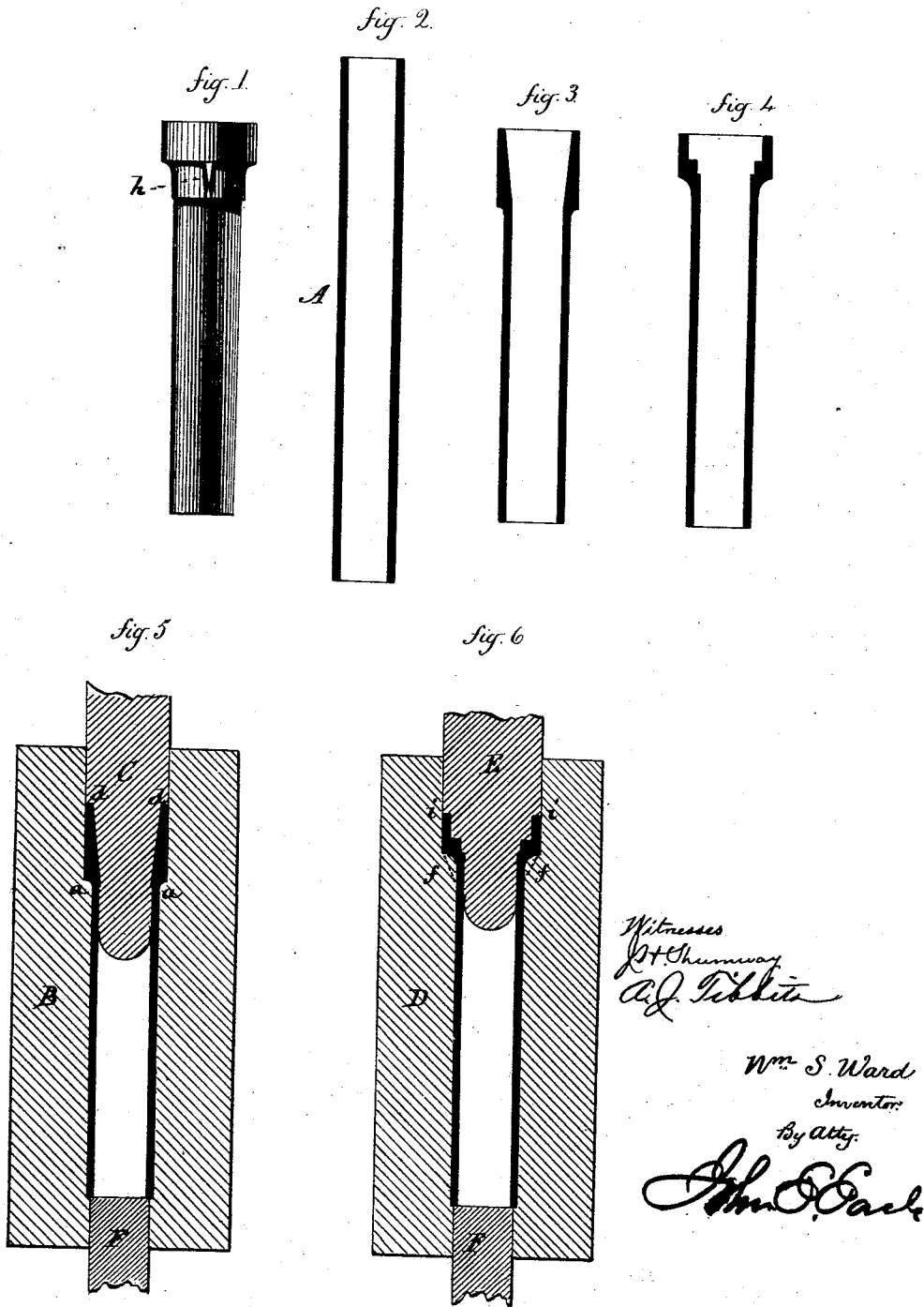


W. S. WARD.
Dies for Making Axle Boxes.

No. 155,128.

Patented Sept. 15, 1874.



