

June 19, 1923.

1,459,542

H. N. McCATHRON
BOILER TUBE REPAIR PLUG
Filed June 25, 1921

FIG. 1.

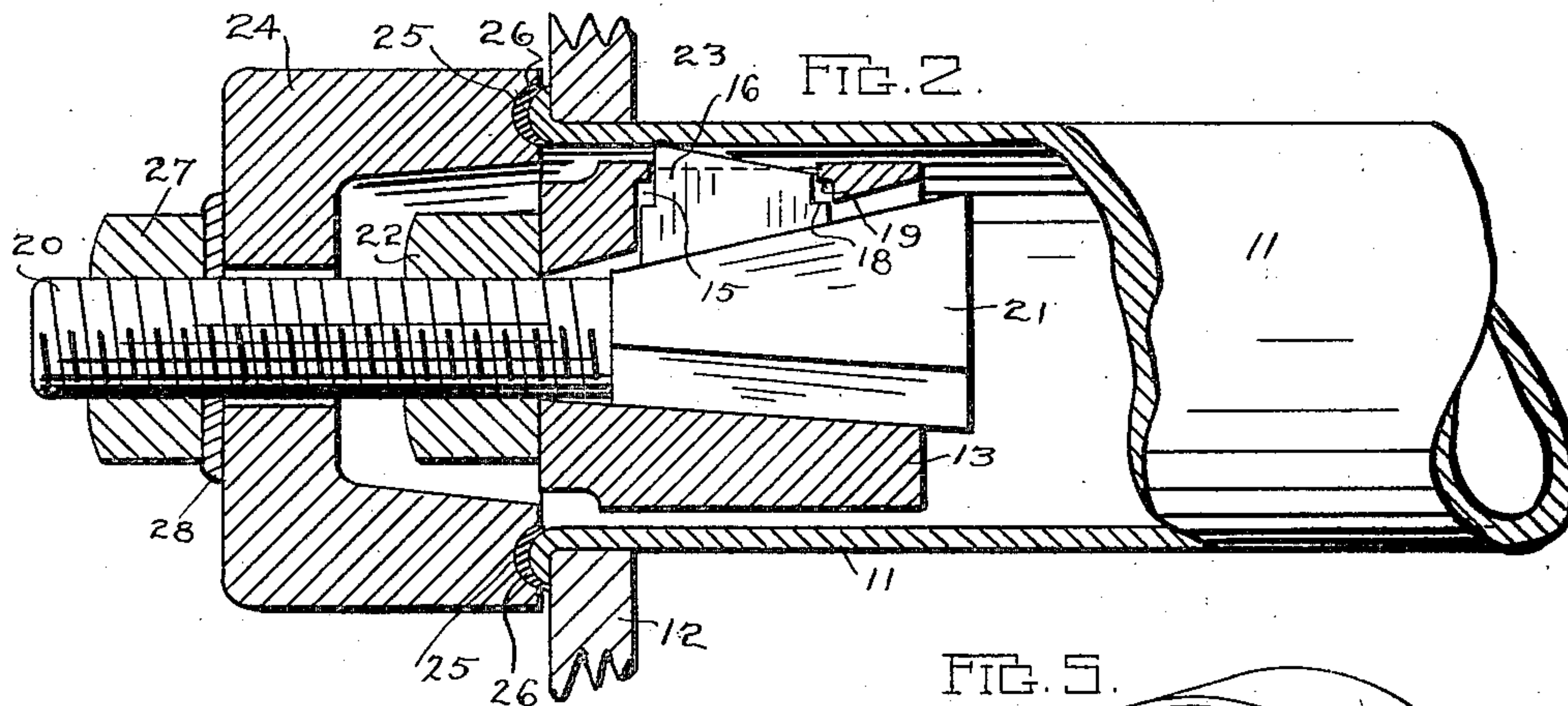
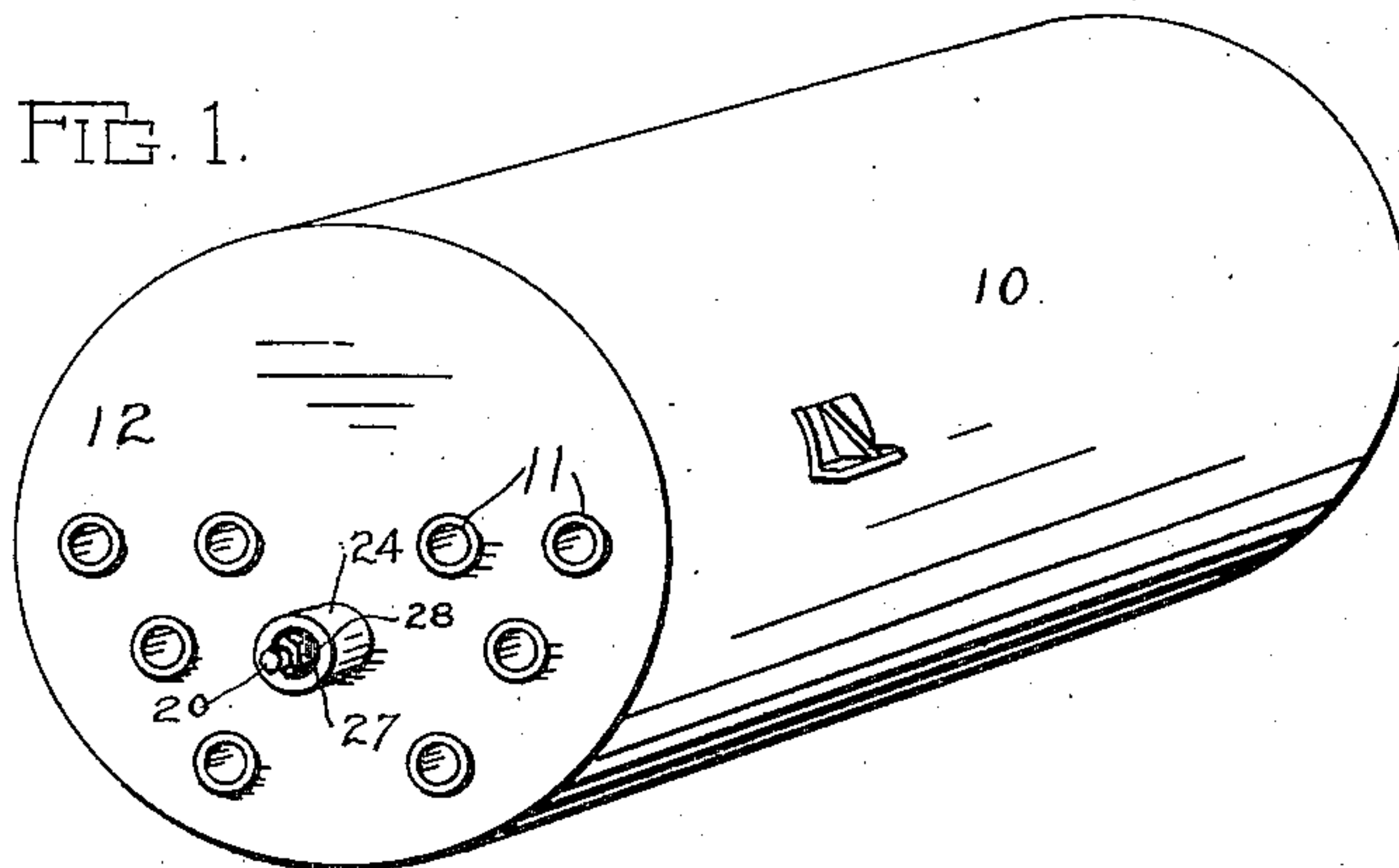


