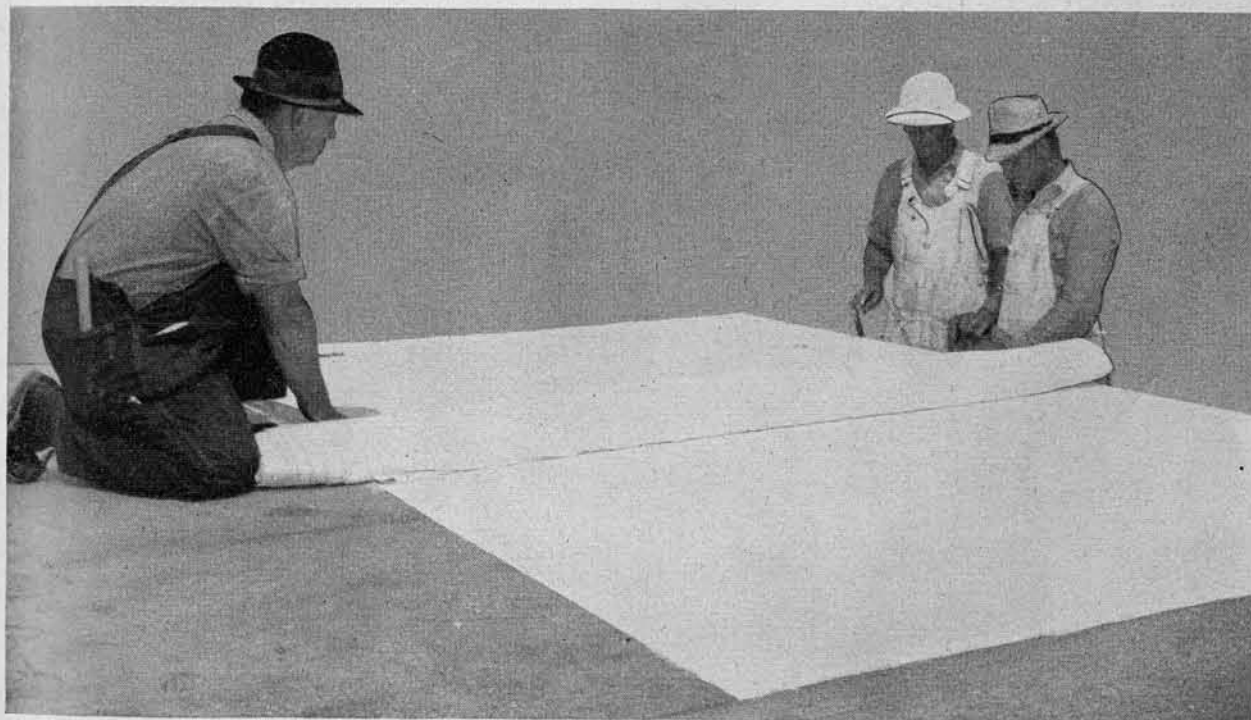
Figure 21. Plywood flooring in place.

of the plywood. Extreme care must be exercised that the surface of plywood is free of all stones, gravel, or dirt which will form a raised place when the canvas is applied.

b. A generous coating of white lead paste of a consistency which will fill the holes should be applied just ahead of the roll of canvas being applied. The canvas should be so placed that one edge will be at



*Figure 22. Applying white lead paste.*



*Figure 23. Laying canvas flooring.*

least  $\frac{3}{4}$  inch under the room door when in a closed position and the opposite edge at least  $\frac{3}{4}$  inch under the interior finish at walls. The canvas should be bedded dry and stretched taut by rolling it into the lead and tacking it while taut along all edges with

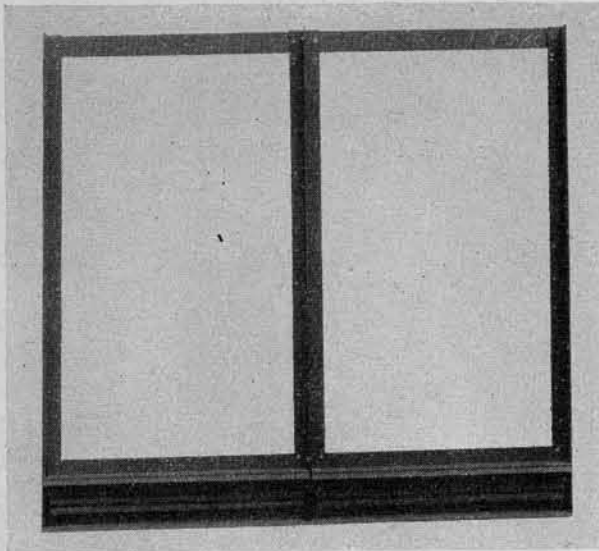


Figure 24. Typical side wall framing.

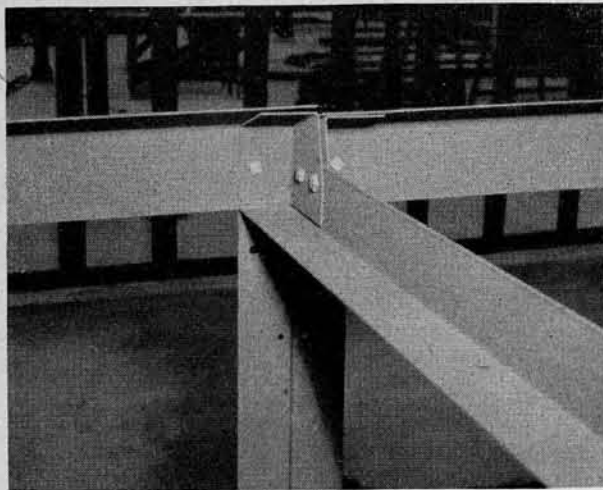


Figure 25. Connection of truss to side wall.

No. 6 galvanized carpet tacks, spaced not over  $1\frac{1}{4}$  inches on centers under the lines of all partitions and under the interior finish at walls, so that all tackings will be fully concealed in the completed building. The surface of canvas floor covering shall be drenched with water and before it has dried shall be painted with the white lead and oil undercoat of a consistency that will fill, bond with, and coat, the surface without much penetration of the body of

canvas. When dry the flooring should be covered with crating material for protection from damage during the wall and roof erection. The finish coat consisting of a heavy flowed-on brush coat of floor and deck enamel shall be applied after all erection has been completed.

### 29. Assembly of End and Side Wall Units.

The end and side walls of these two buildings cannot be preerection assembled as in the standard buildings in section III. The window jambs, head, and sill must be applied after the metal interior finish; therefore only the sills, uprights, eave angle with clip angle WCA-1 R/L attached, louver angle, screens, and louver vanes should be preerection assembled.

### 30. Erection of End, Side Wall Units and Part of Trusses.

The erection of these assembled wall framing units can progress as described in section III, except the clip angle WCA-1 R/L fastens to the bottom chord of the trusses in lieu of a gusset plate G-3. Plate No. 12 shows the framing elevations and the order in which the members are to be placed.

### 31. Application of Finish of Exterior Walls.

a. When the wall framing is erected and temporarily braced with either crating material or the bottom chord of the trusses, the interior wall finish should be applied. The interior panels are factory fabricated and should be applied by means of sheet metal screws to the sill, uprights, and eave angles. Details of the panels and location of screws are shown on plate No. 13. The panels are set in position by raising the panel until the Z member will hook over the sill angle and then lower, pressing the panel firmly against the uprights.

b. The window frames in the ward buildings are assembled into a complete frame and are installed after the application of the interior wall panels. They are applied by fastening the head to the eave plate with bolt and by means of S. M. screws to the stiffener of the wall panels at the sill.

c. The exterior finish is applied similar to that described in section III, except that the upright angles WWA-8 are installed when the metal panels are applied and are fastened to the louver angle with bolts and to the panel stiffener with S. M.



