

No. 678,753.

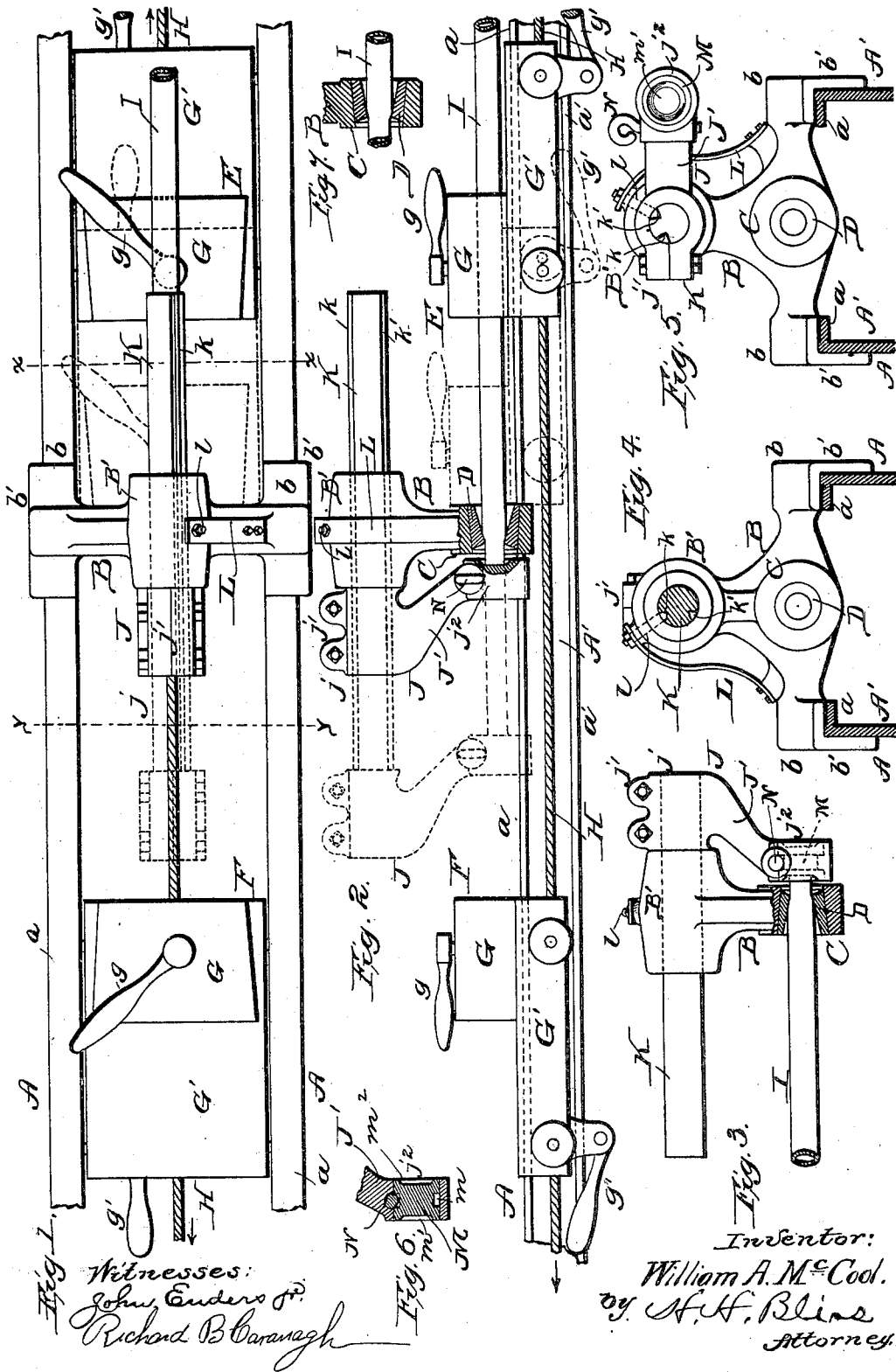
Patented July 16, 1901.

W. A. McCool.

MACHINE FOR DRAWING METAL.

(Application filed Jan. 20, 1899.)

(No Model.)



UNITED STATES PATENT OFFICE.

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MACHINE FOR DRAWING METAL.

SPECIFICATION forming part of Letters Patent No. 678,753, dated July 16, 1901.

Application filed January 20, 1899. Serial No. 702,809. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. MCCOOL, a citizen of the United States, residing at Beaverfalls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Drawing Metal, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a plan view of a sufficient portion of a drawing-bench to illustrate the manner of applying my improvement. Fig. 2 is a side view of parts of the same, some parts being shown in section. Fig. 3 is a side view of the tube-support detached. Fig. 4 is a cross-section of the bench on the line *x x*, Fig. 1. Fig. 5 is a cross-section on the line *y y*, Fig. 1. Fig. 6 is a section of a part of the tube-support. Fig. 7 is a section of the die.

