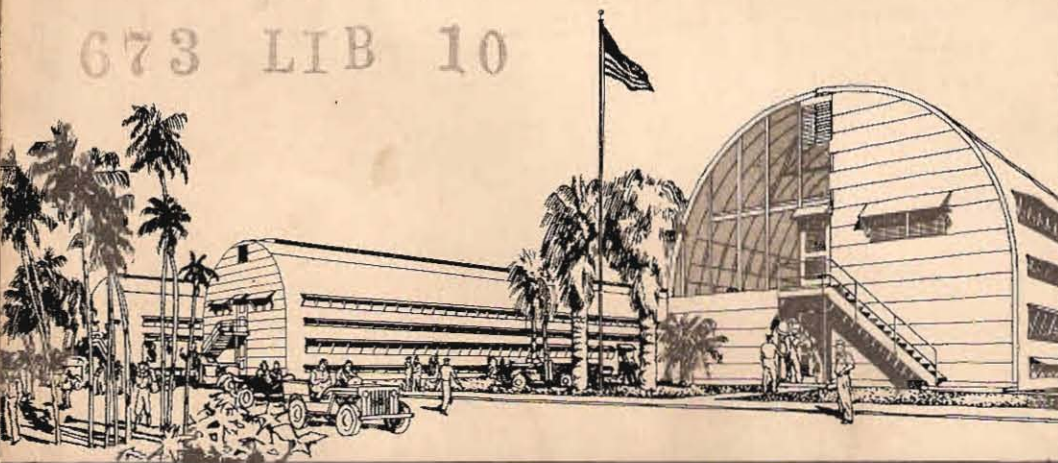


673-LIB



673 LIB 10



**ERECTION  
INSTRUCTIONS  
FOR THE 40'x160'  
U.S. NAVY  
STEEL ARCH RIB  
B1-B BARRACKS**

**MANUFACTURED FOR NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS  
BY STRAN STEEL DIVISION OF GREAT LAKES STEEL CORPORATION  
DESIGN MAY 16, 1944**



# OUTLINE OF ERECTION PROCEDURE

**REFER TO**

**SUGGESTIONS TO ERECTOR**

**PAGE 19**

**BEFORE STARTING**

**ERECTION**

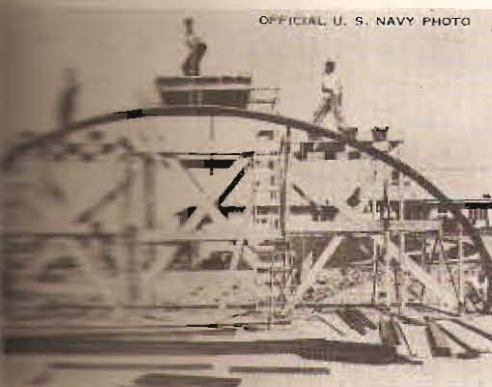
## SECOND FLOOR JOISTS



## FIRST FLOOR WALLS



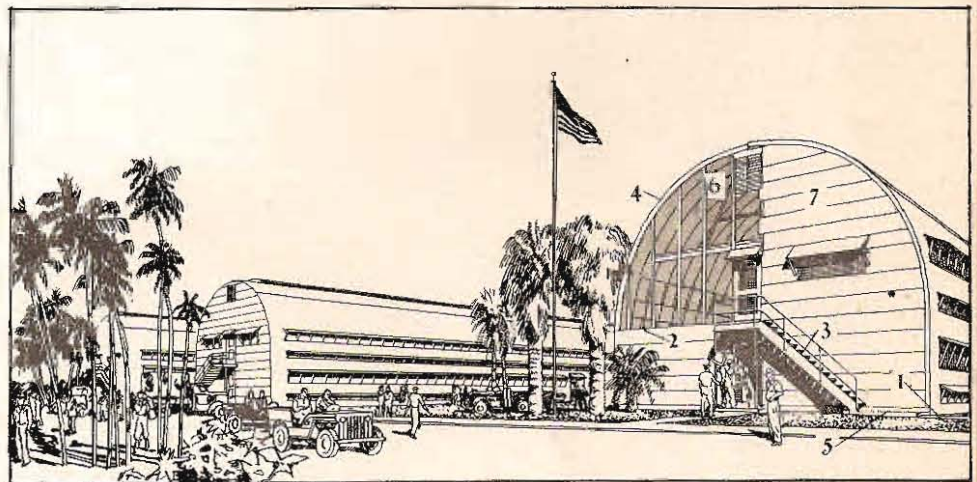
## RAISING THE RIBS



## CONCRETE FLOOR



## INTERIOR COVERING



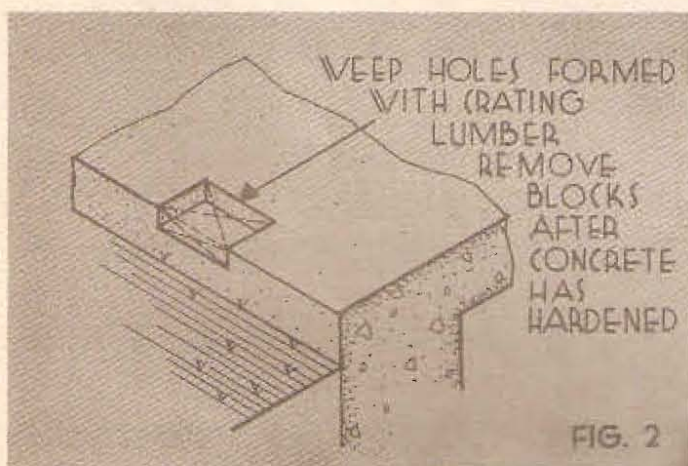
1. **FOUNDATION**—Lay out building. Set anchor bolts, place wooden blocks and pour concrete.
2. **FIRST FLOOR WALLS**—Place channel plate. Assemble and raise walls. Plumb and brace.
3. **COLUMN AND BEAMS, SECOND FLOOR JOISTS, STAIRWAYS**—Erect beams and columns, install joists. Erect interior and exterior stairways.
4. **ARCH RIB ROOF FRAMING, MONITOR, END WALLS, HOODS**—Lay corrugated sheets on second floor. Assemble and raise ribs, erect purlins and frame monitor. Frame end walls and hooded openings.
5. **CONCRETE FLOORS, FRAMING OF OPENINGS, CEMENT BASE**—Pour concrete floors, stair treads and landing. Frame openings, apply wood blocking. Apply cement base.
6. **INTERIOR COVERING, SCREENING, INSULATION**—Nail Masonite sheets to ribs and studs, apply screen to openings then trim around openings and cover sheet joints with battens. Cover surface of building with insulation.
7. **CORRUGATED IRON COVERING**—Apply corrugated iron sheets to outside of building.
8. **PARTITIONS**—Assemble and raise steel framing of partitions and cover with Masonite.



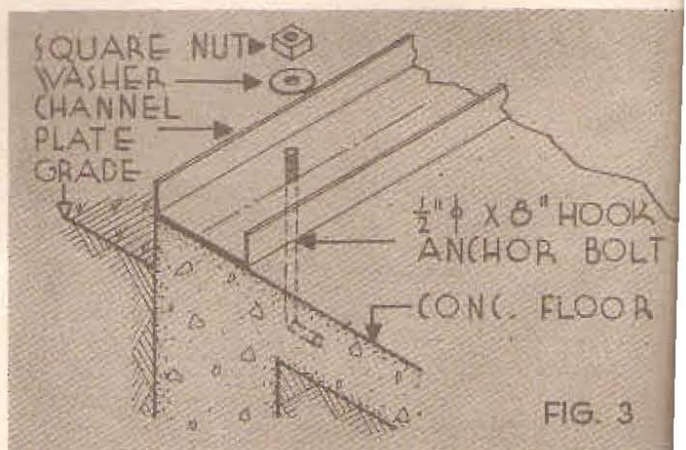
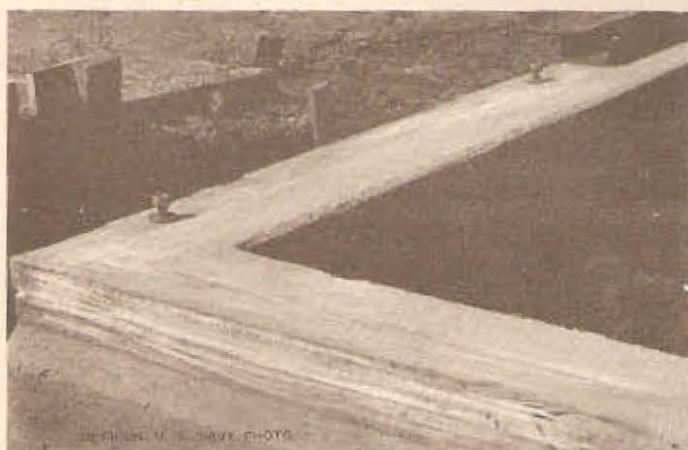
# FOUNDATION



COMPLETED FOUNDATIONS

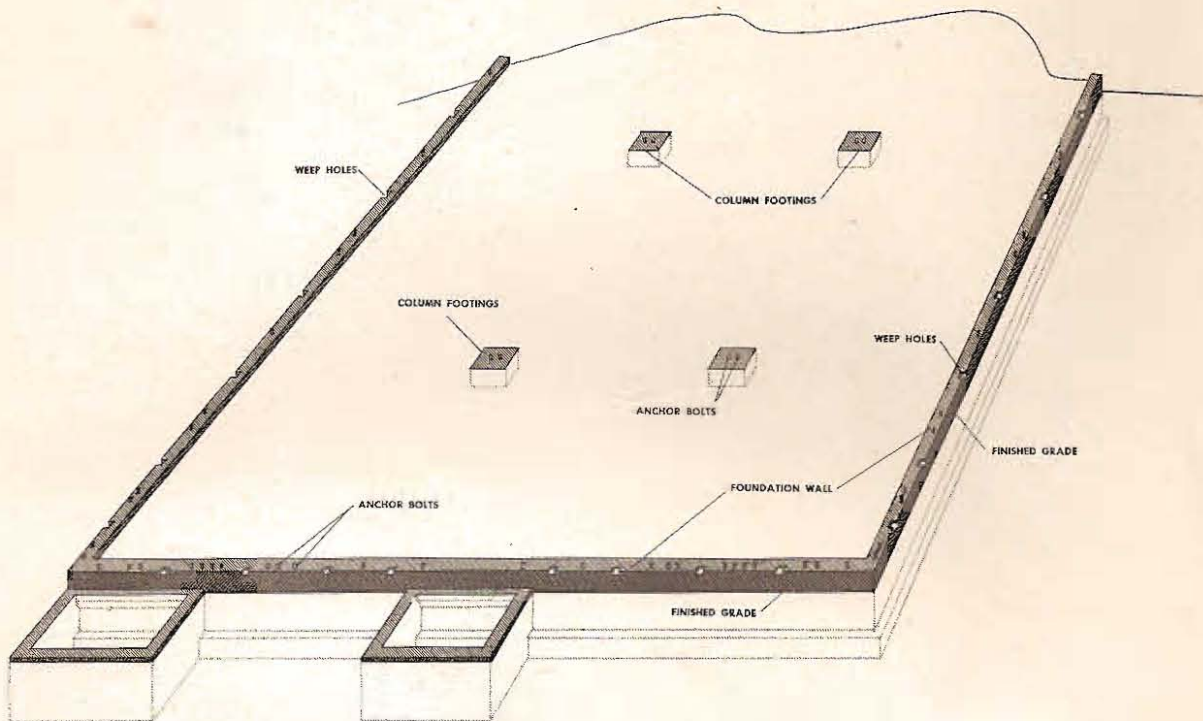


TIGHTEN BOLTS





# FOUNDATION



**1**

Lay out building accurately to dimensions shown on foundation plan. Establish elevation of finished first floor which is same as elevation of top of concrete foundation walls.