FIG. 3.

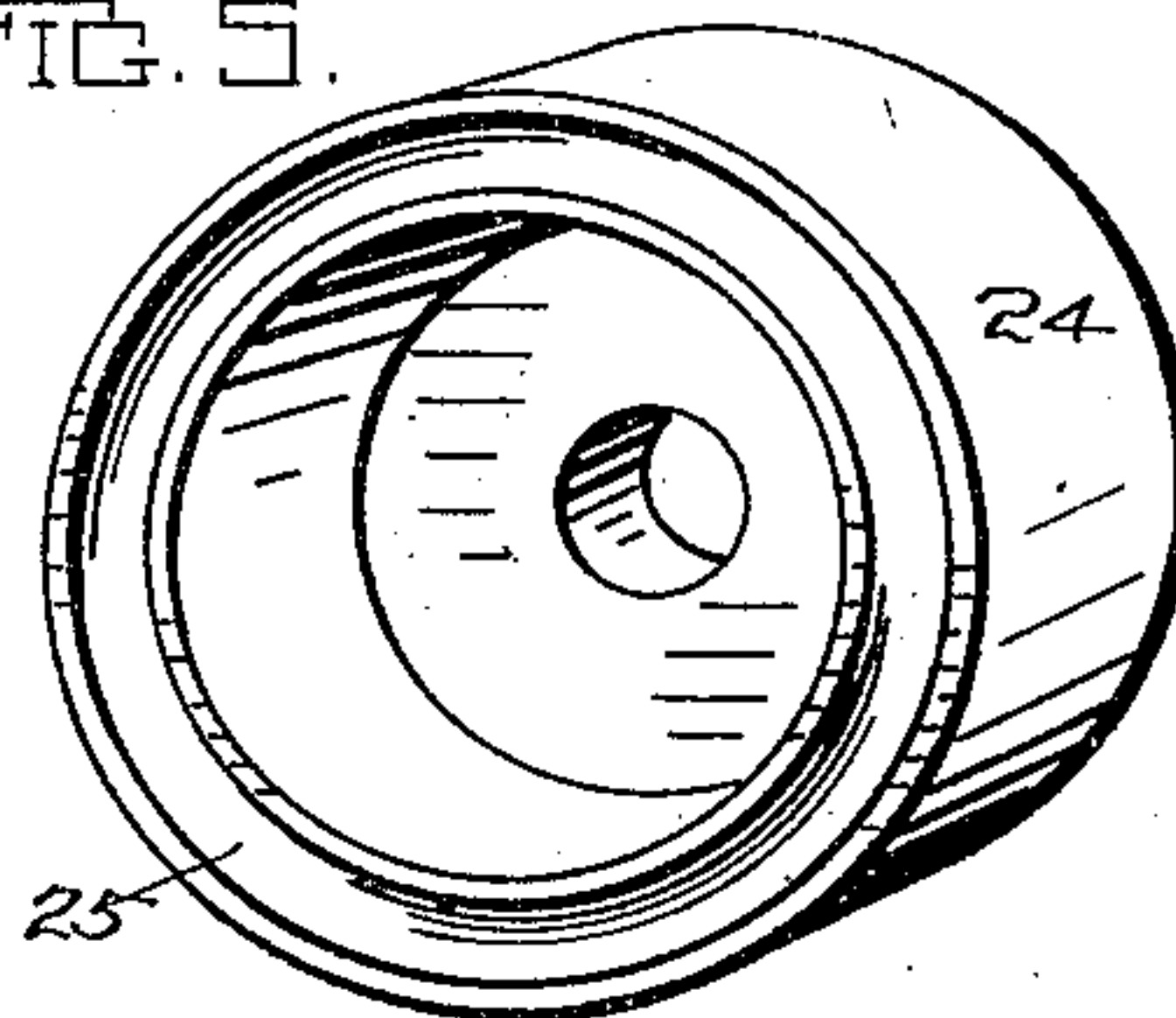


FIG. 4.

