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HOLLOW REPAIR DEVICE FOR LEAKY BOILER TUBES

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Fig. 1

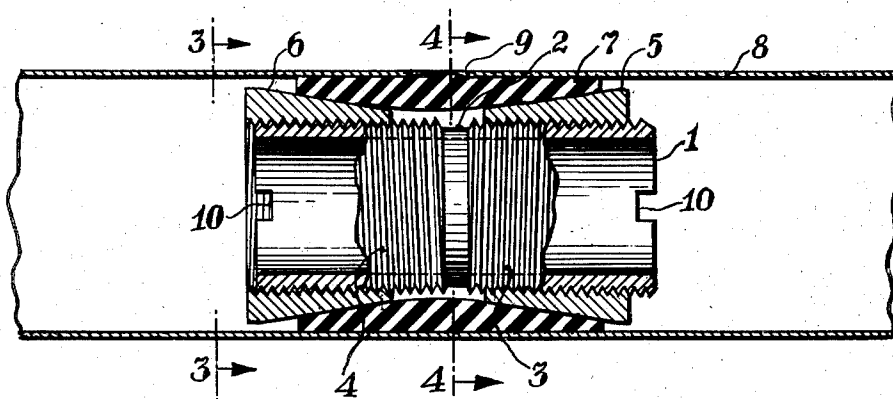


Fig. 2

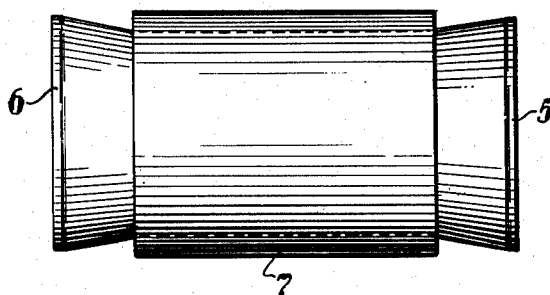


Fig. 3

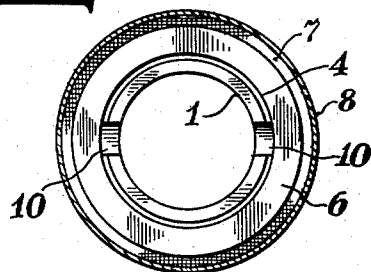
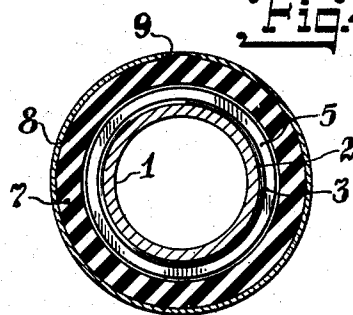


Fig. 4



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HOLLOW REPAIR DEVICE FOR LEAKY
BOILER TUBES

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3 Claims. (Cl. 138—97)

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This invention relates particularly to devices for stopping leaks, ruptures or the like in boiler tubes to permit the tubes to be repaired.

A prime object of the present invention is to provide such a device that is readily and speedily applied to a leaky or broken tube or pipe and which when applied will effectively seal the leak or break yet provide unobstructed passage for the flow of water, steam, air or the like.

Another object is to provide a device of this kind that permits repair of the damaged tube without stopping operation of the boiler or the like.

A further object is to provide a device of this kind that is simple in construction, easy to assemble and economical to manufacture.

Other objects and advantages of the invention will be apparent from the description thereof to follow taken in connection with the accompanying drawing in which:

Figure 1 is a longitudinal sectional view showing my improved stopper applied to a leaky hollow boiler tube.

Figure 2 is a side elevational view of the improved stopper.

Figure 3 is a cross sectional view taken on the plane of the line 3—3 of Figure 1.

Figure 4 is a cross sectional view taken on the plane of the line 4—4 of Figure 1.

The improved stopper comprises a tube or pipe of metal 1, the external surface of which is smooth at its center as indicated at 2, the remainder of said surface being formed with screw threads. The threads to the right of said central portion as indicated at 3 are cut in one direction, for example, right hand threads, and the threads to the left as indicated at 4 are cut in the opposite direction, or left hand threads. On the right hand end of the tube is a frusto-conical metal sleeve member 5 formed with internal screw threads adapted to mesh with the right hand screw threads 3. A similar sleeve member 6 is mounted on the left hand end and has internal screw threads adapted to mesh with the left hand threads 4, of the tube. These sleeve members are positioned on the tube with their smaller ends facing each other.

