

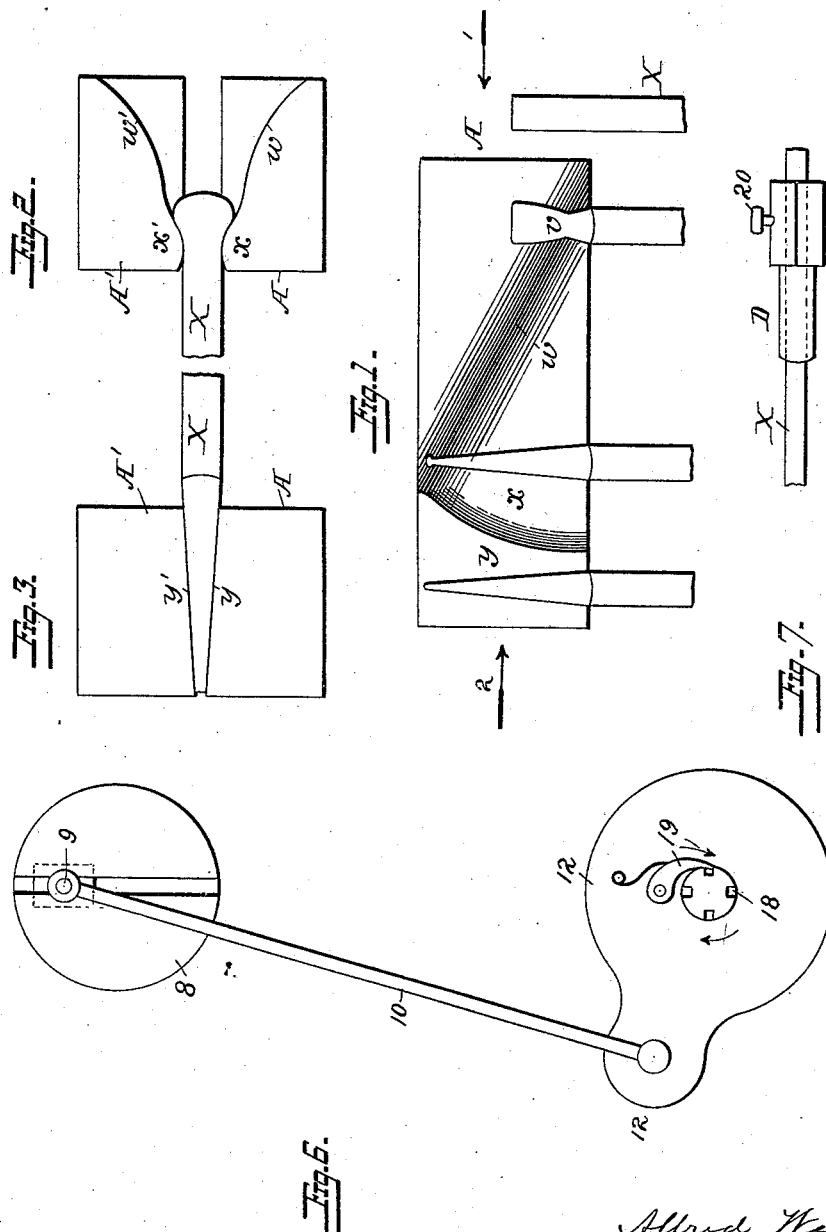
(No Model.)

2 Sheets—Sheet 1.

A. WEED.
FORMING ARTICLES OF METAL.

No. 418,631.

Patented Dec. 31, 1889.



Witnesses
Jno. G. Shinkel, Jr.
J. S. Barker.

