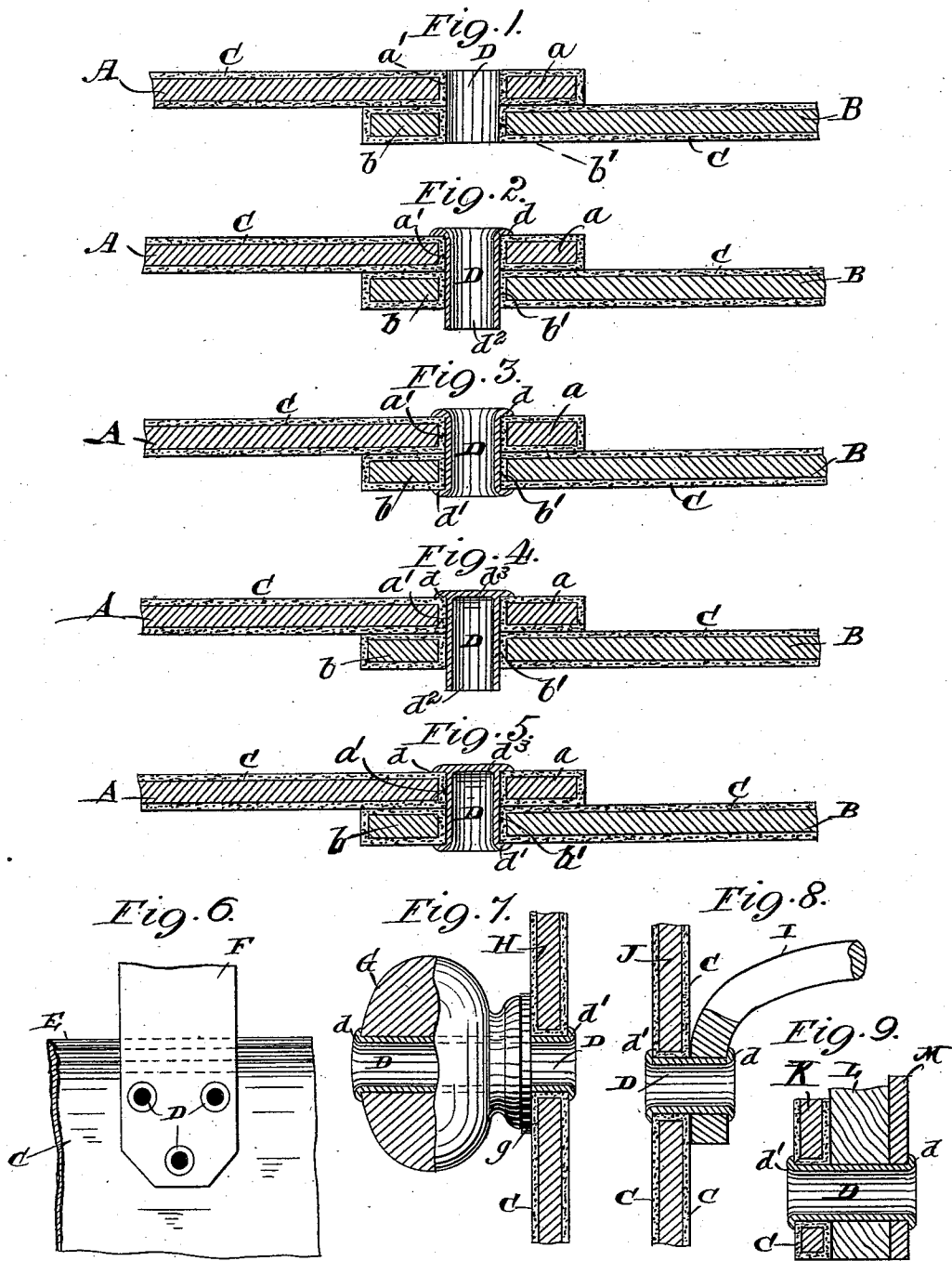


(No Model.)

A. NIEDRINGHAUS.
ENAMELED SHEET METAL WARE.

No. 429,578.

Patented June 3, 1890.



WITNESSES
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ALEXANDER NIEDRINGHAUS, OF ST. LOUIS, MISSOURI.

ENAMELED SHEET-METAL WARE.

SPECIFICATION forming part of Letters Patent No. 429,578, dated June 3, 1890.

