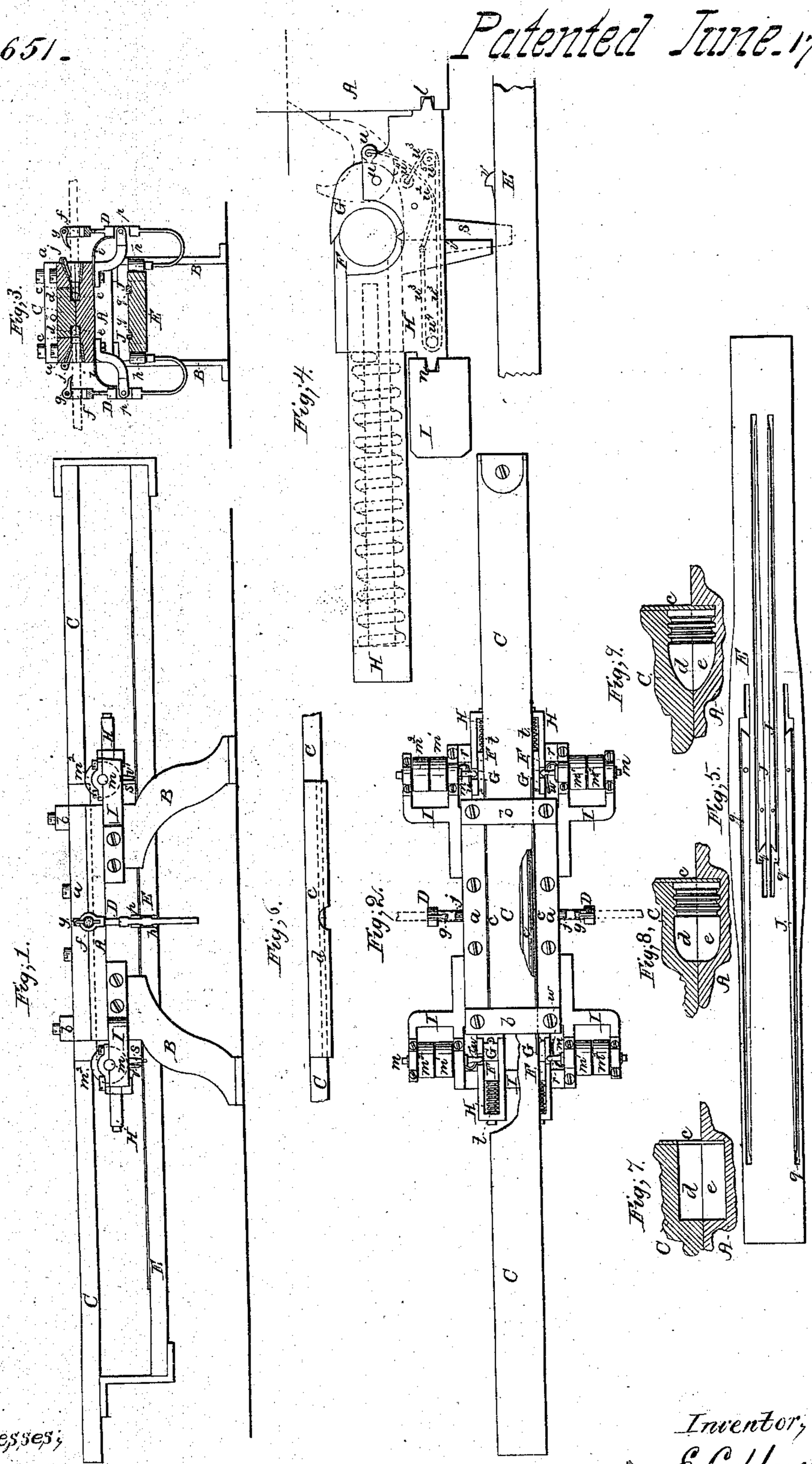
E. C. Hussey,

Bullet Machine,

No. 35,651. Patented June 17, 1862.



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IMPROVEMENT IN MACHINES FOR MAKING ELONGATED BULLETS.

Specification forming part of Letters Patent No. **35,651**, dated June 17, 1862.

To all whom it may concern:

Be it known that I, E. C. HUSSEY, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Machine for Making Elongated Bullets; 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 side elevation of the machine. Fig. 2 is a plan of the same. Fig. 3 is a transverse vertical section of the same at the middle of its length where the rods of lead are fed in. Fig. 4 is a side view, natural size, of one of the sets of dies which hold the bullets for drilling their central cavities. Fig. 5 is a plan of what I call the "feed-bar," by which the bullets are fed to the drill and the rods of lead are fed to the cutters. Fig. 6 is a face view of one of the cutters for cutting off pieces of the lead bars of the required length to form bullets. Figs. 7, 8, and 9 exhibit transverse sections of one pair of rolling-dies at different points, showing the manner in which the lead is gradually rolled into shape for the bullets.

