P. Naylor,

Making Bullets,

No. 34,844. Patented Apr. 1, 1862.

Fig. 5.

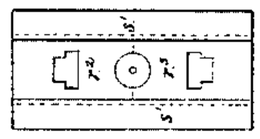


Fig. 3.

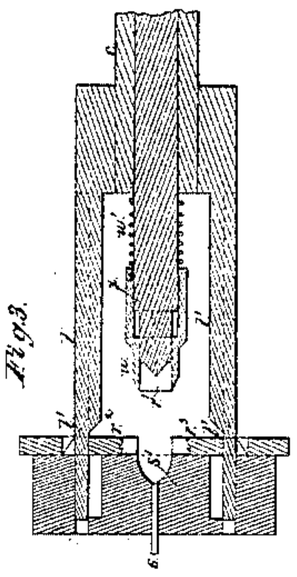


Fig. 4.

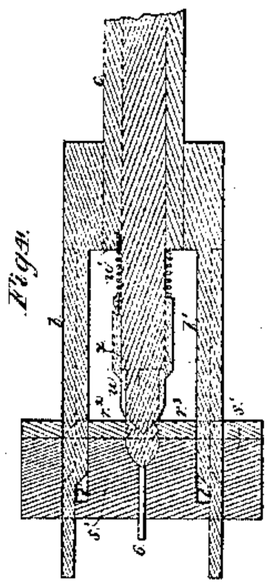


Fig. 6.

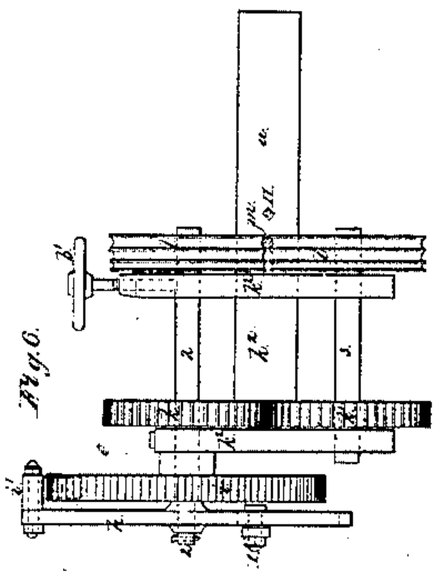


Fig. 2.

