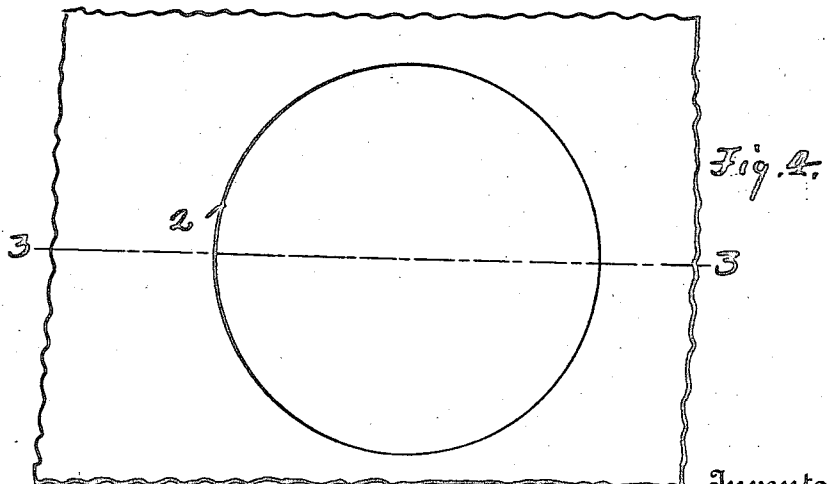
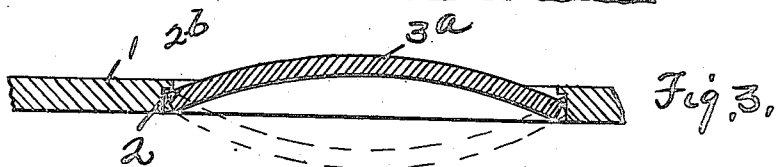
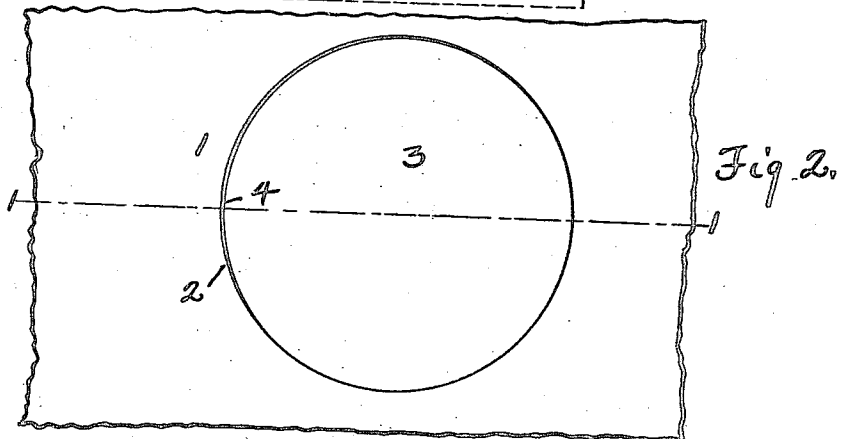
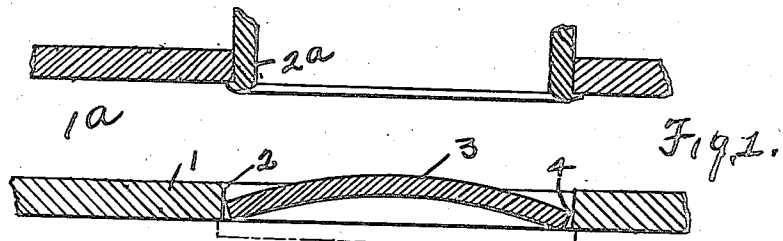


H. C. LORD.
CLOSURE FOR OPENINGS IN RECEPTACLES SUBJECTED TO PRESSURE.
APPLICATION FILED AUG. 8, 1918.

1,432,475.

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Inventor
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UNITED STATES PATENT OFFICE.

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CLOSURE FOR OPENINGS IN RECEPTACLES SUBJECTED TO PRESSURE.

