The Design and Construction of Locomotive Boilers.

Following is a continuation of the report of the American Railway Master Mechanics Association's standing committee's report on this subject, presented at the annual meeting in Atlantic City, N.J., recently, the first portion of the report having been published in Canadian Railway and Marine World for August:

ARCH TUBES.—Of the replies received, 15 members use 3 in. tubes, one member uses 2 in. tubes and one member uses 2¼ in. tubes. Five members do not use arch

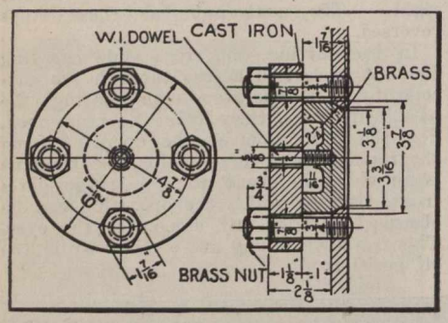

Fig. 16.—Arch Tube Hole Plate.

tubes at all. One member supports brick arches with studs fastened into the side sheet.

Thickness of tubes used: .15 in., .165 in., .18 in., .203 in., .25 in. Eight members use thickness of .18 in. Eleven members use seamless steel, one member uses charcoal iron, thickness of tube not given.

PLUGS OR PLATES FOR COVERING Arch Tube Holes in Throat Sheet and Back Head.—Twelve members use brass plugs, one member uses extra large size brass plugs for covering the holes; these plugs are drilled for 2¼ in. plug so as to avoid remov-

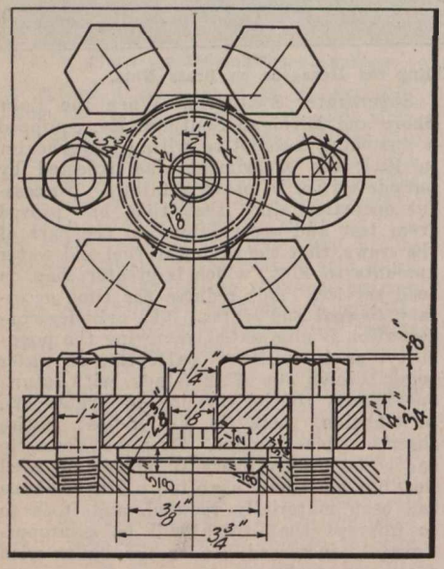

Fig. 17.—Arch Tube Hole Plate.

ing the large brass plugs when washing the tubes. Three members use plates with ball joints, as shown on figs. 16 and 17, claiming greater ease in removing and applying in close quarters.

THE SETTING OF ARCH TUBES varies. The replies received were indefinite as to just what practice they are following out. Six members did not state whether they use copper ferrules or not. Six members advise that they use copper ferrules. Three members set the arch tubes without ferrules. Three members set the tubes with a roller expander and a sectional expander to be used in the ordinary manner to set out the tube, as shown at A, fig. 18. Tubes are then beaded over with a bootleg tool, except by one member who bells out the tube on the water side to prevent the tube from pulling out of the sheet. This member does not use any ferrules. The other two members do use copper ferrules. Fig. 18 at B shows arch tube setting as used by one member.

For the information of the members you will find complete set of instructions for setting arch tubes, which is being used by several large roads with success. This covers tubes expanded and beaded on the outside as follows:

PREPARING HOLES IN FIREBOX Sheets.—Original holes in firebox sheet must be 3 3-32 in. in diameter. Worn holes must be reamed when more than 1-16 in. out of round. Sharp edges must be removed by slightly rounding with file or reamer.

in. thick seamless drawn steel. The tubes should be cut to proper length and bent to template conforming with drawings. The length can only be determined by actual measurement of the firebox and allowance

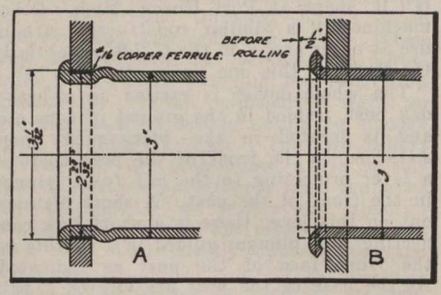

Fig. 18.—Two Methods of Setting Arch Tubes.

must be made for projection of ½ in. into water space at each end of firebox. Tubes must then be securely fastened with the roller expander. See A, fig. 19.