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

This invention consists in a machine of novel character, in which cylindrical blanks are cut from rods of lead, then brought to the desired external form for the bullets by a rolling process, and afterward drilled to produce the cavities in their bases.

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

A is a strong table of cast-iron resting upon and secured to suitable standards, B B, and supporting all the working parts of the machine.

C is a long straight flat bar, arranged to slide back and forth upon the flat top of the table A, between guides *a a*, and confined to the table by means of transverse pieces *b b*, bolted across the tops of the guides *a a*. This bar is intended to have a longitudinal reciprocating movement, which may be imparted to it by its direct connection with the piston of a steam engine, or by a crank or other means.

To each edge of the bar C, at the middle of its length, there is secured one of two small knives *c c*, the cutting part of which consists of a semicircular notch or recess at the middle of its length, (shown best in Fig. 6,) the depth of the said recess being equal to the diameter of the rod from which the bullet-blanks are to be cut, and the straight lower edge of the said knife projecting below the under face of the bar C a distance equal to half the intended diameter of the bullet.

Along that part of each edge of the under side of the bar C, which is covered by its respective knife, there is a groove, *d*, the transverse form of which, at the middle of its length and opposite to the notch in the cutter, is of a rectangular form corresponding with the longitudinal profile of the cylindrical blanks of which the bullets are formed, and which gradually assumes, in each direction, the form of one-half the intended longitudinal profile of the bullet, as illustrated in Figs. 7, 8, and 9, the first of which represents the form at the middle of its length, the next the form about half way between the middle and ends, and the last the form at the ends where it corresponds with the profile of the bullet. In the upper surface of the table A there are two grooves, *e e*, of a form corresponding with *d d*, arranged at a distance apart to match the latter grooves in the manner shown in Figs. 3, 7, 8, and 9, said grooves *e e* extending the whole length of the table, the grooves *d d* being of the same length, and the cutters *c c* being somewhat longer, the object of making the cutters of such length being to make them cover the outer edges of the grooves *d d* throughout their whole length. The cutters also work into the grooves *e e* to the full depth thereof, as shown in Figs. 3, 7, 8, and 9.

At the middle of the length of the table there is on each side an opening, 1, for the admission of the rods of lead from which the bullet-blanks are to be cut, said opening being formed partly in the table itself and partly in one of the guides *a a*, and being lined with a bush, *k*, to which is attached a pawl or dog, *j*, to prevent

the rods of lead from coming back, and outside of the said opening there is applied a feeding apparatus consisting of an elastic lever, D, working on a fixed fulcrum, *p*. This lever has an eye, *f*, at the upper end for the passage of the rods of lead through it, and a dog, *g*, to grip the lead as the upper part of the lever moves toward the table, and has at its lower end a roller, *h*, which bears against one edge of the feed-bar E, which is secured rigidly at its ends to the main bar C, and which is of nearly the full length of the latter bar. The said lever D has also applied to it a spring, *i*, to throw back its upper end from the table. The edges of the feed-bar E are so curved, as shown in Fig. 5, as to operate each on its respective lever D in the movement of the bar in either direction to produce the feed movement.

As the notches in the cutters *c c* approach the feed-openings in the sides of the table in the movement of the bar in either direction, the curved edges of the feed-bar E by their operation on the elastic lever D D cause the said levers to press the rods of lead, (represented in red color in Figs. 1, 2, and 3,) against the outer surfaces of the cutters, so that when the notches in the cutters arrive opposite to the end of the rods the latter may be quickly forced through the said notches and into the grooves *d e* of the table and sliding bar C, as far as the backs of the said grooves. The continued movement of the said bar causes the portions of the rods which have entered the grooves to be cut off by the cutters *c c*, and afterward causes the cylindrical pieces or blanks so cut off to be subjected to a rolling motion on their axes between the grooves *d d*, by which it is caused to travel in the direction in which the slide is moving till it arrives at the end of the table and drops out from the end of the groove *e*, having its exterior finished to the desired form for the bullet. In this operation each pair of grooves *d e*, matching each other at the point where and at the time when they receive the blank, continue throughout the rolling movement of the bullet within them to match each other at the point at which the blank or partly-formed bullet is traveling, as illustrated by Figs. 1, 2, and 3, and the blank is by the rolling operation and pressure to which it is subject in its passage toward the end of the table caused gradually to assume the desired form, and is not only made as true as if turned in a lathe, but made extremely compact and homogeneous.

On their being discharged from the grooves at the end of the table the bullets are caught in the dies F G, in which they are held for drilling the cavities in their bases. Of these dies there are four pairs—viz., two pairs at each end of the table A and one at each end of each pair of grooves, *d e*. Each pair of the dies is fitted to and carried by a separate carriage, H, and the several carriages are arranged to move transversely to the slide and table in guides provided for them at the ends of the table, the two carriages at either end of the table working in a V-shaped horizontal groove, *l*, in the end of the table itself, and a similar groove, *n*, in one of two horizontal frames, I I, which are secured to the table at opposite ends thereof, and which also serve to contain the bearings for the journals of the drill-stocks *m m*, containing the drills *r r*.

