

50,000 GAL. RR WATER TANK



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Assembly Instructions

Steam locomotives depended on fuel and water for the generation of their steam power. Of the two, an adequate supply of water was often the more serious problem. Maintaining the proper level of water in the boiler was of paramount importance; if there was too much, there would be insufficient space remaining for the required amount of steam to operate the locomotive---if the water was allowed to get too low, the boiler would explode with terrific force, scattering parts of the engine over a wide area and killing the engine crew and any others in the vicinity.

For these reasons, water tanks were to be found along the right-of-way of every railroad operating steam locomotives, at intervals to assure a plentiful supply of water wherever it might be needed. Every town, hamlet and junction had a water tank, and others were placed between these points wherever required---often out in the country, completely away from civilization.

In the early years, tanks were all built with tapered staves, so the tank was smaller at the top. This was required because the hoops were riveted to the required diameter, and driven down on the taper of the tank until they were tight. Sometime in the early 1900's sectional hoops, with lugs for tightening, were introduced. Most tanks from then on were built with straight sides. This is the type modeled in this kit. NOTE: Changes in humidity and temperature sometimes cause the paper to shrink or swell, slightly altering the size of the templates. If the wood parts do not exactly fit the templates, work from the center, splitting the difference.

Before starting assembly, sort and identify the parts, and be sure you visualize each step. Most of the wood parts have been cut to length for you, and should need no further work. Some of the castings may need a bit of filing to remove any flash and to smooth the parting line if it shows. Be careful with the castings as some are very small and can be easily broken.

If you intend to stain your model, this should be done before assembly, as most stains will not "take" on the glued joints. If you plan to paint the model, this can be done later.

1. Glue the 4 pieces of scribed sheathing (3" x 3½") edge-to-edge on the template, Fig. 2, to form the sides or wrapper for the round tank. In working on any of the templates, it is best to spread waxed paper over the drawing to prevent the glue from sticking to the paper. As you glue each piece in place, hold it with bits of masking tape so it will not shift. Make sure the

bottom and top edges are exactly even. Wipe off any glue that squeezes out. Note that the edge plank on each side of each piece is a partial plank width. By proper arrangement, these will form full width planks and when glued tightly together the joint will disappear. Before removing the wrapper from the template, run a length of masking tape the full length at both the top and bottom, to give strength while handling the wrapper carefully! Turn it over, and run a length of Scotch Mending Tape along the full length inside about 3/8" from the top and bottom edges for permanent strengthening.

2. Make the tank core as shown in Fig. 1. Place both hardboard discs upon one end of the ½" dowel tightly together. If you find them slightly out of concentricity, rotate one until they both match fairly even. Now make a mark on both edges at a certain point. This point we will call number one. Then mark off each disc on the smooth side evenly into eighths, as shown. Glue a disc at each end of the ½" dowel, with the marks above each other, keeping the number ones together and both discs concentric. Glue the eight ¼" x ¼" wood spacers between the discs, in line with the marks. As you glue each spacer, rest the disc rims against the table, and press the spacer out flush with the edges of the discs. Repeat with all the spacers so they will hold the wrapper straight from top to bottom. Set the tank core assembly aside to dry thoroughly.

3. While the tank sides and core are drying, make the frames for the tower. These are assembled on the templates in either Fig. 3A or Fig. 3B. To build the normal-height tank, as shown in the photograph and in the side view, Fig. 7, use the template in Fig. 3A. Some of the older and narrow gauge roads built lower towers under their tanks. For this construction, use the templates in Fig. 3B, and the method in Step 5 below.

4. The legs of the tower are made of 3/32" x 3/16" wood, and are cut to length for the higher tower. Each leg is formed by two pieces which glue together as you assemble the tower frames to make the finished legs, 3/16" square. The tower is made up of 12 frames, of which 8 are to be made on the right hand template of Fig. 3A and 4 on the left hand template of Fig. 3A.

Start by cutting 48 diagonal "X" braces from the 1/16" x 3/32" wood, to fit the templates in Fig. 3A. The diagonals must be cut with their wider side against the template, while cutting the ends on the angles to fit between the legs. Cut them carefully and accurately. Cut the two tower frame spacers from the printed card, and glue them over the shaded areas in Fig. 3A, so the diagonals line up with the diagonals on the template.