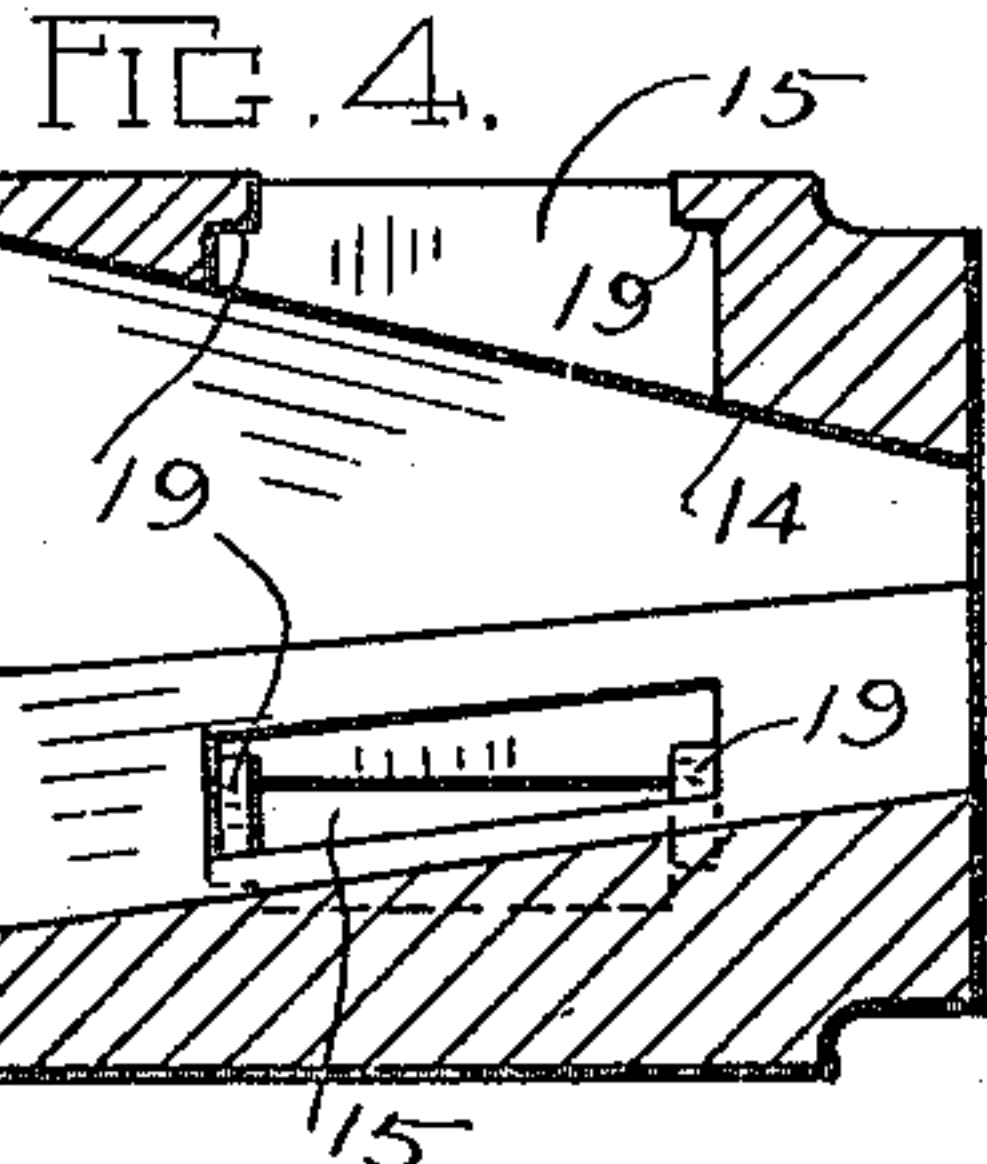
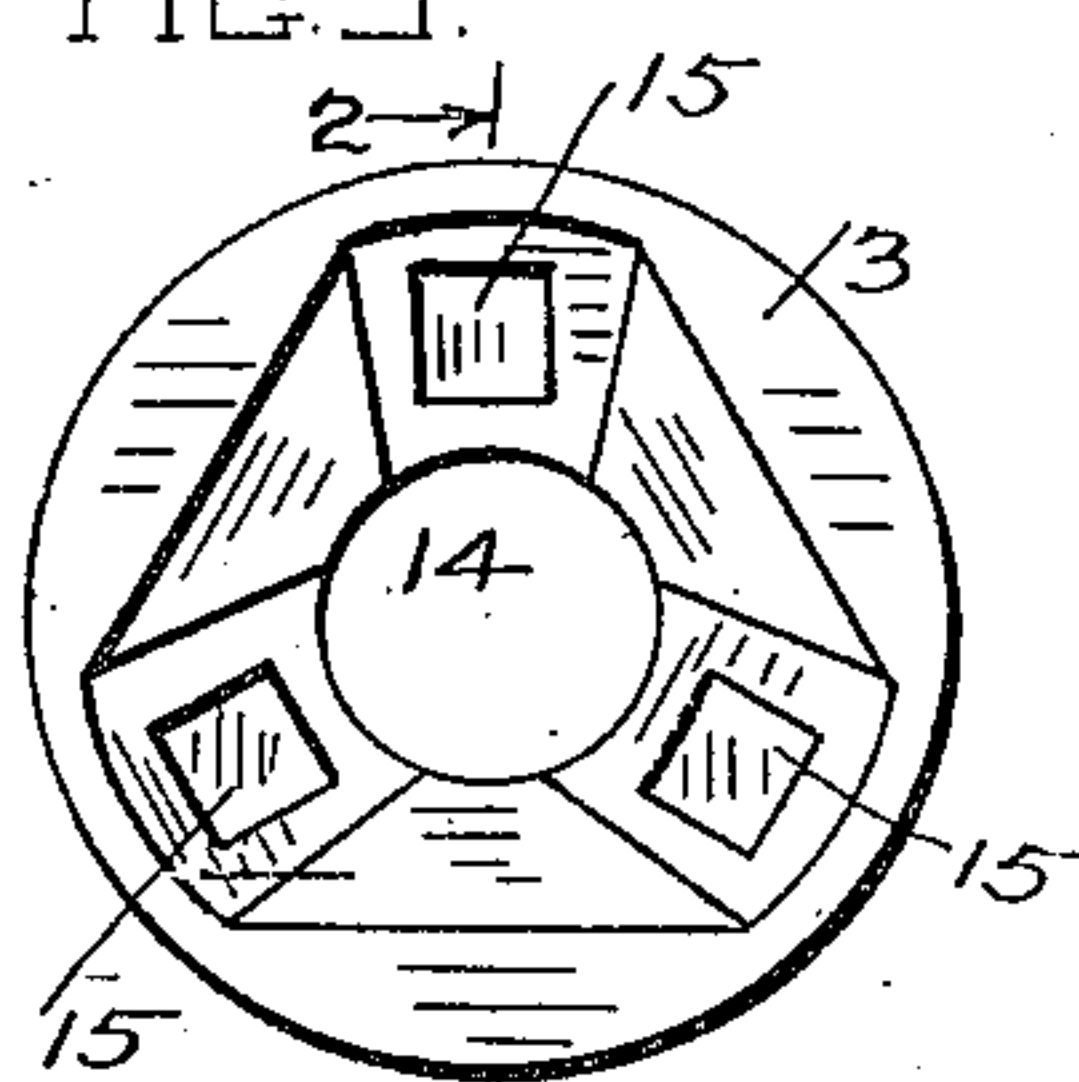


