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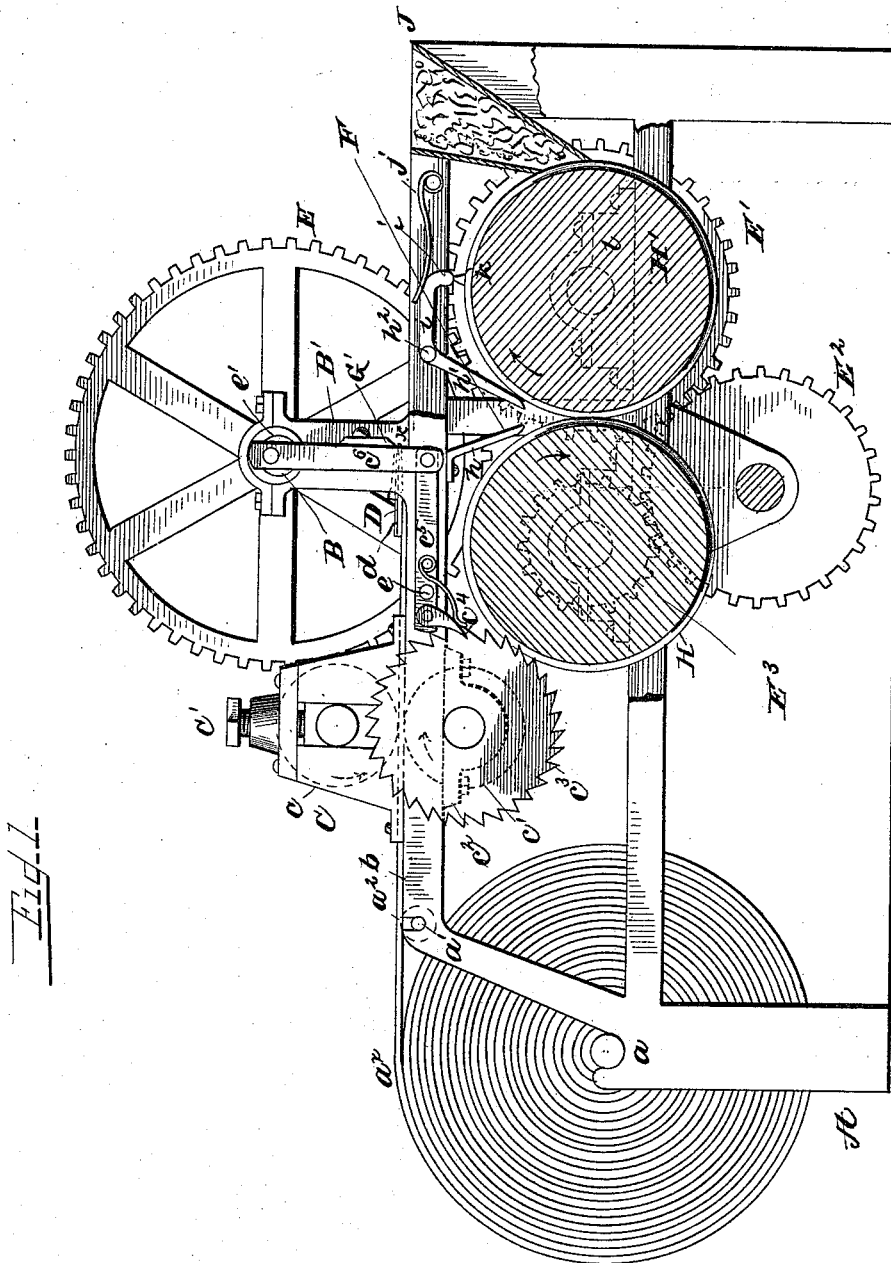
2 Sheets—Sheet 1.

E. J. LUMLEY.

MACHINE FOR MAKING BULLETS AND SHOT.

No. 417,733.

Patented Dec. 24, 1889.



Witnesses

G. W. Tauberschmidt,
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Inventor

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By his Attorney

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(No Model.)

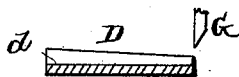
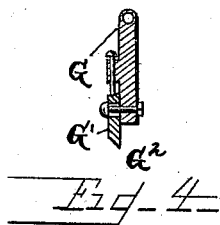
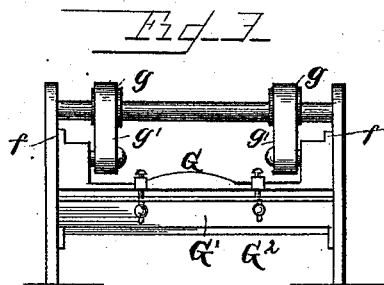
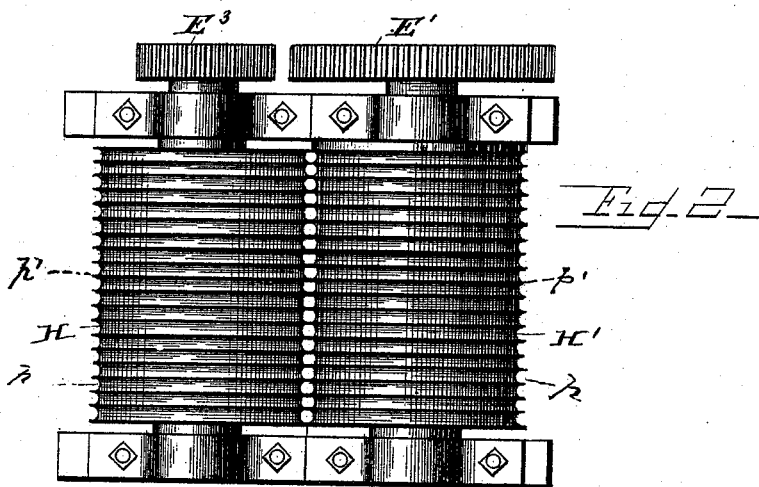
2 Sheets—Sheet 2.

