# Canadian Northern Railway New Boiler Tools and Methods.

The common practice of rivetting over the heads of staybolts, with a low crowned head on the flat surface of the inner and outer sheets of the firebox, has been the cause of a great deal of trouble in maintenance. On the inner side of the firebox, or for that matter any part of the boiler against which the direct heat of the fire impinges, the thickness of metal should be as slight as practicable, in order that the difference in temperature between the two sides of the sheet may be small, as the greater the thickness, the slower the heat flows, and the greater must be the heat potential, so to speak. Projections of metal are also undesirable, catching the direct heat and absorbing it more rapidly than the smooth surface. The slight projection of the flattened rivet head in the old construction, as shown at the top in fig 1, catches the heat, and it is a no uncommon thing to frequently have trouble from burnt out staybolts on heavy runs, creating a fruitful source of expense.

The method adopted by the C.N.R. is that shown at the bottom of fig. 1, the plate being so depressed on the fire side that the top of the rivetted staybolt head is flush with the sheet, creating no projections for the gathering of heat. An added advantage is the ease with which the staybolt head can be efficiently caulked, the head resting in a depression presenting an excellent caulking edge around the rim of the depression. The staybolt as actually drawing out the plate to the form shown below the punch. The sheet as actually drawn in practice is shown in fig. 3, the drawing out conforming very closely to the designed shape. It will be noted that the staybolt bearing is lengthened, a desirable factor. In inserting the rivet, a 4 thread length is projected through for rivetting over, which is a larger amount than would be possible with the flush plate. The heading snap is also shown in fig. 3, centering on the centre safety hole. The holding on the end of the tool bears on the patch around the rim of the patchbolt head, raising a seam all round the bolt. A perfectly tight joint is assured.

smaller than that of the top of the patchbolt head. The head of the tool is hexagonal. After tightening up as much as possible in the usual manner, with a wrench on the square head of the patchbolt, the tool is put on, and, under the vibration created by the hammer, the bolt is tightened down still further by a wrench on the hexagon of the tool. The hammering tends to draw the plates tighter together, creating a tight joint. The smaller radius cupping

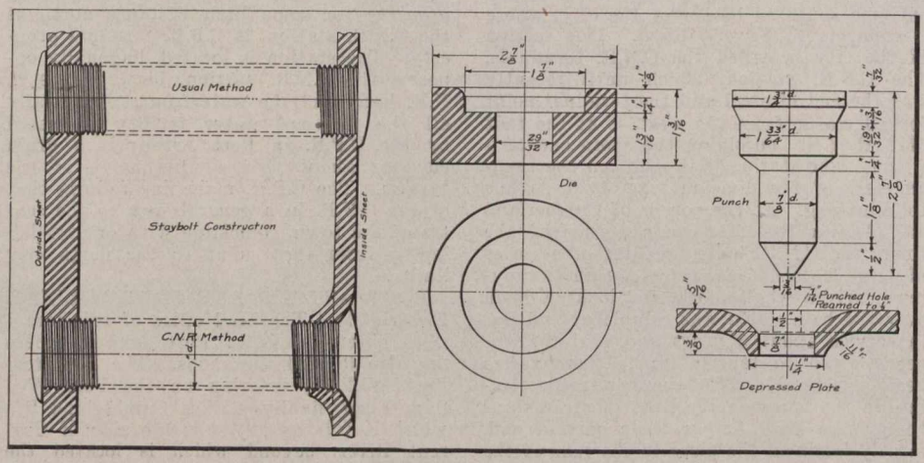


Fig. 1.—Punch and Die for Depressed Staybolt Holes.

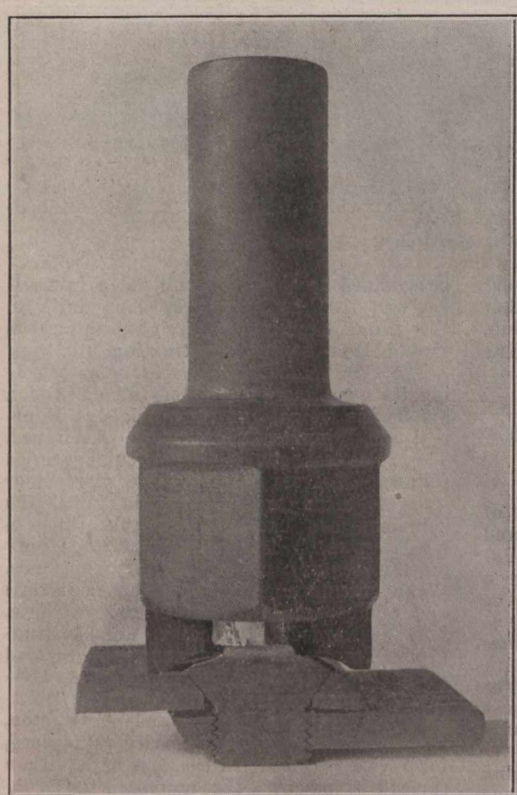

Fig. 2.—C.N.R. Patchbolt Practice.