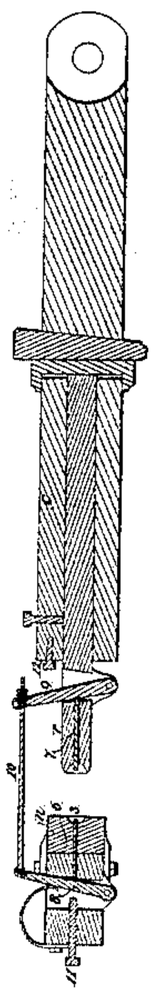
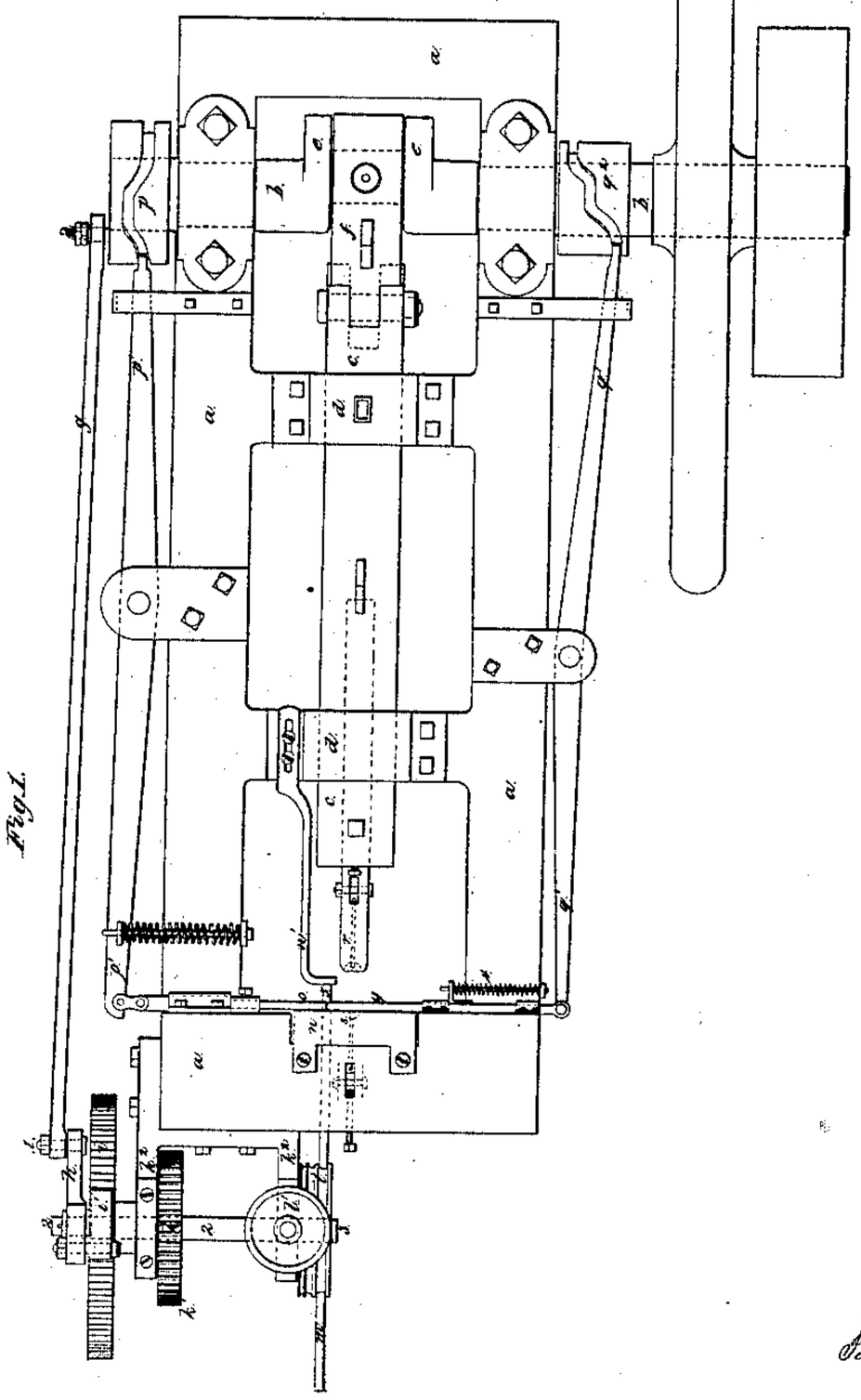


Fig. 1.



Witnesses.

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Thos. Geo. Harold

Inventor.

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UNITED STATES PATENT OFFICE.

PETER NAYLOR, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR COMPRESSING MUSKET-BALLS.

Specification forming part of Letters Patent No. **34,844**, dated April 1, 1862.

To all whom it may concern:

Be it known that I, PETER NAYLOR, of the city and State of New York, have invented, made, and applied to use certain new and useful Machinery for Compressing Balls for Muskets, Rifles, &c.; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a plan of my machine complete. Fig. 2 is a vertical section of the dies for making round balls. Fig. 3 is a vertical section as open, and Fig. 4 is a section as closed, (in larger size,) of the dies for making Minié or hollow balls.

Similar marks of reference denote the same parts.

The nature of my said invention consists in an arrangement of dies for compressing and delivering balls either globular, elongated, or hollow, said balls being made from short sections of lead or suitable metal cut off from a bar and presented successively to the action of the dies.

In the drawings, *a* is a frame of suitable construction carrying the cross-shaft *b*, propelled by competent power.

c is a sliding die-stock sustained in the bearings *d d*, and reciprocated by the crank *e* and connection *f*.

g is a connecting-rod from a pin *z* at the end of *b* to an adjustable pin 1 in a slotted arm *h*, that acts as a lever and moves on the shaft 2 of the ratchet-wheel *i*, which wheel *i* is moved by the pawl *i'* the required amount each reciprocation of the rod *g*. On the shaft 2 is a gear-wheel *k*, corresponding to and working into the wheel *k'* on the shaft 3. (See Figs. 1 and 6.) These two shafts 2 and 3 are in bearings k^2 and fitted each at the outer end with a grooved feed-roller *l*, and *l'* is a screw by which the said rollers are pressed together and upon a bar or strip of lead *m* with the necessary power to feed it into the machine when said rollers are moved by the wheel *i* and pawl *i'*. The lead passes through a hole in a die *n*, and is stopped when projecting the necessary length by an adjustable gage *n'*, and is cut off by the cutter *o*, that is brought up at the proper time by the cam *p* and lever *p'*. At the same time a holding-jaw *q* comes up by the spring 4, or is pressed up by the lever *q'* and cam q^2, so as to sustain the section of lead 5 as cut off and while being carried to the line of the die *r* in the stock *c*, and so soon as taken by said die the cutter *o* and the holding-jaw *q* retire or are forced out of the way by their respective cams.