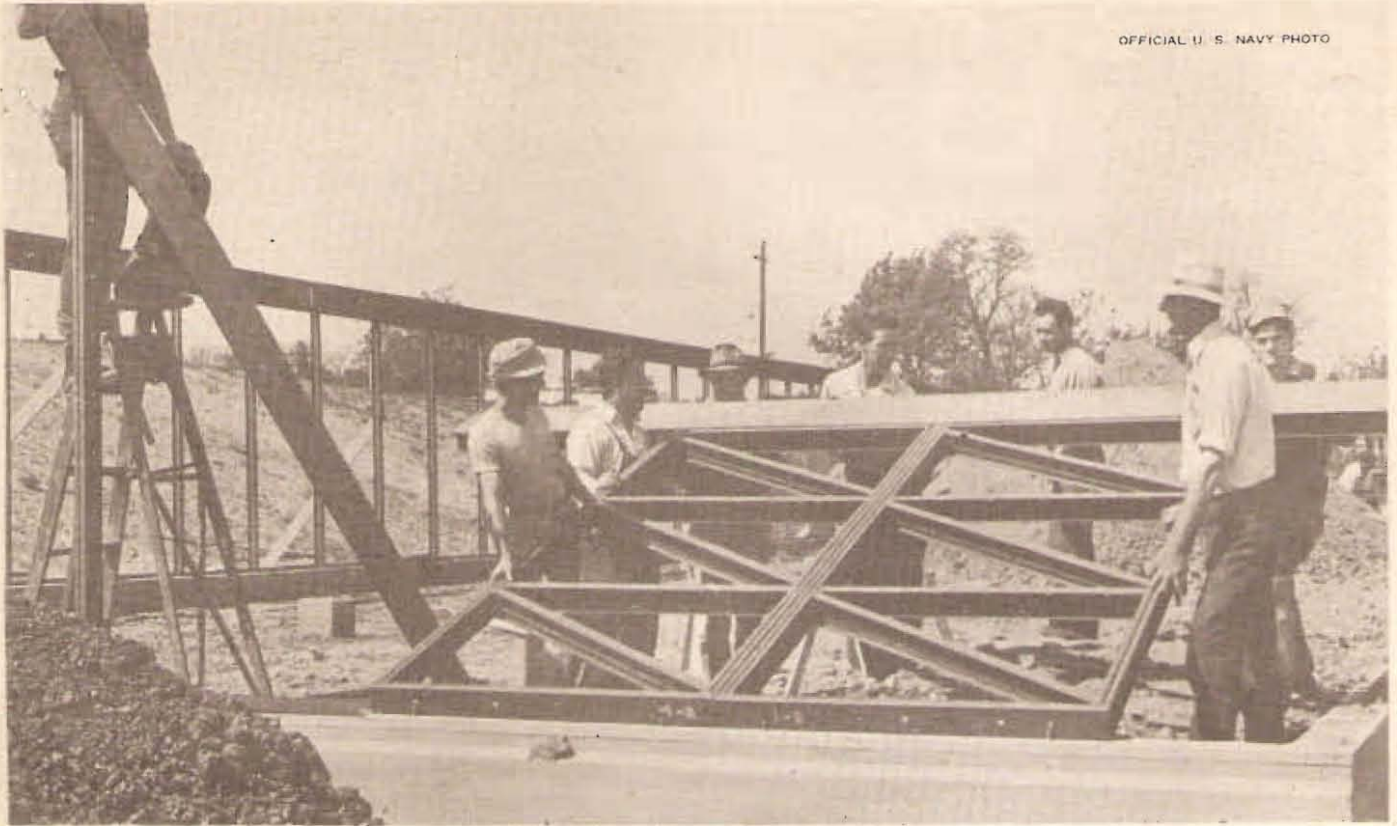
Excavate for footings and pour concrete. Simultaneously with the pouring of footings for interior columns, set column anchor bolts accurately according to plan. (The engineer in charge of erection must design the footings to meet the local soil conditions. The plans indicate the design loads which the footings must transfer to the soil.)

Build forms for concrete foundation walls and for walls that support slab platforms. Place anchor bolts accurately to dimensions indicated noting that 13— $\frac{3}{4}$ " dia. bolts occur at each corner of the building. Cut 90 blocks of wood, 1 $\frac{1}{8}$ " thick x 3" long and 3" wide from crating lumber, and place them in the forms midway between anchor bolts that are spaced 3 or more feet apart, keeping one edge flush with outside face of the wall and top flush with top of wall. Pour the concrete.

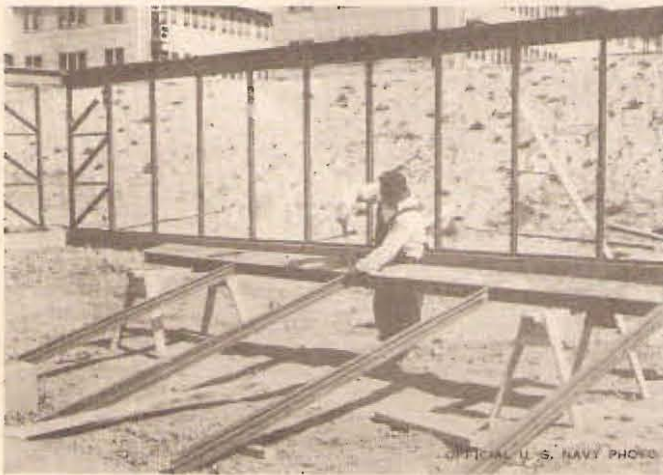
Strip the forms, and remove the wooden blocks.



# FIRST FLOOR WALLS



**ERECTING BRACING PANELS**



**ASSEMBLE WALL SECTION**



**ERECT WALL SECTION**



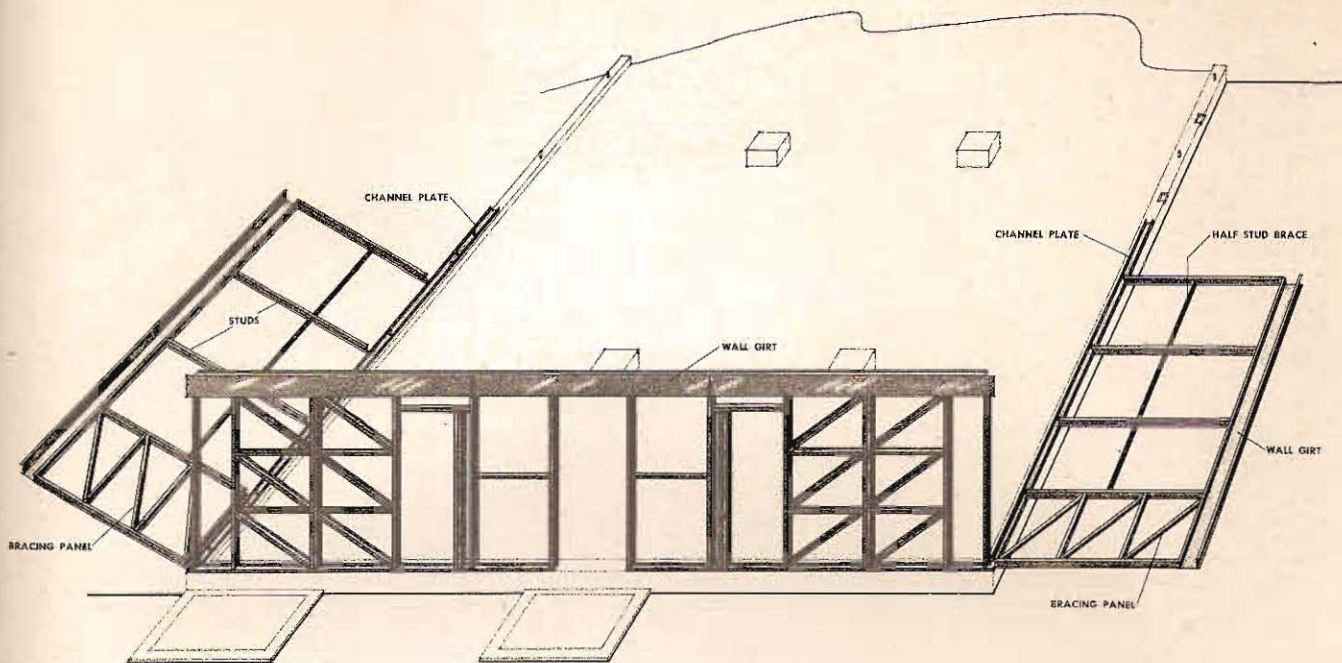
**WALL GIRT**



**BRACE WALL**



# FIRST FLOOR WALLS



**2** Lay  $3\frac{3}{4}$ " bottom channel plates in position over anchor bolts according to piece mark. Be sure plate layout is square, and maintain the  $40'-8\frac{3}{8}"$  dimensions center to center of plates across the building. Cut new holes in plate if necessary. Level and grout the plates and bolt them down, leaving nuts off the  $\frac{3}{4}"$  bolts until later.

With tape and chalk, locate and mark center of each stud on bottom channel plate and on girts that occur at the second floor line.

Assemble first floor wall framing in horizontal position with lower ends of the studs resting in the bottom channel plate and upper ends resting on horses. Length of section to be determined by the wall girts and convenience in handling. Fit tops of studs into the  $3\frac{3}{4}"$  channel of the wall girt, space  $4'-0"$  O.C., and secure with two holite screws. Slip ends of half stud braces over flanges of studs and secure with screws.

After section has been assembled, distribute the men over its length and raise it to vertical position guiding the bottoms of the studs into bottom channel plate. Brace sections in vertical position and secure studs to bottom channel plate. Secure bottom of the single mullion stud of the double doorway to a channel clip fastened to the concrete.

Join pairs of studs S-28 in end walls with C-clips marked CC. Insert legs of clips into nailing grooves of the adjoining studs and drive down tight.

Plumb walls after raising and brace securely with salvaged lumber and wire.