Application filed August 8, 1918. Serial No. 248,843.

To all whom it may concern:

Be it known that I, HUGH C. LORD, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Closures for Openings in Receptacles Subjected to Pressure, of which the following is a specification.

This invention relates to closures for openings in receptacles subjected to pressure and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

The closure is particularly adapted for openings in headers for water tube boilers.

The invention is illustrated in the accompanying drawings as follows:—

Fig. 1 shows a section on the line 1—1 in Fig. 2 of a portion of a header.

Fig. 2 an elevation of the outer header plate.

Fig. 3 a section on the line 3—3 in Fig. 4 showing an alternative construction.

Fig. 4 an elevation from the inside of the plate shown in Fig. 3.

1 marks the outer plate of a header 1^a. It is provided with an opening 2 opposite a tube 2^a and of a size to permit the removal of the tube 2^a through the opening. It will be understood that there are many of such openings in the ordinary header. A closure plate 3 is provided for the opening. It is formed of sheet steel and in the preferred construction is initially flat having a diameter slightly greater than the diameter of the opening 2. It is forced into the opening by initial pressure at its center dishing the plate so as to contract its edges to the size of the opening. The plate is then thrust into the opening and released, its tension expanding its edges into engagement with the walls of the opening. Ordinarily the edges 4 will present a line contact with the walls of the opening and the material of the plate 3 is preferably harder than the plate 1 so that under pressure the plate 1 is slightly indented assuring a complete closure. With added pressure on the plate 3 from within its engagement with the walls of the opening is increased, thus preventing the removal by reason of pressure. When it is desired to remove the plate it is simply driven through.

In the alternative construction the opening 2 is provided with a shoulder 2^b and the plate 3^a is initially curved to the position shown in dash lines. In putting it in place

it has an initial diameter permitting its insertion in the opening against the shoulder 2^b and then by pressure at the center the plate is sprung through the opening, the movement being progressive, the center springing in and passing a line between the shoulders prior to the elimination of the outer curvature of the disc near the edges. After the disc springs past the center it tends to return to its outer position and thus expands into engagement with the walls of the opening.

If desired pressure may be exerted against the inner face of the plate after it is in place to expand it forcibly into the walls of the plate 1.

By increasing the arch, or dish, of the closure plate the expanding force against the walls of the opening in the plate 1 is decreased when the receptacle is under pressure. On the other hand the engagement between the edges of the closure plate and the walls of the opening is decreased. The arch should, therefore, not be carried to a point endangering the safe engagement of the edges with the walls of the opening. On the other hand it should be carried sufficiently to prevent the expansion of the edges by indentation a sufficient distance to eliminate the arch or dish of the plate and also sufficiently to assure a quite pronounced arch in its final position. By reason of the arched structure ordinarily the closure plate may be made somewhat thinner than the plate 1. This permits of its taking on the arch with less stress of metal than if the thickness were greater. On the other hand ordinarily in the span of the opening such a plate so arched has sufficient strength to correspond to the strength of the plate 1.

What I claim as new is:—

1. In a closure for receptacles subjected to pressure, the combination of a metallic plate with a circular opening therethrough with cylindrical walls therein; and a metallic closure disc having its edges in sealing engagement with the cylindrical walls of the opening and dished inwardly, the disc being of material adapted to indent the walls of the opening and under tension tending to expand its edges into securing engagement with said walls.

2. In a closure for receptacles subjected to pressure, the combination of a metallic plate with a circular opening therethrough; and a metallic closure disc having its edges

in sealing engagement with the walls of the opening and dished inwardly, the surface of the edge of the disc being out of alinement with the surface of the wall of the opening making a sharp line of contact between the disc and the wall of the opening, the disc being of harder material than the plate. 5

3. In a boiler header, the combination of a metallic tube plate; a metallic outer plate

having an opening in alinement with the opening of the tube plate; and a metallic closure disc for the opening in the outer plate having its edges in securing and sealing engagement with the walls of the opening in the outer plate and dished inwardly. 15

In testimony whereof I have hereunto set my hand.

HUGH C. LORD.