Fasten the template on a piece of soft wood, and make an assembly jig by putting pins upright where indicated on the template. Use one of the frost box sides as a guide in fixing the distance between the legs. In making each frame, insert two legs in the jig, one of them on edge, and the other lying flat, as indicated. Glue the two diagonals in positions "X" first, holding them firmly down against the card spacer. The

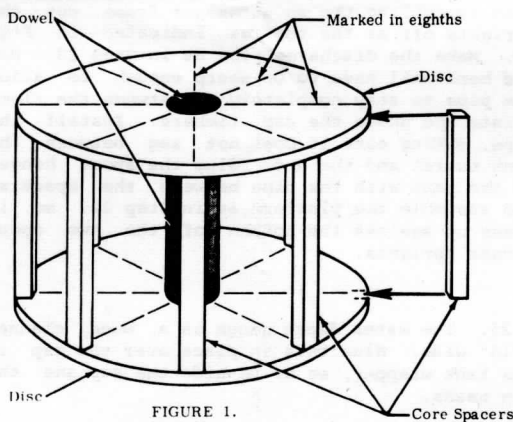


FIGURE 1.
Tank Core.

other two diagonals on each frame glue on top of the first ones, and are glued only to the leg that is on edge, and to the middle of the first diagonals "X". The other end is above the flat leg, and will glue to the next frame when you assemble the tower.

As each frame dries, mark the bottom and lift it carefully from the jig. Repeat, making four frames from the left, and eight from the right hand template in Fig. 3A.

5. If you are building the lower "narrow gauge" tower, the procedure is the same as in Step 4, except that all the legs must be cut to the shorter length shown on the template, and there will be only two diagonals in each frame. For the lower tower use only the templates in Fig. 3B, with card spacers as described above. You will also have to use extra care in removing the frames from the template, and in assembling the tower, as the two legs of each frame are held together by only one diagonal until the frames are assembled into the tower.

6. While the frames are drying, you can complete the tank itself. Place the wrapper over the template in Fig. 2, with the top and bottom edges lined up exactly with the template, and fasten it in place with masking tape so it cannot move. The short horizontal lines extending out beyond the ends of Fig. 2 are the positions for the tank bands. In order that the bands will be straight, we suggest that you lightly scribe all the way along the length of the wrapper for each band. When you pull the bands tight they will drop into the grooves and be held straight, and in place. Scribe the groove with a knife that is sharpened into a broad "V" edge, thus V. A knife sharpened to a thin edge, will not make a groove wide enough to hold the bands, and a dull knife tears the wood, making "fuzzy" edges.

In scribing the band grooves, be very careful that each one is exactly lined up on the marks, or the grooves will not meet when the wrapper is placed around the tank. It is best to scribe each groove lightly, several times, rather than trying to do it all in one stroke. Also BE CAREFUL not to make the grooves too deep, as this would weaken the sides and let them bow in between the core spacers.

7. When all the tank band grooves are made, the wrapper may be glued to the core. Carefully hold the wrapper around the core, and cut off enough staves to allow a gap of about 1/16" between the ends of the wrapper. With one of the core discs resting on the table glue one end of the wrapper to one of the core spacers---leaving about 3/16" of the ¼" face of the spacer exposed. Hold this firmly in place until the glue begins to set---with the core against the table, and the wrapper straight out, with one edge resting on the table. This will assure that when you pull the wrapper around the core the edges will fit flush with the top and bottom discs. Remove the outer tape.

When the glue on the end of the wrapper has set, spread glue around the edges of both discs, and pull the wrapper around tight. Hold it in place with masking tape. Be sure the grooves for the tank bands line up, and that the edges of the wrapper are flush with the discs. DO NOT put glue on the 1/4" x 1/4" core spacers---just on the edges of the top and bottom discs. Set the tank aside until it is thoroughly dry.

8. The tower frames should now be ready to assemble. Note in Fig. 4 how these fit together. In this drawing the half-legs colored black are the two sides of one frame, and those left white are the next frame. By gluing these half-legs together, and to the un-glued ends of the diagonals, the complete tower framing is erected.

9. The four sides of the frost box are assembled by gluing them to 1/8" x 1/8" wood inside corner posts. Note that the outside corners of the frost box will fit between the inner tower legs as shown in Figs. 4 and 5. The frost box sides are the same height as the legs, but if you are building the low tower, they must be cut down to the same height as the legs. The frost box door frame is cut from scale 2 x 4's and glued to one of the sides as shown in Fig. 9. The door knob is the head of a small pin.

10. When the tower is complete, put a little glue in the corner grooves of the frost box and slide it down inside the four inside legs.

11. Glue the cap timbers to the tops of the legs, as shown in Fig. 5. Cut them to length and bevel where necessary. Use Fig. 5 for cutting and to show assembly.

IMPORTANT NOTE:

Before beginning operation 12, glue roof sections and ceiling to 1/16" x 2 1/2" x 6" and 1/16" x 4 1/2" sq. card stock supplied to make them heavier.