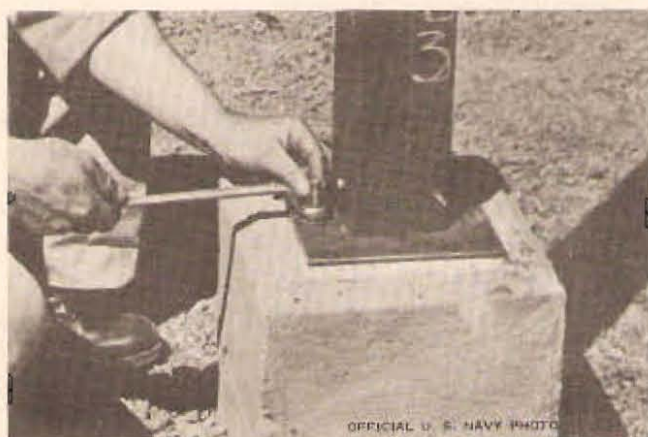


# COLUMNS AND BEAMS, FLOOR JOISTS, STAIRWAYS



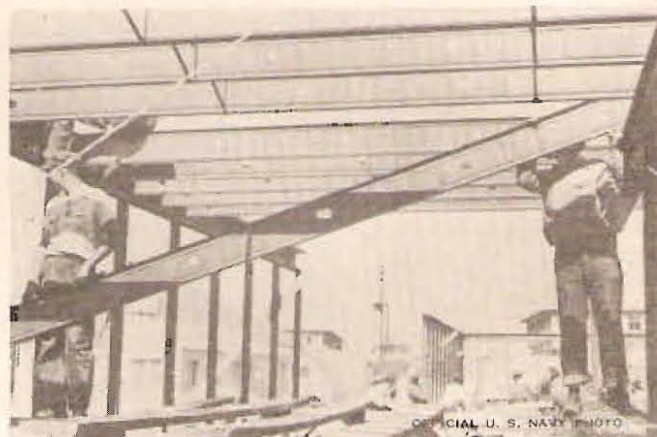
OFFICIAL U. S. NAVY PHOTO

**ERECT BEAM**



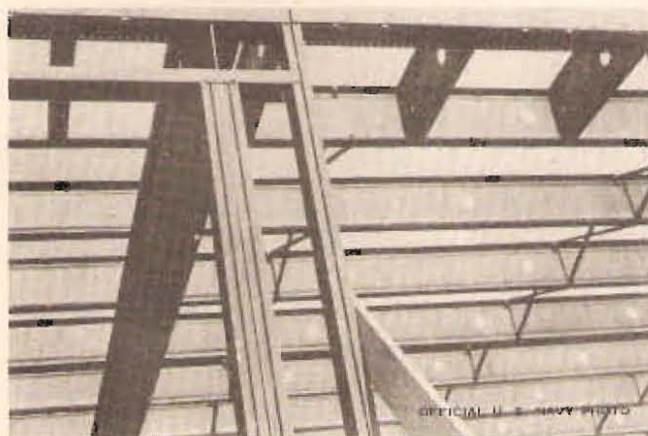
OFFICIAL U. S. NAVY PHOTO

**BOLT BASE PLATES**



OFFICIAL U. S. NAVY PHOTO

**ERECT JOISTS**



OFFICIAL U. S. NAVY PHOTO

**TAIL JOISTS AND BRIDGING**

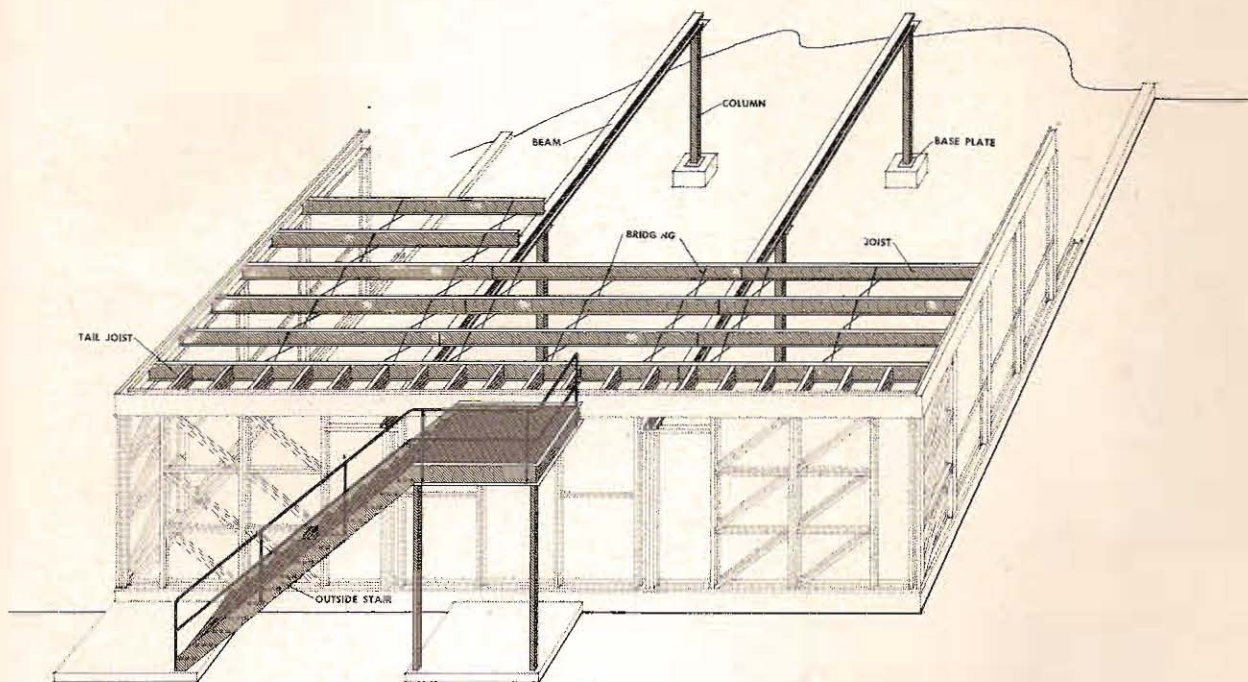


OFFICIAL U. S. NAVY PHOTO

**COMPLETE FLOOR FRAMING**



# COLUMNS AND BEAMS, FLOOR JOISTS, STAIRWAYS



**3** Set column baseplates level, grout, and bolt down. Attach column caps to tops of columns, assemble beams on the ground, then distribute beams and columns to their respective positions. Erect pair of columns nearest end wall, and raise the beams that extend between these columns and the end wall into position, simultaneously install joists that bear on beams, and side walls of building. Bolt channel stiffeners, where they are required, to joists as they are installed. Erect joists that span between beams and splice to abutting joists, then place tail-joists and install the seven rows of clip-on bridging.

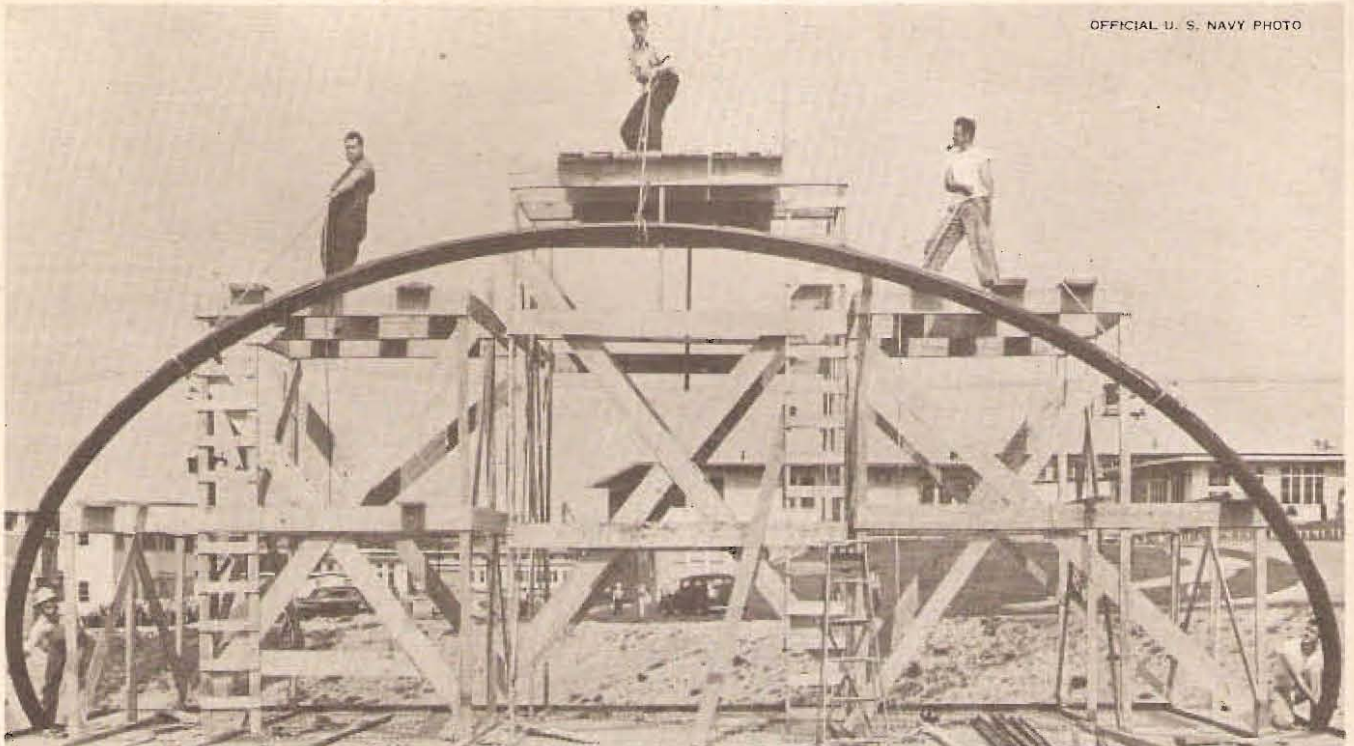
Follow same procedure with remaining pairs of columns and beams, splicing each beam as it is installed to adjoining beam at column. Install and bridge the joists that bear on each beam as soon as beam is in position. This will tend to keep structure stiff and plumb. Bolt knee braces of end and center pairs of columns in place.

Install interior stairway. Assemble stringers and platform framing, bolt stringers to beam at second floor, and block platform posts and stringers to finished first floor level until slab is poured. Lay angle platform supports and platform plate, then bolt risers and treads to carrier angles which are welded to stringers. Block treads with wood so temporary use of stairway will not injure nosings.

Erect the exterior stairways at the ends of the building. Assemble landing platform including clip angles that support stringers, then bolt platform to wall girt and support it on angle posts, blocking bottoms of posts to slab level until slab is poured. Attach upper ends of stringers to platform, blocking bottom ends of stringers similar to angle posts, then bolt grating treads to stringers. Finally erect hand rails; assemble rail on ground and install as a unit.