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Witnesses

G. A. Taubenschmidt,

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Fig. 5

By his Attorney

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UNITED STATES PATENT OFFICE.

EDWIN J. LUMLEY, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO ALEXANDER R. WILLIAMS, TRUSTEE, OF SAME PLACE.

MACHINE FOR MAKING BULLETS AND SHOT.

SPECIFICATION forming part of Letters Patent No. 417,733, dated December 24, 1889.

Application filed March 9, 1889. Serial No. 302,620. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. LUMLEY, a subject of the Queen of Great Britain, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Making Bullets and Shot; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for manufacturing bullets and shot; and it consists in the novel instrumentalities which will be fully understood from the following description, taken in connection with the annexed drawings, in which—

Figure 1 is a side elevation of my improved machine, parts of the frame of which are broken away and parts of which are in section. Fig. 2 is a top view of the twin spherical bullet or shot forming rolls, showing their journal-bearings and gearing. Fig. 3 is a view in detail showing the shearing device, the guiding or sash frame for the vertically-reciprocating shear, and the shear-bed. Fig. 4 is a sectional detail view showing a device for adjusting the knife G, and Fig. 5 shows in detail a portion of the bed or platen and one of the beveled side guides for a sheet of lead or other suitable metal.

Referring to the annexed drawings by letter, A designates a frame adapted to sustain the devices which I shall hereinafter explain. The front or feeding end of this frame is open-notched at *a* to receive the journals of a roller adapted to hold a ribbon of lead or other suitable material of which it is desired to produce spherical shot. This sheet or ribbon is indicated in the annexed drawings coiled or wound about the said roller. In front of this roller is an anti-friction roller *a'*, the journals of which are sustained in notches *a''*, formed in the cheek of the main frame A. The perimeter of this anti-friction roller *a'* at its highest point is slightly above flush with a solid flat bed or

platen *b*, which extends to and terminates at a point *x*, hereinafter again referred to, and shown in dotted lines, Fig. 1. The object of this platen *b* is to cause the sheet of metal, after it crosses the roller *a'*, to lie flatly and evenly. In advance of the said roller *a'*, I show twin rollers *c c'*, the object of which is threefold: first, to spread the sheet or blank ribbon *a''* evenly upon the bed *b*; second, to feed this ribbon forward in the direction indicated by the arrows on Fig. 1, and, third, to condense and compress the ribbon and prepare it for a further process hereinafter explained. The highest point of the lower feed-roller *c'* is slightly above the horizontal plane of the bed or platen *b*, and this roller is journaled in bearings *c''*, bolted to the bottom of the top rails of the main frame A. The upper roller *c* is practically the evenner and pressure roller, for which reason the journals of this roller are applied in the guiding-slots of pillow-blocks C provided with screw-tapped nipple-adjusting screws C' and cap-blocks, as shown in Fig. 1. The perimeters of the two rollers *c c'* are strictly parallel and in the same plane as the surface of the bed *b*. After the compressed sheet *a''* leaves the said rollers I have found in practice that it is liable to buckle up laterally. To obviate this, I employ side guides D, which are open sheath-shaped portions wedging and having laterally-overhanging lips *d*. At the point *x* of these guides D the sheet of metal is cut into strips, as will be hereinafter explained.

On one end of the journal of the feed-roller *c'* is keyed a ratchet-wheel *c'''*, the teeth of which are evenly spaced and pitched, as shown in Fig. 1. With the teeth of this wheel engages a spring-actuated pawl *c''''*, which is pivoted to a longitudinally-reciprocating lever *c'''''*, which is pivoted to the main frame on the stud *e*. The front end of the said lever is pivoted to a rod *c''''''*, which receives vertical movement from an eccentric *e'* on the horizontal transverse shaft B of a master gear-wheel E. It will thus be observed that an intermittent rotary motion is imparted to the lower feed-roller from the said main shaft. The main shaft B is journaled in boxes on standards B' rising from the top rails of the

main frame. Below the discharge-point x of the guides D is a transverse hopper, which I shall presently describe.