Figure 26. Erecting trusses and showing suggested platforms.



Figure 27. Wall framing completed.

screws. Plate No. 2 shows an elevation and the panel markings.

d. The windows, screens, and doors are installed after the roofing has been applied and in a manner similar to that described in section III.

### 32. Erection of Roof.

a. The roof erection is similar to the erection of a standard building described in section III. The wire guides WWG-1 should be bolted to the rafters (plate No. 34), and the chicken wire panels WIS-1

with the insulation should be located between the rafters before the metal roof panels are placed in position. The insulation should be placed with the exposed cotton side down.

b. The details of roof ventilators and the attachment to the building are shown on plate No. 11 and section III.

c. Catwalks from crating material should be provided on the bottom chord of the trusses to permit access to the electric wire supports and fixtures.

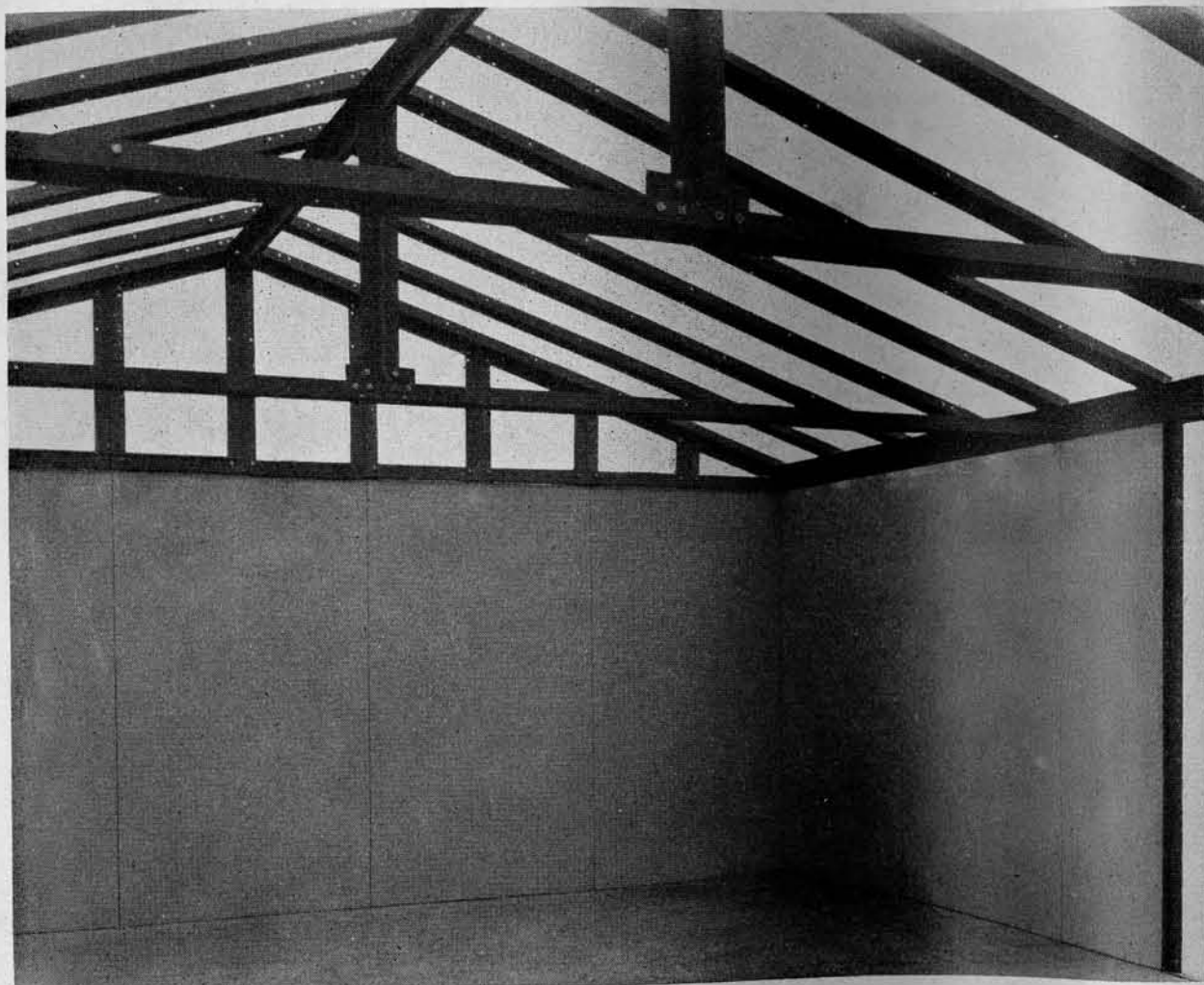
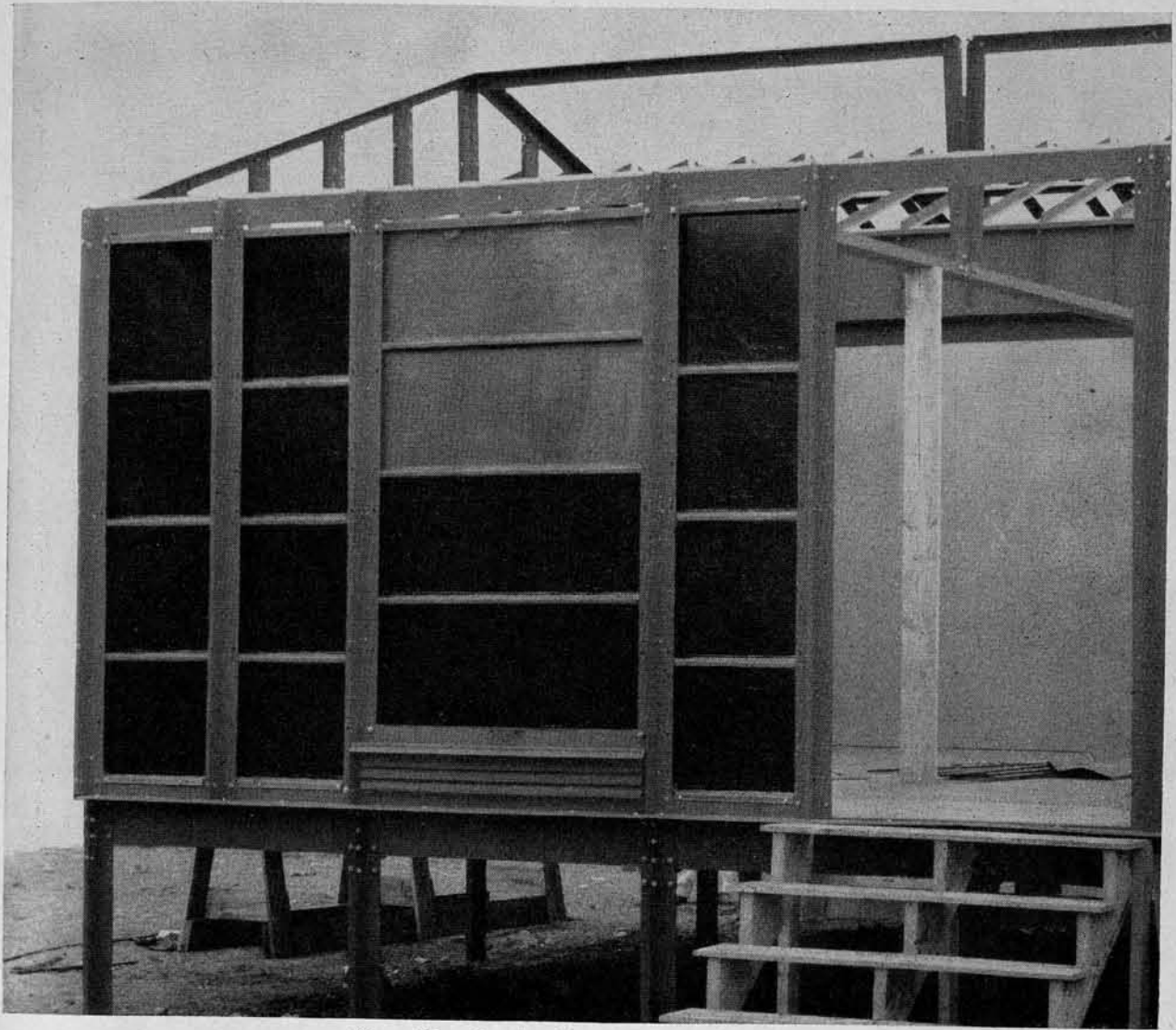