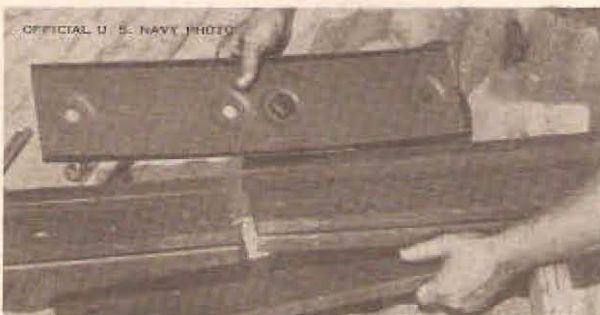


# ARCH RIB ROOF FRAMING, MONITOR, END WALLS, HOODS



OFFICIAL U. S. NAVY PHOTO

**ERECTING RIBS**



OFFICIAL U. S. NAVY PHOTO

**SPLICING RIB**



OFFICIAL U. S. NAVY PHOTO

**COMPLETED SPLICE**



OFFICIAL U. S. NAVY PHOTO

**RIB FRAMING**



OFFICIAL U. S. NAVY PHOTO

**END WALL FRAMING**



OFFICIAL U. S. NAVY PHOTO

**RAFTER CLIP**

**4**

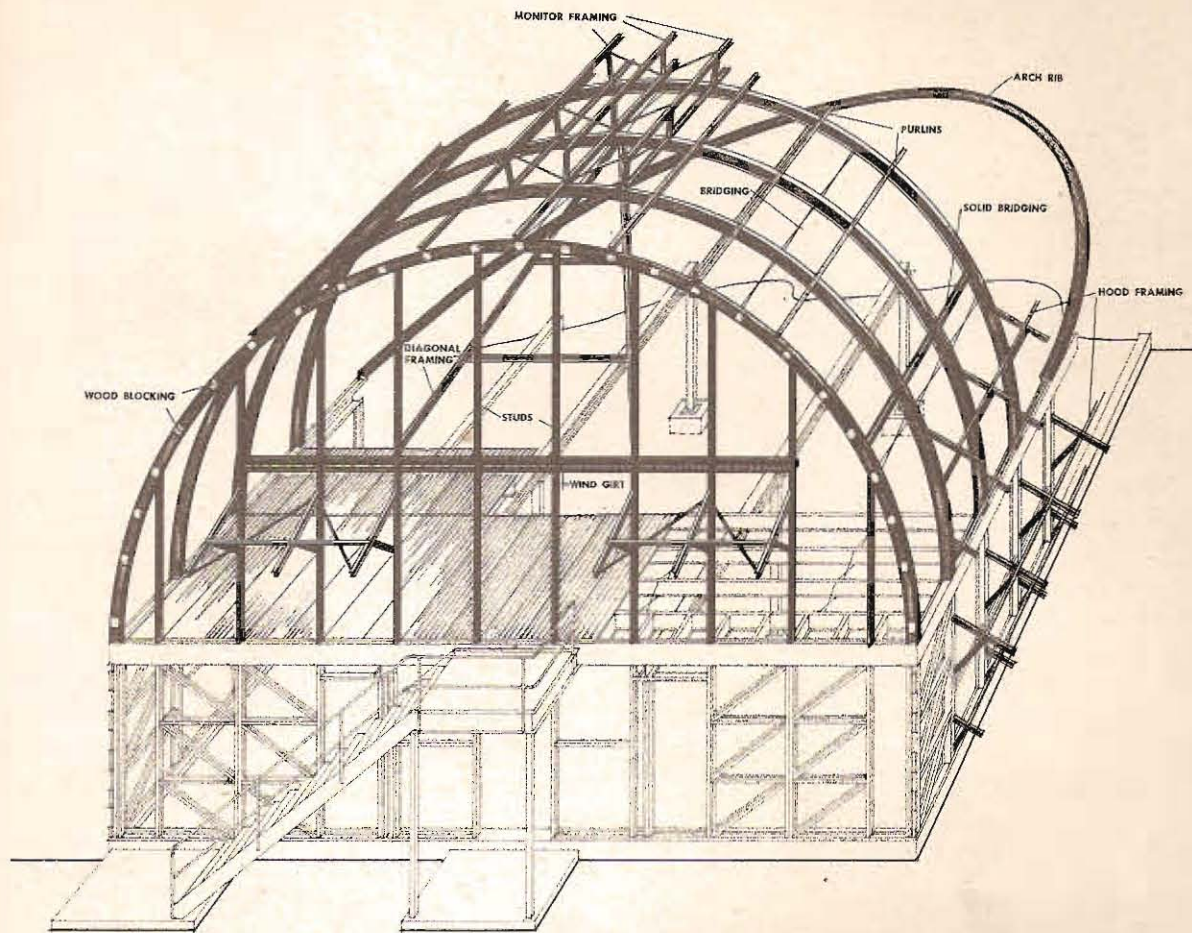
To facilitate assembling and raising of rib roof framing, apply second floor corrugated sheets to second floor joists before beginning work on ribs. At end walls sheets bear on angle L-3.

Assemble ribs on corrugated iron surface of second floor from the numbered sections marked R, C and L; lay them near their position in the building with lower end resting in channel plate and make splices. Lay end ribs so wood blocks will face outside of building after ribs are raised. Mark location of bridging, etc, while ribs are lying flat.

Construct movable staging similar to that shown on page 18.



# ARCH RIB ROOF FRAMING, MONITOR, END WALLS, HOODS



**4** Raise ribs; have men on platform pull rib into vertical position with ropes while remainder of crew guide bottom of rib into channel plate. Raise end rib first, then follow with others in sequence, securing each rib as it is raised to channel plate with four screws. Install bridging as successive ribs are raised, noting that the first three spaces at each end of building receive joist bridging. Place joist bridging marked 6BJ4, third space—top center, so  $\frac{3}{4}$ " hole is nearer third rib. Plumb first four ribs carefully and brace them with planks crossed diagonally and nailed to outside of ribs before raising intermediate ribs and attaching the clip-on bridging.

Assemble and raise the last four ribs in the same manner, grouping the ribs, however, against fifth rib from end of building until all ribs are raised, then move the staging out to the end of the building and successively "walk" each rib to its proper position.

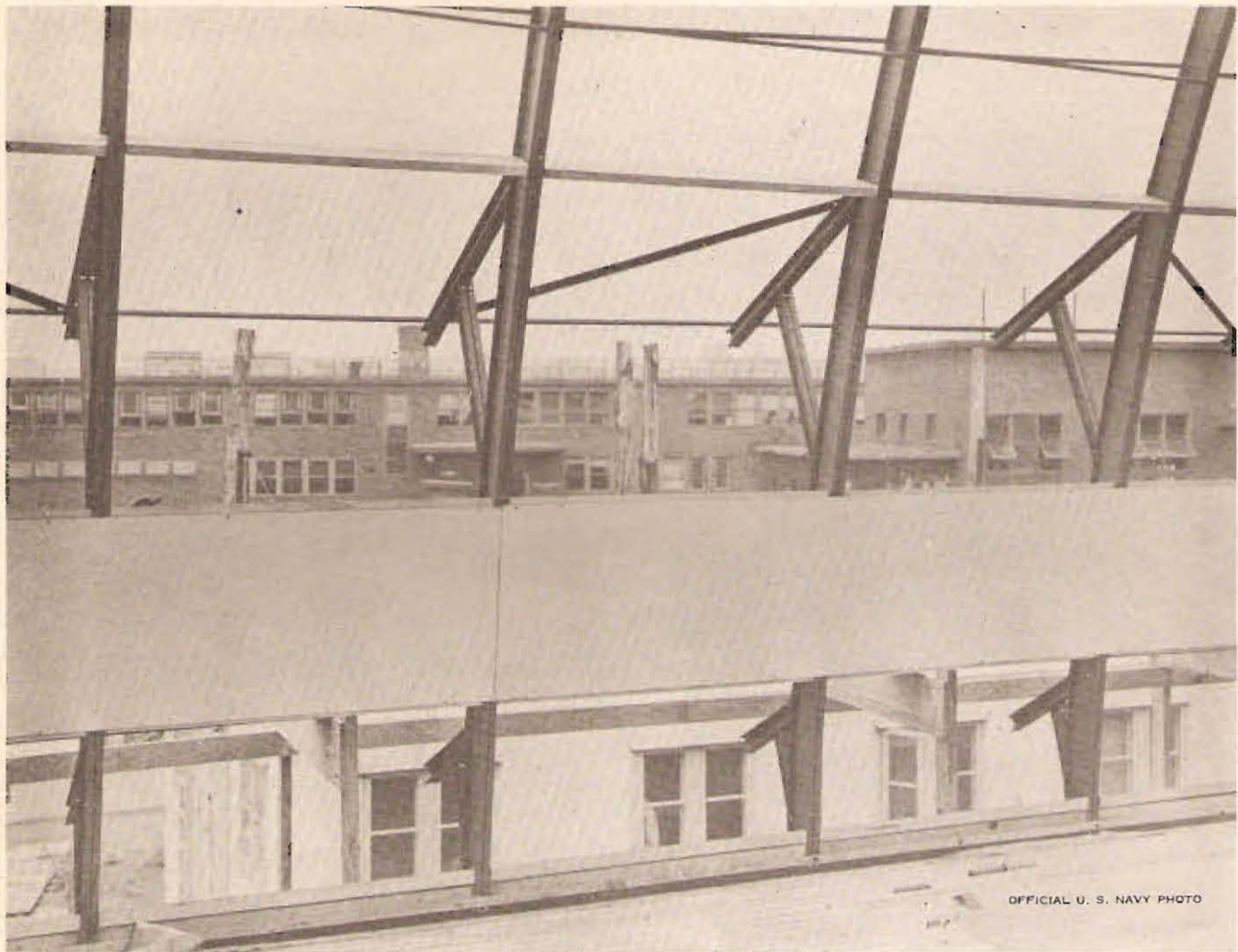
Erect the purlins and complete the monitor framing as the ribs are being raised, using the staging simultaneously for each purpose.

Erect second floor end wall framing while staging is at end of building. Raise and secure studs individually, then screw horizontal wind girt to their inside flanges. Connect braces from wall back to solid bridging 6BJ4, and install the bracing tie members.

Assemble lookouts, struts and clip angles of hood framing into units and fasten to studs and ribs with screws. Nail channel spreaders to lookouts and install bracing angles. Make sure hood framing is square and level. Nail closure ends of hooded openings to lookouts and ribs.



