

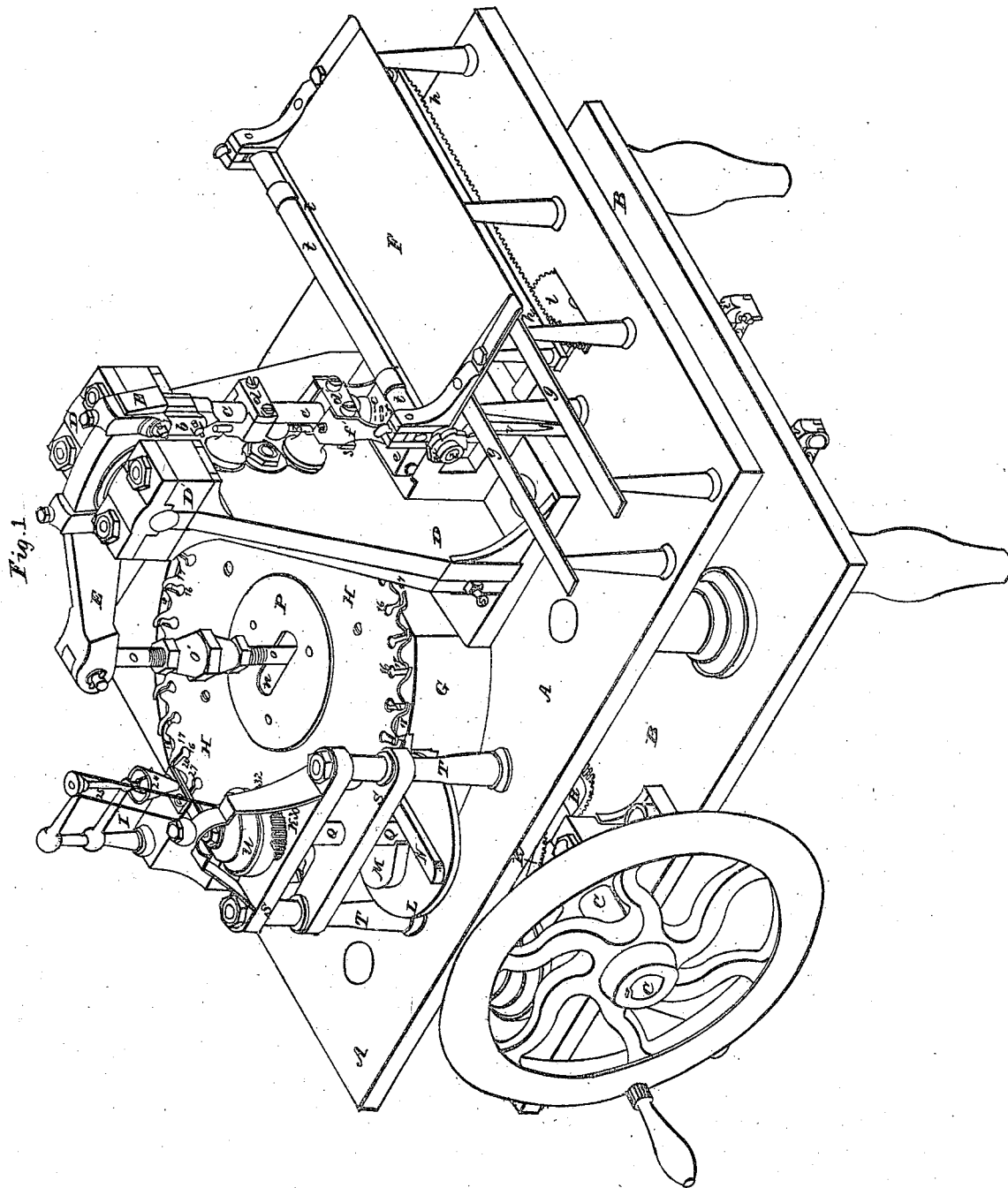
G. WRIGHT

3 Sheets—Sheet 1

Filling Percussion Caps.

No. 7,675

Patented Sept. 24, 1850.



G WRIGHT.