The standards B' have on their inner sides tenons $f f$, (shown in Fig. 3,) which afford vertical guides for a knife-bearing frame G, which receives vertical reciprocating motion from eccentrics $g g$, keyed on the main shaft, acting through the medium of straps or links g' . To this frame G is suitably secured a knife G', which is adjustable and preferably set for operation in the inclined position, my object being to cut the sheet transversely and squarely against a fixed blade G² with a clean shearing action. During this act of severing a shot-blank strip from the sheet a^x its free end will naturally drop. Now, for the purpose of presenting each shot-blank strip evenly to shot-forming rolls H H', I employ my peculiarly-constructed hopper F, above referred to. This hopper is formed of an inclined rigid wall h and inclined wall h' , which is pivoted at h^2 to said rail and provided with an arm i , that is acted on by a spring j and bent to form a toe i' , that is acted on at proper times by a tappet k , fixed to the shot-forming roll H'. This shot-forming roll is journaled in boxes supported by the lower bar of the frame A. On one end of the shaft of the said roll H' is keyed a cog-wheel E', which engages with the main wheel E, and which also in turn engages with an idler E². This idler engages with a cog pinion-wheel E³, which is keyed on the shaft of the roll H.

The two rolls H H' are provided with grooves p , which, when each roll is taken diametrically, present a semicircle, the points p' of both rolls exactly coinciding, forming knife-edges which cut through and aid in condensing the metal without waste.

J is a funnel for the front roll H'. This funnel is closely adapted to the several corrugations of this roll, and in practice it may be filled with raw cotton saturated with water for the purpose of cleaning the several corrugations thereof and in part acting as a lubricant.

I have above described my device for producing condensed bullets or shot of one gage or size from a sheet of metal or other material. I contemplate, and it is shown, that the rolls H H' may be removed and other rolls substituted for them having corrugations of a different size. In doing this I prefer to adjust the lever e^5 lengthwise, and thus gage the throw of the pawl e^4 .

It will be observed that the two drums H H' rotate in the same direction, as indicated by the arrows thereon; also, that these two drums are so respectively speeded that the drum H rotates more rapidly than its fellow. The object of this movement is that after a shot-blank strip is received in the bite of the two rolls it will be gradually rotated, subdivided into bits, and these bits condensed again, compressed, and delivered in spherical form into a suitable receiver. It will also be

observed that one jaw of the strip-blank hopper F is actuated synchronously with the feed, the cutting-off device, and the final condensing-rolls H H'. Instead of giving vibration to the wall h' by a tappet k and the arm i , this arm may be extended in an opposite direction, so that it will be actuated directly by the cutter-frame, thus giving a more positive movement to the said wall and at the same time a more sensitive movement. It will be observed that the rollers H H' are of the same diameter, and that these rolls are geared so that the roll H revolves more rapidly than the roll H'. The object of this is that the strips or blanks are evened between these rolls and cut off squarely. Should both rolls have the same speed, the blank strips falling between them might be cut obliquely and the material wasted.

If desirable, I may use a knife G', which, if desired, is adjustable for the purpose of setting it more or less obliquely to regulate the cut of the shear, and also to nicely compensate for the wear and grinding of the knife, so that the several steps shall be strictly synchronous.

Of course it will be understood that the rollers $c c'$ are made of steel and sufficiently strong and heavy to stand the work required of them—viz., to feed, flatten out, and condense the metal as it is fed to the knife.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a shot-machine, the combination of a sheet-metal feeder, a transverse cutter, and corrugated spherical forming-rolls revolving in the same direction at different speeds, as specified.

2. The combination, in a shot-making machine, of the guiding and flattening roll a' , over which the sheet of metal passes from the journal a , feed-rolls, one of which is adjustable, and lateral guides arranged to guide the sheet on its way to the cutting device, as set forth.

3. The combination, in a shot-making machine, of a sheet-supplying roll, a guiding-roll, a platen flush with the highest point of said roll, two feed and condensing rolls, one of which is adjustable and the other adapted to receive an intermittent rotative motion, a knife for cutting off strips from the sheet, a hopper for receiving the strips, and two rolls adapted to sever the strips and condense them into spheres, as specified.

4. The combination, in a shot-machine, of two corrugated cutting and condensing rolls with a feed-hopper, one side of which is fixed and the other pivoted, and means for oscillating the latter, as specified.

5. The combination, in a shot-machine, of the guiding and flattening roll a' , the condensing and feeding rolls $c c'$, the cutter G', the hopper having a fixed and an oscillating side and rotatory cutting, condensing, and forming rolls H H', as set forth.

6. The combination, in a shot and bullet making machine, of a sheet-blank feeder, a transverse cutting-knife, a hopper having a fixed and a movable side, and means for oscillating the latter and rotary cutting, condensing, and spherical forming grooved rolls rotating in the same direction at different speeds, as set forth.

7. In a bullet and shot machine, the combination, with a frame having a solid platen, of a flattening-roll *a'*, a pair of feeding and condensing rollers actuated intermittently, lateral guides, a sash-frame having an ad-

justable knife, a feed and portable hopper, one side of which is fixed and the other pivoted, and means for oscillating the latter, and two rolls adapted to cut, condense, and mold the spheres and discharge them, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN J. LUMLEY.

Witnesses:

HENRY J. ENNIS,
J. MCNAMEE.