(No Model.)

F. W. JUDD.

BUSHING FOR OPENINGS IN SHEET METAL VESSELS.

No. 393,333. Patented Nov. 20, 1888.

Fig 1.

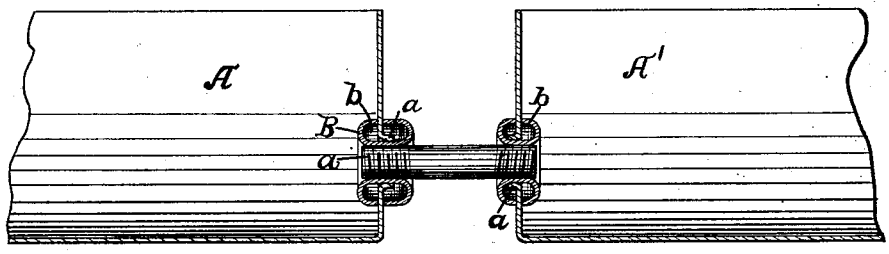


Fig 2.

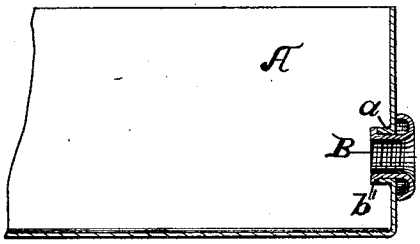


Fig 3.

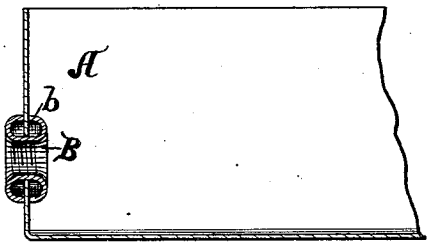


Fig 4.

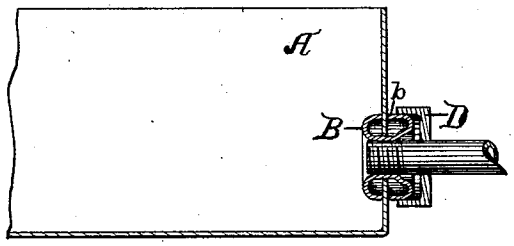


Fig 5.

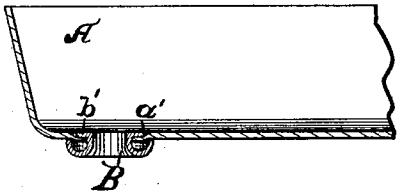


Fig 6.

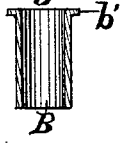
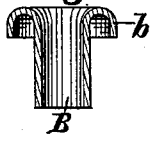


Fig 7.



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BUSHING FOR OPENINGS IN SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 393,333, dated November 20, 1888.

Application filed July 17, 1888. Serial No. 280,188. (No model.)

To all whom it may concern:

Be it known that I, FRED W. JUDD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Bushings for Openings in Sheet-Metal Vessels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view through two sheet-metal troughs and the bushings thereon with a pipe connecting them. Figs. 2, 3, and 4 are vertical sections through sheet-metal troughs and their bushings, showing slight modifications from the form shown in Fig. 1. Fig. 5 is a vertical section of a sheet-metal sink, showing my improved bushing secured thereto. Fig. 6 is a sectional view of a bushing, of the form shown in Figs. 2 and 5, before the same is secured to the vessel. Fig. 7 is a similar view of such a bushing as is shown in Figs. 1 and 3 before the attachment.

Hitherto the most satisfactory manner of securing outlet and inlet pipes to sheet-metal vessels has been to rivet or bolt in or around an orifice therein an independent bushing or boss, which was generally made of cast-iron and threaded or otherwise adapted to the attachment of the pipe; but the cost of these cast-iron devices, and especially of the labor required for their attachment, adds considerably to the cost of the vessel.

The object of my invention is to combine with a vessel a bushing of cheap and novel form which may be quickly and easily secured to said vessel, whereby the pipes may be attached thereto.

To this end it consists of the combination of a sheet-metal vessel having a hole therethrough with a sheet-metal tube enlarged at one end, substantially as described, which is pushed through said hole until the enlargement rests against a part of the wall of said vessel and having the other end turned back upon itself until its end engages with the wall of said vessel, whereby the bushing is held in place and a space left between the ends of said tube for the formation of a screw-thread or stuffing-box, and also the sub-combinations herein described, and pointed out in the claims.

