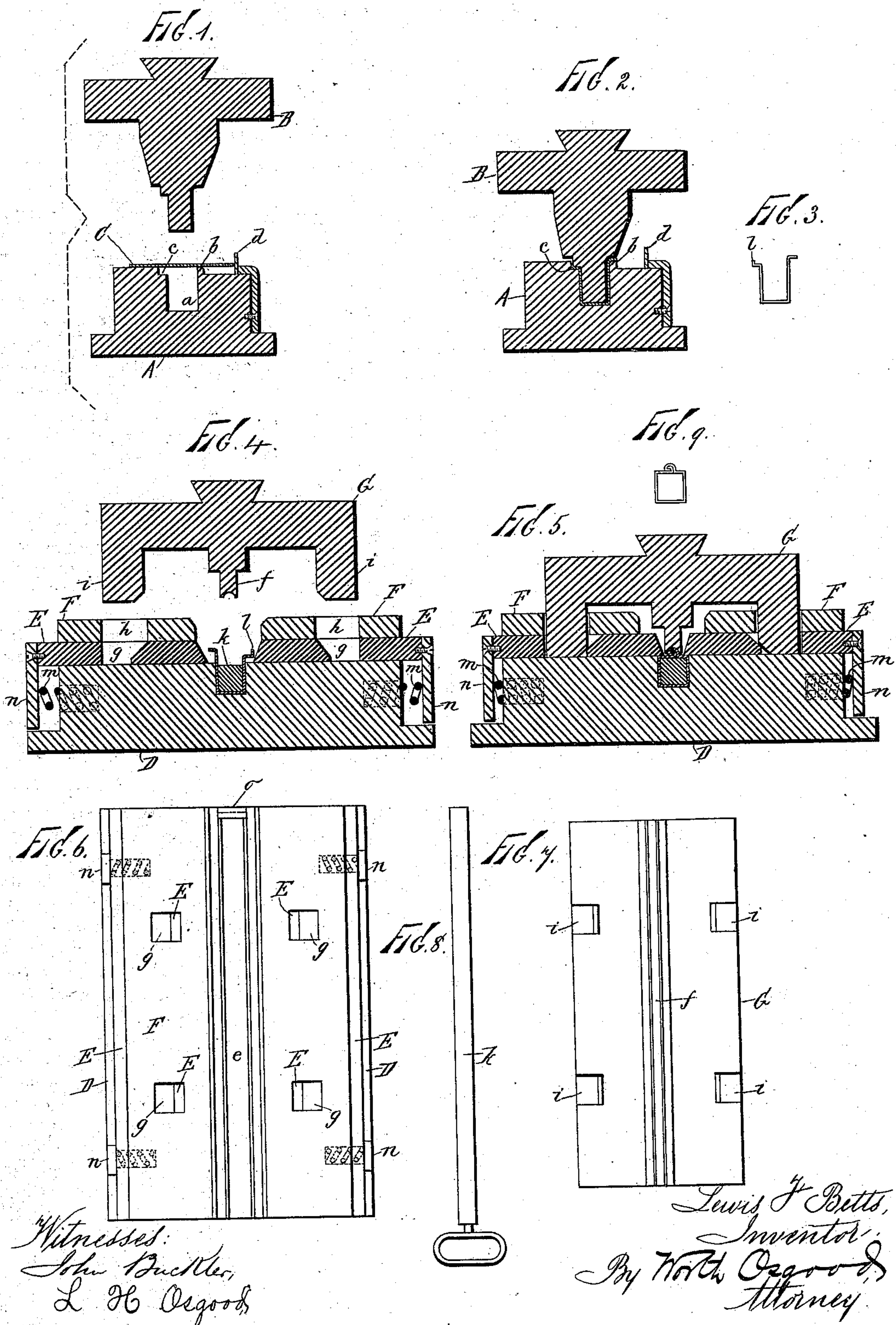


(No Model.)

L. F. BETTS.
MACHINE FOR FINISHING METAL TUBES.

No. 402,133.

Patented Apr. 30, 1889.



UNITED STATES PATENT OFFICE.

LEWIS F. BETTS, OF NEW YORK, N. Y.

MACHINE FOR FINISHING METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 402,133, dated April 30, 1889.

Application filed July 27, 1887. Serial No. 245,398. (No model.)

To all whom it may concern:

Be it known that I, LEWIS F. BETTS, of New York city, county and State of New York, have invented certain new and useful Improvements in Machines for Finishing Metal Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to machines for finishing angular metal tubes from sheet-metal blanks, the object of my said invention being to provide or produce a simple, compact, efficient, and easily and rapidly operating machine or apparatus for automatically bending the material for forming the tubes and securely locking the edges or margins together. To accomplish all of this, my improvements involve certain new and useful peculiarities, relative arrangements, or combinations of parts and principles of operation, as will be herein first fully described, and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a cross-section of two dies or formers which may be employed for bending the sides and shaping the edges or margins of the tube-blank, the two parts being separated and the flat sheet of metal laid upon the lower section ready to be shaped up. Fig. 2 is a similar view showing the two dies or formers forced together and the intervening tube-blank. Fig. 3 is an end view of the tube-blank as it appears when detached from the formers. Fig. 4 is a cross-section showing the apparatus employed for finishing and locking the tube, the parts being in position ready to commence the operation, and Fig. 5 is a similar view, but showing the parts in the position which they assume at the completion of the stroke. Fig. 6 is a plan view of the upper face of the lower section shown in Fig. 4, and Fig. 7 is a plan view of the under face of the upper section. Fig. 8 is a plan of the mandrel detached from the tube. Fig. 9 is an end view of the finished tube.