Figure 28. Interior finish panels in place.



*Figure 29. Exterior view of interior finish panels.*

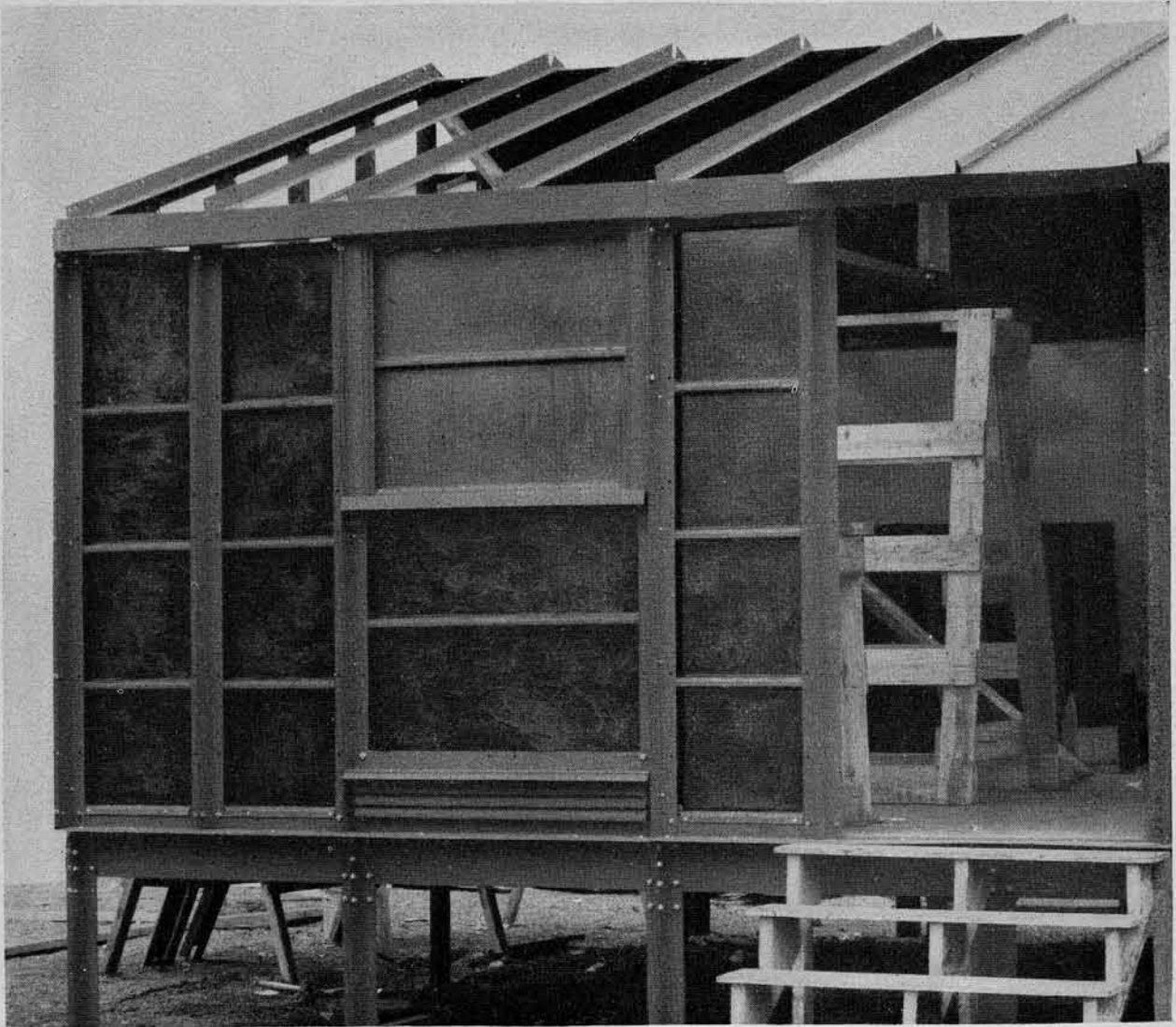


Figure 30. Exterior view showing roof rafters and roofing.



*Figure 31. View of completed exterior side wall.*



## Section V

# INTERIORS—WARD BUILDINGS

### 33. Partitions in Wards.

a. The interior partitions for the ward buildings are factory fabricated, ready for assembly. The assembly consists of face panels held together with partition spaces which slide into position from either the top or bottom of the face panel, so that the clips on the spacers hold the face panels. The clip angles should also be fastened to the panels during assembly.

b. The partitions are assembled into units which correspond with the unit markings shown on plate No. 15 and the details on plates Nos. 16 and 17.

c. It is suggested that the location of the holes in the flooring for fastening the clip angles be established by dropping a plumb line from and at

the end of the bottom of the truss and the use of a chalk line between these points. The holes in the flooring should be made slightly smaller than the cap bolts and the cap bolt started into the hole before a partition unit is set into position.

d. The base cover and cornice cap are screwed into place after the partitions have been firmly set in place.

### 34. Ceilings in Wards.

The ceilings in the wards are in panels and are to be installed before the partitions are set in place and with Phillips oval self centering type bolts where partitions will not cover bolt heads. (See plate No. 8.)

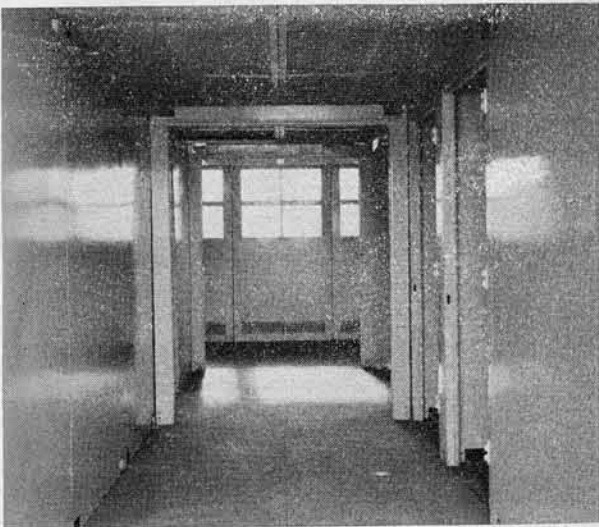


Figure 32. Interior view looking towards single ward, closet, entry and day room.