12. Cut the 8 triangular roof sections from the printed card, using a sharp X-acto knife against a metal straight edge. Cut straight down through the card.

Using the paper with the perforated shingles, draw a line down the center of the perforations to divide them in half. Draw another line 5/16" on each side of this center line. Now cut on each line to make strips of paper shingles. Cut these shingle strips long enough for each row marked on the triangular roof sections plus a slight overhang at each end. Glue the solid portion of these shingle strips to the card roof sections along the guide lines leaving the notched end unglued, giving a more uneven, natural texture. You can even lift some of the shingles for an older appearance.

In applying the shingles, start with the bottom, allowing some overhang along the bottom edge, and with the un-notched edge of each row on the guide line. Omit shingles over the hatch.

13. With the shingles on all eight roof sections, trim the sides even with the card. Place the sections face down with their slanting edges touching, and the top points together. Scotch tape them together firmly, then join the outer edges to form an eight-sided pyramid, and tape the final joint. Cut the eight-sided ceiling from the card, cutting carefully along the outer straight lines, and fit it up inside the roof pyramid. Glue it in place with the printed circle showing, and making sure each roof section overhangs an equal amount on all sides.

14. If the roof is to be stained, do so now. Tru-Scale Tie Stain is good for this, giving a natural look. If the roof is to be painted, add the 1/32" square wood divider strips and finial before doing so: Drill a hole in the peak of the roof and glue in the finial. Cut the wood divider strips to reach from the finial to the outer edge of the roof, and glue one between each roof section, working some glue down into the cracks between the sections. If the roof is to be painted, do so now. The dividers and finial can either match or contrast with the shingles.

15. The tank bands are made of a single length of "mono filament" line, which is wound without cutting, as described below. The first step is to press the small pins furnished in the kit, into the gap between the ends of the tank wrapper. Each pin should be in the middle of the gap, and just below one of the grooves in the tank wrapper. Let the heads of the pins remain about 1/16" out from the wrapper. Tie one end of the mono filament line firmly to another pin, and press this into the gap about 1/2" from the top, between two of the other pins, and drive it all the way in.

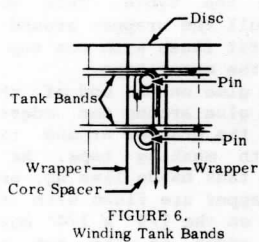


FIGURE 6.
Winding Tank Bands

Bring the line up along the gap and around the top pin then around the tank, tight in the groove in the wrapper. Now bring it over the top pin again, down the gap and all the way around the next pin, so it will come out above this pin and lined up with the second groove in the wrapper, as in the detail sketch, Fig. 6. Hold the mono filament line taut at all times, and continue as above, moving down the tank until all the bands have been wound. Bring the end of the line up the groove, and tie it to one of the pins. Press all of the pins in until their heads are flush with the tank wrapper.

This process is actually much easier than it sounds, and the grooves help greatly in preventing the bands from slipping out of position while you work. Winding the line around the pins in this manner makes both sides of each band line up. We will cover the gap in the wrapper, and the pin heads with the depth gauge in a later step.

16. Cut out the circle in Fig. 7 the template for the floor joists. The position for the spout is marked "Y", and the water gauge will be placed at either of the two positions marked "W". Glue the circle firmly to the bottom of the tank (the end where the bands are closest together), and with the gap in the tank wrapper at one of the two positions marked "W". (Choose the position that will show the water gauge best when the tank is installed on your layout).

17. The floor joists are 1/16" x 3/16" wood. Cut them to length as per template. Glue them firmly, on edge, to the bottom of the tank in the positions shown on the template, Fig. 7. Drill a 3/32" (#38) hole in the floor between the joists, in the position marked for the discharge pipe. (The pipe will be installed later).

18. Wire is furnished for the steel tie rods in the tower frames. In the tall tower there are three rods in each frame, and in the low tower there are two. In each case one rod goes through at each end of the X-braces, as shown in Fig. 9. Also note that the rods cross each other in each leg. Drill #72 holes for the rods, making sure they will pass each other where they cross. Placement for the rods can be measured from the drawing in Fig. 9. Trim the wire just long enough so that about 1/32" will extend out on each end, beyond the legs. Insert the rods and put a small dab of glue on each end.

19. If you are going to paint the tank, it would be well to paint the tower frame, the frost box, and between the floor joists before going further. Use any color you like, or have adopted as the standard colors for structures on your layout. Red, yellow or gray are often used, or yellow with brown trim (as on the frost box door frame, tie rods, etc.). Glue the tank to the tower frame by spreading glue on the top surface of the cap timbers. Notice in Fig. 7 how the spout location lines up with the cap timbers.