The dies *r* and *s* which form the ball are to be of the size and shape required. I have shown the same in Figs. 1 and 2 as hemispherical cavities in order to make a globular ball. Of course the dies must be accurately fitted and adjusted, and in order to throw out the ball as the dies part I make use of the delivering-punches 6 and 7, set in holes in the respective dies and actuated by levers 8 and 9, that are connected together at their upper ends by the rod 10. Screws 11 and 12 regulate the point to which these punches may recede by the pressure of the lead, the ends of the punches corresponding accurately to the interior of the respective cavities, so that the ball when delivered is smooth and perfectly globular. Any slight feather that may remain on the ball at the point where the dies *r* and *s* come together may be removed in a revolving box or rumbler.

In order to form the hollow or Minié balls in my machine, I employ the dies shown in Figs. 3, 4, and 5, wherein the die *r'* is formed with a conical end to produce the cavity in the ball, and the fixed die *s'* is shaped to form the point of the ball with the pushing or delivery punch 6, as before. It is generally necessary, however, to form grooves around the ball near the base, and to provide for such grooves I make a divided face to the die, as at r^2 r^3, and these pieces are to slide in grooves crosswise of the die *s'*; and to give the motion required for opening and closing these face-pieces I employ the wedges *t t'*, projecting from the die *r'* or die-stock *c*, so that as this die moves forward to compress the lead the face-pieces r^2 r^3 are closed and firmly held by the wedge-bars *t t* while the ball is formed, and then these face-pieces are opened for the delivery of the ball by the reverse movement, the inclined parts *t' t'* taking offsets in the slots through which they move to effect this opening for the delivery of the ball. If the pointed end of the die *r'* came in contact with the lead blank without being accurately guided, the said point once entering the lead eccentric of said cylindrical blank or section of the lead bar, the ball would be irregu-

lar. I therefore provide the sliding cylinder u around the pointed die r', which, receiving the lead blank as presented to the dies, conveys the same into the die s', when the end of this cylinder, coming in contact with the face-pieces r^2 r^3, is arrested and the compression is effected by the die r' sliding through this cylinder u, the spring u' allowing for this movement, and as the dies withdraw this cylinder being slid forward by its spring u' insures the delivery of the ball from the pointed die r'; and to the said cylinder u I communicate a slight turning motion by means of the spring u', the ends of said spring being attached, respectively, to the stock c and cylinder u, and the spring wound up in the act of being put in place. Hence this spring keeps the cylinder and wedge-shaped incline (shown by dotted lines) toward each other, and as the die r' draws back, the pressure of the shoulders x of said die r' being removed, the said spring u' causes the cylinder to partially turn, and the end thereof, being properly shaped, acts against the edges of the die-faces r^2 r^3 and cuts off any thin burr of lead that may be projecting, or separates it so nearly that it will fall off as the ball is handled. This same operation might be effected by the holding-jaw q suddenly brought up before the ball is delivered and then drawn back to allow of said delivery. The faces r^2 r^3 of the die s' require to be held together very firmly while the pressure is applied to the ball; hence the wedge-bars t t should have flat backs to take their bearing in the die s, and if required the face-pieces r^2 r^3 might have a circular groove turned in their surface surrounding and a slight distance from the ball, in order that a cylindrical ring projecting from and moving with the die u might enter said groove to hold the face-pieces more firmly together.

A cylinder similar to the cylinder u might be applied to the die r for forming globular balls, to guide the blank 5, and separate any slight burr, the same as with the Minié ball.

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

1. The delivery-punches 6 and 7, adjusted by means of the levers 8 and 9 and set-screws 11 and 12, in combination with the dies r and s, arranged substantially as set forth.

2. In combination with the said dies r and s, provided with the delivery-punches, levers, and adjusting-screws aforesaid, the holding-jaw q and cutter o, arranged as and for the purposes set forth.

3. The solid die s' and sliding face-pieces r^2 r^3, constructed and acting as and for the purposes specified.

4. The cylinder u as constructed, having a partially-revolving movement around the die r, in combination with the spiral spring u', as set forth.

5. The arrangement of the dies s' r' r^2 r^3 and wedge-bars t t, acting in the manner and for the purposes set forth.

In witness whereof I have hereunto set my signature this 12th day of December, 1861.

PETER NAYLOR.

Witnesses:
LEMUEL W. SERRELL,
THOS. GEO. HAROLD.