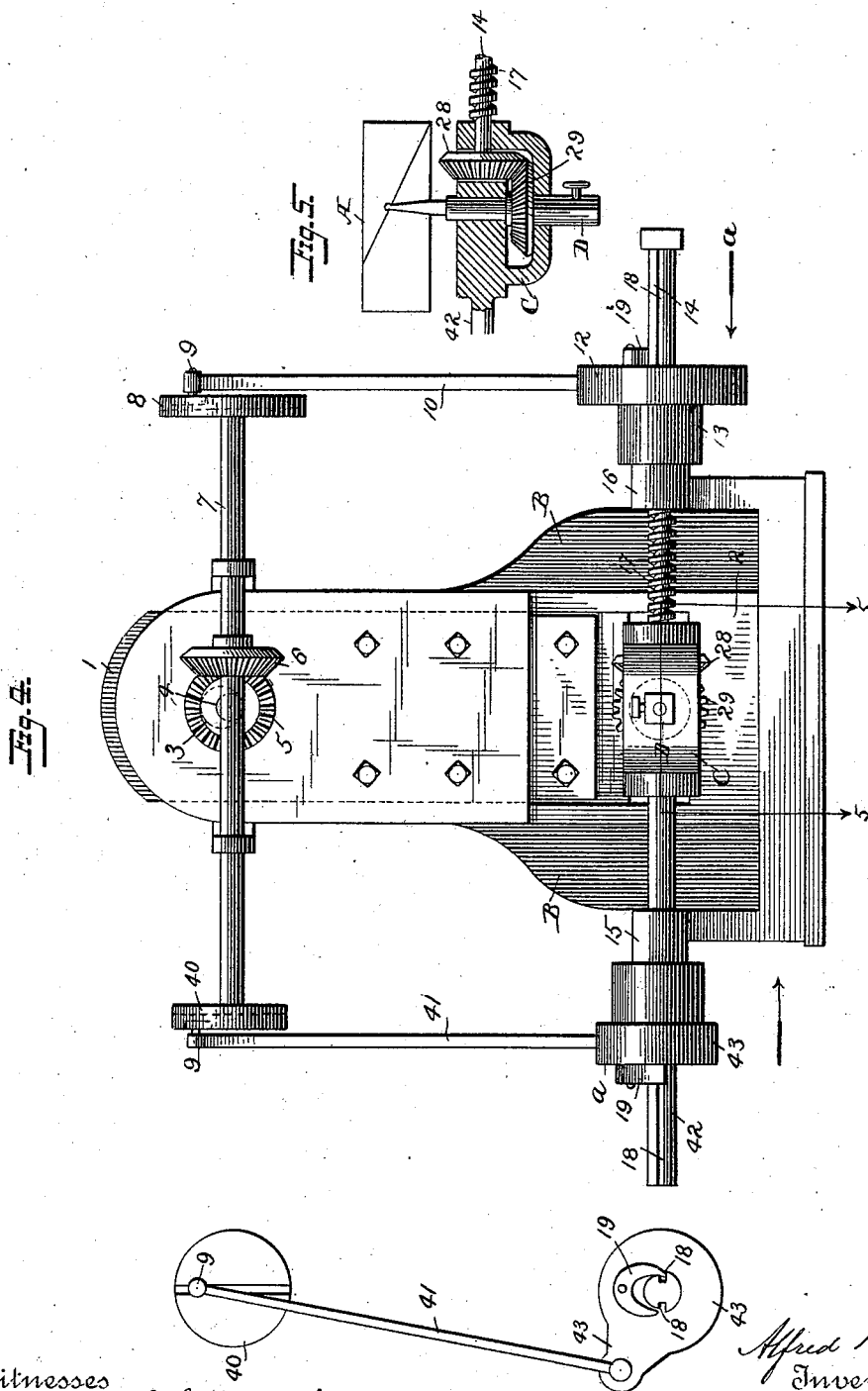
Alfred Weed,
Inventor

By his Attorneys
J. M. L. Luman

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Fig. 4.

By his Attorneys
J. G. Shinkel, Jr.
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UNITED STATES PATENT OFFICE.

ALFRED WEED, OF TARRYTOWN, NEW YORK.

FORMING ARTICLES OF METAL.

SPECIFICATION forming part of Letters Patent No. 418,631, dated December 31, 1889.

Application filed April 11, 1889. Serial No. 306,911. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WEED, a citizen of the United States, and a resident of Tarrytown, Westchester county, New York, have invented certain new and useful Improvements in Forming and Shaping Articles of Metal, of which the following is a specification.

My invention relates to the forming and shaping of articles of metal; and it consists in imparting the desired shapes by means of reciprocating dies, between which the metal bars may be carried and subjected to repeated compressions, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a face view of one of the dies, illustrating the progressive formation of a blank. Fig. 2 is an end view of the dies, looking in the direction of the arrow 1, Fig. 1. Fig. 3 is an end view of the dies, looking in the direction of the arrow 2, Fig. 1. Fig. 4 is an elevation of a machine embodying my invention. Fig. 5 is a horizontal section on the line 5 5, Fig. 4, looking downward; Fig. 6, an end view, looking in the direction of the arrow *a*, Fig. 4. Fig. 7 is a detached view of the holder and blank. Fig. 8 is a detached view illustrating means for tilting the carrier.

In carrying out my improved method of shaping and forming articles of metal I make use of a carrier by means of which the metal bar to be shaped is moved between the dies of a rotating holder supported by and forming part of the carrier and serving to hold and rotate the bar as it is carried between the dies, and of two dies between which the bar is carried, one or both of which dies are reciprocated, so as to compress the bar and release it alternately by short and frequently-repeated movements, and the said dies are so shaped as to gradually impart the desired form to the bar as it is rocked or rotated and carried comparatively slowly between the dies from one end to the other.

Before describing the entire mechanism of a machine for carrying out my improvement in the mode of manufacture I will describe the latter and illustrate the same in connection with a pair of dies only, inasmuch as the die-moving mechanism, the carrier, and holder

may be constructed and operated in various different ways. Thus in Fig 1, A represents the lower die constructed for the purpose of imparting a tapering form to the end of a bar or blank X. To this end the said die has a rib *x*, narrow at the end where bar X approaches the dies and gradually widening toward the opposite end, where it merges into an inclined face *y*, corresponding in its inclination to the taper to be imparted to the end of the bar, the rear face *w* of the rib inclining downward, as best shown in Fig. 2. The die A' corresponds in form to the die A, except that the parts are reversed, so that there are two widening ribs *xx'*, with diverging rear faces *w w'*, and with converging faces *y y'*.