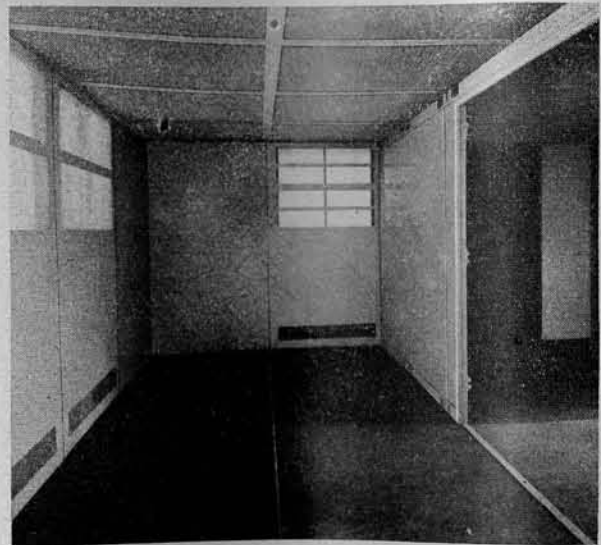
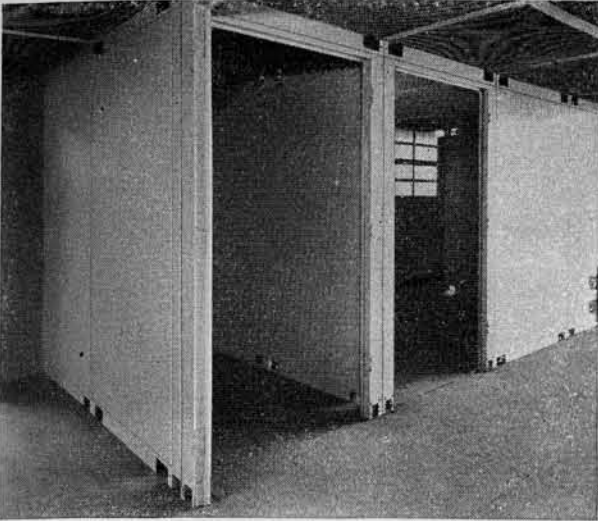
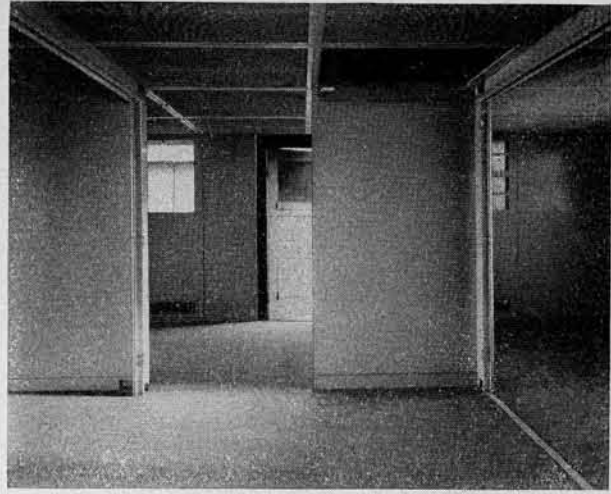


Figure 33. Interior view day room.



*Figure 34. Interior view looking towards closet and single wards.*



*Figure 35. View looking towards entry.*

## Section VI

# ERECTION PROCEDURE OF UTILITY BUILDING

### 35. General.

The general principles of erection described in section III are applicable to the utility building, however, the interior lining of this building is metal and slight departures in the procedure are necessary. The component members are similar to those in the kitchen and office building and are prefixed with the letter *U*. For piece markings see parts list and plates 20 through 33 inclusive.

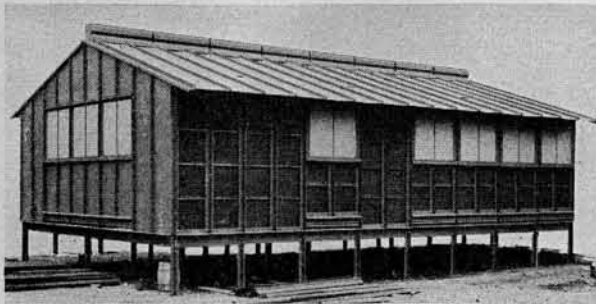


Figure 36. Utility building being erected.

### 36. Foundation Posts, Joists, and Floor Panels.

a. The foundation posts and floor joists are erected as described in section III.

b. The purlins are omitted on this building and metal floor panels or pans are placed on the joists. These floor panels (plate for markings) are bolted to the joists with 2-inch bolts and girders with  $\frac{3}{4}$ -inch bolts and the screeds are bolted  $\frac{3}{4}$  inch to the panels. The blockings under partitions, plumbing fixtures, and the collars around holes should

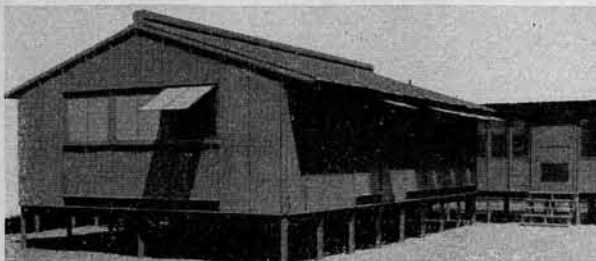


Figure 37. Completed utility building.

be carefully placed and fastened to the panels before the concrete is poured into the pans. The ends of blockings should be turned down to prevent the concrete from filling the blocking.

c. The mixture of the concrete should be such as to provide a plastic workable consistency with the use of the least possible quantity of water. The concrete should be poured to the top of the screeds and leveled off to a smooth wood floated finish.

### 37. Side Walls and Roof.

The side walls and roofing, inside and outside panels are assembled and erected similar to those in the ward buildings. The drawings should be followed closely as the wall partitions as well as the interior partitions provide the proper holes for partitions and plumbing fixtures.

### 38. Plumbing Fixtures and Pipes.

a. The plumbing fixtures are fabricated ready for assembly and erection. The water closets fit on the seats in the floor panels. The urinals and lavatories are placed and fastened to the walls. Some field punching is required. (See figs. 41 and 42.)