The drill-stocks are arranged with their axes at right angles to the length of the bar C, and are furnished with fast and loose pulleys m' m^2 to receive driving-bands for the purpose of giving the drills a rotary motion, which is the only motion they have. The bullets are fed to the drills by movements of the die-carriages H H along the guides *l n*, such movements being obtained from the bar E through the agency of grooves *q q* in the feed-bar, one groove for each carriage. The carriages have each rigidly secured to its under side a pin, *s*, which enters its respective groove *q*, and in each groove there is a switch, J. In the movement of the feed-bar in one direction the pin *s* works on one side of its respective switch, and in the movement of the feed-bar in the other direction the said pin works on the other side of the switch. The switch and groove are so formed as to cause the carriage to advance slowly toward its respective drill to effect the drilling of the bullet, but to move quickly back from it after the drilling operation.

One die, F, of each pair—viz., the one which is situated farthest from the table—is arranged to slide horizontally to and from the other in guides or ways in its carriage H, and has applied to it a spiral or other spring, *t*, to force it toward the other one. The other one, G, is arranged to swing in the manner illustrated in Fig. 4, on a pin, *u*, which attaches it to the carriage, that it may assume the position shown in red outline for the reception of the rolled blanks or bullets from the table. The opening of each pair of dies is effected by means of one of four lugs, *v*, (one for each pair of dies,) firmly secured to and standing up from the feed-bar E, the said lug just before the bars C E complete their movement in one direction coming in contact with a stud, v', that is attached firmly to the die F, and pushing the said die away from G far enough to permit the dropping out of a bullet which has remained in the dies after having been drilled during the last movement of the bars C E in the opposite direction. The movement of the die F by means of the lug *v*, as described, is continued beyond the point necessary to discharge the bullet, for the purpose of throwing the die G to the position against the table A, (represented in red,) in time for the reception of the new bullet, which, as the movement of the bar C is completed, drops out from the grooves *d e* into the cavity of the die G.

The movement of the die G to the position shown in red outline in Fig. 4 is effected by its connection at u' by a cord or chain, u^2, with the stud v', the said cord being of such length

that it remains slack during the first part of the movement of the die F to liberate the finished bullet. As the bars C and E commence their return movement, which they do immediately after the die G has received the bullet, the stud v' is gradually relieved of the pressure of the lug v, and the spring t forces back the said die, and this die in coming back draws back the die G to the position shown in black outline by means of a cord or chain, u^3, which connects the said die at u^4 with the stud v' of the die F, the said cord or chain passing round pulleys u^5 u^6 in the carriage H. When the dies are thus closed, the pressure of the spring t operates to press them together and keep them closed tightly enough to hold the bullet while it is being drilled. As the return movement of the bars C and E is completed, the dies at the opposite end of the machine are operated in the manner above described to discharge a drilled bullet and receive a new one. Just before the opening of the dies at either end of the machine their respective carriage is thrown back suddenly by a spring, w, Fig. 2, applied to it for the purpose, and the bullet is thus freed from the drill. This throwing back of the carriage takes place when the thick end of its respective switch J passes the pin s. When the bars C E move to the left, the bullets are rolled toward and delivered from the left-hand end of the table A, and when they move to the right the bullets are rolled toward and delivered at the right-hand end of the table. The same operation takes place simultaneously on each side of the machine and alternately at both ends thereof.

It is obvious that one side only, or one end only, of the machine may be used; but a great saving of power, time, and labor is effected by using all four of the sets of rolling and drilling apparatus.

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

1. The combination, in a machine for making bullets, of a straight groove, e, in a stationary flat table or bed, and a corresponding groove in a straight reciprocating bar or slide, such grooves having a suitable form and operating to roll the blanks of lead into shape by a movement about their own axes, substantially as herein specified.

2. The combination, with the grooved reciprocating bar or slide C and the grooved stationary table or bed A, of a cutter, c, applied and operating in connection with the grooves of the bar or slide and table or bed, substantially as herein set forth.

3. The combination, with a bar or slide, C, a table or bed, A, and cutter c, operating as described, of a feed-bar, E, and an elastic feed-lever, D, applied and operating substantially as and for the purpose herein specified.

4. The combination, with the grooved table or bed A and the grooved bar or slide C, of one or more pairs of holding-dies and a corresponding number of drills applied to receive the rolled bullets from the said grooves and drill the cavities in their bases, substantially as herein specified.

5. The dies F G, constructed, combined, applied, and operated substantially as and for the purpose herein specified.

6. Combining the die-carriages H H with the reciprocating feed-bar E, by means of grooves q q and switches J J, substantially as and for the purpose herein set forth.

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