

ed by air, are controlled by levers located with the flanging press levers to the rear of that machine convenient for the operator. The heated plate, pulled out by hooks from the furnace on to a simple metal stand, is lifted with special hoop hooks by an air hoist on an I-beam track, running across to the flanging press. The plate is here dropped on to a couple of rollers, and shoved on to the lower clamping plate of the press. This plate is then raised by the operator, lifting the tube sheet up and clamping it

of dies for many parts on boilers of varying sizes, have been made from time to time.

Quite a number of sizes of dies have been made for hydraulically flanging the sides of the throat sheet. Where this is possible, the flange can be made in one heat. In the case of the throat sheet shown in fig. 3, which is one of an order of six boilers, it was considered inadvisable to make hydraulic dies, so only a single block of the requisite shape is made for the flanging operation. The sheet, originally flat, trimmed to

desired diameter. In the case of the barrel, the various straight and tapered courses after being thus punched and rolled, are fitted together on the floor in their proper relation to each other and held together as a unit by bolts in the circular seams and along the lapped seams. The front tube sheet is also bolted up into this barrel section. When thoroughly bolted together the whole unit is carried down the shop to the hydraulic rivetter, where the 20-ton hydraulic crane over the rivetter raises the barrel into position for rivetting, all

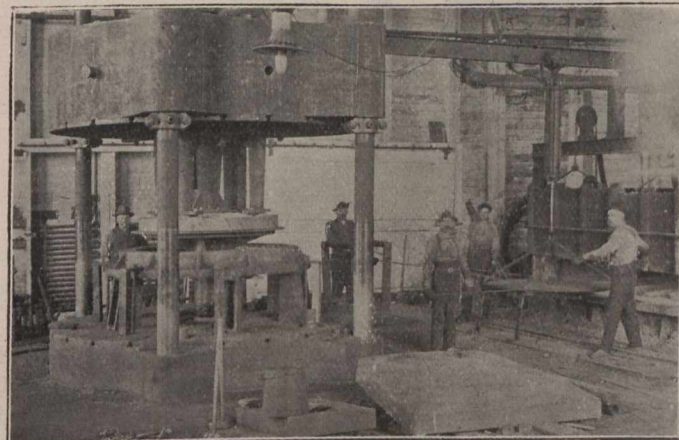
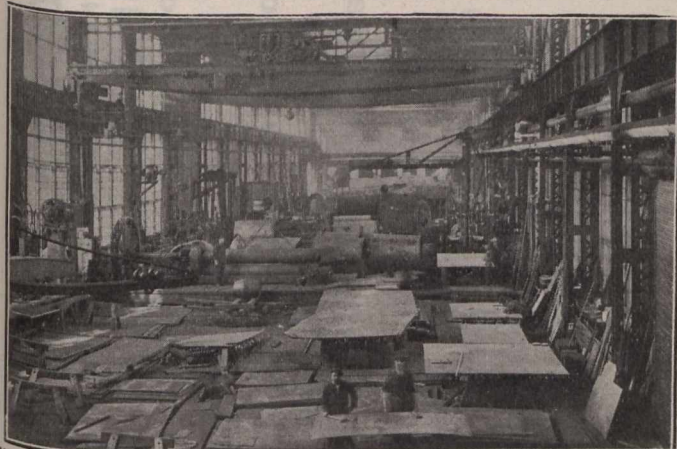


Fig. 1—View of Boiler Shop, looking from Outer End towards the Assembling and Erecting Floors.

Fig. 2—Arrangement of Heating Oven and Hydraulic Flanging Press.

to the upper clamping plate, the male part of the die, secured to the upper tube of the press by bolsters. The female part of the die, supported on bolsters on the lower table, is forced up over the projecting edge of the tube sheet by the whole lower table being raised; this forms the flange. The table and clamping plate are then lowered, plate removed, and the operations repeated. The action being familiar to all, requires no further description. The flanged edge and tube sheet are next laid out and the sheet taken first

the correct size, after being laid out to be punched for the barrel-flange fit, is removed to the punch for this purpose. From there it goes to the rolls, where the bends are given to it, and it is then brought on to the flanging shop. One edge at a time is heated in a flange fire, and in from four to five heats the flange is formed, all the work being done by the sledge hammer. In fig 3, the plate is shown fresh from the flange fire in the background, after the third heat. The sheet is brought across by a crane running on an I-beam. It is lowered on to the flange block and located by

the barred rivets being thus inserted. This process of forming the barrel is often slightly varied, depending on the way the different parts are advanced. The different courses may be independently butt strapped, and these courses then rivetted together. The process is but slightly affected by such changes in the routine.