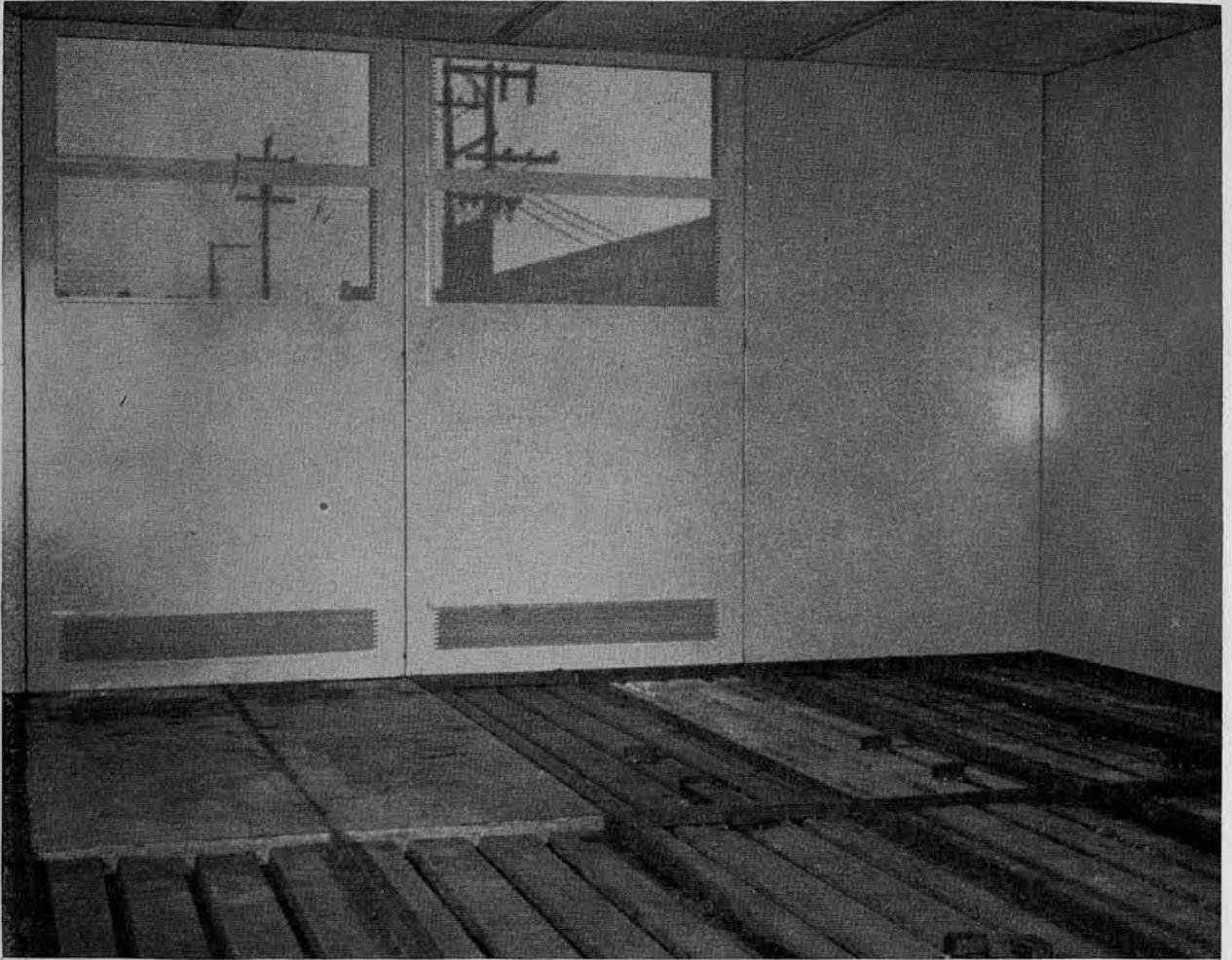
b. All the piping is cut to size and bears identifying marks as indicated on plate 35. It is suggested that 2 by 4 material be placed between the floor girders and ample strapping from the crates be utilized to hold the piping under the floor to the proper level and slope. (See fig. 39.) Some of the piping can be assembled before placing into position; however, care should be exercised that no piping is assembled which will necessitate unassembly to place it into position.

### 39. Ceilings.

Ceilings are provided similar to those shown on plate No. 18.

### 40. Cabinets and Work Tables.

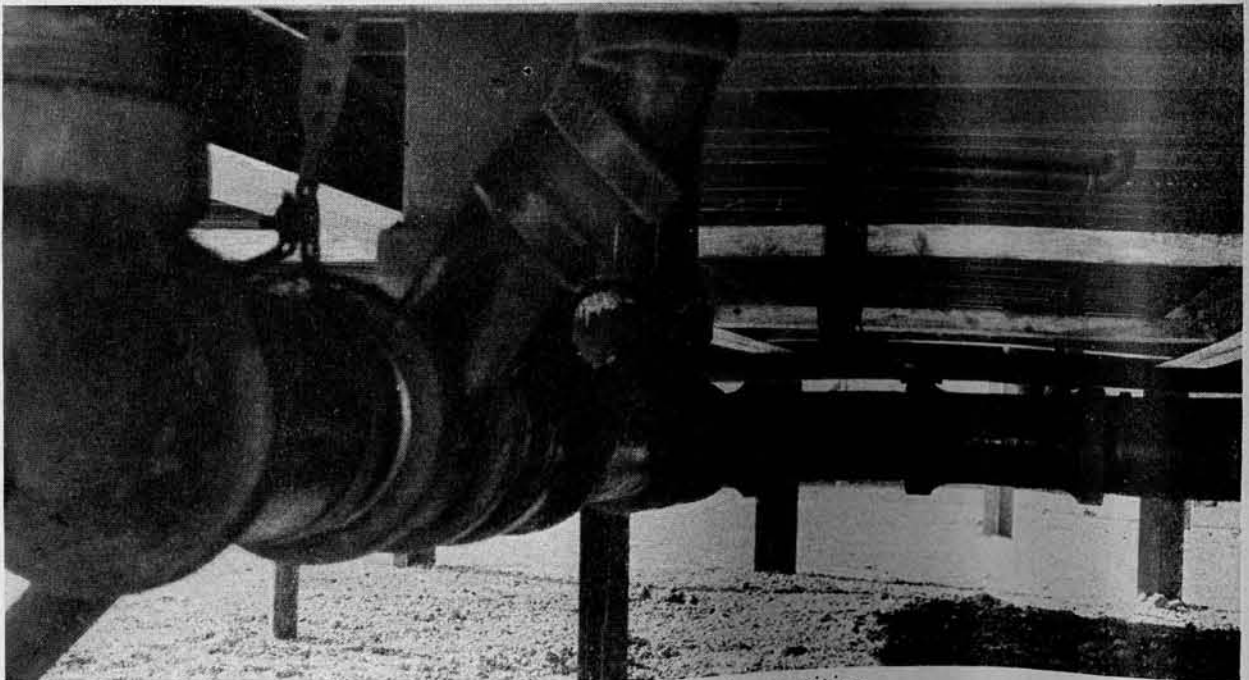
The assembly of the cabinets and work tables should be done carefully. See the plates and figure 50, for the details of assembly.



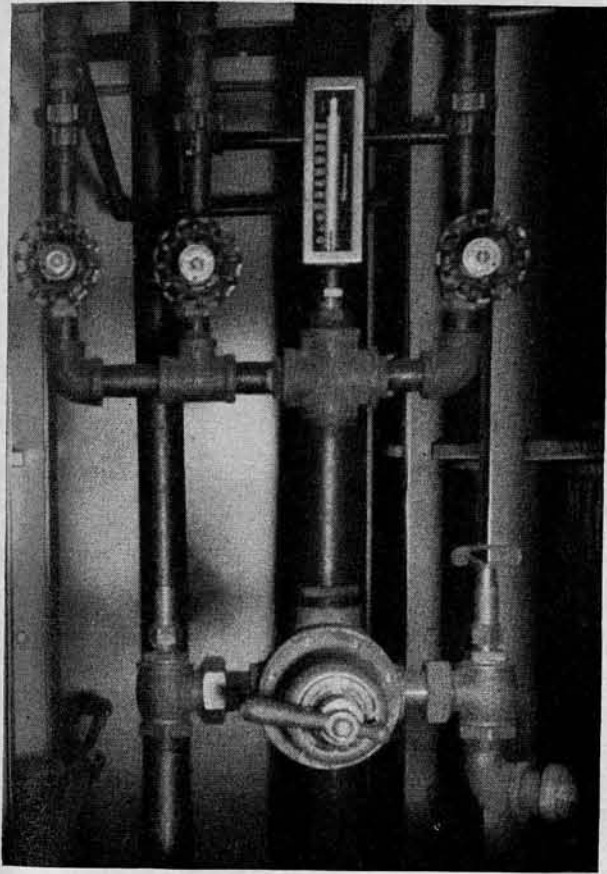
*Figure 33. Interior of utility building showing floor panels.*