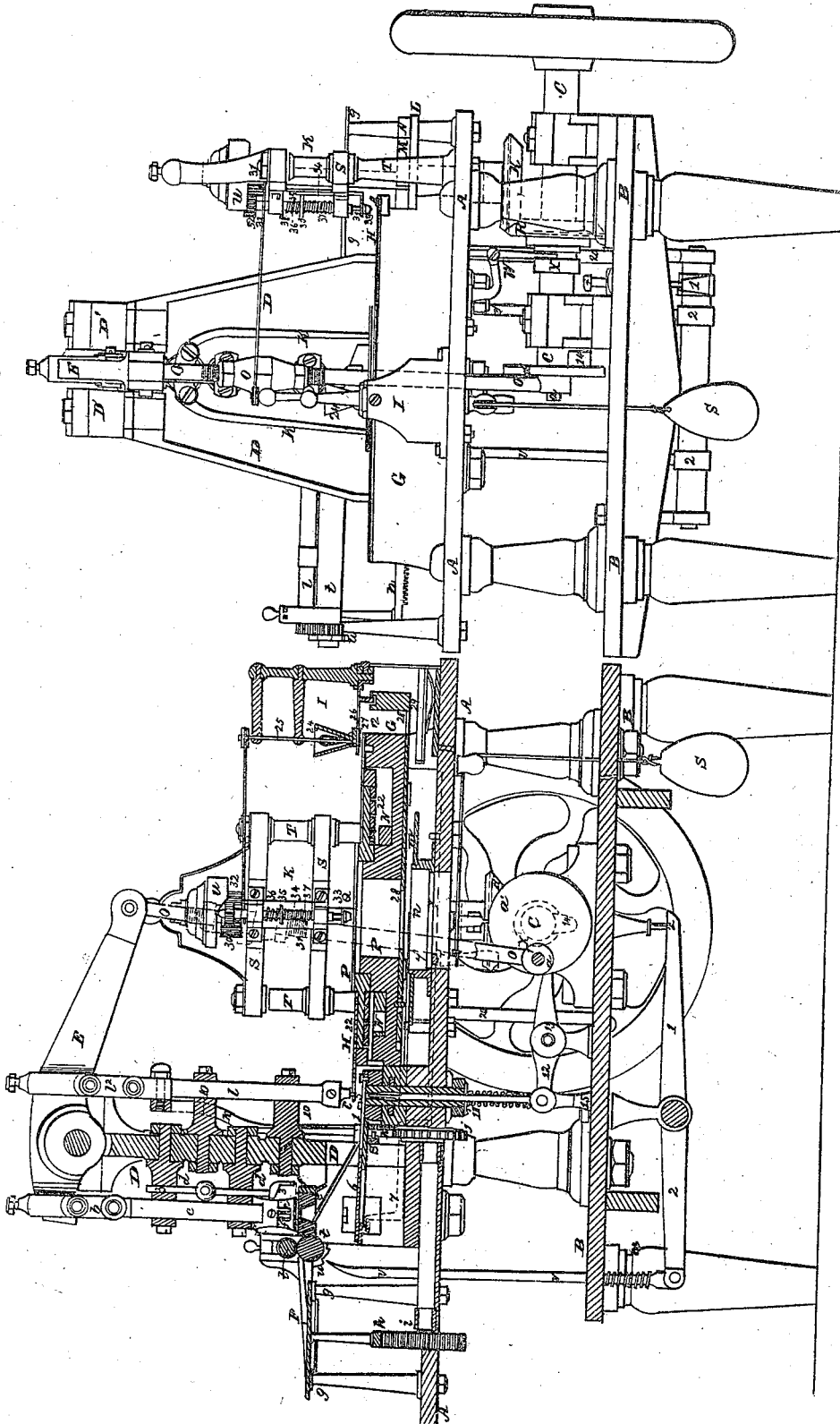
3 Sheets—Sheet 2.

Filling Percussion Caps.

No. 7,675.

Patented Sept. 24, 1850.

Fig. 2



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3 Sheets—Sheet 3.

Filling Percussion Caps.

No. 7,675.