In the drawings I have indicated at A A parts of the bed-frame of the drawing-bench, which latter as an entirety may be of any known or preferred form, these parts A A being specifically here the side rails which support the die-holder and also support the carriage by which the tube is propelled through the die. The die-holder as a whole is indicated by B, it having a hub or bearing B' at its upper end and a boss or die holder at C. It has outwardly-projecting arms *b*, which rest upon the top flanges *a* of the bed-bars A, and fastening-plates *b'*, which are secured to the vertical parts A of the frame-bars.

D indicates more or less conventionally a die which is inserted in the part C of the support B, this die being the external tool by which the outer surface of the tubing is shaped.

E and F indicate, respectively, carriages by which the tube is grasped and propelled, that at E being used initially for grasping the tube I and pushing it more or less through the die D and that at F being subsequently utilized to grasp the forward or protruding end of the tube and draw it onward through the die. Each of these carriages has a tube-engaging part at G and a base portion G', which engages with the cable H or other de-

vice for advancing the tubing. At *g* there is a hand-lever for effecting the engagement of the carriage with the tube and at *g'* a hand-lever for connecting the carriage to the cable and disconnecting it therefrom. However, these parts and the details thereof have formed the subject-matter of earlier patents and need not, therefore, be here further described in detail.

One of the serious difficulties met with in manipulating tubes in this process of cold-drawing them grows out of the fact that when the forward end of the tube is forced through the die it tends to be curled, bent, displaced, or thrust out of proper lines, and there results not only an undesirable action upon the metal, but trouble in properly grasping the tube by the carriage upon the draft side of the die. To obviate this, I have devised the following mechanism: J indicates an arm provided with suitable means for receiving, supporting, and steadying the advancing end of the tube I as it emerges from the die under the action of the pressure-carriage E and arranged in suitable way to advance with the tube and continue to hold it steadily in position in proper line. At the lower end this arm J has a tubular eyepiece *j*², with a socket or aperture in alinement with the path of the tube. Preferably it has an enlarged aperture, into which is inserted a removable holder-piece M, the latter having sockets, as shown at *m' m*², which are concentric with the tube and adapted to have the edge of the front end seated firmly therein. The arm J is curved, as at J', so as to bring this supporting part *j*² close into the delivery side of the die in order that the advancing front edge may be immediately caught and guided. The holder advances under the pressure of the tube, it having a stem K, which can move loosely longitudinally through the hub B'. As shown, the arm J is formed with a split collar or eye *j* at the upper end, which can be tightly clamped by binding-screws *j*¹, accurate adjustment around its axis being in this way permitted. The stem K is prevented from rocking or moving axially, and the holder *j*² is thus kept in line. This is effected by forming a longitudinal groove *k*

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in the stem K and fitting therein a pin *l*, which acts as a spline or feather.

It is desirable at times to hold the tube-support out of line, which is attained by forming a supplemental groove *k'* in the stem and arranging the pin *l* so that it can be withdrawn from the groove *k* and then seated in the groove *k'* after the stem K has been turned out of its operative position. To hold the pin *l* in either of its two positions, (in groove *k* or *k'*), use is made of a spring L, which normally tends to press the pin *l* inward, but at the same time permits it readily to be withdrawn.

The mode of operation of the devices above described will be readily understood. A tube I is first clamped in the gripper part G of the carrier E, and then the carriage is clamped to the cable H or propelling device. Thereupon the forward end of the tube is forced into and through the die D, the latter being of such dimensions as to produce the diameter of the tube as desired. Immediately upon the protruding of the forward end of the tube through the die it is received by and seats itself in the socket *m*² of the holder J M. Twisting, bending, or misalignment of the tube is prevented. The onward advance of the tube pushes the parts M, J, and K forward with it to or toward the dotted position shown in Figs. 1 and 2. By this time a sufficient portion of the tube has passed through the die to be engaged by the draft-carriage F. Then the operator draws back the spring L and pin *l*, turns the arm J up to the position shown in Fig. 5, and allows the pin *l* to again be pressed inward, it seating itself now in groove *k'* and holding the parts J and M out of the lines of the tube. Then the carriage G is engaged with the tube, and the latter is connected to the cable, and the drawing process is completed.