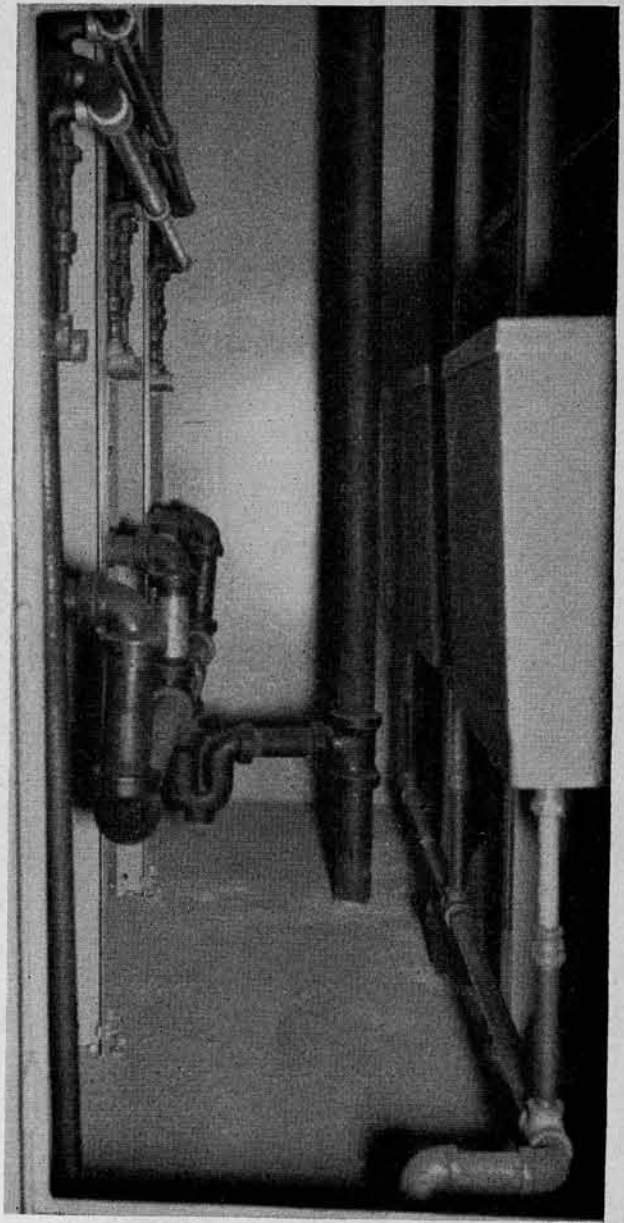
*Figure 39. View under floor showing piping.*



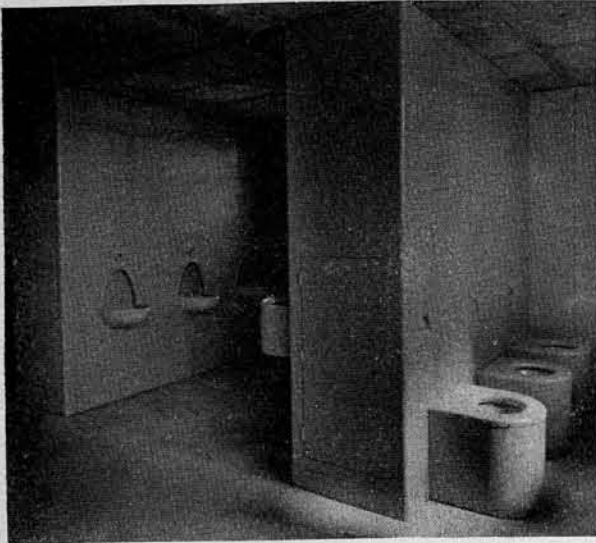
*Figure 40. Water closet connections to piping.*



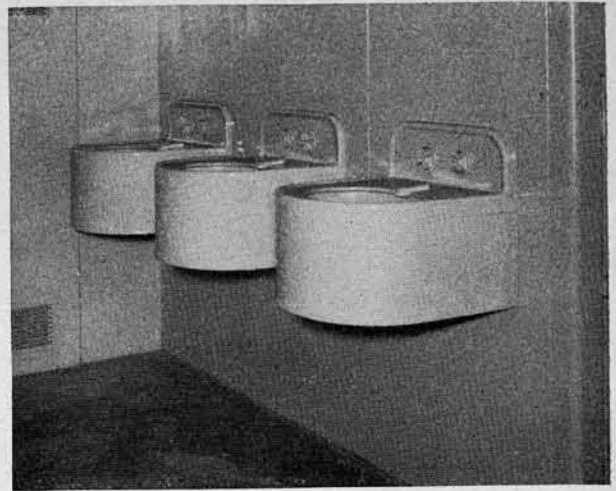
*Figure 41. Shower controls and piping.*



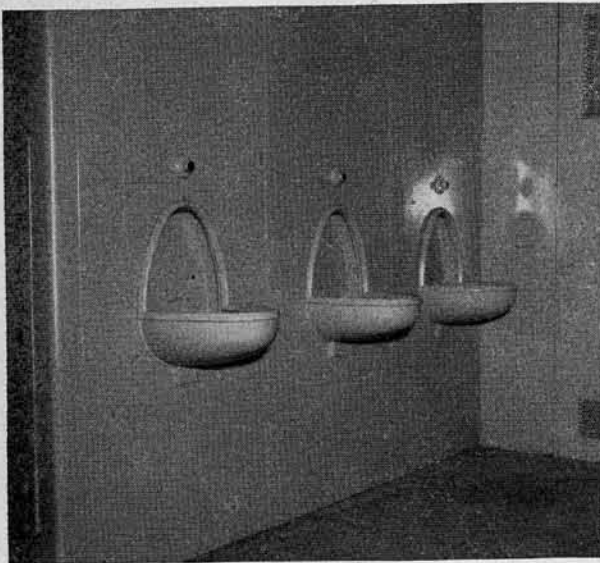
*Figure 42. Piping to lavatories and water closets.*



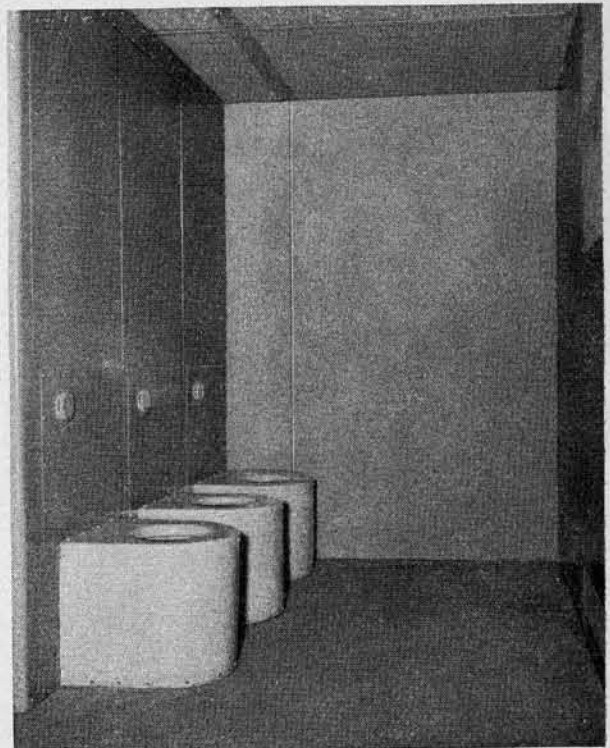
*Figure 43. Interior view of fixtures installed.*