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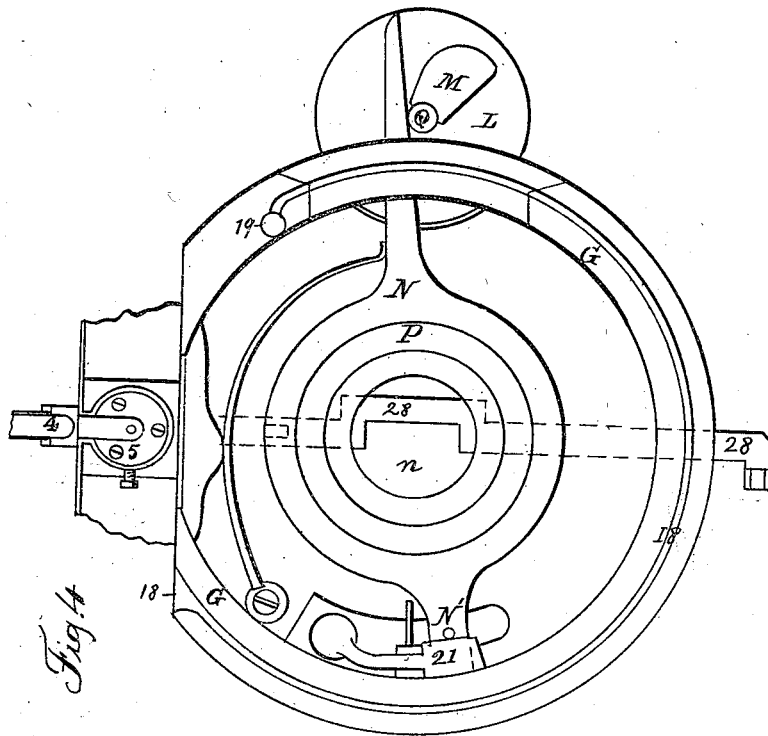


Fig. 4

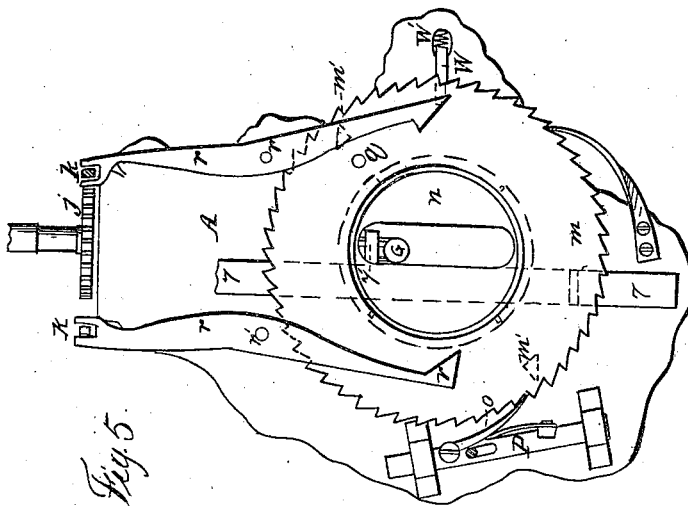


Fig. 5

# UNITED STATES PATENT OFFICE.

GEORGE WRIGHT, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVED MACHINE FOR FORMING AND CHARGING PERCUSSION-CAPS.

Specification forming part of Letters Patent No. 7,675, dated September 24, 1850.

*To all whom it may concern:*

Be it known that I, GEORGE WRIGHT, of Washington, in the county of Washington and District of Columbia, have invented certain Improvements in Machines for Making Percussion-Caps; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawings, of which—

Figure 1 is a perspective view; Fig. 2, an end elevation; Fig. 3, a longitudinal section; Fig. 4, a sectional plan of the pedestal with the carrying-plate removed; Fig. 5, a plan of the reversing apparatus, &c.

Machines have been before made and used for the purpose of cutting out blanks from a strip of metal and punching them into the shape of percussion-caps. Other machines were then employed to charge and press down the detonating powder into the cap, the caps having to be placed into the machine by hand—a tedious and slow process, and requiring a close personal attendance, which, in case of a cap exploding, is attended with great risk, which, owing to the construction of this machine, is extremely liable to happen.

My machine is the only one yet constructed which will make a complete percussion-cap at one operation. It does not require the copper to be cut into strips, but uses it just as it comes from the rolling-mill. It cuts out the blanks, which are in the shape of a cross, so that the projection of one is cut out of the notch left by the others, so that no metal is wasted, except the small division, like network, between the holes where the blanks were cut from. The machine is entirely self-acting, requiring only to be supplied with a sheet of copper of any length and the hopper to be filled with the detonating compound, and dispensing with that close personal attendance which, in case of explosion, might do injury. This is not likely to happen, as each part is capable of perfect adjustment, and the action, when once regulated, continues the same on each cap. The machine has been set purposely (for experiment) to explode every cap as it came under the polisher, without sustaining any injury therefrom. It works with great precision, and all its motions are smooth

and regular, avoiding all concussion, all the motions being derived from the main shaft. It is capable of making over fifty thousand complete percussion-caps per day of the best quality, and all being equally good and perfect, no after sorting is required. The upper platform, A, is supported by posts above the lower platform, B, which stands on legs. On the platform B are the bearings in which the main shaft C turns. On the upper platform, A, is the standard D, forming a fulcrum for the main lever E, and supporting the parts for punching and shaping the caps.