The tube receiver and holder M is preferably detachable and reversible, it having sockets *m*² and *m'*, one at each end. To permit it to be readily withdrawn and reversed or replaced by another, there is a pin N detachably carried by the arm J and adapted to seat itself in the groove *m*, formed in the periphery of the holder M. While I have shown and described these devices in connection with the drawing of tubing, I do not mean to limit my invention to such articles, as it can be embodied in various ways and operate substantially similarly when drawing modified articles, such as solid bars, rods, and the like.

As has been pointed out heretofore in this specification, the holder and guide for the end of the article which emerges from the die is arranged in immediate proximity to the emerging face of the die, and in this respect it differs from the article engaging or grasping devices on the emerging side of the die, which constitutes a part of the drawing mechanism, as such drawing devices are situated at a considerable distance from the face of

the die. Further, as has been pointed out heretofore in the specification, the guide and holder is freely movable, and in this respect also it differs from the drawing devices, which are actuated by an impelling force other than that of the advancing article. My freely-movable holder and guide is also different in function and construction from the yielding abutments which are sometimes employed in the manufacture of certain ponderous articles, such as projectiles for heavy ordnance, and which abutments, under the impelling force of strong springs or equivalent strong but yielding forces, bear against the articles being formed while they are being acted upon by steam-hammers or reducing-rolls. Such abutments do not guide the articles being produced after emerging from the shaping-tools, but merely serve to hold them in place between the tools, and they are not freely movable, but are rather acted upon by tremendously powerful forces.

What I claim is—

1. In a machine for drawing metal, the combination with the die, the die-holder and the drawing devices, of a movable guide for the forward end of the metallic article, arranged to lie immediately adjacent to the emerging face of the die, so as to receive the end of the article as soon as it emerges from the die, and a support for the guide arranged to direct its movements, and in which it is free to move, whereby it advances with the forward movement of the article, and serves to hold and guide the same, substantially as set forth.

2. In a metal-drawing machine, the combination with the die, the die-holder and means for propelling the metal articles through the die, of the movable holder supported independently of the propelling means and adapted to receive and support the front end of the article being drawn, and adapted to be moved into and out of alinement with said article, and means for guiding said holder in the direction desired to be taken by the end of the tube, substantially as set forth.

3. In a machine for drawing metal articles, the combination with the die, the die-holder and the devices for propelling the article through the die, of the longitudinally-moving holder for said articles adapted to be rotated to and from the path of the articles being drawn and means for guiding said holder rectilinearly, substantially as set forth.

4. In a machine for drawing metal articles, the combination with the die, the die-holder and the means for propelling through the die the articles to be drawn, of the holder for the front ends of said articles successively, freely movable with and by the action of the drawing devices at the opposite side of the die and having a detachable receiver for receiving said front ends, substantially as set forth.

5. The combination with the draw-bench, and the die, of the holding device having the

arm J, with an aperture or socket for the front end of the article being drawn, and the stem or guide K adapted to move forward with said article, substantially as set forth.

5 6. The combination with the draw-bench and the die, of the sliding stem or guide K and the rotating holder on the said stem or guide, substantially as set forth.

7. The combination with the draw-bench 10 and the die, of the longitudinally-movable holder freely movable with and by the action of the drawing devices at the opposite side of the die and adapted to be positively held in a position in alinement with the article being 15 drawn, and in a position out of such alinement, substantially as set forth.

8. In a machine for drawing metal the combination of a die, the freely-sliding holder arranged immediately adjacent to the face of 20 the die from which the article emerges, and means at the other side of said die for forcing through it a tube or bar and sliding said holder by the end pressure of such rod or bar, the latter being guided by said holder.

25 9. In a machine for drawing metal the combination of a die, a freely-sliding holder at one side of the same, guiding devices for said holder comprising fixed and movable parts the fixed part being connected with the die, 30 and means at the other side of said die for forcing through it a tube or bar and operating said holder by the end pressure of such

rod or bar, the latter being guided by said holder.

10. In a machine for drawing metal, the 35 combination of a die, the drawing devices for engaging with and moving the article to be drawn, arranged upon opposite sides of the die, and a guide-holder for the forward end 40 of the article, arranged between the die and the drawing devices on the emerging side of the die, and adapted to guide the forward end of the article as it moves from the die toward the last said drawing devices, sub- 45 stantially as set forth.

11. In a machine for drawing metal, the 45 combination of a die, the drawing devices arranged to engage with and move the article, and situated upon opposite sides of the die, 50 and a guide for the forward end of the article, situated between the die and the drawing devices on the emerging side of the die and arranged to guide the forward end of the article 55 as it moves from the die toward the said drawing devices, the said guide and holder being movable into and out of the path of the article, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. MCCOOL.

Witnesses:

JAMES F. MERRIMAN,
RICHARD B. CAVANAGH.