FIG. 6.

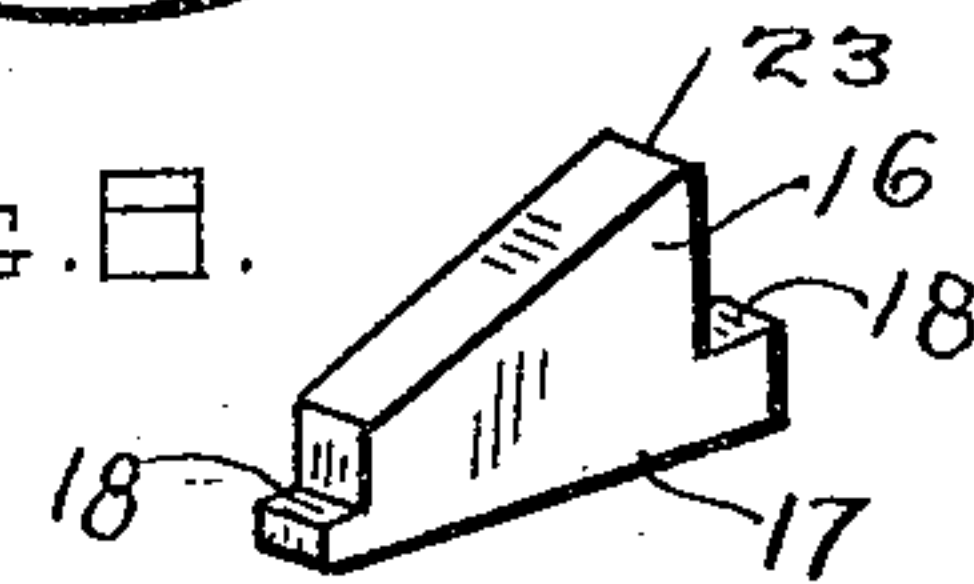


FIG. 7.