Surrounding the sleeve members and tube is an elongated expansible packing sleeve 7 formed of rubber or other suitable elastic, expansible or compressible material. The sleeve 7 extends across the threaded sections of the tube and seats on the beveled outer surfaces of the sleeve members 5 and 6.

In using my improved stopper, the parts are

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assembled as shown in Figure 2 with the sleeve members 5 and 6 screwed into the tube 1 and the expansible sleeve 7 mounted on said sleeves 5 and 6. It will be understood that the normal diameter of the expansible sleeve will be such as to afford a sliding fit with the interior of the hollow boiler tube to be repaired, and that various sized stoppers will be used for various sized boiler tubes. The assembled unit is driven into the cracked or leaky boiler tube 8 to be repaired until it is opposite the leak or crack 9 therein and until the leak is positioned between the movable sleeve members 5 and 6 as shown in Figure 1. A wrench or other tool is now applied to the end of the tube 1, each end of the tube being provided with opposed slots 10 in its edge to receive such a tool, and the tube is turned in one direction, for example, to the left. Rotation of the sleeve members 5 and 6 on the tube is prevented by the engagement of the expansible sleeve 7 with said sleeve members and with the inner surface of the boiler tube. Due to the right and left hand threads, the turning of the tube 1 in one direction will cause the sleeve members 5 and 6 to be drawn or moved toward each other thereby compressing and expanding the central portion of the sleeve 7 and forcing it outwardly against the inner surface of the boiler tube in which the stopper is located thereby filling the void in the rupture, leak or crack 9. This forms a seal between the imperforate or unbroken part of the boiler tube and the stopper around the outer surface of the sleeve 7. Upon rotation of the tube in the opposite direction, the sleeve members 5 and 6 will be moved apart so as to permit the elastic sleeve 7 to contract so that the stopper can be easily inserted into and removed from the tube.

What I claim is:

1. A device for sealing ruptures in hollow boiler tubes or the like comprising a tube having external screw threads at each end, the threads on one end being cut in a direction opposite to the threads on the other end, a frusto-conical sleeve member on each end of said tube and having internal screw threads adapted to mesh with the threads on the corresponding end of the tube, said sleeve members being positioned with their smaller ends facing each other, and an elastic sleeve surrounding said frusto-conical sleeve members and relatively slidably engaging the tapered outer surfaces thereof whereby said elastic sleeve is expanded or contracted upon movement of said frusto-conical sleeve members toward or away from each other into leak-proof contact

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with the inner surface of a boiler tube and out of contact therewith, respectively, at least one end of said tube being slotted to receive a tool for turning same relative to the frusto-conical sleeve members.

2. A device for sealing ruptures in hollow boiler tubes or the like comprising a tube having external screw threads at each end, the threads at one end being right hand threads and the threads at the other end being left hand threads, a frusto-conical sleeve member on each threaded end of said tube and having internal screw threads adapted to mesh with the threads on the corresponding end of the tube, said sleeve members being positioned with their smaller ends facing each other, and an elongated rubber sleeve surrounding said frusto-conical sleeve members and frictionally engaging the tapered outer surfaces thereof whereby upon inward movement of said frusto-conical sleeve members toward each other said rubber sleeve is expanded into contact with the inner surface of a boiler tube enclosing same to seal a rupture therein, the engagement of said rubber sleeve with said inner surface of the boiler tube and with the tapered surfaces of said frusto-conical sleeve members preventing their rotation.

3. A device for sealing ruptures in hollow boiler tubes or the like comprising a tube having external screw threads at each end, the threads on one end being cut in a direction opposite to the threads on the other end, a frusto-conical sleeve

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member on each end of said tube and having internal screw threads adapted to mesh with the threads on the corresponding end of the tube, said sleeve members being positioned with their smaller ends facing each other, and an expansible sleeve surrounding said frusto-conical sleeve members and frictionally engaging the tapered outer surfaces thereof whereby said expansible sleeve is expanded upon movement of said frusto-conical sleeve members toward each other, said tube having means to be engaged by a tool for rotating the sleeve.

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