20. Glue the frost box foundation in place, centered over the walls of the frost box (it is 1 1/2" square and 5/32" thick). Using contact cement, glue the footings on the bottoms of the legs. NOTE---Use contact cement whenever metal castings are to be glued on.

21. Build the spout hanger on the template in Fig. 10. Fasten a piece of waxed paper over the template and glue the parts to the waxed paper with tiny dabs of glue. Position the up-rights first---3/32" x 1/16" strips, cut to length to fit on the template. Glue the pulley hanger (1/8" x 1/8") to the uprights over its position on the template, and glue the spout hanger beam (3/32" x 1/16") in position. Also glue the two 3/32" x 1/16" spacers between the uprights. Cut these to length from the wood strips furnished. Drill out the pulleys above the wheel to take the chain. This is a very delicate operation! Use approximately a #61 drill, centering the hole and working slowly so as not to break the casting. When both pulleys are drilled out, glue them over their positions on the pulley hanger beam.

22. The small platform or ledge below the spout should be built and installed now. Its floor is a piece of the Gang Planking cut for you. The brackets must be cut from the 1/16" x 1/16" wood strips. The platform must be carefully positioned as shown in Figs. 9 & 10 for the regular height tower. For the lower "narrow gauge" tower see Step 24. Lift the spout hanger from the template and glue it in place on the tank, resting the bottom ends on the platform.

23. Form the discharge pipe from the length of insulated copper wire furnished. Cut away the insulation at one end for about 1/4". Form the bend over the drawing of the pipe in Fig. 9, and cut it to length as indicated. Bring the exposed end of the wire in between the spacers on the spout hanger, and glue it into the hole you drilled in the bottom of the tank in Step 17. Let it rest on the lower spacer of the spout hanger.

24. If you are building the lower "narrow gauge" tower, it will be necessary to make several changes in the above procedure. First, when assembling the spout hanger frame cut the uprights off at the top as indicated in Fig. 10. Make the discharge pipe as in Step 23, but the bend will have to be sharp enough to allow the pipe to stay completely up between the floor joists and above the cap timbers. Install the pipe, making sure it does not sag between the tank outlet and the end. Glue the spout hanger to the tank with the pipe between the spacers, and assemble the platform as in Step 22, so it comes up against the bottom of the two spout hanger uprights.

25. The water depth gauge is a wood channel 3/16" wide. Glue this in place over the gap in the tank wrapper, so as to hide the gap and the pin heads.

26. Glue the 48 tank band lugs in place. Be careful when removing the flash (if any) not to remove part of the detail. The lugs are in three slanting rows as partly indicated in Fig. 9. They are to be staggered diagonally around the tank at about 2 stave intervals. Start the first row two or three staves outside the spout hanger. The second row should be started about 18 staves beyond the end of the first row, and the third row about the same distance beyond the second. It would be quite proper to vary this spacing to suit your taste, or to match photos or drawings of prototype water tanks. You will probably want to omit the lug that would come beneath the depth gauge.

27. Now paint the tank. It is best to use some form of spray gun or air brush in order to get a smooth and even coat. If you wish, the spout hanger, depth gauge and lugs can be a darker color than the base coat. See the suggestions in Step 19. Paint the footings and frost box foundation (installed in Step 20) concrete color.

28. Cut the depth gauge from the card and glue it in the bottom of the channel installed in Step 25. Glue the roof to the top of the tank, being careful to center it exactly. Place the section with the hatch where you plan to install the ladder.

29. Paint the spout casting, and if necessary, drill out the holes for the yoke, which is to be formed of the soft copper wire furnished. With the wire in the holes, form the yoke as in Figs. 9 & 10. Cut a piece of the chain 6 1/2" long, and tie the center link to the spout band with a piece of fine thread. Bend the ends of the yoke around the spout hanger beam as shown in Figs. 9 & 10. Pass the ends of the chain through the holes in the pulleys, and glue the weights on the ends of the chain. If necessary, adjust the length of the chain so the weights just clear the platform when the spout is in the up position. Put a tiny dab of glue to hold the chain in the pulleys, with the spout in the up position so it will clear all locos and cars that will pass. Glue the valve-trip chain with one end under the eaves over the spout, and looped as shown, and the other end fastened to the spout band.

30. Glue a length of black thread up the middle of the depth gauge from the depth you wish indicated, and cut a marker from the small piece of 1/8" wide strip wood furnished for this purpose

Use this:---for a template. Paint it black or dark gray, and glue in the channel at the end of the thread.