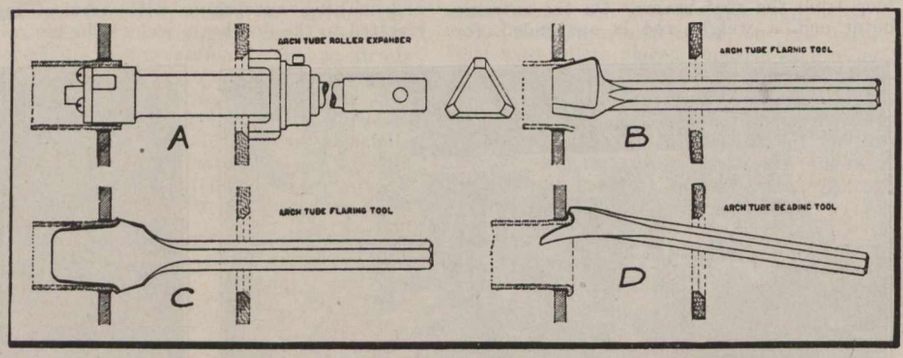

Fig. 19.—Different Tools for Beading Tube Ends.

APPLYING COPPER FERRULES.—Copper ferrules must be used at both ends of arch tubes. Ferrules should be 3 ins. outside diameter, .095 in. thick and ⅝ in. long, expanded by carefully hammering on a round mandrel to snugly fit the hole. Ferrules should be set with 1-16 in. projection on each side of sheet and secured in place with a roller expander.

PREPARING AND APPLYING TUBES.—Tubes must be 3 in. outside diameter, .18

FLARING TUBE ENDS.—After tubes have been set they must be flared at both ends with the flaring tools shown at B, fig. 19. After the tube ends have been thoroughly flared the tube ends are then ready for beading.

BEADING TUBE ENDS.—Additional flaring with tool shown at C, fig. 19, is necessary to start the bead. The bead must then be formed with special beading tool, fig. 19. Notice that it is not desired to

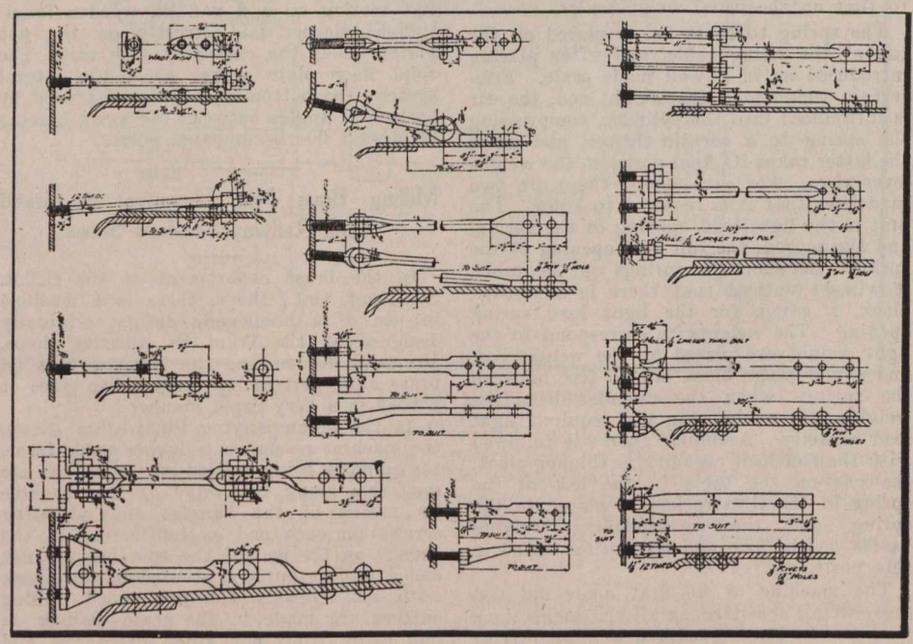

Fig. 20.—Twelve Styles of Throat Sheet Belly Brace.