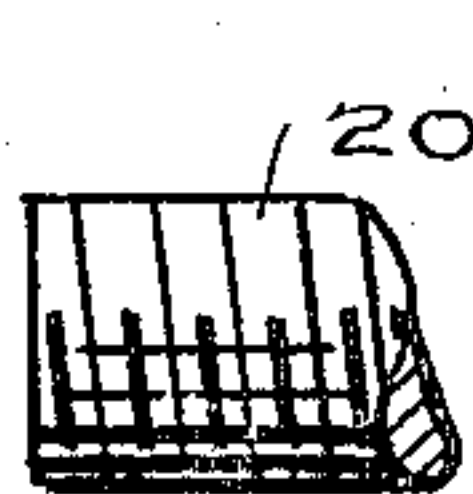
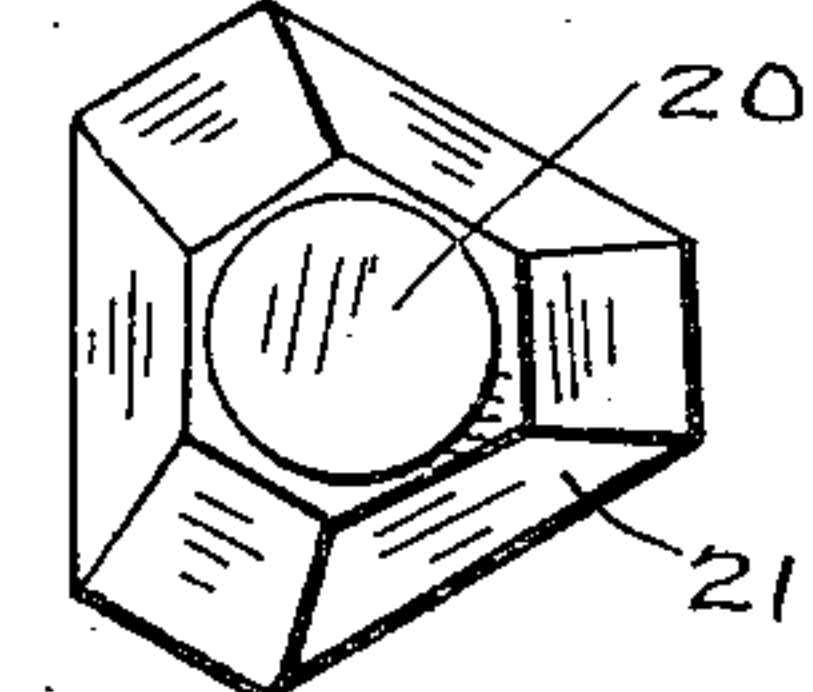
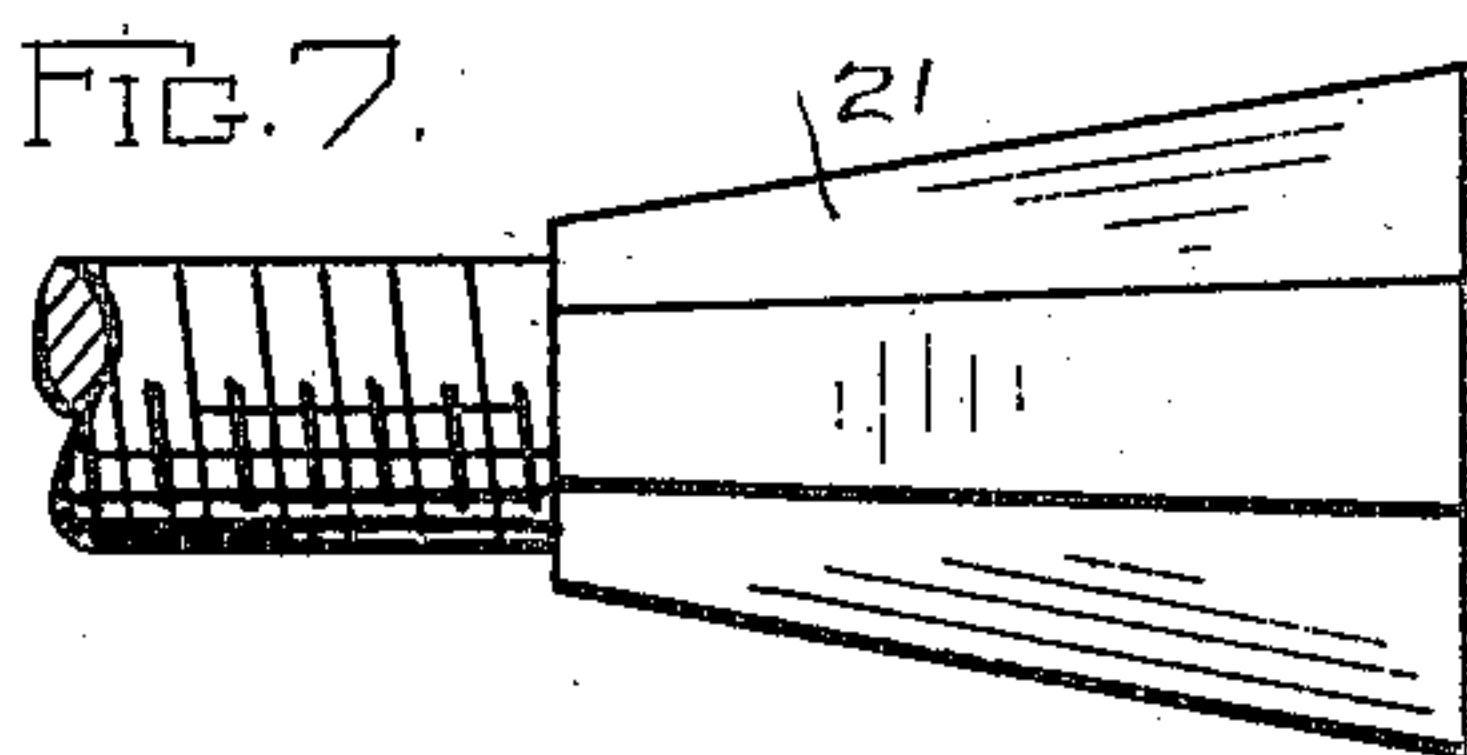