31. Build the ladder over the template in Fig. 8. First cut the two long side pieces from the scale 2 x 4's, to fit the template. Now cut 37 rungs each 15/32" long. Fasten a piece of Scotch tape, sticky-side-up over the template, and place the rungs flat on their positions, and held by the tape with their ends projecting on both sides. Run a bead of glue along one edge of a side rail and glue it to the rungs over the template. Repeat for the other side rail. When the glue is dry cut off the ends of the rungs flush with the side rails, and remove the Scotch tape carefully.

The hatch is Gang Planking the same width as the ladder. Cut and glue 2 x 4's on edge to the top and bottom of the hatch cover, and two more on the sides as ladder braces, with the tops flush, and bottom ends out beyond the roof edge to support the ladder. Glue three steps as shown. The hand rails are 2 x 4's as in Fig. 9, but may be omitted if you prefer.

Cut two more ladder braces 1 3/8" long to brace the middle of the ladder to the tower legs.

32. Install the Water Tank model so the end of the spout would swing down over the center line of the track---checking to be certain it clears all your cars and locos!



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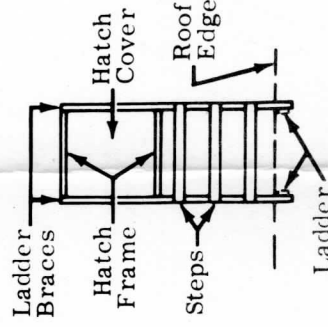