*Figure 45. Lavatories.*



*Figure 44. Urinals.*



*Figure 46. Water closets.*

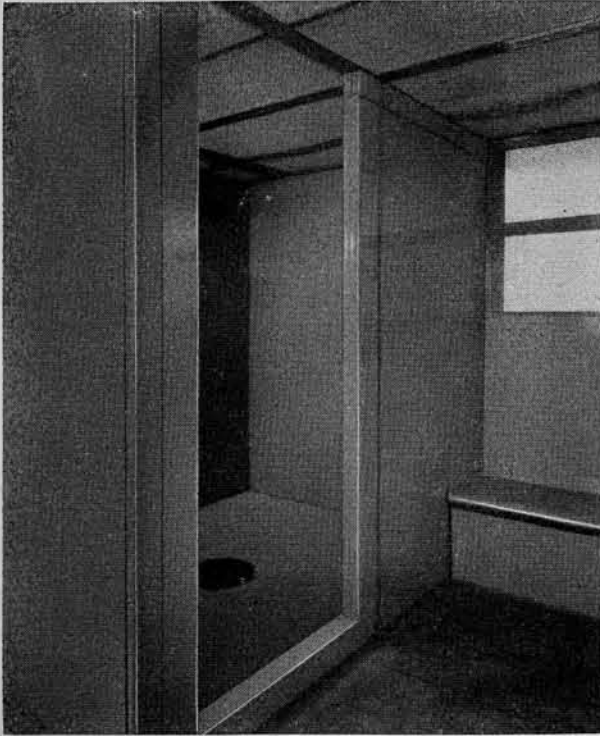


Figure 47. Shower.

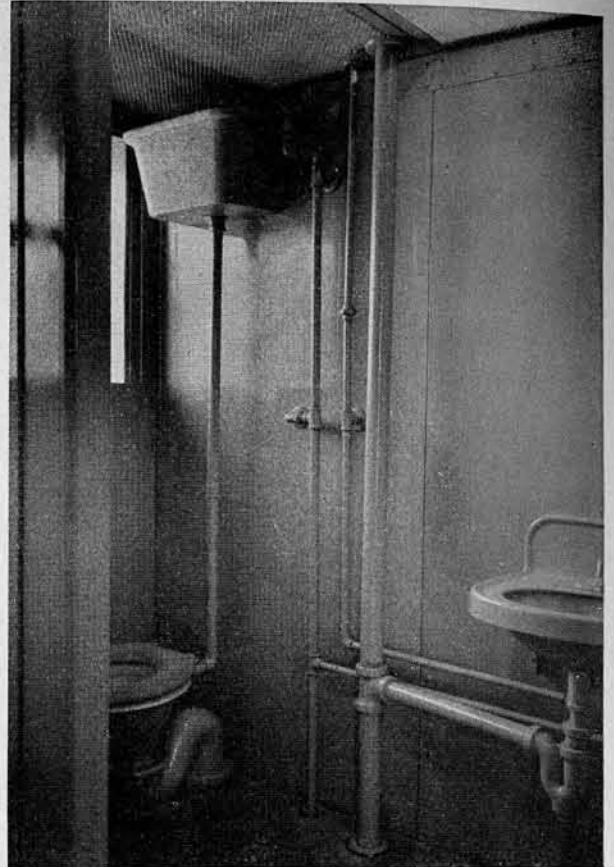


Figure 49. Nurses' toilet.



Figure 48. Bed pan washer.

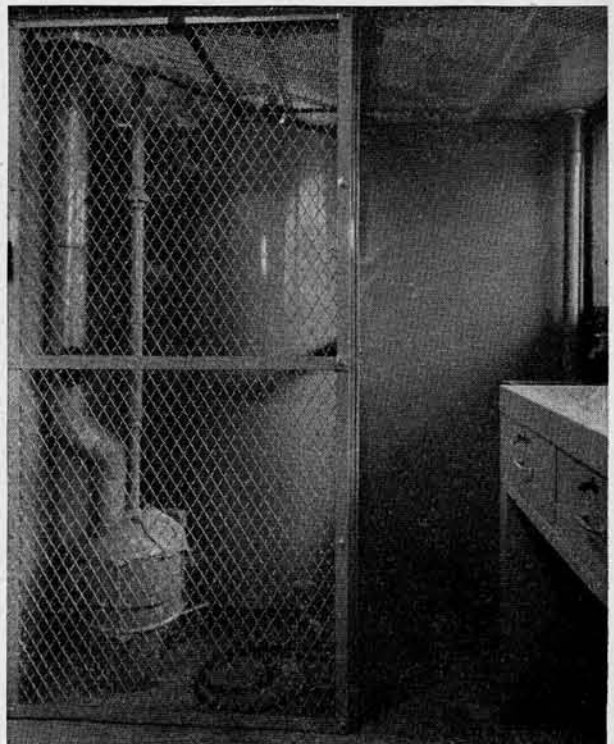


Figure 50. Water heater.





*Figure 51. Interior view of completed utility building.*

## Section VII

# ERECTION PROCEDURE FOR CORRIDORS



Figure 52. View of completed corridor from exercise yard.

### 41. General.

a. The component members of the corridors are prefixed with the letter "C." For piece markings see parts list and plates Nos. 4 to 8 inclusive. The erection procedure is similar to the kitchen and office building with some variation, as in the wards and utility buildings.

b. It is recommended that the corridors be constructed as the second phase of the unit.

### 42. Foundation Posts, Joists and Purlins.

The foundation posts, floor joists, and purlins are assembled and should be erected as described in section III. Where the exercise court occurs, plate No. 1, wire mesh panels are provided and will require a trench for application. These panels must be applied when the joists and girders are in place and before the holes are back-filled.

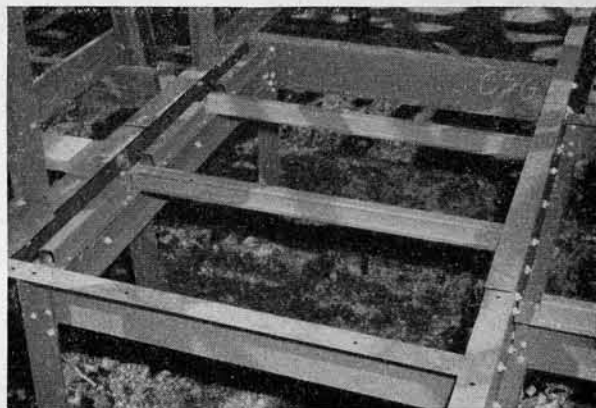


Figure 53. Floor connection at corridor and utility building.