In Fig. 1 are shown two sheet-metal troughs, such as now used in stock-cars, each provided with one form of my improved bushing and connected by a short pipe which is screwed into said bushings.

In said drawings, A A represent the troughs, each provided with an opening, around which the metal is drawn out at right angles to form a flange or boss, *a*.

B represents the bushing, which in the process of manufacture is first drawn into the form shown in Fig. 7 with one end, *b*, bent backward, so as to form an enlargement which will prevent its being drawn through the hole in the vessel. This bushing is inserted through the hole in the trough, where it should fit as tightly as practicable, and the enlarged end *b* pushed against the wall of the vessel. A mandrel is then inserted to hold the wall of the tube in a cylindrical form, and the outer end thereof as drawn or bent outward and backward until its end rests snugly against the wall of the vessel. The bushing cannot now be removed because of the engagement of the ends thereof on both sides of the wall of the vessel. With this construction, above described, the flange *a* forms a strengthening-sleeve, which serves to prevent any distortion of the tube B. When the bushing is thus attached to the trough, the whole is preferably galvanized, which operation serves to prevent the bushing from turning in the hole, and also serves to make tight the joints between the bushing and vessel. If a screw-thread is to be cut in the bushing, it is preferably done after the above steps in the manufacture and connection of the bushing are completed.

The essential principle of the generic invention described herein and claimed in claim 1 is that the tubular bushing shall have at one end—preferably the inner end—an enlargement of some form, (two forms being shown in Figs. 6 and 7,) which engages with the vessel and prevents the tube being drawn through the hole, and that the other end of the tube shall be bent outward and backward until its end engages with the wall of the vessel, the bend in the tube being at such a distance from said wall as will leave a straight piece of the tube large enough to permit the cutting of a

screw-thread or formation of a stuffing-box therein. With this view of the principle of the invention it is plain that some modifications may be made in the construction above described without departing from said principle, and some of these modifications are shown in the other figures.

In Fig. 3 the flange *a* on the vessel around the hole is omitted, and this omission, since it deprives the tube of the strengthening-sleeve, weakens it to some extent and renders it more liable to distortion both in the manufacture and use of the device; but in common with the form first described this form has this advantage, that since both ends of the tube are bent outward and backward until their ends engage with the wall of the vessel a greater length of straight tube may be left for the screw-thread.

Another form of the bushing before it is attached to the vessel is shown in Fig. 6. This form is enlarged at its inner end by the formation thereon of an annular flange, *b'*, at right angles to the axis of the tube. This form of the bushing may be attached to a vessel having a flange, *a*, around the opening, as follows: The tube is pushed through the hole until the enlargement or flange *b'* strikes against the edge of the flange *a*, when the other end is turned backward, as described and shown in Fig. 2, until its end engages with the wall of the vessel. In Fig. 5 the bushing, enlarged at one end, as shown in Fig. 6, is shown attached to a sink. The tube is drawn through the hole until the flange *b'* lies against the flat wall of the sink, when the other end is turned back, as described. The wall around the hole may be countersunk, so that the flange shall lie flush with the general surface of the wall.

Fig. 4 shows a form of bushing in which the tube before it is attached is shaped to form a stuffing-box, and the tube on the stuffing box end is turned back until it lies parallel to the axis and a screw-thread cut on the outside thereof. Upon this thread a cap, D, for retaining the packing is screwed.

These bushings, while designed with special reference to the attachment of pipes, may, if desired, be employed as bearings into which stationary pins may be inserted and the vessel, especially troughs, pivoted thereon.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a vessel having a hole through the wall thereof, with a tubular sheet-metal bushing having an enlarged end which engages with one side of said wall, and having the other end bent outward and backward against the other side of said wall at a point which will leave a sufficient length of tube between its ends for the formation of an interior screw-thread or stuffing-box, substantially as and for the purpose specified.

2. The combination of a sheet-metal vessel having a hole through the wall thereof, and a flange integral with said wall turned up around said hole, with a tubular sheet-metal bushing having an enlarged end which engages with one side of said wall and having the other end bent outward and backward against the other side of said wall at a point which will leave a sufficient length of tube between its ends for the formation of an interior screw-thread or stuffing-box, substantially as and for the purpose specified.

3. The combination of a sheet-metal vessel having a hole through the wall thereof, with a tubular sheet-metal bushing having an enlarged end which engages with one side of said wall and having the other end bent outward and backward against the other side of said wall, said bushing being provided with an internal screw-thread, substantially as and for the purpose specified.

FRED W. JUDD.

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