FIGURE 11.
Hatch Frame

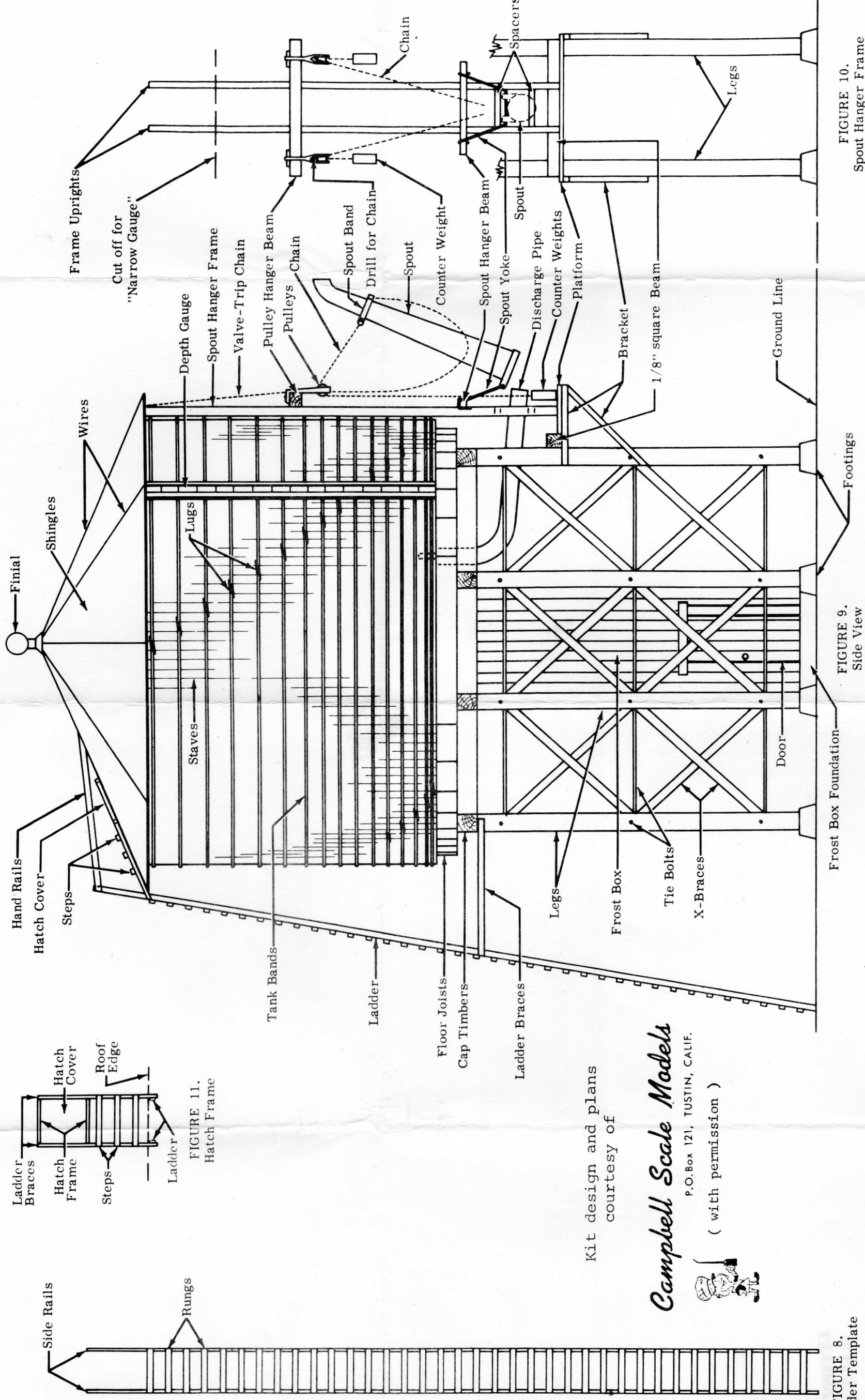


FIGURE 9.
Side View

FIGURE 10.
Spout Hanger Frame
Template

Kit design and plans
courtesy of

Campbell Scale Models

P.O. Box 121, TUSTIN, CALIF.

(with permission)