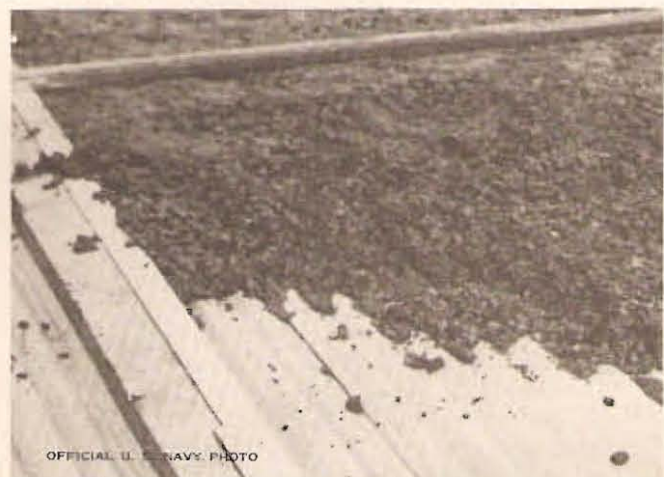
# CONCRETE FLOORS, FRAMING OF OPENINGS, CEMENT BASE



**FRAME OPENINGS**



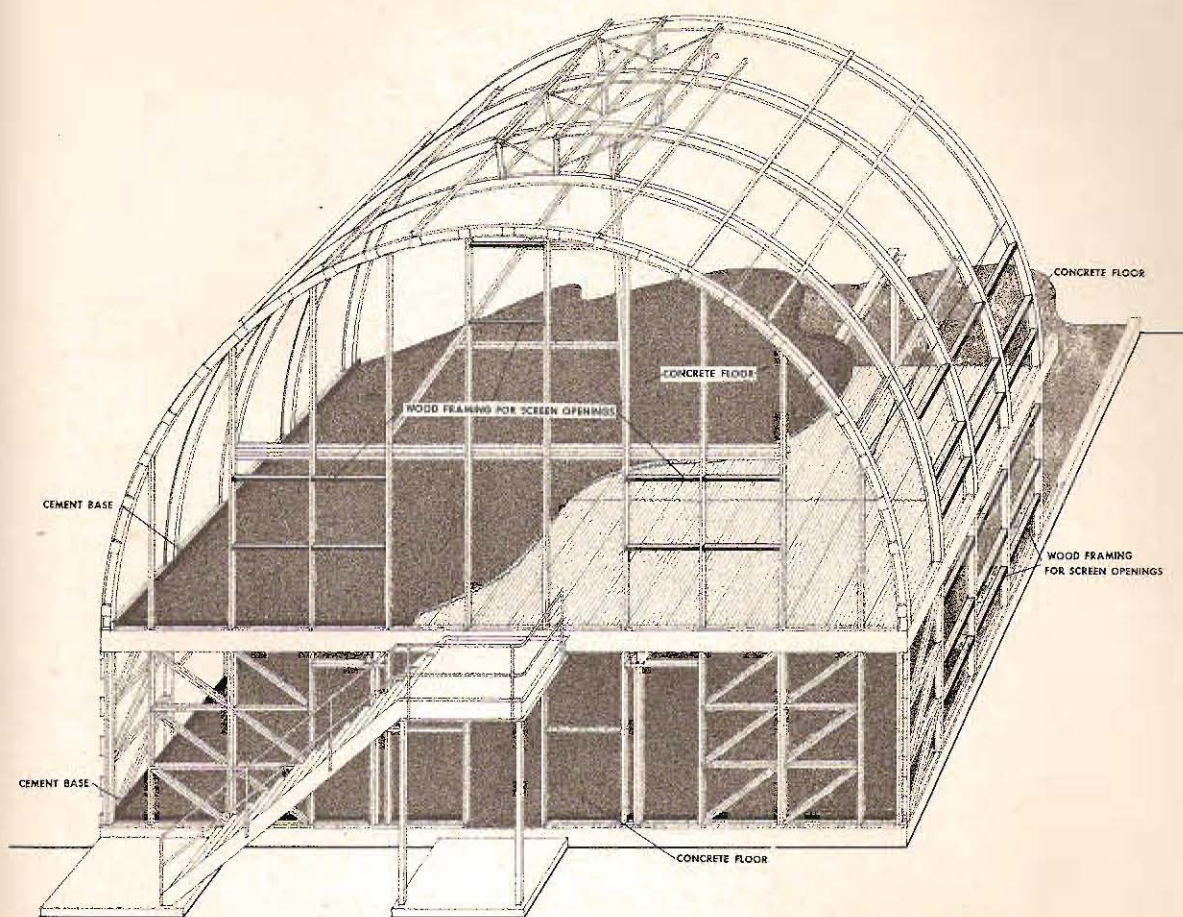
**WOOD PURLINS**



**CONCRETE FLOOR**



# CONCRETE FLOORS, FRAMING OF OPENINGS, CEMENT BASE



**5** Pour 2½" second floor concrete directly on corrugated iron after placing door sills DS1 for end doors. Do not fill channel plates with concrete. At stairway finish slab flush with nosing of top riser; at stairwell finish concrete flush with ends of joists and flanges defining opening. Pour 1½" cement fill on stair treads flush with top of nosings and pour 2½" concrete slab on steel plate of landing platform. Pour first floor slab on fill providing expansion joints where slabs contact foundation walls and concrete piers under columns. Slab reinforcing must be determined by engineer in charge. Pour entrance platform slabs.

Nail continuous 2⅜" sq. wood purlins to ribs at monitor, and place miscellaneous blocking, cutting blocking from salvaged crating lumber.

On studs and ribs, using chalk line, lay out hooded openings accurately, level and in line. Nail wooden sills and heads of these openings in place between ribs through holes provided in rib flanges. Assemble door frames from wooden jambs and heads, and nail channel clips to backs of jambs. (At double door, offset clips on jambs that form mullion to prevent interference with each other.) Bend down legs of clips on outside of frame; insert door frame between studs and bend legs of clips back. Plumb door frame; check to see that it is square, and nail clips to studs. Install louvres in end walls.

Nail and tie metal lath of cement base to studs and channel plates around walls of building at floor line; back up lath where hooded openings occur near floor line with metal plates BS-2 nailed to studs. Nail continuous metal base screed marked BS-1 to studs, carefully keeping it at proper height and absolutely level. Apply Portland cement base 1¼" thick flush with face of screed and trowel to smooth finish. Where hooded openings occur near floor, apply continuous wood screen mold to top of screed, nailing it to studs. Tack wood screen stop lightly until screen is installed.



# INTERIOR COVERING, SCREENING, INSULATION



**INSULATION**



**APPLY INTERIOR COVERING**



**AT END**



**APPLY BATTENS**



**SCREENING**



**COMPLETE**

**6**

**FIRST FLOOR WALLS AND CEILING:** Each Masonite sheet covers from centerline to centerline of studs. Set bottoms of sheets on metal base screed and center long sides of sheets over studs, then secure adjoining sheets to studs simultaneously with "Simplex" nails.

Begin with side walls, apply sheets adjoining doorways and stairway first, and work out to ends of building. At hooded openings nail sheets to wooden heads and sills with 6 D nails, and cover flanges of studs exposed in openings with 2" wide Masonite fillers. Apply sheets to end walls of building, starting with sheet over door and working out sheet by sheet towards each side.

Cover ceiling with three rows of sheets placed so edges nearest C-section beams are 9 1/8" from center line of beam. Nail sheets where they butt at alternate joists with "Simplex" nails, and between joints with 6 D nails. Apply 2" wide Masonite fillers at beam flange and at outside wall, then apply 7" wide borders on either side of beam and 10" wide borders at outside walls, nailing to joists with 6 D common nails. Cover sheet joints with 2" Masonite battens extending from border to border and nailed with 6 D nails. Nail 2" x 3/4" ceiling molding in place at junction of walls and ceiling.

Apply screen to inside of hooded openings; fasten it with cloth staples, and be careful not to have screen more than 1 1/2" beyond limits of openings.

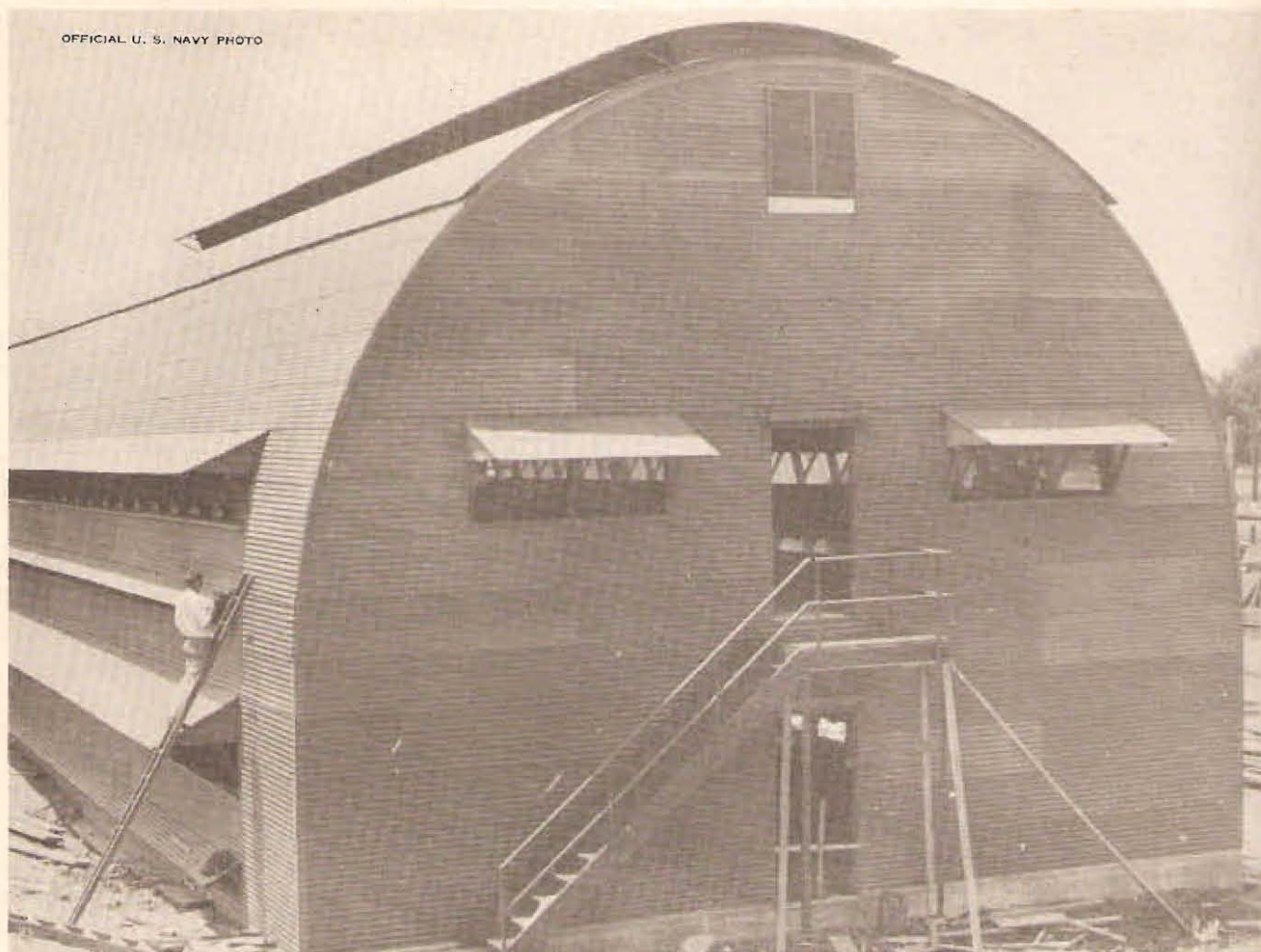
Trim around openings and doors, cover sheet joints and fillers in hooded openings with 2" wide battens, extending these battens from top of base screed to bottom of ceiling mold.

**SECOND FLOOR CEILING AND WALLS:** Begin application of sheets on curve with row of 3'-11 7/8" x 11'-11 7/8" sheets directly above large hooded openings. Place bottom edge of these sheets flush with inside of opening header and center long edges of sheets on center line of rib, then nail adjoining sheets simultaneously with "Simplex" nails spaced so Masonite sheets will follow curve of ribs. Slip wall splines which extend continuously for length of building over the top ends of these sheets. Apply the remaining row of sheets on each side of the building next, slipping their lower ends into wall splines on upper ends of lower row of sheets. Nail this row of sheets as lower row was nailed, and place continuous wall splines over upper ends of sheets. Nail sheets between hooded openings to heads and sills of openings. Where hooded openings do not occur, extend sheets down to metal base screed.

