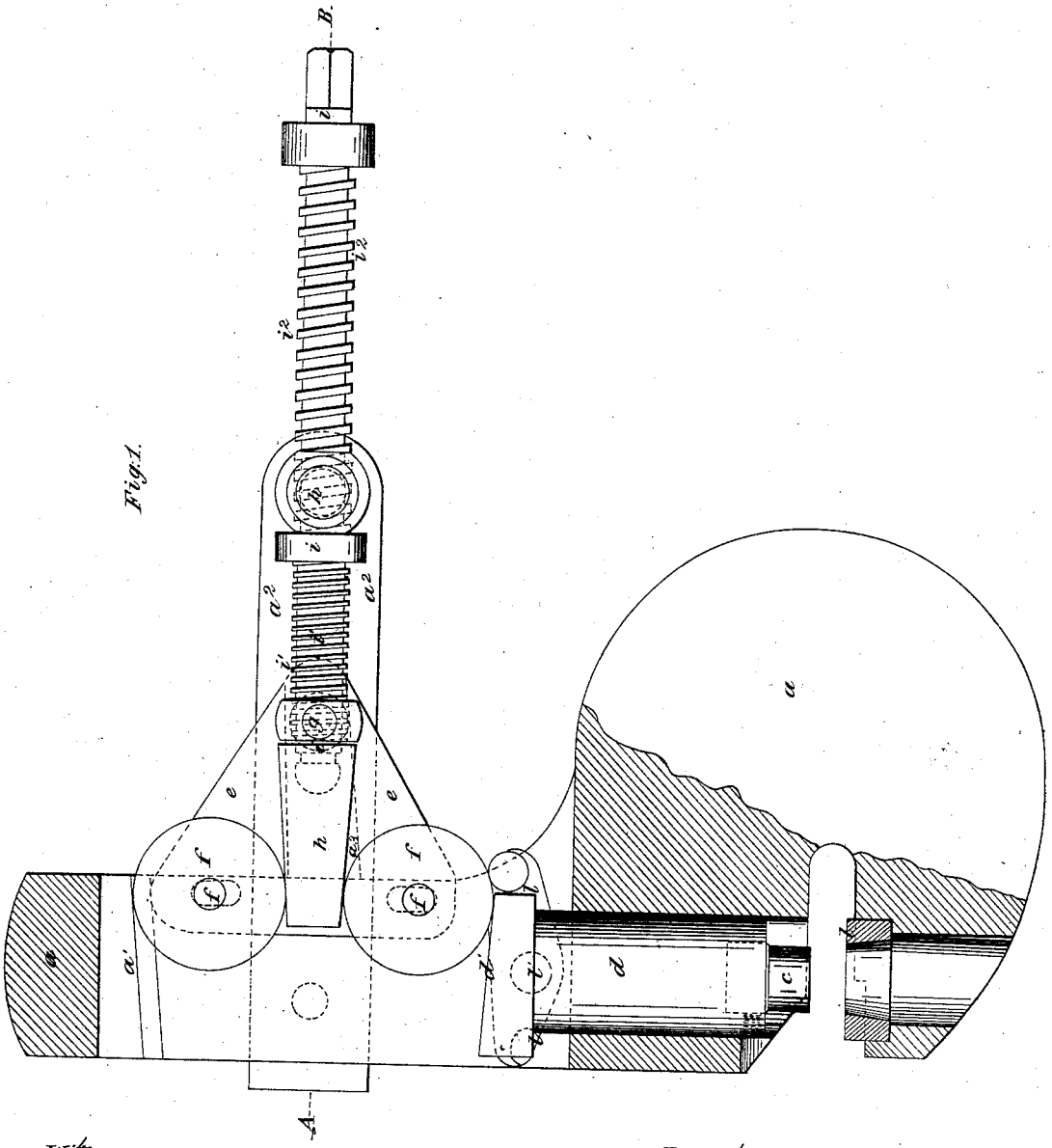
E. R. Hollands,

Metal Punch.

No. 46,056. Patented Jan. 24, 1865.

Fig. 1.



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UNITED STATES PATENT OFFICE.

EDWARD RICHARD HOLLANDS, OF NORTHAMPTON SQUARE, ENGLAND.

MACHINE FOR PUNCHING METAL.

Specification forming part of Letters Patent No. **46,056**, dated January 24, 1865.

To all whom it may concern:

Be it known that I, EDWARD RICHARD HOLLANDS, of No. 16 Charles Street, Northampton Square, in the county of Middlesex, England, machinist, a subject of Her Majesty the Queen of Great Britain, have invented or discovered certain new and useful Improvements in Machinery for Punching, Cutting, and Pressing Metals and Other Materials; and I, the said EDWARD RICHARD HOLLANDS, do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention has for its object improvements in machinery for punching, cutting, and pressing metals and other materials. For this purpose I employ a frame carrying a stationary or bed die, and also a punch or forcer. The punch or forcer is fitted into a suitable holder, which is able to move on the frame toward and from the stationary or bed die. So far there is no novelty in the arrangement; but my invention consists in the means which I have devised for forcing the holder with its punch or forcer toward the bed-die in order to punch, cut, or press the metal or material. I form on the head or farther end of the punch or forcer holder an incline, and opposite to it I form a similar incline on the frame of the machine. Between the two inclines is a movable frame carrying the axes of two rollers, and the periphery of one of the rollers rests on the one incline and that of the other on the other incline. The axes of the rollers are held loosely, so that they can approach or recede from each other. A wedge with inclines upon it, equal and opposite to the inclines before mentioned, is entered between the rollers, and to cause the punch or forcer holder to approach the bed-die the wedge is thrust inward, so as to separate the rollers farther the one from the other. The wedge as it enters causes the rollers to revolve. The peripheries of the rollers bear on the opposite sides of the wedge, and as the rollers turn they run along the two inclines—viz., that on the tool-holder and that on the frame. By the combined actions of the wedge and the inclines the punch or forcer is forced toward the stationary or bed die, and the action is obtained with little loss of power in friction, as the moving parts do not rub, but roll the one on the other, thus there is rolling contact between the wedge and the two rollers, and also between these latter and the two inclines.

It is not essential, although it is preferred, that a wedge and inclines, as above described, should be used in conjunction. Two parallel surfaces may be substituted for the inclines, while the wedge remains as before; or the inclines may be employed together with a straight strip or piece of uniform thickness, which takes the place of the wedge. In working the machine the wedge may be forced between the rollers by a lever or in other convenient manner. In some cases I give a positive motion to the frame which carries the axes of the rollers as well as to the wedge. This is conveniently done by two screws on the same stem, the pitches of which are such as to move the wedge forward at twice the speed with which the frame of the rollers is moved. This, as will be seen, being the relation of the speeds of the parts which is proper to insure rolling and avoid rubbing taking place between the moving parts. If desired, the roller-frame may receive motion by a lever or otherwise, the wedge being left free, and then as the rollers move forward the wedge will be drawn in between them, or in this case the wedge may be omitted, the peripheries of the rollers being allowed to come in contact the one with the other. When, however, the power is applied to the roller-frame, there will be a loss from the friction of the axes of the rollers in their bearings.

Having thus stated the nature of my invention, I will proceed to describe more fully the manner of performing the same.

The drawings hereunto annexed show various views of a machine suitable for punching metals and other materials, constructed according to one of the arrangements above described. From the description and drawings of this arrangement of machine any other of the various arrangements above described could be readily constructed by a competent workman.

Figure 1 is a side view, partly in section. Fig. 2 is an edge or front view; and Fig. 3 is a horizontal section taken through the line A B, Fig. 1.

In these figures, *a* is the frame, carrying a stationary or bed die, *b*, and also a punch, *c*, which

is carried by a holder, d, capable of moving to or from the bed-die. On the top of the holder is an incline, d', as is shown, and opposite to it a similar incline, a', is carried by the framing. The piece a' is of hardened steel, and is let into the framing, as is shown. Between these two inclines a frame is capable of moving. This frame is composed of two side plates $e\,e$. (See Fig. 2.) In these plates holes or slots are formed, into which the axes $f'\,f'$ of the rollers $f\,f$ enter. These rollers are also of steel. Holes are also formed in the plates, in which the ends of the cross-bar g are received and are capable of turning. Between the two rollers is a wedge, h, of steel, the rear end of which is connected by a swivel-joint to the end of a rod, i. The portion of the rod nearest to the wedge has a screw-thread, i', cut upon it that works in a female screw cut in the cross-bar g of the moving frame e. The other end of the rod i has a screw-thread, i^2, cut upon it, which works in a female screw cut in a cross-bar, k, the ends of which are supported by two plates, a^2, projecting at right angles from the frame a, as is shown. The plates a^2 also serve to retain the cross-bar g of the frame e in position. For this purpose the ends of the cross-bar project beyond the plates e, and on these projecting ends rollers are placed which work in slots $a^3\,a^3$ in the plates a^2. The ends of the cross-bar g being thus retained, the frame e is held in its place and prevented from tilting either upward or downward. The pitch of the screw-thread i^2 is twice the pitch of the screw-thread i', thus when the screw-rod i is turned the wedge h is forced forward (by means of the screw i^2) between the rollers $f\,f$, and as it enters between the rollers it causes them to revolve and so to roll along the inclines a' and d'. The frame e is also at the same time caused to move forward by the screw i', but is only moved at half the speed of the wedge h. As the frame moves forward, it is at the same time moved downward toward the stationary die. The slots a^3, in which the rollers on the ends of the cross-bar g work, are therefore made at an angle downward, as is shown.

In order to withdraw the punch after it has been forced downward, the lower one of the two rollers f is, as it is drawn back by the screw being turned in the opposite direction, caused to come against the end of a lever, l, which turns on a pin at l'. The other end of the lever has a pin projecting from it, which enters a slot or hole in the punch-holder d. It will thus be seen that as the end of the lever against which the roller f comes is depressed the other end is raised, and raises with it the punch-holder d.

In place of raising the punch in the manner above described, any other suitable arrangement of apparatus may be employed for that purpose.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the tool-holder with the movable wedge, the mechanism for moving it, the rollers, and the inclines, or their equivalents, operating substantially as hereinbefore set forth.

EDWARD RICHARD HOLLANDS.

Witnesses:

GEORGE F. WARREN,

THOMAS LAKE.