(No Model.)

F. W. JUDD.

BUSHING FOR OPENINGS IN SHEET METAL VESSELS.

No. 393,334. Patented Nov. 20, 1888.

Fig 1.

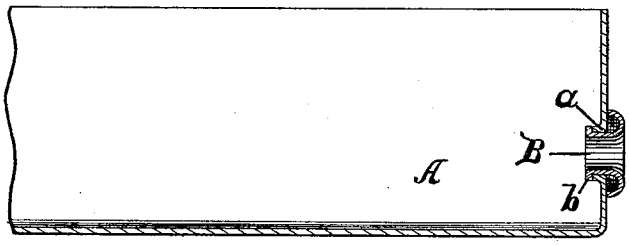


Fig 2.

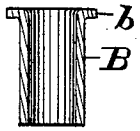


Fig 3.

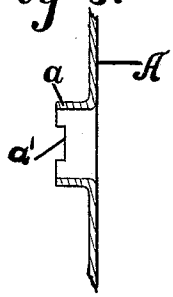
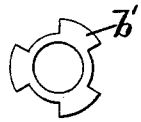


Fig 4.



WITNESSES.

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UNITED STATES PATENT OFFICE.

FRED W. JUDD, OF CLEVELAND, OHIO, ASSIGNOR TO THE AVERY ELEVATOR BUCKET COMPANY, OF OHIO.

BUSHING FOR OPENINGS IN SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 393,334, dated November 20, 1888.

Original application filed July 17, 1888, Serial No. 280,188. Divided and this application filed September 24, 1888. Serial No. 286,159. (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 sectional view of a sheet-metal vessel and the bushing herein described attached thereto. Fig. 2 is a sectional view of the tubular bushing before it is attached. Fig. 3 is a sectional view of that part of the vessel adjacent to the hole, showing the notches in the flange *a*. Fig. 4 is an end view of the tubular bushing having a notched flange.

This application is a division of my application, Serial No. 280,188, filed July 17, 1888.

The object of my invention is to provide a sheet-metal vessel with a novel form of sheet-metal bushing, which may be provided with means for the attachment of a pipe.

To this end it consists in the construction, combination, and arrangement of the parts herein shown and described, and pointed out definitely in the claims.

Referring to the drawings, A represents a sheet-metal vessel having a hole in the wall, around which an annular flange, *a*, is turned up, substantially as shown. B represents a sheet-metal tube which forms a bushing for said hole. In the process of manufacturing this bushing and attaching it to the vessel a flange, *b*, at right angles to the axis of the tube is bent over as shown. The bushing is then pushed into the hole until the flange *b* abuts against the edge of the flange *a*. A mandrel is then inserted into said tube to prevent it being drawn out of shape, and the other end of said tube is curled or bent outward and backward upon itself until its end abuts against the wall of the vessel, thus holding the bushing in its place, the bend being made at a sufficient distance from the other end of the tube to leave a considerable length of straight tube, in which a screw-thread may be cut.

By the above-described construction the tube, though comparatively thin itself, is re enforced by the flange *a* at a point where strength is needed, and it is more easily and quickly made and attached than other forms. After being attached the vessel and bushing are preferably galvanized, and a screw-thread is cut in the inner wall of the bushing after this is done.

As an additional improvement, and to prevent the bushing from being revolved when a pipe is being attached or detached, I cut away portions of the flange *b*, thereby forming a series of teeth, *b'*, and in the flange *a*, I cut a series of corresponding notches, *a'*, into which said teeth are drawn, and the other end is turned back, as described.

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

1. The combination of a sheet-metal vessel, having a hole through the wall thereof and a flange, *a*, integral with said wall turned up around said hole, with a sheet-metal tube having a flange, *b*, at right angles to its axis, which engages with said flange *a*, and having its other end bent outward and backward against said wall, whereby said tube is secured to the vessel and a portion thereof between its ends is left straight, substantially as and for the purpose specified.

2. The combination of a sheet-metal vessel, having a hole through its wall and a notched flange integral therewith turned up around said hole, with a sheet-metal tube having a notched flange at right angles to its axis, and having its other end bent outward and backward against the wall of said vessel, substantially as and for the purpose specified.

FRED W. JUDD.

Witnesses:
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