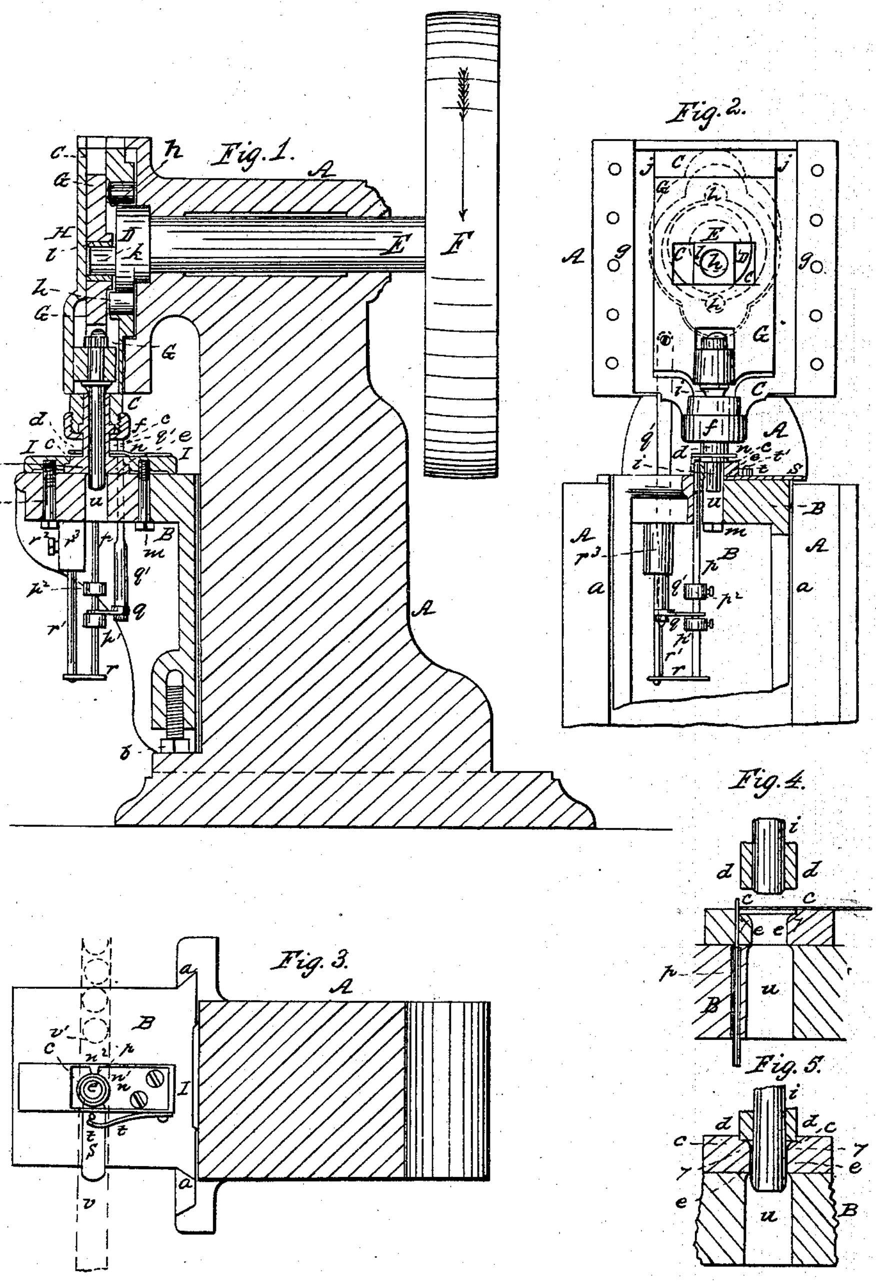
T. J. POWERS.

Machine for Cupping Metallic Cartridges.

No. 47,246. Patented April 11, 1865.



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UNITED STATES PATENT OFFICE.

TIMOTHY J. POWERS, OF NEW YORK, N. Y., ASSIGNOR TO J. P. FITCH AND J. R. VAN VECHTEN, OF SAME PLACE.

IMPROVED MACHINE POR CUPPING METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. **47,216**, dated April 11, 1865.

To all whom it may concern:

Be it known that I, TIMOTHY J. POWERS, of the city, county, and State of New York, have invented a new and Improved Machine for Cutting Out and Cupping Metallic Cartridge-Shells and other Articles of Cup Form; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of the machine. Fig. 2 is a front elevation of the same with the front plate removed to show the slides which carry the cutting-punch and male cutting-die. Fig. 3 is a plan of the bed and cutting and forming die. Figs. 4 and 5 are vertical sections of the dies and punch on a larger scale than Figs. 1, 2, 3, showing the punch and male cupping-die in two positions.