Application filed April 4, 1890. Serial No. 346,548. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER NIEDRINGHAUS, of St. Louis, Missouri, have made a new and useful Improvement in Enameled and other Sheet-Metal Ware, of which the following is a full, clear, and exact description.

The improvement relates, mainly, to enameled ware, but it is also applicable to some other forms of sheet-metal ware, and especially that class of ware having a highly-finished surface which is liable to be injured or marred when its parts are being united, and the improvement has for its object the uniting of sheets or parts of sheets or attachments to sheets or parts of sheets of enameled and other sheet-metal ware by means which, in their application, do not involve the shock and concussion incident to the use of solid rivets when employed to unite parts such as enumerated; and it consists, substantially, in the use of hollow rivets whose end or ends, after the rivet has been inserted into perforated, lapped, or opposed parts to be united, are, with the aid of a mandrel or analogous tool, introduced within or applied to the rivet, formed into flanges or heads laid tightly against but without shock to the enamel or finish surrounding the rivet-perforation, substantially as is hereinafter set forth and claimed, aided by the annexed drawings, making part of this specification, in which—

Figure 1 represents two pieces of enameled sheet-iron having their perforated lapped edges in position to be united; Fig. 2, a view analogous to that of Fig. 1, and showing in addition the rivet inserted, but one of its ends not yet formed into a flange, and Fig. 3 a view of the same parts, showing the riveting completed; Figs. 4 and 5, views, respectively, similar to those of Figs. 2 and 3, but showing a hollow rivet closed at one end; Fig. 6, a side elevation showing an ear fastened to a vessel-body by means of the improved fastening; Fig. 7, a sectional elevation exemplifying the application of the improvement to a vessel attachment, say a wooden knob secured to a piece of enameled ware; Fig. 8, a sectional elevation exemplifying another application of the improvement, and Fig. 9 a sectional

view showing more than two parts united by means of the improved fastening.

The same letters of reference denote the same parts.

A and B, Figs. 1, 2, 3, 4, and 5, represent any two metallic sheets or parts of sheets of the kind described which it is desired to unite. Their respective edges *a* and *b* are perforated at *a'* and *b'*, respectively, and are lapped to bring the perforations *a'* *b'* into coincidence.

C represents an enamel coating applied in the usual manner to the sheets prior to being united.

D represents the rivet or one of the rivets employed to unite the sheets. The flange *d* at one end of the rivet may be formed before the rivet is inserted in the perforations in the sheets. The flange *d'* at the opposite end of the rivet is formed after the rivet is inserted. The rivet is of copper or other malleable metal, and of such thinness to enable the flange *d'* to be formed, as shown, by bending and turning and pressing the hollow end *d²* of the rivet into the form shown without subjecting the enameled portion of the structure to percussive blows of such violence as to endanger the integrity of the enamel. In Figs. 4 and 5 the end *d³* of the rivet is shown closed, but in either case—that is, as made in Figs. 2 and 3 or in Figs. 4 and 5—the flange *d'* is formed as described, and in either case a mandrel can be introduced into the rivet to effect the formation or to aid in effecting the formation of the flange *d'*, and at the same time largely, if not entirely, sustain the strain caused by any tool used to form the flange.

Fig. 6 illustrates the application of the improvement to an attachment to some part—such as the vessel E, for instance.

F represents an ear attached to the vessel. The ear is perforated at *f* and is coated with enamel G.

The rivet D is used to unite a handle—such, for instance, as the wooden knob G, Fig. 7—to a piece of enameled ware—such, for instance, as the part H—in the same manner as when uniting the sheets A B. The handle may or may not be enameled.

In Fig. 8 another form of attachment I is shown fastened to a piece of enameled ware J.

In Fig. 9 three parts K L M are shown united by means of a single rivet D in the usual manner. But one K of these parts is shown enameled, although two or all three of them may be enameled.

I claim—

1. In enameled sheet-metal ware, two or more lapping parts united by a hollow rivet, substantially as described.
2. In sheet-metal ware, two or more lapping parts united by a hollow rivet, substantially as described.

3. In sheet-metal ware, a sheet or part having a sheet, part, or fixture applied and united thereto by means of a hollow rivet, substantially as described.

Witness my hand this 27th day of March, 1890.

ALEXANDER NIEDRINGHAUS.

Witnesses:

C. D. MOODY,
F. C. SHARP.