FIGURE 8.
Ladder Template

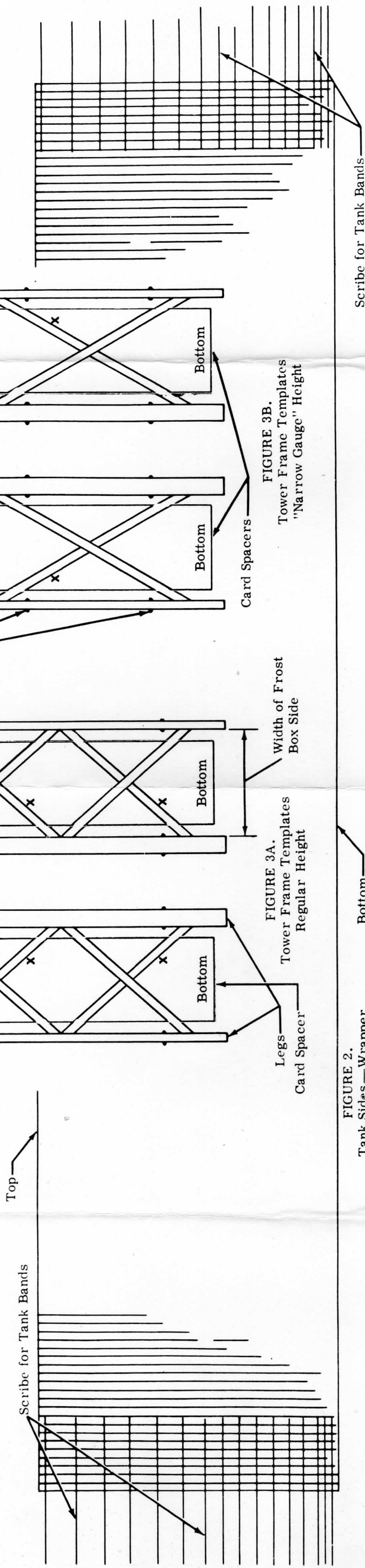


FIGURE 2.
Tank Sides — Wrapper

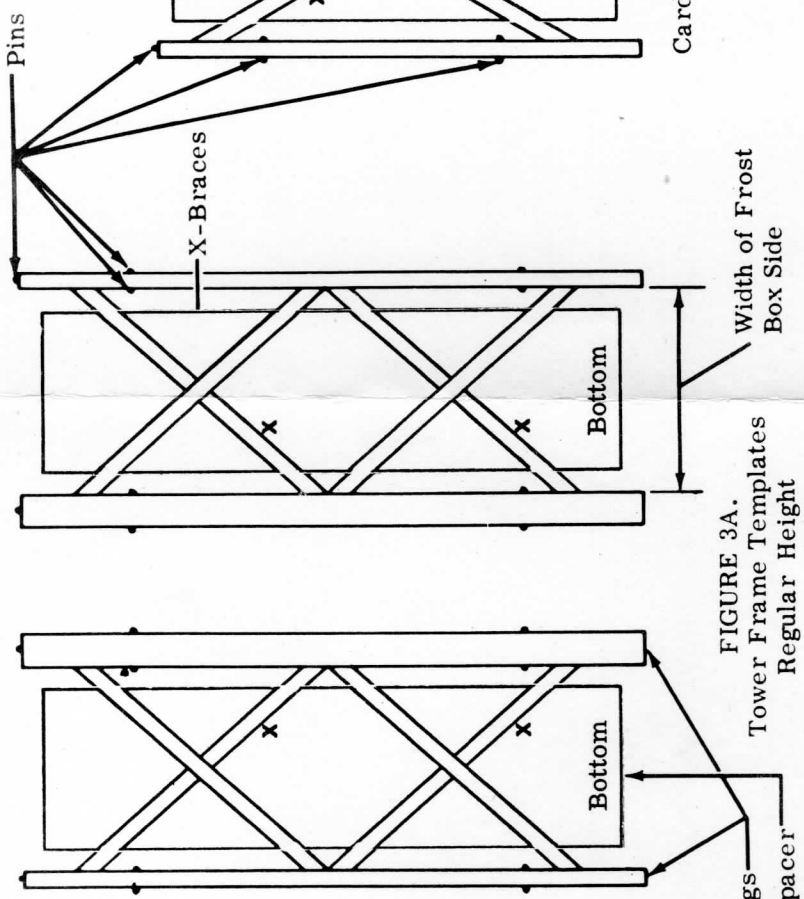


FIGURE 3A.
Tower Frame Templates
Regular Height

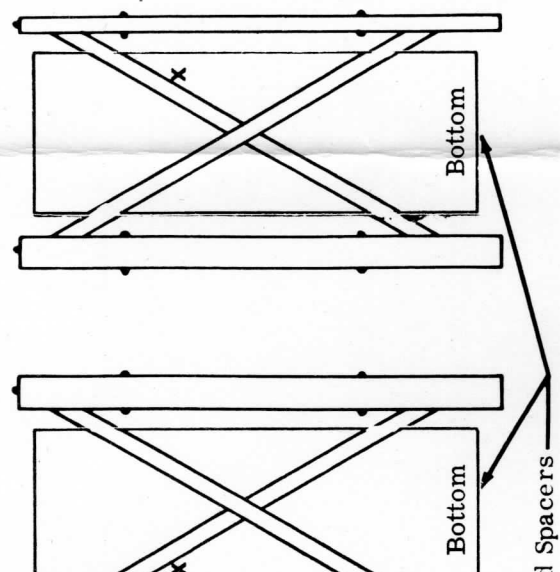


FIGURE 3B.
Tower Frame Templates
"Narrow Gauge" Height