In all the figures like letters of reference, wherever they occur, indicate corresponding parts.

The tubes to be formed are of sheet metal, especially such as are employed in tubular

lamps and lanterns; but they may be of any length and any size in cross-section within reasonable limits, and may be employed for any purpose for which they are fitted.

A represents the lower section of a die which may be employed for producing the preliminary bending and shaping of the sheet metal. This section is supposed to be rigidly mounted and held in any suitable manner, as upon the bed-plate of a power-press.

B is the upper or movable section of the preliminary die, which is operated by any suitable mechanism.

It has not been deemed necessary to show the press, as that may be of any pattern, and it should be understood that either section of the die may be made movable, or both may be so mounted as to move toward and from each other.

The section A has a recess, *a*, upon the upper margin of which is a projection, *b*; on one side and opposite this an offset, *c*, with horizontal and vertical faces, and the section B is so cut or formed as to fit the lower section, leaving space for the accommodation of the metal sheet.

C represents the sheet of metal which is to be formed into a tube. This is first cut to the proper width corresponding with the size of the dies, and is placed upon the section A, any suitable guide or gage-stop, as *d*, being employed to determine the proper location of the sheet. Section B is then forced down until the parts assume the position shown in Fig. 2. Upon lifting section B and removing the blank it will be found bent or pressed into the form indicated in Fig. 3, which is the blank for the tube. These blanks may be made very rapidly and very accurately, the margins or edges being in proper shape and size to be bent and locked together. For the purpose of completing the tubes the devices shown in Figs. 4, 5, 6, 7, and 8 are employed.

The bed-plate D is provided with a recess, *e*, open at top and calculated to receive the blank shown in Fig. 3. The bed-plate and its recess may be of any desired length.

When the blank is placed in the recess *e*, as shown in Fig. 4, its upper edges project beyond the flat face of the bed-plate, leaving material enough exposed to finish the tube.

E E are two slides arranged to move upon

the bed-plate D and beneath the cap-plate F. The edges of these slides are angular and arranged to bend the projecting portions of the blank without cutting them.

5 G is the upper section of the finishing-die, which is made to move up and down by suitable mechanism. (Not necessary to be shown.) Along the central line of this section is the closing-die *f*, the same being slightly curved
10 on its lower face, so that when brought into contact with the margin of the blank it will bend the same over and press it down in the direction and in the manner desired.

In the slides E E are openings *g g*, located
15 beneath corresponding openings *h h* in the cap-plate F, and the margins of the openings *g g* are beveled or inclined slightly, as shown in Figs. 4 and 5. Projections, as *i i*, are formed upon the section G, and these correspond in
20 number, size, and location with the openings *h*, and have beveled or inclined lower edges to ride upon the inclined faces of the openings *g*.

The parts being thus constructed, it will be
25 apparent that when the section G is made to descend the projections *i* will force the sliding-plates E toward each other. The blank being first placed in the recess provided for it and the mandrel *k* being laid in the blank,
30 as the plates E approach each other they bend the sides of the blank over the mandrel, and when the section G has descended sufficiently the portion *f* comes in contact with one margin of the blank, as *l*, and bends it down and
35 around the other and presses the two firmly to their final position, causing them to assume the form shown in Fig. 9. Operating against each plate E are returning-springs, as *m m*, which may be let into the bed-plate, as shown,
40 and bear against depending strips, as *n n*, secured to the plates E E. As soon as section G is elevated the springs *m* cause the plates E to return to their normal or open position. Then the tube and mandrel may be with-

drawn and a new blank inserted to be finished 45 in like manner as the first.

At *o* is a stop which may be employed as a gage for locating the mandrel and blank.

The parts are few and simple, the final bending and locking are accomplished at each 50 descent of the movable section, and the movements of the parts so timed, by reason of operating the bending plates or slides directly by the locking-die, that there is no possibility of imperfection in the work or damage to the 55 machine.

The machine may be operated as rapidly as the blanks can be inserted and removed.

The blanking-dies and the finishing-dies may be mounted upon the same bed-plate, if 60 desired, and operated by the same power.

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

1. In a machine for finishing metal tubes, 65 the recessed bed-plate, the bending-plates mounted thereon and having openings with inclined faces, the mandrel, and the closing-die provided with projections arranged to enter the openings in the bending-plates and to move said plates, the parts being combined 70 substantially as shown and described.

2. In a machine for finishing metal tubes, the combination of a recessed bed-plate, bending-plates mounted thereon and having open- 75 ings with inclined faces, a mandrel, a closing-die provided with projections arranged to enter the openings in the bending-plates, and returning-springs operating in connection with the bending-plates, substantially as shown and 80 described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

LEWIS F. BETTS.

Witnesses:

W. J. MORGAN,
WORTH OSGOOD.