F is a moving platform, which carries the sheet metal from which the caps are made.

G is an annular pedestal, which supports the carrier-plate H.

K is the apparatus for pressing and polishing down the powder into the caps, and I the apparatus for charging them with the requisite quantity previously.

L is a cam-plate, with a cam, M, for giving motion to lever N and the carrier-plate H.

The punching of the blanks from the sheet-copper is performed by the apparatus attached to the main lever E, which is worked by the connecting-rod O, which is jointed at its other end to a crank-pin, *a*, on a plate, *a'*, on the end of the main shaft C. The fulcrum or gudgeons of the main lever are supported by the plumber-blocks D'.

At the end of the main lever E are the links *b*, which connect it with the sliding stock *c*, which has the punch *c'* fixed in its lower extremity. The stock *c* slides up and down in the guide-boxes *d*, attached to the standard D. Below the punch is the die-plate *e*, which is firmly fixed to the standard D, and has a hole into which the punch at the end of the stock *c* enters at each stroke, and the sheet metal being introduced between the punch and die-plate, a piece is cut out of the shape required to form a cap, the metal being moved by apparatus to be described, so as to bring a fresh place under the punch for each stroke. A plate, *f*, through which the punch passes, is affixed by its side pieces, *f'*, to the lower guide-box, *d'*, having its lower surface parallel to and a small distance above the die-plate *e*, serves to keep the sheet from rising after being punched.

The apparatus for feeding the sheet metal to the punch has two series of motions, one for

giving a sidewise motion, so as to move the sheet the distance of one cap-blank for each stroke, and to reverse the motion when the edge of the sheet comes to the punch, and the other motion to advance the sheet lengthwise the distance of one blank for each row that is cut out, so that after punching a row of blanks entirely across the sheet it returns and another row is punched immediately behind the first. It consists of a platform, F, which slides on the bars *g*, elevated on posts, the top of the platform being on a level with the die-plate *e*.

Under the sliding platform F, and fixed to it, is the rack *h*, which is worked by the pinion *i*, on the shaft of which, at its other end, is the ratchet-wheel *j*, which is moved by one of the pawls *k*—one tooth for each stroke—and thus moves the platform F the distance of one blank. The upper ends of the pawls *k* are jointed to the punch-stock *l*, and reciprocate up and down with it. To reverse the motion and cause the platform to move in the opposite direction, one of the pawls *k* must be thrown out of gear and the other brought to act on the ratchet-wheel. This is done by apparatus concealed under the pedestal *g*, (see Fig. 5,) consisting of a ratchet-wheel, *m*, surrounding the center opening, *n*, having twice as many teeth as there are blanks to be punched out of the width of the sheet. This ratchet-wheel is actuated by a pawl, *o*, jointed to a sliding bar, *p*, which is moved to and fro by a pin in the lever N.

On the upper face of the ratchet-wheel *m* is a pin, *q*, which, as it passes round, comes in contact alternately with the two levers *r*, which have their fulcrums at *r'*, and have forked ends, which embrace the pawls *k* and cause them to engage alternately with the ratchet-wheel *j*, the two pawls being made to move simultaneously by the sliding bar *s*. Thus the sheet of metal is moved from right to left at the proper intervals till the edge is reached, and then, by the action of the pin *q* in the ratchet-wheel *m* on one of the levers *r* and the pawls *k*, the motion is reversed, and it moves in like manner from left to right. On the completion of the punching of each row it is necessary to advance the sheet.

On the platform F are two rollers, *t*, between which the sheet passes. On each end of the lower roller, outside the journals, are ratchet-wheels *u*, which, at the extremities of the motion of the sliding platform F, are presented to the action of the pawls V, which at that period have an upward motion imparted to them, forcing the ratchet-wheel on the end of the roller a portion of a revolution, and advancing the sheet metal the distance required to cut out a row of blanks parallel to the first.

