(No Model.)

E. HORTON.

DIE FOR FINISHING BLANKS FROM SHEET METAL.

No. 317,789. Patented May 12, 1885.

Fig. 1

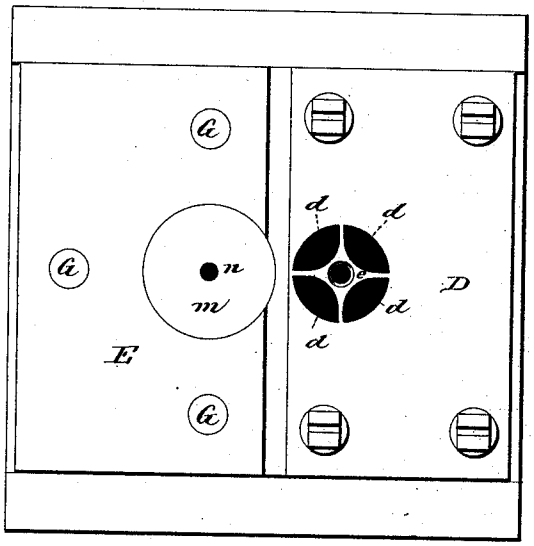


Fig. 2

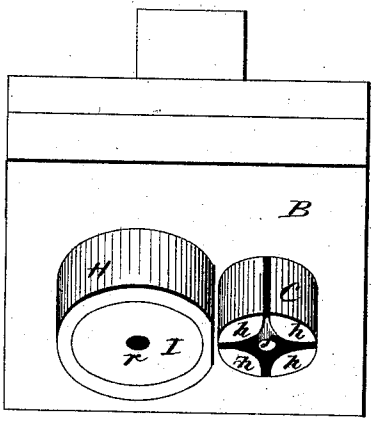


Fig. 3

Fig. 7

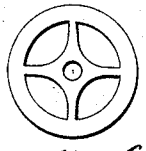


Fig. 6

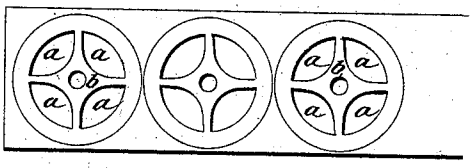


Fig. 5

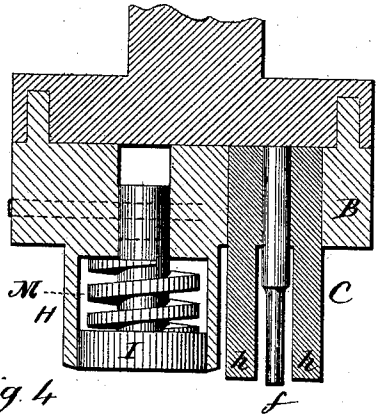
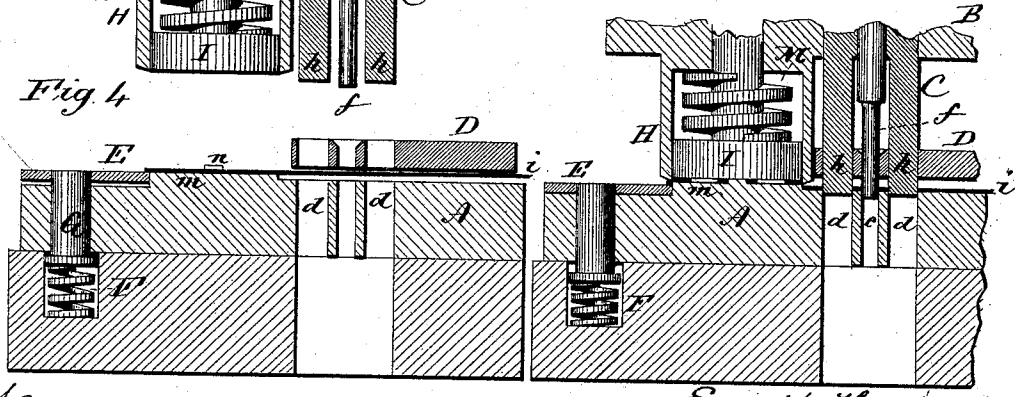


Fig. 4



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UNITED STATES PATENT OFFICE.