Similar letters of reference indicate corresponding parts in the several figures.

The principal elements of this machine are a punch and die for cutting out blanks from sheet metal and a male and female die for producing the cupping operation, the cutting-punch also operating, in combination with the cutting-die or female cupping-die, to hold the edges of the blanks during such portion of the cupping process as is necessary to prevent the metal from being buckled or crimped in that process.

In order to enable the cutting-punch to operate as above described a very delicate adjustment is required, that it may press upon the blank with just sufficient force to hold it smooth without preventing it from being drawn into the female cupping-die as fast as is necessary, and this adjustment requires to be varied to enable the machine to operate on different thicknesses of metal. As there are practical difficulties in the way of adjusting the punch, I provide for the adjustment of the dies; and my invention consists in the arrangement of the dies upon a table which is adjustable by means of a screw in a direction parallel with the movements of the punches and male cupping-die.

My invention further consists in a novel mode of applying and operating a movable stop in combination with the punch, to gage the plate for the cutting out of the blanks.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the frame of the machine, in form substantially like that of an ordinary punching-press.

B is a table fitted to guides *a a* on the front of the frame A, and adjustable vertically by means of a supporting-screw, *b*. On this table the cutting-die *c* and female cupping-die *e* are supported. These dies, for the sake of convenience, are made of one plate of steel, which has a hole, *e*, Fig. 4, cut right through it to form the female cupping-die, and the countersinking of this hole a little way produces the cutting-die.

The bottom of the countersink is made flat for some distance from its sides, but toward the central hole or die, *e*, it is rounded downward, as shown at 7 7 in Figs. 4 and 5, to form an easy passage for the metal into the said die in the cupping operation. The plate of which the dies *c* and *e* are formed is secured firmly to the table B by two plates, I, and screws *m m*. There is a hole, *w*, in the table B, under the dies *c e*. *d* is the cutting-punch, having its operating portion of the form necessary for cutting out the blanks, and secured by a nut, *f*, into a socket formed for its reception in the lower part of a slide, C, which works in suitable vertical guides *g g*, secured to the frame A, and which receives a vertical movement from a cam, D, on a horizontal rotating shaft, E, which works in bearings in the upper part of the frame A, and which has motion imparted to it by a belt running on a pulley, E, which is fast on its rear end, the said cam operating on anti-friction rollers *h h*, arranged within the opening or cavity provided in the said slide for the reception of the cam, and the cam being of such form as to bring down the punch quickly, then allow it to rest for some time before raising it. The punch *d* is made hollow by boring it through longitudinally for the reception of the male cupping-die *i*, which fits it snugly, but so as to work easily through it. The exterior of this die is so much smaller than the interior of the female die *e* as to ad-

mit the thickness of metal of which the shell or cup is to be made. A partly-formed shell is shown in section in red outlines in Fig. 5. The extremity of the said die *i* is sufficiently rounded to prevent it from cutting or tearing the blank in the cupping operation. The said die is secured to the lower part of a slide, G, which works vertically between guides *j j* in the slide C, and between the said slide and the plate H, which is secured to the front of the upper part of the frame A for the purpose of covering the two slides C and G. The slide G is operated by a crank-wrist or eccentric-pin, *k*, secured to the shaft E, and working in a box, *l*, which is arranged to slide freely in a horizontal slot, *l'*, provided in the said slide. The movement of the slide G relatively to that of C is such that it will cause the die *i* to be drawn up with its point above the bottom of the punch *d* and forced down through the bottom of the said punch a distance somewhat greater than the intended depth of the shell or cup. The timing of the movements of the punch *d* and die *e* will be hereinafter explained in describing the operation of the machine. *n* is a steel plate attached to the plate I and extending over the dies *c e* to serve as a stripper to strip off from the punch *d* the plate *v* of copper or other metal, from which the blanks are cut. The latter plate, represented in red outline in Figs. 3 and 4, is fed under the said plate *n*, which prevents it from rising with the punch. This stripper has provided in it a hole, *n'*, of such size and so arranged that the punch may pass freely through it without touching, and on the opposite side of the said hole *n'* to that whence the plate is fed to the punch and dies there is a narrow slit, n^2, for the entrance of the gage or stop *p*, by which the feeding in of the plate is regulated. The gage *p* consists of a straight upright rod working vertically through holes in the table B and dies *c e*, and furnished some distance below the said table with two tappet-collars, p' p^2, between which plays a horizontal tappet-arm, *q*, attached to a vertical rod, *q'*, which is secured to the punch-slide G, and which passes through a hole in the table B. Under this gage *p* there is arranged a fixed rest, *r*, for controlling the downward movement of the gage. This rest is attached to a vertical rod, *r'*, secured by a set-screw, r^2, and adjustable in a socket, r^3, provided below the table B.