Witnesses
 J. H. Chumway
 A. J. Tibbitts

Wm. S. Ward
 Inventor

By Atty.
 J. M. Cash

UNITED STATES PATENT OFFICE.

WILLIAM S. WARD, OF PLANTSVILLE, CONNECTICUT, ASSIGNOR TO H. D. SMITH & CO., OF SAME PLACE.

IMPROVEMENT IN DIES FOR MAKING AXLE-BOXES.

Specification forming part of Letters Patent No. **155,128**, dated September 15, 1874; application filed March 5, 1874.

To all whom it may concern :

Be it known that I, WILLIAM S. WARD, of Plantsville, in the county of Hartford and State of Connecticut, have invented a new Improvement in Dies for Manufacturing Wrought-Iron Axle-Boxes; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the box complete; Figs. 2, 3, and 4, different stages in central section; and in Figs. 5 and 6, vertical central sections of dies for forming the box.

This invention relates to the manufacture of axle-boxes from wrought metal.

By the several processes under which it has been attempted to make this class of boxes, the uncertainty of making perfect work, the complication of processes, and the consequent expense make these boxes of so high cost as to make them impracticable for anything except the best grades of work.

The object of this invention is to produce a wrought-metal box at so small a cost that it may compete with the common cast-metal box; and it consists in the dies, constructed as hereinafter described, whereby the box is formed from wrought-metal tubing, the said dies upsetting one end of such tube to form the collar or neck of the box.

I take wrought-metal tubing of a little less internal diameter than the diameter of the finished box to be produced, and cut therefrom a section, A, Fig. 2, in length to give sufficient metal to form the neck and box complete. This section I place in a die, B, the internal diameter of which corresponds to the external diameter of the tubing from the bottom up to the upper portion of the die, where it is enlarged, so as to form substantially a shoulder, as at *a*. The upper end of the tube is heated before placing it in the die; then a follower, C, which substantially fills the upper end of the die, and is formed with a shoulder, *d*, below which the follower is contracted, so as to enter the open end of

the tube, is forced down onto the open end of the tube, upsetting and spreading that end of the tube between the shoulder *a* of the die and the shoulder *d* of the follower. In this operation a fin is liable to be forced up between the side of the die and follower, which would so wedge the follower as to make it difficult to withdraw. To prevent this, I prefer to apply a collar to the follower, the lower end of the collar forming the shoulder *d*. This collar is fitted to the follower, so that it will be held to the follower with sufficient force to prevent its displacement in the movement of the follower, but will allow the follower to rise from it if the fin of metal is sufficient to so wedge the collar as to overcome the force which holds the collar to the follower. In such case the collar will be thrown from the die with the box to be again placed on the follower.

Different lengths of collars may be employed, corresponding to different depths of necks.

After this portion of the process the blank is removed, it then being in the form shown in Fig. 3. This blank is then placed in a second die, D, which is of the form of the exterior of the completed box, with grooves, as denoted at *f* in broken lines, to form the fins *h* at the neck.

The follower E is shaped to fill the upper end of the die, preferably fitted with a loose collar, *b*, as described, for the follower C, its lower end, below the collar *i*, corresponding to the interior of the neck or collar of the box. This is forced or struck down upon the blank to upset the metal into the completed form of the box, and thus completed, as in Figs. 4 and 6, the box is removed from the die, then to be treated in like manner as cast-metal boxes.

It is advisable, for the easy removal of the box from the die, to place a slide, F, below the die, which may be forced up against the end of the box, as seen in Figs. 5 and 6, to raise the box from the die.

I have described the process as performed at two operations; but this may be done in a single operation, employing only what I have

described as the finishing-dies, Fig. 6, and it will be understood that the shape of the die and follower is to be in conformity with the external internal shape of the neck of the box to be produced, these forms being variable for different carriage-makers.

By this process of making axle-boxes from tubing, I am enabled to produce boxes at very little, if any, more cost than cast-metal boxes are now furnished.

I claim as my invention—

The dies constructed as herein described, the follower entering and filling the mouth of the die, and with or without the slide F, substantially as specified.

WILLIAM S. WARD.

Witnesses:

SIMEON H. NORTON,
D. H. HULL.