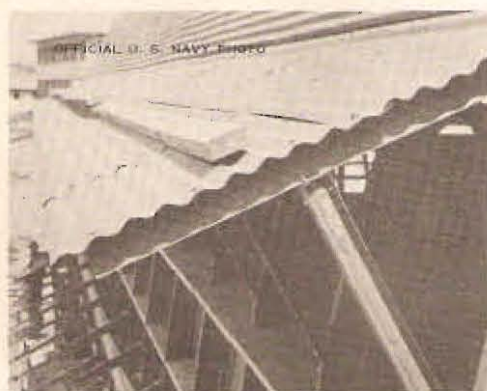
Nail wood blocking to inside of end rib and apply sheets to end walls, following procedure used in applying end wall sheets of first floor, placing sheets cut on curve according to numbers. Finish sheets around wind girt, leaving it exposed.



# CORRUGATED IRON COVERING



**COMPLETE CORRUGATED METAL COVERING**



**HOOD COVERING**



**SIDE WALL**



**MONITOR ROOF**

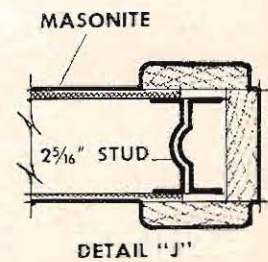
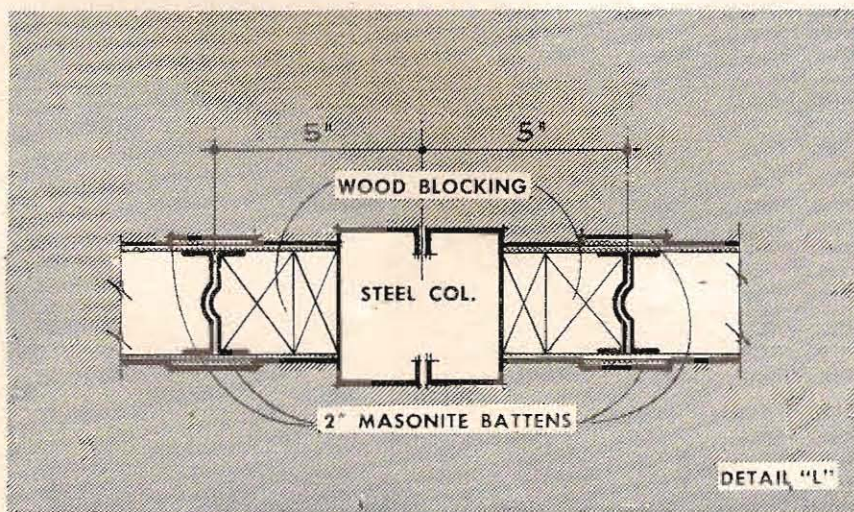
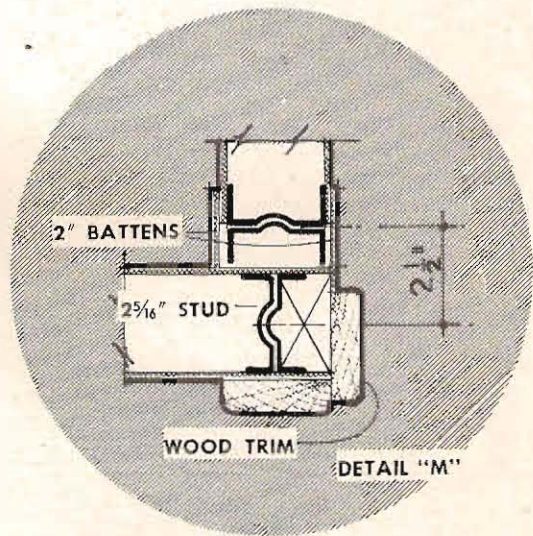
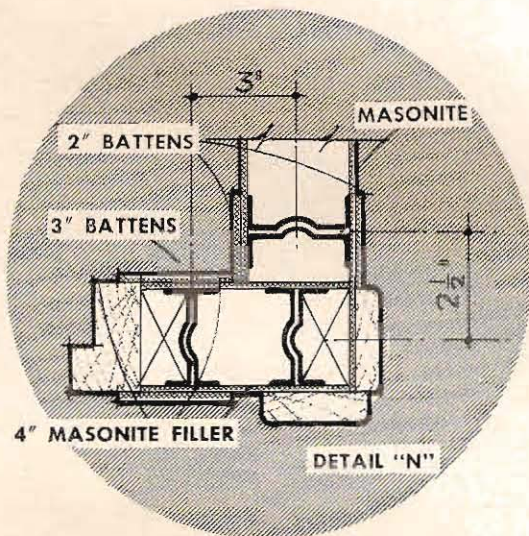
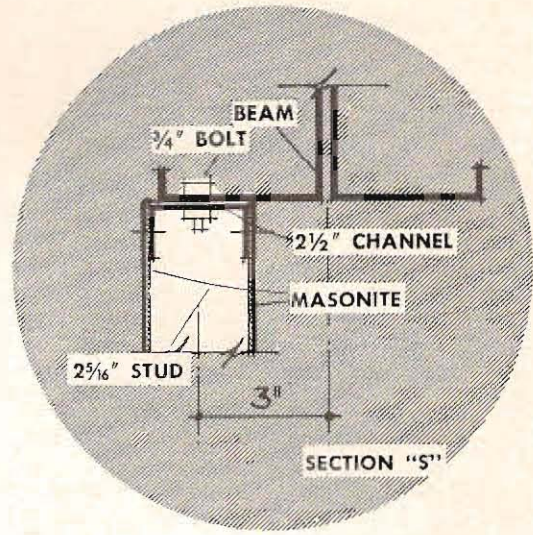
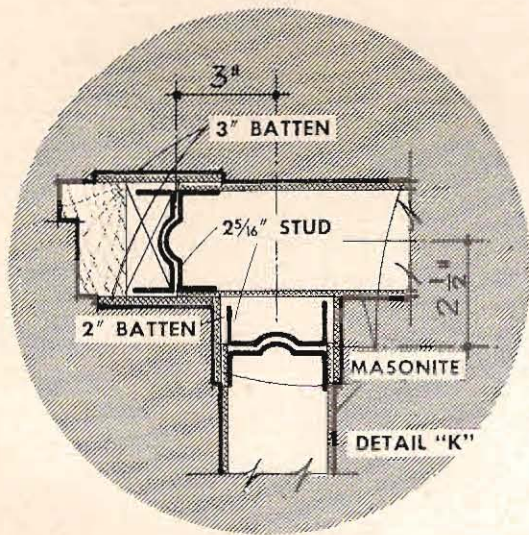


**STAGING**



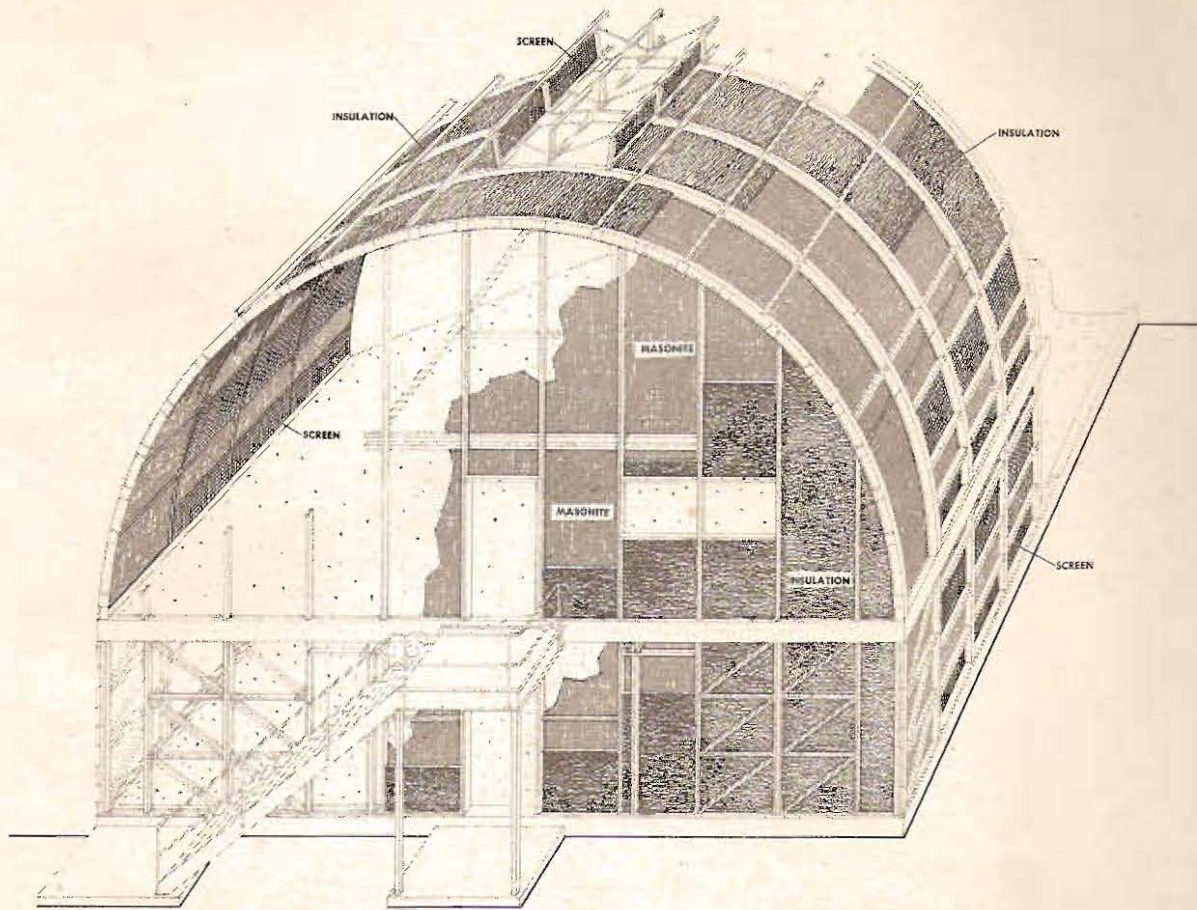
# PARTITIONS

NOTE: FOR LOCATION OF DETAILS, SEE SHEET NO. 19 OF WORKING DRAWINGS





# INTERIOR COVERING, SCREENING, INSULATION



- 6** Apply Masonite fillers to ribs in hooded openings and apply screens, then trim openings and cover rib joints of sheets with 2" wide Masonite battens.