On the under side of the ratchet-wheel *m* are two projections, *m'*, which, as they come round, strike the tail of the lever W, having its fulcrum under the platform A, and its lower extremity forked to embrace the cam-piece X, which slides on and turns with the main

shaft C. The cam-piece X is kept back by the action of a spring, W', on the lever W; but when one of the pins *m'* strikes the tail of the lever W the cam-piece is forced forward on the shaft, and the cam X' then comes in contact with the pin Z, projecting through the platform B, and presses it down, and with it the tail of the levers 1, which causes the other arms, 2, to rise, together with the pawls V, to which they are jointed.

To remove the portion of the sheet which has been perforated, a chisel, 3, is attached to the sliding stock *c*, and partaking of its motion, which cuts the perforated sheet into strips transversely, which fall off to one side. The chisel acts against the edge of the die-plate *e*.

The blanks, after being punched out of the sheet, fall through the die-plate *e* onto an inclined trough, which conveys them to a groove, 4, along which they are pushed at the proper time to the shaping-die 5 by a slide, 6, which is worked by a sliding bar, 7, (represented in blue lines, see Fig. 3,) which has a projection, 7', which bears against the connecting-rod O by the action of a weight, 8, and partakes of the lateral motion of it, (the connecting-rod O.)

The shape of a percussion-cap is given to the blank by pressure between the die 5 and the punch *l'*, fixed in the end of the stock *l*, which receives motion from the main lever E, to which it is connected by the links *f*, and slides in boxes 10, affixed to the standard D. The die 5 is also firmly secured to its place, and its bottom is formed by the end of the bar 11, which is lifted for the purpose of ejecting the cap from the die after forming, at each stroke by the action of the lever 12, having its fulcrum at 13, the tail of which is acted on at each revolution by the cam 14 on the main shaft *c*. The bar 11 is supported, when down, by the stud 15, and is brought down after lifting by the pressure of a spring. The connecting-rod O is made adjustable by the right and left handed screws and nut O', (shown in red lines in Fig. 3.)

After the caps are formed in the die 5, they are lifted by the bar 11 and caught under the rim by the carrying-plate H. This is a flat annular plate revolving around a projection, P, from the pedestal G. Near its edge are a number of holes, 16, which are extended to the outside by a curved slot, 17, of sufficient width to receive the body of the cap and retain it by its flange. The periphery of the plate is scalloped to make room for the operation of forming and lifting the cap, after which it is caught by the slot and carried round.

Immediately under the carrying-plate H, in the upper edge of the pedestal G, is a groove, 18, which serves to guide the cap in its passage round for charging and polishing, and after these operations, by a curve inward of the groove, the cap is moved inward in the slot till it comes to the hole 16, which it falls through, and is received into a hopper at 19, from which it falls through the tube 20. The carrying-plate is moved the distance between

two slots at each stroke of the machine by a lever, N, which is made to surround the projection P, on which it works as a fulcrum. On the inner end of this lever is a pawl, 21, which takes into the teeth of an inverted crown-ratchet, 22, on the under surface of the carrying-plate H, having as many teeth as there are slots in the plate. The lever N is worked in one direction by a cam, M, and is brought back to its position by a spring inside the pedestal. (See Fig. 4.) The cam M revolves with the upright shaft Q, driven by the bevel-wheels R from the main shaft C. From the lever N at N' projects downward the pin, which works the slide p and apparatus for reversing the motion of the platform F and advancing the sheet.

An endless chain might be used for carrying the caps; but I prefer the carrying-plate, as described.

The charging apparatus consists of a hopper, 24, into which the detonating powder is put, and is agitated by a wire stirrer, 25, which is kept revolving by a band passing around a pulley on its head and the upright shaft Q. In the bottom of the hopper is a hole, under which is a slide, 26, having a corresponding hole, which becomes filled with the powder as it passes under the hopper, and its contents forward (being sufficient in quantity for charging a single cap) until the hole in the slide coincides with a hole in an under plate, 27, through which the powder is dropped into the cap presented for its reception by the carrying-plate H, the movement of the slide being timed to drop the powder at the moment that the cap pauses under the charging-hole. The slide 26 is worked by an arm projecting from a sliding piece, 28, which extends into the pedestal G, and has an oblong slot or notch which embraces the connecting-rod O, and is moved backward and forward by it at the extremes of its lateral motion. Under the slide and hopper is a drawer, 29, which serves to catch and prevent the waste of any of the powder which may happen to drop through under the slide in case of no cap being under to receive it.

The apparatus for pressing and polishing down the percussion-powder into the top of the inverted cap is seen at K, and consists of a frame, S, supported by posts T, and having the upright shaft Q revolving within it by the means before described.