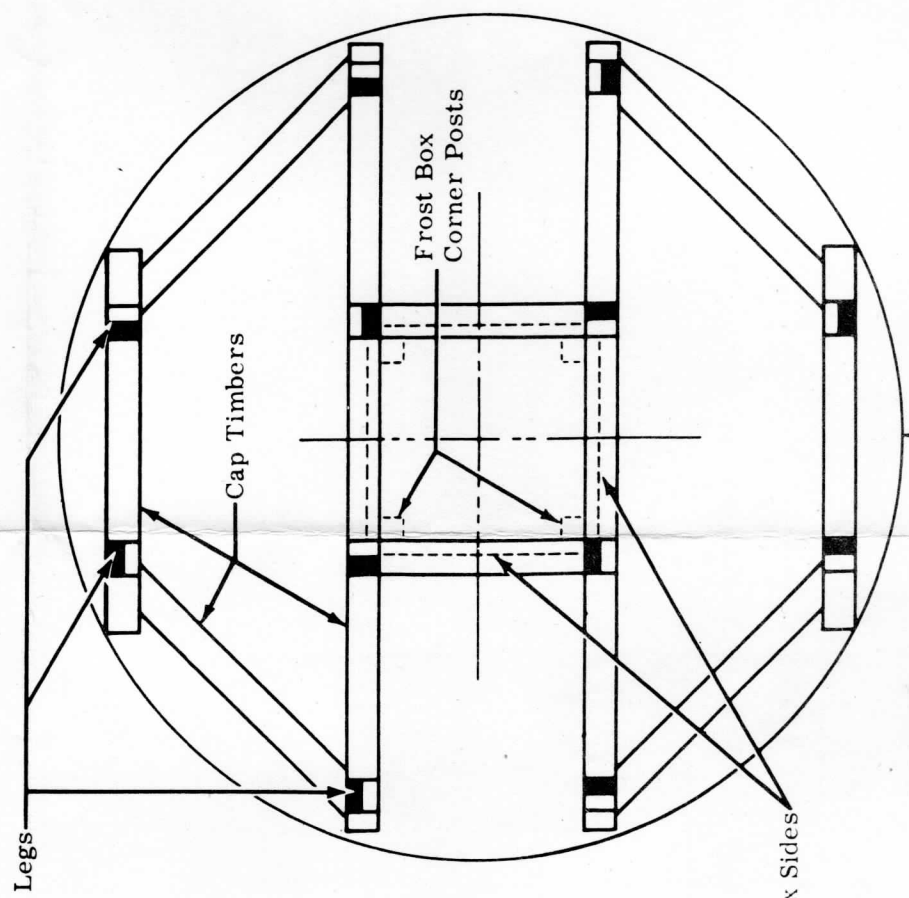


FIGURE 5.
Tower Cap Timbers

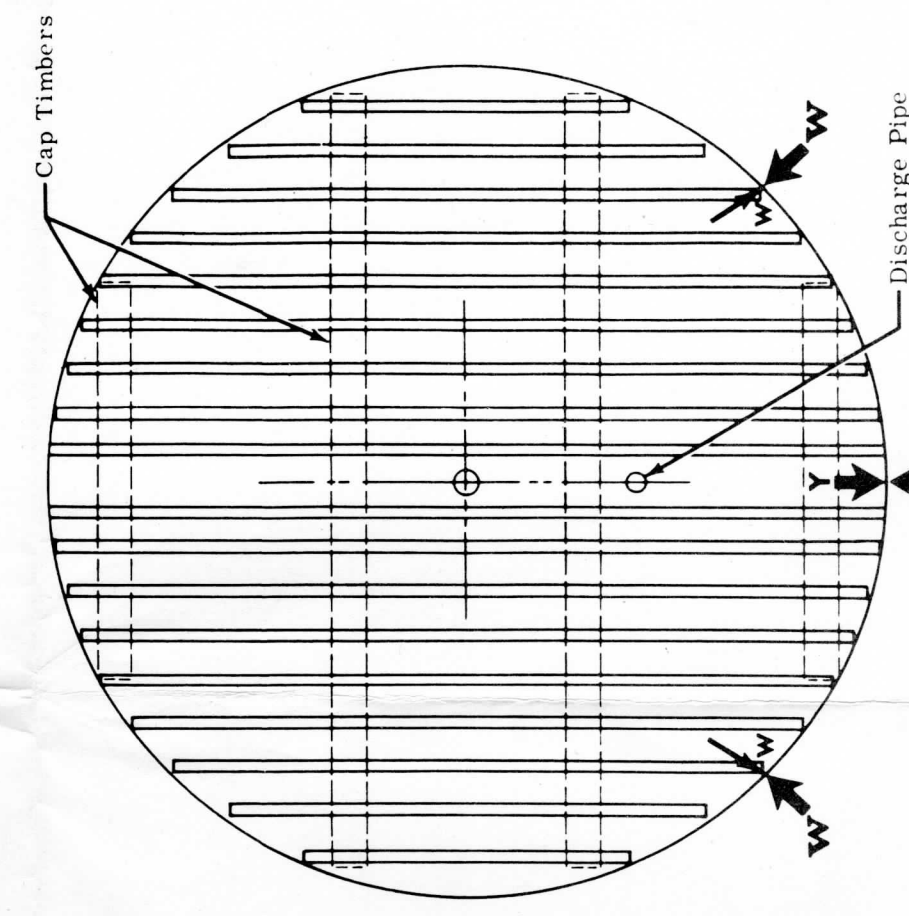


FIGURE 7.
Floor Joists

Lehigh Valley Models

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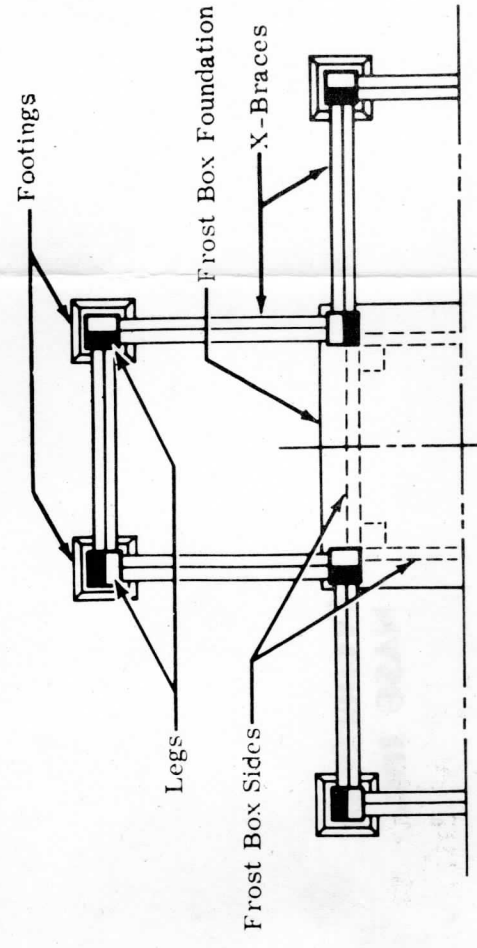


FIGURE 4.
Tower Frame Assembly