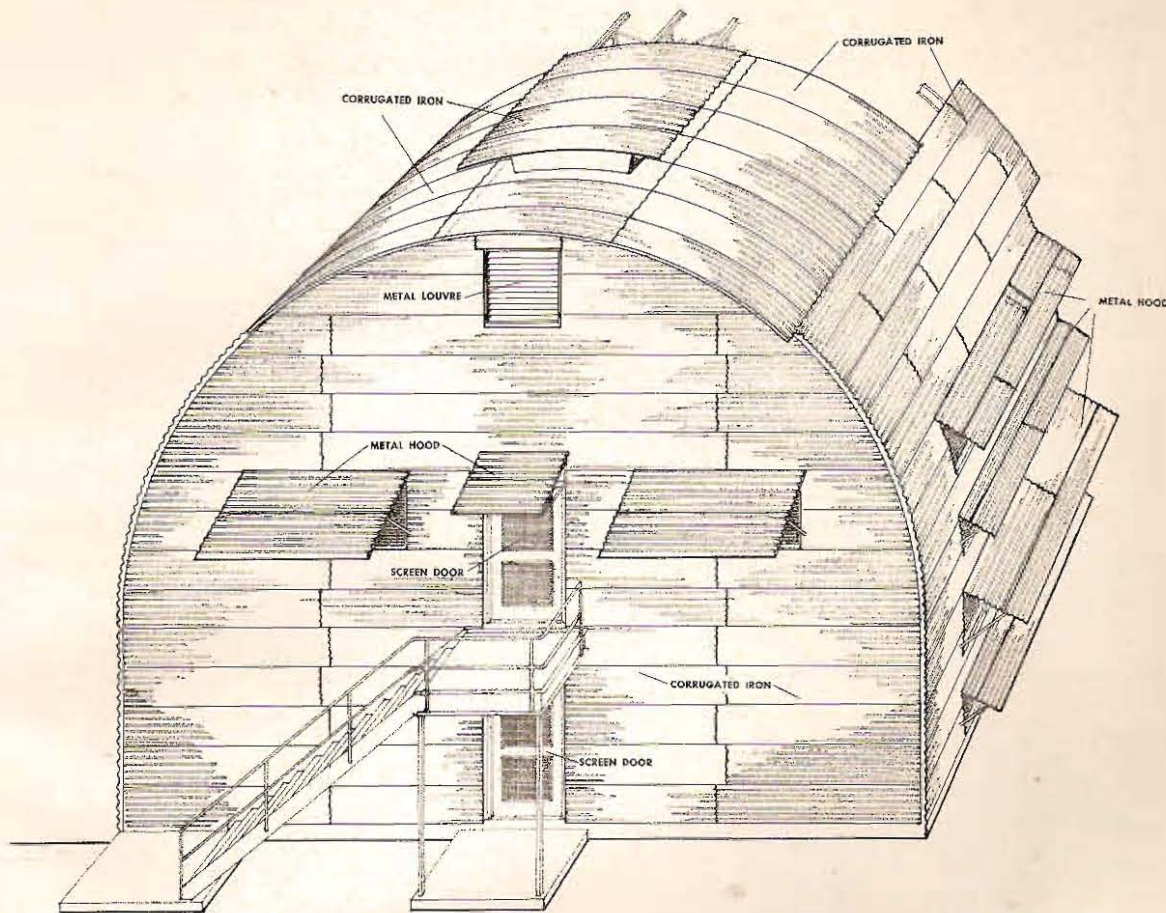
**INSULATION**—Cover entire surface of building between ribs, studs, and openings with insulation placed directly against outside surface of the interior covering.

Uncrate, unroll and stretch insulation. Cut it into lengths to extend from monitor to top of large hooded opening and reroll. At ends of building insulation extends down to floor lines. Nail end of insulation to continuous 2 3/8" sq. wood blocking, unroll between ribs, under bridging, and nail it to wood header of hooded openings. Cut insulation to fit between solid bridging members, and block with wood to hold in position. Between sill of large and head of small hooded openings, place insulation between ribs and nail to sill and head of openings.

Place insulation between studs of first floor walls, fasten to wood blocking wedged into upper channel plate, and nail to heads and sills of hooded openings, etc. At end walls of building place insulation between studs, nail it to blocking on underside of rib and provide additional blocking necessary to hold insulation against inside covering. Securely fasten insulation to prevent its loosening and dropping.



# CORRUGATED IRON COVERING



**7**

Corrugated sheets are 27½" wide, lap each other 1½ corrugations at the sides and 6" at the ends. On curved portion of roof, "butter" end laps with mastic. Nail sheets at each stud or rib with double-headed nails and combination steel and fiber washers placed at approximately 8" O. C. always at high point of corrugation. At jambs of openings and end walls of monitor seal corrugations with corrugated asbestos-asphalt strips placed underneath iron and nailed simultaneously with it.

With chalk line describe line around entire building at 3" below finished first floor. Start corrugated sheets at this line, turning corrugation at lower edge of sheet against wall.

Apply sheets to end walls, starting with bottom row and working row by row toward top of the building. Carefully place sheets according to sizes and marks. Nail sheets to wood blocking in rib and corner studs. Apply covering to hooded openings and install hood over second floor doorway simultaneously with wall covering. Nail flashing pieces F-2 and F-3 in place so their flat sides lap over faces of end walls.

Apply flat sheets of side walls, which extend from three inches below first floor line to the lowest purlin, first. Start with lowest row of sheets and work up row by row to purlin. Cover each hood in turn, carefully meshing the corrugation of sheets covering hood with those of sheets nailed to ribs and studs. Place sheets according to sizes and marks.

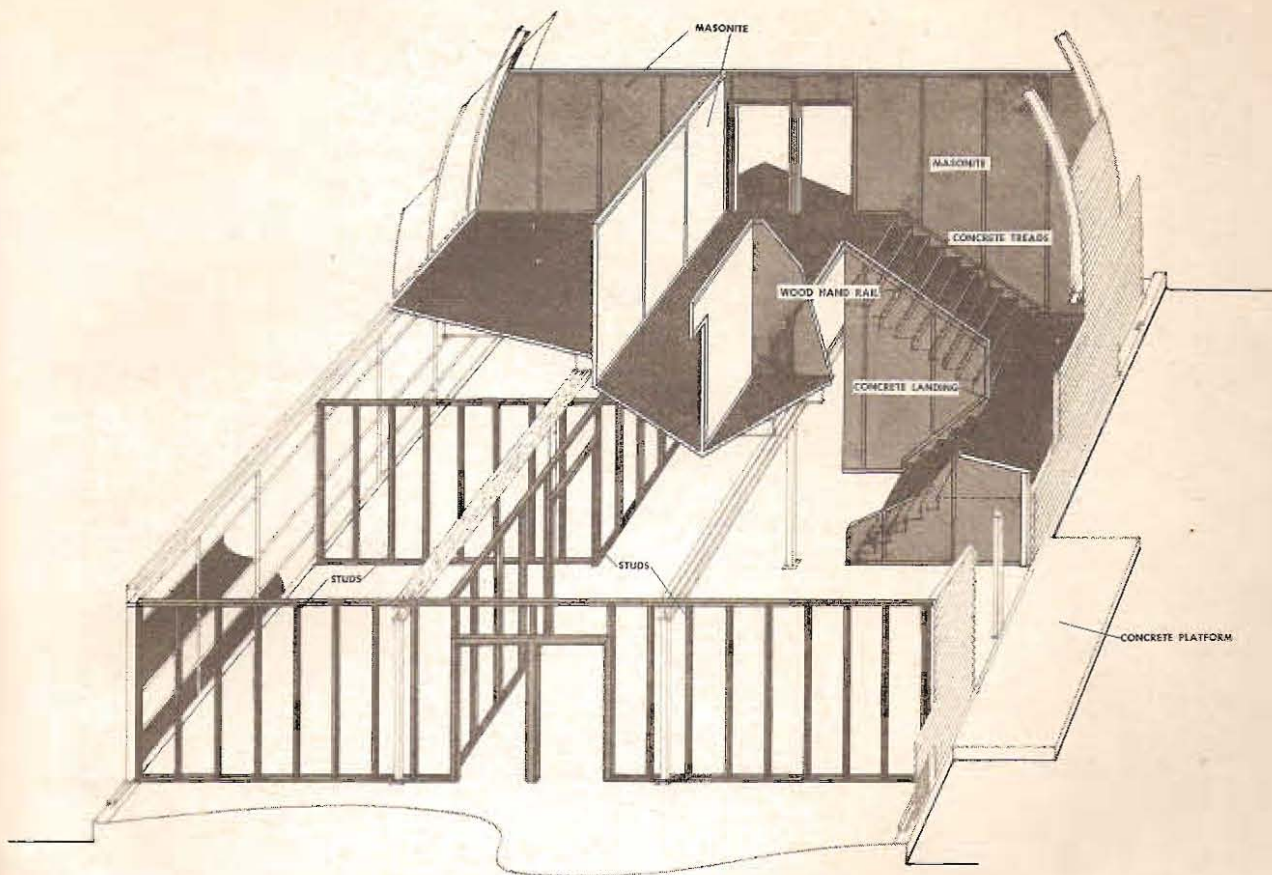
Lay flashing marked F-1 over lowest purlin before applying curved roof sheets. Nail this flashing to each rib and screw to sheets underneath, twice between ribs.

Apply screen to sides of monitor, nailing it to purlin at top and wood nailor at bottom. Apply corrugated sheets to ends of monitor along with flashing F-12 and F-14.

Apply lowest rows of curved sheets, nailing them to purlins. Next apply top center curved sheets at end of building and continue down sides of monitor, applying short curved sheets (24" long). Place flashing marked F-13 at tops of side monitor purlins, and apply curved sheets that cover top of monitor. Install continuous brace L-2 and struts L-1 that support overhang of monitor roof sheets.



# PARTITIONS



**8** Lay out center lines of partitions on concrete floors. Lay bottom channel plates of partitions in position according to marks so they center on center lines of layout. Secure these plates to concrete floors with lag screws and expansion shields. Where mullion studs of the double doors occur, secure a  $2\frac{3}{16}$ " stud bracket (indicated S.B. 1 on elevations) to the floors in the same manner.

**FIRST FLOOR**—Lay out center lines of partitions on ceiling. Nail  $\frac{7}{8}$ " x  $2\frac{1}{2}$ " continuous wood blocking to bottoms of floor joist following partition layout. Nail top channel plates to blocking placing them in accordance with marks. Bolt plates marked T29 to bottom flange of C-section beam with  $\frac{3}{4}$ " bolts. Place studs according to marks and dimensions into channel plates and secure with screws. Nail plate marked T27 to tops of studs framing partitions between runs of stairway.