Reciprocating movements to and from each other being imparted to the dies A A', and the blank or bar X being carried in the direction of the arrow 1, Fig. 1, toward and between the dies A A', the bar is subjected to a series of repeated squeezing operations between the ribs of the dies, which first indent the bar, forming a neck *v*, Fig. 1; but as the bar is rotated or rocked and carried in the direction of the arrow 1, and the width of the rib increases, the extent of the indentation also increases with the effect of gradually drawing out the end of the bar and gradually reducing it to a tapering or conical shape, the rotation of the bar causing the pressures to be brought uniformly upon all sides of the bar, whereby the conical form of the elongation is secured. As the reduced end of the bar passes onto the flattened inclined converging faces *y*, the desired finish is imparted, so that when the bar passes from between the dies its end is of a smooth conical form. By this means the desired form is imparted to the bar without cutting the metal, preserving the strength and other advantages incident to maintaining the skin upon the metal unimpaired.

Where a tapering rather than a conical form is to be imparted to the bar, or where it is to be flat-sided—as, for instance, square or polygonal in cross-section—the rotation of the bar, instead of being by short movements, is in extended steps, each a part of a revolution, the movement being intermitted during the time the pressure takes place. By vary-

ing the form of the ribs $x x'$, or by otherwise altering forms or proportions of the dies, bars or blanks may be drawn to other desired forms, as may be necessary for various purposes—as, for instance, in the manufacture of dental tools, drills, &c., or of coupling-pins for railway-cars, and various other articles.

In the remaining figures of the drawings I have illustrated a complete machine embodying means for moving one die, the other being stationary, and for imparting a continuous rotation, as well as a traveling movement, to the blanks.

The frame B of the machine is of any suitable construction, with a support 2 for the lower die A, a plunger 1, to which the upper die A' is connected, the said plunger sliding vertically in guides of the frame and receiving its reciprocating motion from an eccentric 3 upon a shaft 4, turning in bearings in the frame. The shaft 4 is provided with a beveled wheel 5, gearing with a beveled wheel 6 upon a shaft 7, which is driven from the shaft 4, which may be provided with any suitable driving-pulley, and at the ends of the shafts 7 are two crank-disks 8 40, having adjustable crank-pins 9, connected with rods 10 41. The rod 10 is connected with an arm 12, having a hub 13, which rocks upon a shaft 14, that extends through the bearing 16, which is threaded to receive the screw portion 17 of the shaft, and in said shaft are longitudinal recesses 18, with which engage a spring-pawl 19, so that as the arms 12 are rocked the pawl will turn the shaft with a step-by-step motion that gradually feeds the screw 17 through the threaded bearing 16. The screw portion 17 of the shaft extends to a carrier C, consisting of a frame, and a beveled wheel 28 on the end of shaft 14 gears with a beveled wheel 29 upon the holder D, which is in the form of a hollow sleeve extending through the frame and provided with set-screw 20, for holding the bar X, Fig. 7, which is passed through the holder until its end lies over the face of the lower die. As the shaft 14 is rotated with a step-by-step movement, the holder D receives a like rotary movement, so that the bar is turned as the carrier is moved laterally and between each squeezing action of the die.

To the opposite end of the carrier C is connected a shaft 42, mounted in the bearing 15

in line with the shaft 14, and having in it two longitudinal grooves 18 18, as shown in Fig. 8, and an arm 43, swinging on the shaft 42 and operated by the rod 41, carries a double-ended pawl 19, pivoted to swing first to one side and then to the other, as the arm 43 is reciprocated, thereby rocking the shaft 42 first in one direction and then in the other, thereby lifting the bar from the lower die as the carrier moves onward.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The within-described improvement in the art of forming or shaping metallic articles, the same consisting in operating by means of opposite dies alternately receiving and approaching each other upon a bar carried between the dies to be subjected to repeated pressures and rotated or rocked, substantially as set forth.

2. The combination, in a machine for shaping articles of metal, of parallel dies and mechanism for moving them on and from each other, and a carrier for a bar or blank moving longitudinally opposite said dies and provided with a holder for the bar supported to turn in its bearings, substantially as set forth.

3. The combination, with reciprocating dies, of a carrier moving opposite said dies, a holder for a bar supported by said carrier, and mechanism for turning said holder intermittently, substantially as set forth.

4. The combination, with the dies, of a longitudinally-moving carrier, and mechanism for rocking the same intermittently, substantially as set forth.

5. The combination of the die-supports and operating appliances, dies each having a gradually-widening rib, and carrier for carrying a bar between the dies, substantially as set forth.

6. The within-described dies for forming metal articles each with a rib gradually widening from one end to the other, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED WEED.

Witnesses:

DEB. WILMOT,
DANIEL E. DELAVAN.