EVERETT HORTON, OF NEW HAVEN, CONNECTICUT.

DIE FOR FINISHING BLANKS FROM SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 317,789, dated May 12, 1885.

Application filed January 26, 1885. (No model.)

To all whom it may concern:

Be it known that I, EVERETT HORTON, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Dies for Punching Blanks from Sheet Metal; and I do hereby declare the following, when taken in connection with 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 top view of the die-block, showing the guard D, the fixed punch *m*, and the platform E; Fig. 2, a perspective view of the follower carrying a punch corresponding to the apertures in the die-block and the die corresponding to the punch on the die-block; Fig. 3, a vertical central section through the follower B, die, and punch, showing the follower I and the center punch, *f*, in side view; Fig. 4, a like central section through the die-block; Fig. 5, a vertical central section corresponding to Figs. 3 and 4, but showing the parts closed as in the act of punching and cutting the blank; Fig. 6, the strip, showing three blanks as having been punched therefrom and returned to place in the strip; Fig. 7, one blank detached from the strip.

This invention relates to an improvement in dies for cutting blanks from sheet metal, particularly to that class of work which requires two operations, and is specially designed for cutting out blanks for wheels of clock-movements.

In Fig. 6 I illustrate a strip of metal showing three wheels. In the usual operation of striking these blanks from the strip, first the openings *a* are formed, together with the center opening, *b*, by one punch and one operation. In doing this the burr will be upon the under side of the blank. After this has been done the strip is passed to a second punch, which corresponds to the external diameter of the wheel, and that punch passes down through the strip into the die. This operation will leave the burr on the upper side or reverse of that left in forming the openings in the blank. As the blanks are thus cut they pass down through the die. In being thus cut the blanks generally present an uneven surface—that is, warped in one direction or another. To bring the blanks into a perfectly-flat plane shape, as well as to flatten the burr around the openings in the blank, they are next struck between a pair of flat-faced dies.

The object of my invention is to bring the burrs upon the same side of the blank and to avoid the last-mentioned operation of flattening the blank; and it consists in dies constructed as hereinafter described, and more particularly recited in the claims.

A represents the die-block, through which apertures *d* are cut corresponding to the apertures in the wheel, and with a central aperture, *e*, corresponding to that which is to be formed in the wheel, the apertures being denoted in solid black, Fig. 1.

B is the follower, carrying a punch, C. This punch is cut away, as seen in Fig. 2, corresponding to the solid part of the die—that is, so as to leave a center, *f*, and surrounding parts *h* corresponding to the openings *e*.

Above the apertures in the die-block A is a guard, D, having openings through it corresponding to the openings in the die-block, the guards standing above the die-block, so as to permit the strip of metal *i* to pass between them, as seen in Fig. 4, the metal being denoted in solid black. Adjacent to the apertures, in line therewith and distant therefrom the width of the rim of the wheel, is a stationary punch, *m*. This punch *m* in diameter corresponds to the external diameter of the blank to be produced. In its center is an upwardly-projecting stud, *n*, which corresponds to the hole made in the blank by the central punch, *f*.

Surrounding the punch *m* is a platform, E, having an opening through it corresponding to the punch *m*, and so arranged that in its normal condition it stands flush with the surface of the punch *m*, as seen in Fig. 4. The platform is arranged upon springs F, more or less in number, these springs being preferably below the die-block A, and the platform is provided with studs G, which extend downward and rest upon the said springs, the lower end of the studs being headed, so as to take a bearing upon the under side of the die-block when in their up or normal condition.

In the follower B, directly over the punch *m*, is a corresponding tubular die, H, the in-

ternal diameter of which corresponds to the external diameter of the punch *m*.