FIG. 9.



INVENTOR
Henry A. McCathron
BY
A. M. Wooster
ATTORNEY

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UNITED STATES PATENT OFFICE.

HENRY N. McCATHRON, OF BRIDGEPORT, CONNECTICUT.

BOILER-TUBE REPAIR PLUG.

Application filed June 25, 1921. Serial No. 480,325.

To all whom it may concern:

Be it known that I, HENRY N. McCATHRON, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Boiler-Tube Repair Plugs, of which the following is a specification.

My invention relates to repair plugs and similar means for sealing the ends of a boiler tube or pipe. The object of the present invention is to produce a device of the above class which shall be of simple construction, readily adapted to be applied with a minimum expenditure of time and trouble and which is of rigid and substantial construction to withstand wear.

To these and other ends the invention consists in certain improvements and combination of parts as will be pointed out with greater particularity in the claims appended to the specification.

Referring to the drawings—

Figure 1 is a conventional representation of a fire tube boiler showing the tubes projecting through the head.

Figure 2 is a section through an end portion of one of the tubes with my repair plug secured in position.

Figure 3 is an end view of the body portion of the retaining means for my plug.

Figure 4 shows a longitudinal section of the body portion with the lugs 16 and bolt head 21 removed.

Figure 5 represents a perspective view of the rear of my closure member 24 showing the packing groove 25.

Figure 6 is an end view of the bolt 20.

Figure 7 represents a side view of the same bolt shown in Figure 6.

Figure 8 is a perspective view of one of the lugs 16 removed from the body portion.

From the drawings it will appear that the numeral 10 indicates some simple form of fire tube boiler provided with the usual tubes 11 which may project through and be upset around the boiler head 12. In such boilers considerable difficulty has been experienced in providing a plug or closure member adapted to seal the end portions of the tube on rupture, which plug shall possess the advantages of being easily and quickly secured in position, as well as being adapted to withstand the attendant strains during the subsequent use often necessary with such boilers before the same can be permanently

repaired by the insertion of a new tube. My invention has been devised for the purpose of meeting this above mentioned need.

The numeral 13 indicates the body portion of the retaining means for securing the closure member 24 in clamped or sealed position, and as shown in the drawing is of less diameter than the inside of the boiler tube 11, so as to be easily inserted or slidable into position. The body portion 13 is also hollow having the tapered bore 14 extending therethrough and being provided with a plurality of transversely extending holes 15 for the reception of the lugs 16. In order that the lugs 16 may not be outwardly removable from the body portion, or easily lost when the body portion is not inserted in the tube, the bottoms 17 or inner part of the lugs are preferably made larger than the portions of the lug projecting out from the body portion 13, which in the embodiment shown consists in having the lugs 16 provided with shoulders 18 for co-operation with corresponding shoulders 19 in the body portion to prevent their removal. The bolt 20 is provided with a flared or tapered head 21 of the shape indicated, which is adapted not only to prevent the lugs 16 from falling into the central bore 14 of the body portion, but is also adapted when drawn into the body portion to act as a wedge and press the lugs 16 outwardly into a gripping engagement or co-operation with the inner walls of the tube 11. To facilitate this gripping engagement the lugs 16 may be provided with an edge suitable to slightly cut into the walls of the tube 11 and prevent the lugs and body portion being pulled or drawn out of the tube as pressure is exerted upon the bolt. The nut 22 engages the body portion 13 and the bolt 20 for the purpose of making the lugs 16 tightly grip the walls of the tube 11.