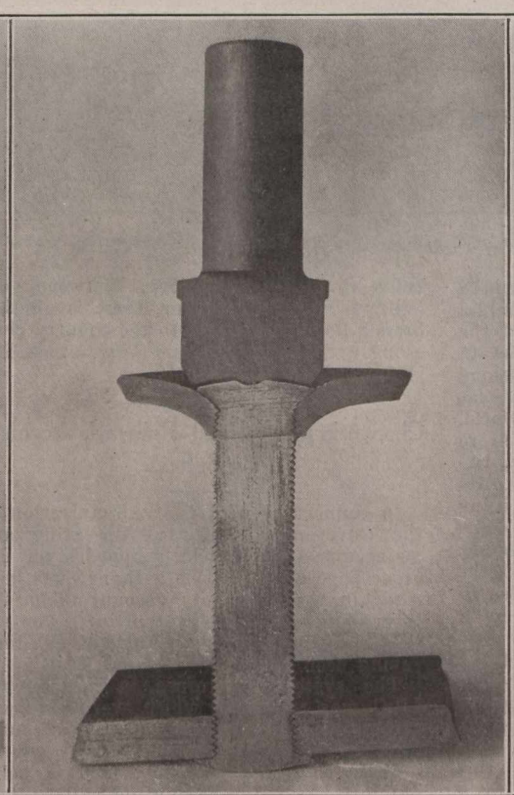

Fig. 3.—C.N.R. Staybolt Practice.

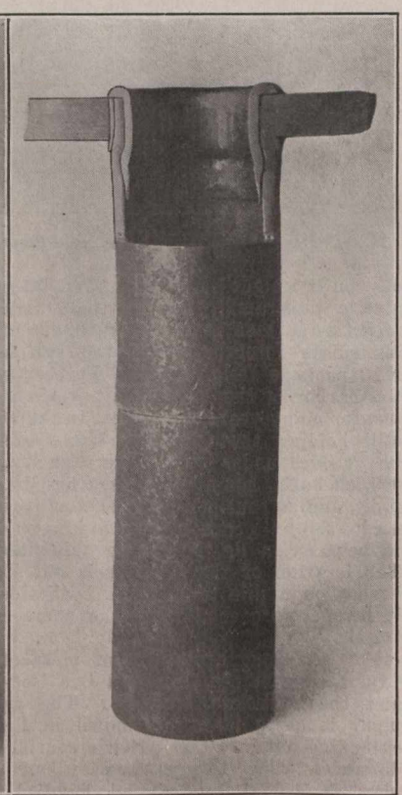

Fig. 4.—C.N.R. Tube End Strengthening Practice.

installed in a sheet is shown in fig. 3. It will be noted that the outer sheet is still treated in the usual manner.

The method of preparing the plate required the development of special tools. The plate is first perforated with a 7-16 in. punch, followed by a ½ in. reamer. The sheet is then annealed, prior to the depressing process. A punch and die of the form shown to the right in fig. 1 is employed for the depressing, the nose of the punch forcing itself through the ½ in. hole, power thus obtained is considerably increased.

Patchbolts usually create trouble from their inability to be properly tightened down to hold the patch to the sheet, due to the roughness of the mating surfaces. The C.N.R. method is illustrated in fig. 2. The patchbolt is of the usual construction, partially severed under the square head for ease in cutting off. A special air hammer tool fits over top, the lower face of the tool being cupped to a radius slightly

The method of rivetting and the rivetting snaps employed are shown in fig. 5. On the right is a tightening up snap. The lower head of the rivet is held securely by the holder on. This hollow snap is slipped over the top of the red hot rivet, forcing the plates tightly together. The rivet head is then ready for forming. This would seem to be a much preferable method of tightening the plates than that of hammering all around the rivet on the plate as is the usual practice.