### 43. Assembly of Side Wall Units.

The side walls of the corridors and connections to buildings cannot be completely erection assem-

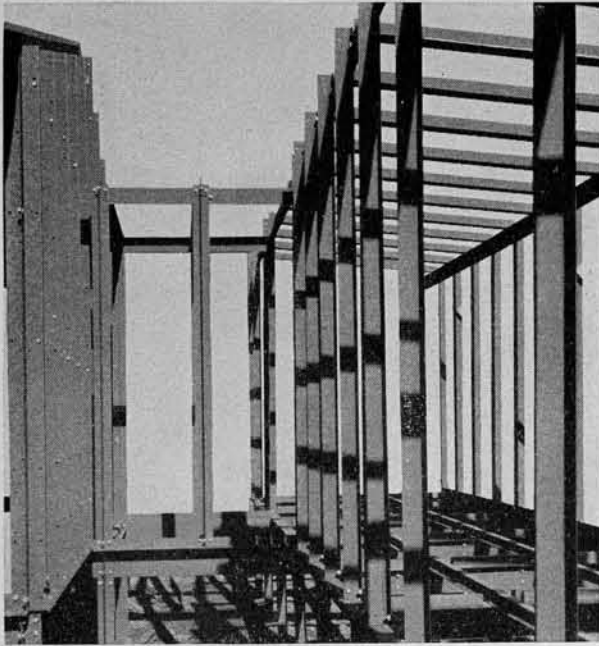


Figure 54. Wall and floor framing of corridor and connection.

bled, only the framing, sill angle, wall angles and eave angle should be assembled to be placed on the foundation.

#### 44. Erection of Framing Panels.

As the framed panels are set on the foundation, the eave flashing, wire raceway and roof rafters should be placed approximately every 2 feet. It will be noted that the shorter side of the corridor is always towards the exercise yard.

#### 45. Interior Finish.

a. Place the plywood ceiling panels on and between the roof angles, fastening by screwing the roof angle to the plywood.

b. The interior metal finish is applied with SM screws to the wall angles except at the bottom corners where the bolts which hold the wall angle to the sill also hold the interior finish.

c. The plywood floor can also be placed at this point or later. The floor is held down with drive screws approximately every twelve inches.

#### 46. Electric Wiring and Fixtures.

The raceway and covers for electric lights in the corridors should be installed while the interior partitions are being placed. Details are shown on plates Nos. 7, 8 and 35.

#### 47. Roofing.

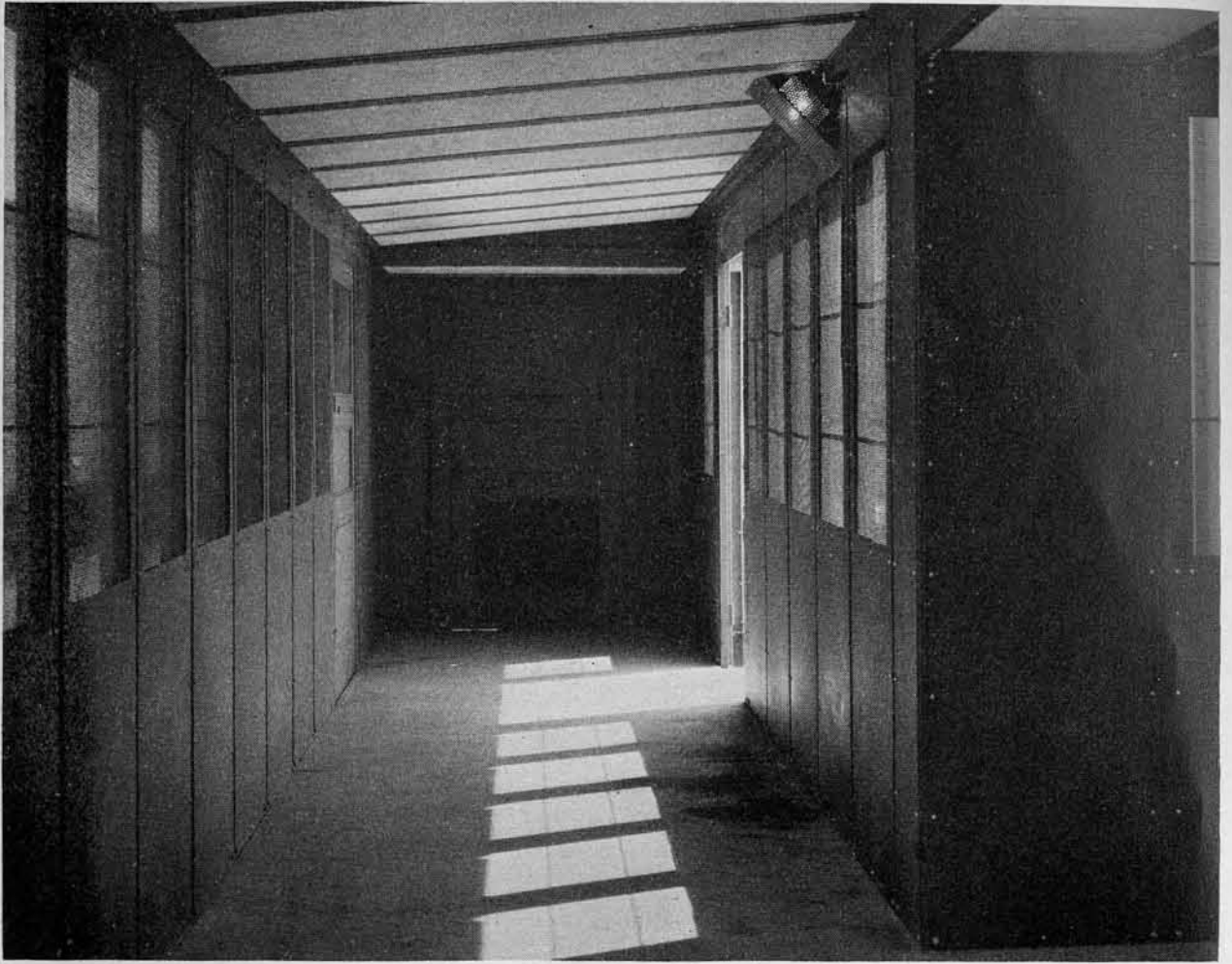
When the ceiling panels are installed the roofing panels may be applied. It is advisable to apply the roofing on the connections to the building when the exterior finish is being applied on the building to which the connection is being made.

#### 48. Exterior Finish.

a. The exterior finish is applied as for the building described in section III.

b. Where doors occur the jambs, head and sill are applied with the exterior finish.

c. The sills are fastened with SM screws to the interior and exterior panels, and the screws are fastened to the sill and exterior panels. (See plate No. 8.)



*Figure 55. Interior view of completed corridor.*

## Section VIII

# HOSPITAL EQUIPMENT AND FURNITURE

---

### **49. Hospital Equipment.**

The hospital equipment is furnished by the medical department including the stove HE-11c and refrigerator HE-9a.

### **50. Furniture—Kitchen.**

The cabinets and sink indicated on the plans of the kitchen and office building are constructed

from material furnished under bill of materials and as detailed on plate No. 2.

### **51. Furniture—Utility Building.**

The counters and benches in the utility building are factory made and must be assembled according to the details shown on plates Nos. 31, 32, and 33, and as described in section VI.

## Section IX

# ELECTRIC AND PLUMBING

---

### **52. Electric Wiring.**

*a.* The electric wiring and fixtures should be installed as indicated on drawings. The material for the kitchen and office are furnished under a bill of materials and should be installed according to standard practice.

*b.* The raceway and covers in the corridor are furnished with the building. (See plates Nos. 7, 8 and 35.)

### **53. Special Switches.**

It will be noted that in the ward buildings spe-

cial switches are required and must be so installed as to be inaccessible to patients.

### **54. Plumbing and Fixtures.**

*a.* The plumbing, piping and fixtures for utility building are included with the material for the building and should be installed as shown on the drawings.

*b.* The plumbing pipes and fixtures for the kitchen are included under the bill of materials and should be installed as shown on the drawings and in accordance with standard practice.