The closure member for tightly sealing the tube 11 against the passage of any fluids may be of any desired shape, but for purposes of illustration I have shown this closure member 24 as being cup-shaped and adapted to be tightly clamped over the end of the tube 11 by means of the nut 27. Figure 5 shows the inner face of the closure member 24 provided with a groove 25 to receive a sufficient quantity of asbestos or other packing 26 necessary to tightly seal the joint against any water which might leak out from the ruptured tube. If as shown in the drawing the closure member

loosely fits over the bolt 20, there may be provided a gasket or packing between the nut 27 and the member 24, or else the inside of the member 24 may receive sufficient packing upon the screw threads to prevent leakage.

In operation when a tube becomes broken, it is necessary to draw the fire sufficiently to permit the insertion and attachment of my improved plug which is accomplished by loosening the nut 22 sufficient to permit the body portion 13 and lugs 16 to be freely inserted or slid into the tube a convenient distance. The nut 22 is then tightened which results in drawing the head 21 of the bolt further into the body portion and pressing the lugs 16 out into a tightly gripping engagement with the inner walls of the tube 11. After inserting the packing in the groove 25 the closure member 24 may be slid in place over the bolt 20 and the member securely clamped in position by means of the nut 27 which co-operates with the bolt and member 24. A packing washer 28 prevents leakage.

From the above description it will be apparent that my improved plug may be quickly and easily inserted in the broken boiler tube. The gripping edges 23 of the lugs cut into the walls of the tube a sufficient amount to prevent their slipping out on the application of great pressure to the clamping nut 27 for the closure member. Not only are the parts of my improved plug made of such rigid and substantial material as to insure satisfaction and long wear if necessary, but it will be noted that the tighter the closure member 24 is pressed against the end of the tube 11, the greater will be the tendency for the lugs 16 to grip the inner walls of the tube by reason of the wedging action with which the head 21 of the bolt co-operates with the lugs 16 in the body portion.

I claim:—

1. In a device for sealing the end of a conduit, a body portion adapted to be slid in said conduit, lugs contained within the body portion and projecting outwardly therefrom, a bolt provided with an enlarged end, a nut engaging the body portion and bolt to draw the enlarged end thereof against said lugs and press the same outwardly for engagement with the inner walls of said conduit, a closure member provided with a packing ring and adapted to be

clamped against the end of said conduit, and a nut in co-operation with said member and bolt to retain the closure member in position and seal the conduit.

2. In a conduit sealing device, the combination with a hollow body portion having transverse holes therein, of gripping lugs carried in said transverse holes in said body portion, the inner end portions of said lugs being larger than the outer to prevent outward movement of said lugs beyond a predetermined amount, a bolt contained in the hollow body portion having a tapering head whereby movement of the head into the body portion is adapted to move said lugs outwardly, a closure member sealing the end of said tube, and means in co-operation with said bolt and closure member to retain the latter in position.

3. In a boiler tube sealing device, a body member adapted for insertion in a tube and having a noncircular opening therein, laterally movable lugs carried by the body member and adapted to grip the inner wall of the tube, a bolt slidable in the body member provided with a tapered portion substantially the same shape in cross section as the opening in the body member and adapted to force the lugs outwardly, a nut having threaded engagement with the bolt and adapted to react with the end of the body member to cause the lugs to engage the wall of the tube, a cap for closing the end of the tube, and means for securing the cap to the bolt and clamping it in position.

4. In a boiler tube sealing device, a body member adapted for insertion in a boiler tube and having a noncircular longitudinal opening therein, said member also having a plurality of lateral openings extending from the longitudinal opening, a plurality of lugs mounted for outward movement in the lateral openings and provided with means to engage the inner wall of the tube, means for limiting the outward movement of the lugs, a bolt having a tapered portion of substantially the same shape in cross section as the longitudinal opening and adapted to move the lugs into engagement with the tube, a nut having threaded engagement with the bolt and reacting with the body member to set the lugs, a cap for closing the tube and a nut on the bolt adapted to clamp the cap in position.

In testimony whereof I affix my signature.
HENRY N. McCATHRON.