On the upper end of the shaft Q is the broad spur-wheel 30, which gives revolution to the polishing-spindle 31 by the pinions 32 on its upper end. The polishing-spindle 31 is depressed at the proper intervals by the crown-cam U on the shaft Q. The piece 33 is for the purpose of holding the cap steady and preventing it from revolving while polishing. It is fixed to a slide which moves up and down in a groove in the piece 34, and has a ring, 35, projecting from it, which surrounds the spindle. Above the ring is a strong spiral spring, 36, and below it another spiral spring,

37, which is much weaker. These springs keep the spindle and cap-holder elevated when not pressed down by the cam U, the lower spring, 37, resting on the bearing, and the upper spring, 36, pressing on a pin, 38, through the spindle.

In the lower end of the spindle 31 is inserted the polisher or pressing-punch 39, which passes through a hole in the cap-holder 33. When working, the revolving spindle is depressed by the cam U, and with it the cap-holder 33, which, on reaching the cap, is prevented from descending farther and holds it (the cap) firmly by its rim. The spindle continues to descend and the polisher enters the cap and burnishes down the powder by its pressure and revolving motion, the springs 36 and 37 yielding to allow of its descent. The revolution of the cam then permits the spindle to ascend and the polisher is withdrawn from the cap, and then, together with the cap-holder, is lifted up to allow of the cap being carried on and another brought under the polisher to undergo the same process.

The process of making a percussion-cap from the sheet metal is as follows: The sheet-copper is to be provided of the proper width and thickness and of any length, and its end entered between the rollers t, and the roll laid on the sliding platform F. The motion of the platform presents the sheet to the action of the punch c', by which a number of blanks are cut from the sheet in a row extending across it. The sheet is then advanced by the rollers t, and another row of blanks is cut out, the motion of the platform being reversed. The perforated sheet is cut into strips by the chisel 3, which are removed as they are successively cut off. The blanks, after being punched from the sheet, fall through the hole in the die-plate e onto an inclined trough, from the lower end of which they are carried forward and placed directly over the die 5, and the punch v descending, the blank is compressed into the shape of a cap. The punch v then rises, and the lifting-punch 11, which forms the bottom of the die, then raises the cap from the die, and the carrying-plate H coming round, the cap is caught in the slot 17 and carried forward, its rim or flange preventing its falling through. The remittent action of the plate carries the cap round, and the guiding-groove 18 in the pedestal, acting on the body of the cap projecting below the plate, causes it to enter farther into the slot 17, so that it may be directly under the hole in the charging-plate, when it receives the exact quantity of percussion-powder for a charge during the interval of motion of the carrying-plate. The cap, moving on as before, is brought under the polisher or pressing-punch, which descends into it, and by its pressure and rotary motion the powder is burnished down and caused to adhere to the cap. Upon being released by the holder the cap is again carried on, and the guiding-groove 18 curving inward, the cap is moved inward in the slot till it comes to the hole 16, which it drops

through into a hopper below, and from thence is conveyed away by the tube 20.

The motion of one cap has been described; but it will be seen that all the operations are carried on simultaneously as caps pass on in succession.

Having thus fully described my percussion-cap machine, what I claim as new therein, and which I desire to secure by Letters Patent, is—

1. The combination of the several motions given to the sheet of metal, by which it is presented to the cutting-punch by an intermittent motion from right to left, and vice versa, and when the edges are reached reversing the direction, and at the same time advancing the sheet, so that the blanks are punched in successive rows across the sheet, substantially as set forth.

2. The chisel 3, moving with the punch-stock *c*, by which the perforated sheet is cut into strips for removing it piece-meal from the machine, substantially as described.

3. Giving such a form to the slots of the car-

rying-plate that the caps, when lifted from the shaping-die, are caught by them and taken on, substantially as described.

4. In combination with the slots of the carrying-plate, the conducting-groove by which the caps are guided transversely in the slots and made to present themselves accurately under the charger and polisher, and to drop out, when completed, through the holes 16 at the end of the slots, substantially as described.

5. Operating the cap-holder 33 and the revolving polisher or pressing-punch 31 by a single cam in connection with the strong and weak springs 36 and 37, substantially in the manner and for the purposes set forth.

6. The combination, in one automatic machine, of the several processes by which the percussion-caps are cut out of a sheet, shaped, charged, and the charge polished down, substantially in the manner described.

GEO. WRIGHT.

Witnesses:

WM. BOSWELL,

J. RAYMOND.