Every plate as it leaves the rolls, is carried further on down the shop. Such is the case of the outer wrapper shown in fig. 4. The operations carried on in this position, are those of fitting the corners of the throat sheet and face

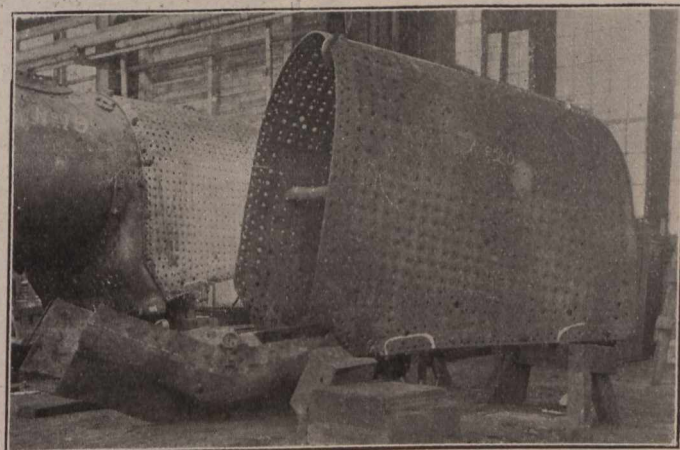
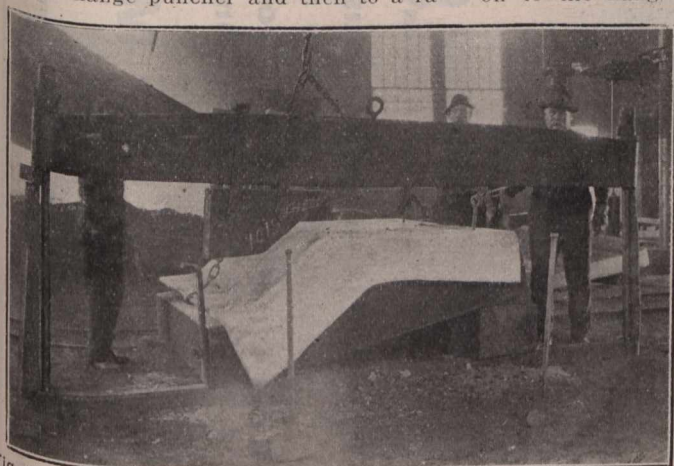


Fig. 3—Side-flanging a Throat Sheet by Hand on a Formed Flanging Block.

Fig. 4—Operation of Fitting Throat Sheet and Face Sheet Corners to Mud Ring.

dial drill to have the tube holes drilled. The art of using the flanging press for all kinds of flanging work has been developed to a high degree, a wide range of dies having been made for flanging up various parts of the boiler, such as tube sheet, face sheet, back sheet, back tube sheet, throat sheet, steam dome and the various pipe flanges. It is a question that only the condition of the order can decide, the question of whether or not the order contains enough locomotives to make it pay to make the necessary pair of dies for the press. This question has been settled so often in the affirmative that a large collection

pins dropped into two previously laid out and punched holes in the sheet, which register with similar holes in the block. The man to the right is shown inserting one of these pins. The clamp beam is quickly lowered by knocking out supporting end blocks, and tightening down the nuts on the guiding bolts. The four men in shifts of two, gradually hammer down the flange as desired. The flange for the barrel fits is similarly formed when no hydraulic dies exist.

The various component sheets of the boiler that require bending, after being laid out and punched, are taken to the rolls before referred to, and bent to the

sheet to the mud ring. The mud ring finished and drilled in the machine shop, is placed on low horses, and the outer wrapper bolted to it as indicated. The throat sheet, placed on the ground in front of the wrapper, is swung up into position with regard to mud ring and wrapper, and clamped there. The throat sheet has no holes in it up to this point, the reason for which will be explained presently. An oil torch directed against the corner of throat sheet where it fits over the mud ring, heats it to a working heat. This is done that the throat sheet may be worked directly into the exact shape on the mud