s is a stripper for stripping the cupped shells from the male cupping-die *i* after they have been formed and forced down by the said die entirely through the female die *e*. This stripper consists of a flat steel slide fitted to slide horizontally in a dovetail-groove in the top of the table B and under the dies *c e*, and having its inner end hollowed out to fit against one side of the male cupping-die *i*. The said stripper has applied to it a spring, *t*, which is attached to one of the plates I, and which acts against a projection, *t'*, on the top of the stripper to press it inward, the same projection also acting against the dies *c e* as a stop to prevent the stripper from being forced in farther than is necessary. The hollowed out inner end of the stripper *s* is beveled upward, to enable it to be easily pushed aside by the wedge-like action upon it of the bottom of the shell as the latter is forced downward through the die *e* and into the opening *u* of the table by the descent of the punch *i* in the cupping operation.

The operation of the machine is as follows. While the cutting-punch *d* is in its highest position, (shown in Fig. 4,) the die *i* rises to its highest position, (shown in the same figure,) the gage *p* at the same time rising up above the upper surface of the die *c*. The plate *v*, from which the blanks are to be cut, and which is of a width slightly greater than the diameter of the blanks, is then fed forward under the punch from the opposite side of the die *c* to that on which the gage is situated, until it is stopped by the gage, and the revolution of the main shaft brings down the punch which cuts out the blank, carries it to the bottom of the die *c*, and then becomes stationary to hold it there while the die *i*, which commences to descend immediately after the punch, descends into the die *e* to produce the cupping operation.

As the die *i* descends and forces the metal of the blank into the die *e* it gradually draws the edges of the blank from under the punch *d* toward the center, as shown in Fig. 5; but the pressure of the punch prevents the blank from crimping or buckling and insures the formation of the sides of the shell of a uniform thickness all round. The vertical adjustment of the table B enables the dies to be so set that the punch will hold the blank with sufficient pressure, but not so firmly as to prevent it from being drawn into the die *e* by the action of the die *i*, and hence the liability to tear the blank and waste the stock is obviated. The die *i* descends not only far enough to withdraw the blank entirely from between the punch and the bottom of the die *c* or top of the die *e*, but far enough to carry the shell entirely through the die *e* and below the edge of the stripper *s*, which, having been pushed aside by the pressure of the lower part of the shell upon its beveled inner end, is now caused by the pressure of the spring *t* to slip over the edge of the shell, so that when the die *i* rises the shell will be prevented from rising with it, and so be stopped off from it and caused to drop through the hole *u*. The punch and die *i* rise together; but, owing to the lost motion of the tappet-arm *q* between the tappet-collars p' p^2, the gauge *p* does not commence to rise with them, but remains supported on the rest *r* until after the punch has risen to its full height, and is then lifted by the action of the arm *q*

upon the collar p, as the upward movement of the slide G and rod q' continue.

As the punch rises out of the hole in the plate v, from which it has cut a blank, the attendant pushes the said plate forward as far as permitted by the die i, and so brings the thin portion v', left beyond the hole, past the gage p, so that as the latter rises it will rise within the said hole, and when the die i has been drawn entirely above the plate the latter will be permitted to move far enough to enable a new blank to be cut, in which position it is stopped by the back of the hole last cut coming in contact with the gage. As the die i makes its next descent the gage drops down to the rest r and entirely below the upper surface of the die c, so that it will not interfere with the succeeding feeding movement of the plate v.

I do not claim a mere blank-holder surrounding a male cupping-die and operating in a countersink provided in a female cupping-die to hold the edges of a metal blank during the operation of cupping it; but

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

1. The combination, as described, in a machine for cutting out and cupping cartridge-shells, of the punch d, dies i c e, and adjustable table B, the whole operating as and for the purpose herein set forth.

2. The rising-and-falling gage p, applied in combination with the punch and dies, operated by means of a rod, q', tappet-arm q, and tappet collars or pieces, p' p^2, and controlled by a rest, r, substantially as and for the purpose herein specified.

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Witnesses:
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