Within the die H is a follower, I, supported in a position with its face flush with the face of the die H by a spring, M, within the die, but so that the spring will yield to pressure upon the follower. As the follower B descends it brings the die H down over the punch *m*, the internal edge of the die acting as a cutter against the corresponding edge of the punch.

In the center of the face of the follower I is a recess, *r*, corresponding to the stud *n*, and into which the said stud will enter as the follower I descends. The strip having been first punched to form the openings *a a*, the follower B rises, as seen in Fig. 3; standing in that position, the strip is moved forward until the central opening in the blank may be set over the stud *n*, as seen in Fig. 4, solid black indicating the strip of metal. Now the follower B descends and the punch C passes down through the strip into the die below, as seen in Fig. 5, cutting out the openings in the strip. At the same time the follower I bears upon the upper surface of that portion of the strip then lying upon the punch *m*, and while the strip is thus held firmly between the punch *m* and follower, and in a perfectly-flat condition, the die H passes downward, depressing the platform E and cutting off the surrounding metal, as seen in Fig. 5. Then, as the follower B rises to withdraw the punch C and die H, the follower I still holds the blank firmly grasped between it and the face of the punch *m*, the platform rises, following the rising die, and returns the strip back into its original plane and around the blank which has been cut from it, so that the blank will then stand in the hole from which it was punched. After the blank punched from the strip has been returned into the strip, as just described, the follower B continues its ascent, taking the die H, its follower I, and the punch C upward. Then the strip is advanced for the next operation, the die H, with the punch *m*, successively cutting out the blanks which have been previously partly formed by the punch C and its die, and each successive blank so completely cut is returned to the strip, and so that as the strip is advanced it takes the blanks so cut to some point beyond the dies, where they may be readily removed. It will be observed that the punch for the openings must leave the burr upon the under side, and also that because of the employment of the tubular die H, with the stationary punch *m*, the burr on the periphery of the wheel will also be upon the under side; hence the burr from all the cuts is upon the same surface of the blank. The power of the spring M is so great as to force the follower I upon the punch *m* with sufficient power to not only flatten the blank, but to hold it in that perfectly-flat plane condition until the work is complete; hence the special and independent operation of flattening the blank is avoided. The stud *n* in the punch serves as a guide to properly locate the strip, not only with relation to the punch *m* itself, but also to the first punching operation. As the distance between the center of the stud *n* and the center of the opening *e* in the first die is equal to the distance between the centers of the two adjacent blanks, therefore, when the strip is advanced and set over the stud *n*, the strip is in proper position for the punching of the first openings.

While I prefer to arrange the dies so that the operation may be performed in one and the same machine, the preliminary punch C, with its die, may be in a machine separate from the punch *m* and its die, so that the first operation will be performed in one machine and the last operation in a second machine. I therefore do not wish to limit my invention to the necessary arrangement of the two operative mechanisms in one and the same machine.

I have illustrated my invention as for punching successive blanks for wheels from a strip; but it will be understood that the invention is applicable to punching other blanks or articles from sheet metal which require successive operations of punches, it only being necessary to adapt or construct the preliminary punch and its die corresponding to the opening to be made in the blank, and the fixed punch, with its die and follower, to correspond to the exterior of the blank or article to be cut.

It will be understood that the die-block and the follower B are to be arranged in a press in the usual manner for arranging punches and dies, too well known to require illustration or description.

I claim—

1. The combination of the punch *m*, the surrounding yielding platform E, the tubular die H, corresponding to said punch *m*, and the yielding follower I within said die, substantially as described.

2. The combination of the die-block A, constructed with apertures corresponding to the openings to be cut in the blank, and with a stationary punch, *m*, adjacent to said apertures, the said punch corresponding to the external shape of the blank to be cut, the yielding platform E, surrounding said punch, the punch C, corresponding to the apertures in the said die-block, the tubular die H, corresponding to the said punch *m*, and the yielding follower I within said tubular die, substantially as described.

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G. A. JEWETT.