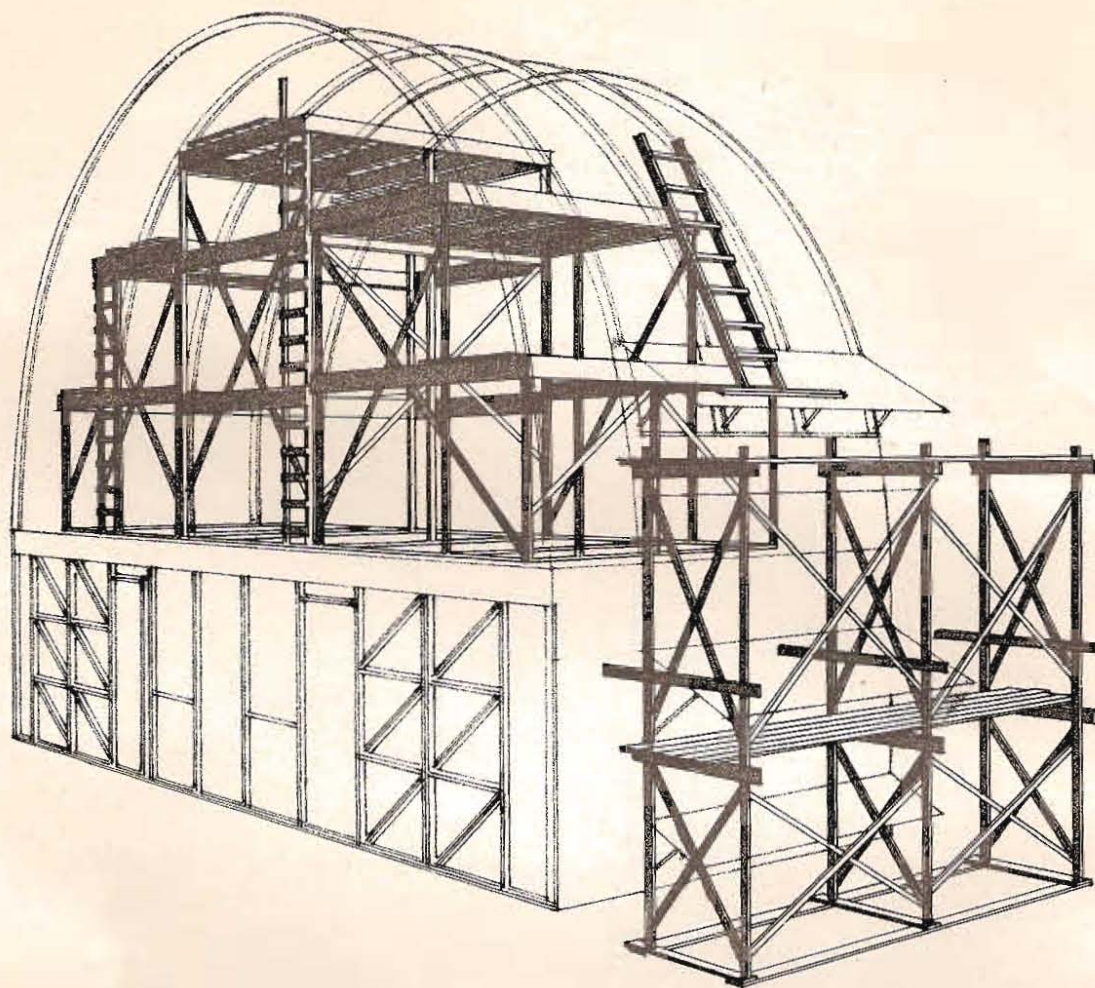
**SECOND FLOOR**—Assemble second floor partitions on floor, and raise them into vertical position. Brace individual partitions until all partitions are raised and joist ties are installed.

Assemble door frame, attach channel clips to jambs, and set in position between studs. Nail miscellaneous wood blocking that occurs where partitions of second floor butt into outside wall, to top of stair rails, where partitions join columns and where partitions form outside corners in place.

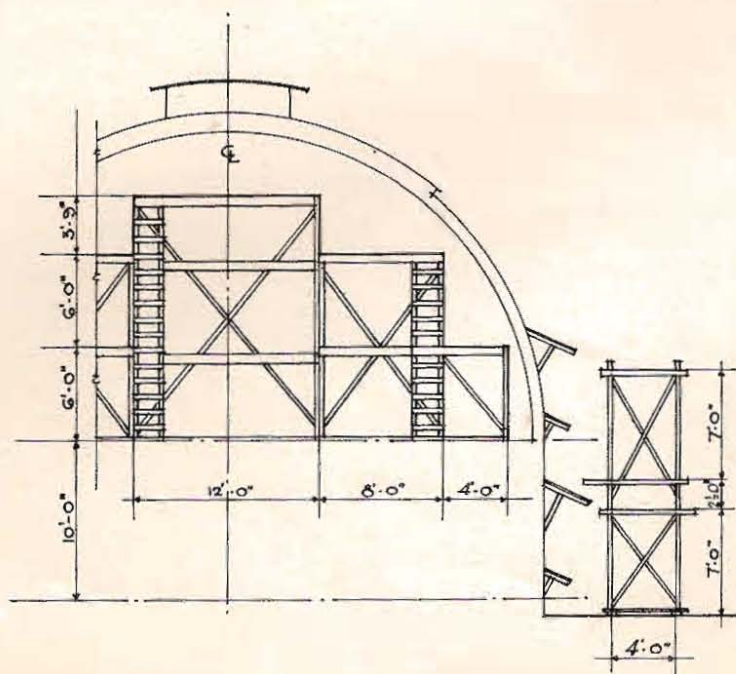
Nail metal base screed and metal lath to studs at floor line, and apply cement base.

Nail Masonite sheets to partition framing, and to stair rails. Place sheets according to size and mark, and secure them at sheet joints with Simplex nails, and at intermediate studs with 6 penny common nails, cutting the sheets at the stairway to finish on the stair stringers. Nail  $3\frac{1}{2}$ " x  $2\frac{3}{4}$ " wood ceiling molds to top and exterior corners of partition. Apply Masonite battens. Use the 3" wide battens to finish around doors and openings and to finish partitions against outside walls, and use 2" wide battens to cover sheet joints, trim at base screed, stair stringers, etc. Nail battens with 6 penny common nails.






# SCAFFOLDING AND STAGING





## SUGGESTIONS TO ERECTOR

 **ORGANIZATION**—The erection of the S.S.A.R. B1-B barracks is simple and fast. One operation easily follows another—if the operations are done properly and in sequence. It is important to get off to the right start by being careful to get the frame square, plumb and level so the Masonite and corrugated iron will fit.

Where a number of buildings are to be erected a logical division of personnel is into crews for (1) foundations, (2) Stran-Steel frame, (3) framing of openings, (4) interior covering and screening, (5) insulation, (6) outside covering.

The instructions give each operation complete in its proper order; it is not always necessary, however, to finish an operation throughout the entire building before the next one is begun. Much time can be saved by having the crews working on their respective portions of the work simultaneously. For example, the crew framing the openings can begin work after the second floor joists have been placed while the Stran-Steel framing crew is proceeding with the ribs of the second floor. The men installing the Masonite can follow immediately behind those framing the opening and the outside covering men can follow the insulation crew. In this way all operations can be carried on together.

**HINTS**—If any of the steel members have become damaged in shipment, the easiest way to straighten them is by placing the bent part over a crate or sawhorse and having a man bear down on each end. The hardest way to straighten is by using a hammer.

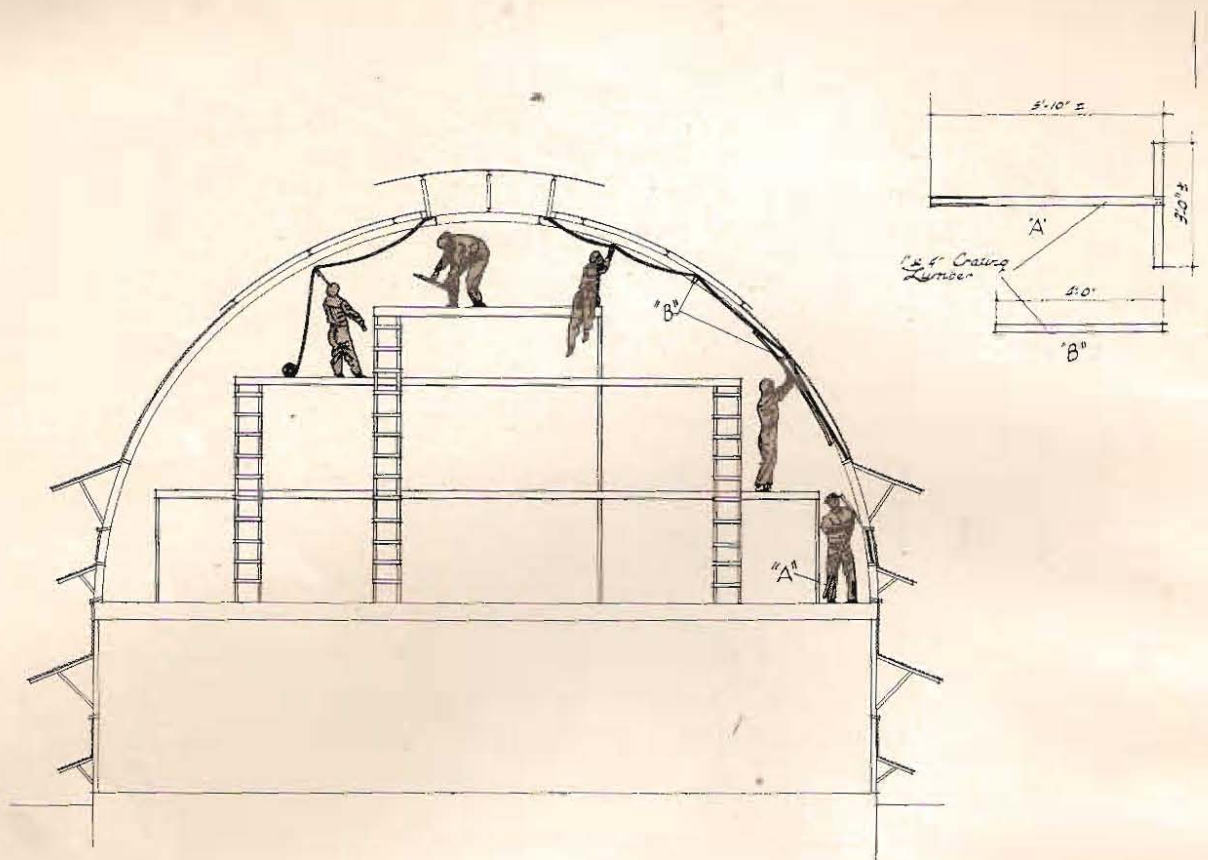
There is a trick to opening the banded crates. When this is known and used, much time and effort can be saved. Take one of the screwdrivers furnished for assembling the frame, insert flat side under steel band about an inch or inch-and-half. Turn the screwdriver about the handle roughly an eighth turn. This brings the sharp edge of the screwdriver in contact with the band. Pull up quickly. This motion cuts the band rather than breaking it. When the knack of using a screwdriver is learned, opening the crates is an easy job. Open crates carefully so lumber can be reused in building erection staging.

The importance of using the right nails, screws, and attachments cannot be too strongly stressed. Follow the instructions closely in this regard.

**TOOLS**—A complete set of necessary tools is furnished for erecting the complete buildings. They should be supplied to the men who will use them. If there are many buildings to be erected at one location, the best scheme is to open all the boxes containing tools and pool them. Then issue by tool check.

### TAKE GOOD CARE OF THE TOOLS





SUGGESTED METHOD OF INSULATING BUILDING  
BEFORE APPLYING MASONITE SHEETS.

# WORKING DRAWINGS

The drawings reproduced on the following pages are the working drawings from which the basic building was manufactured. On these drawings all the parts necessary to assemble the building appear along with their piece markings. These drawings should be studied in conjunction with the erection instructions and illustrations appearing in other parts of the book. When so used they will help the erector understand the entire building and see the reason for each successive operation. We caution the erector not to cut, or repunch any part without first making sure that cutting or punching is necessary as each member was fabricated to fit into its respective position in the building without additional cutting, etc.