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3 Sheets—Sheet 1.

W. MASON.

MACHINE FOR HEADING CARTRIDGE SHELLS.

No. 437,442. **Patented Sept. 30, 1890.**

Fig. 1.

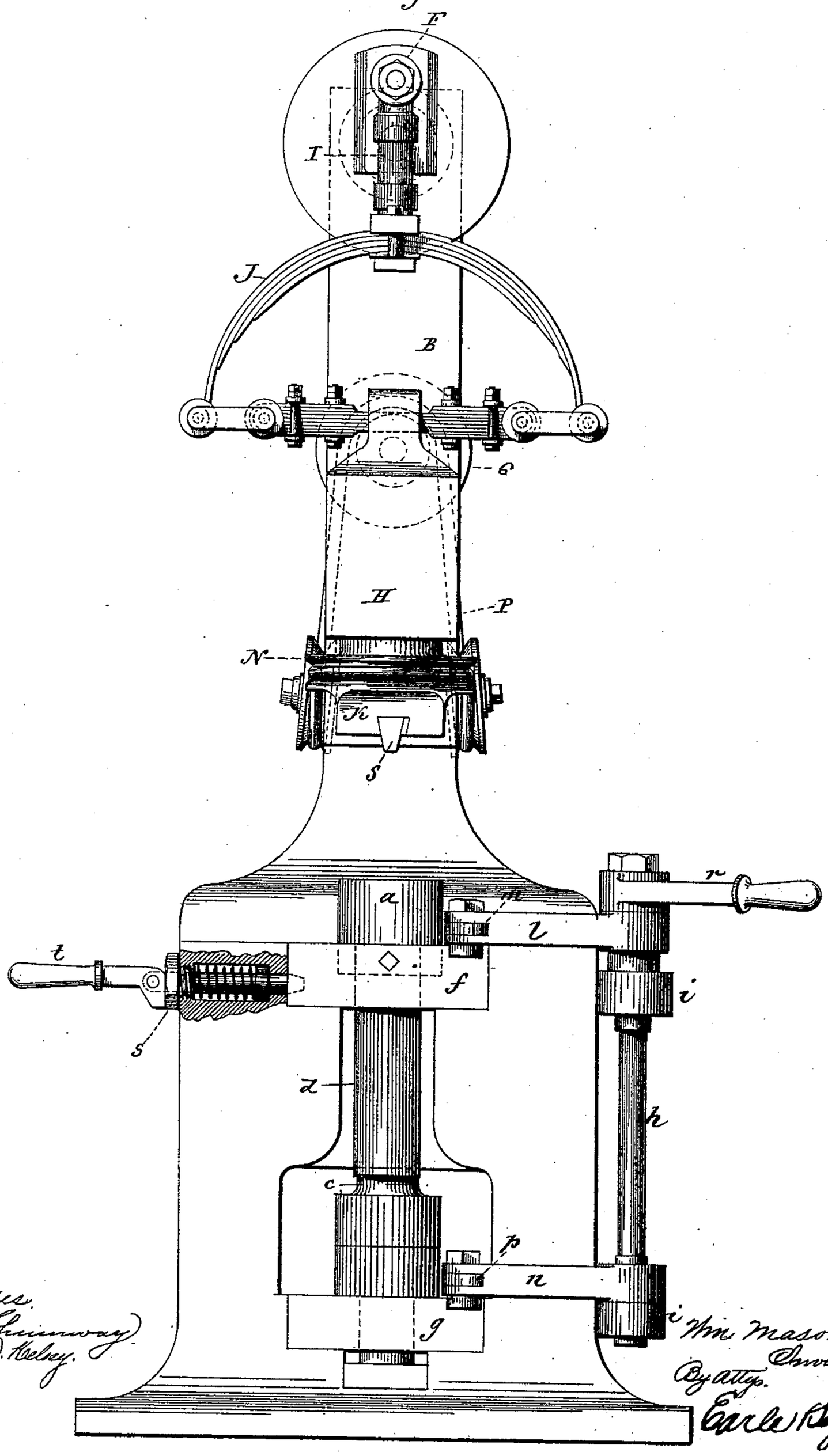

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Fig. 2.

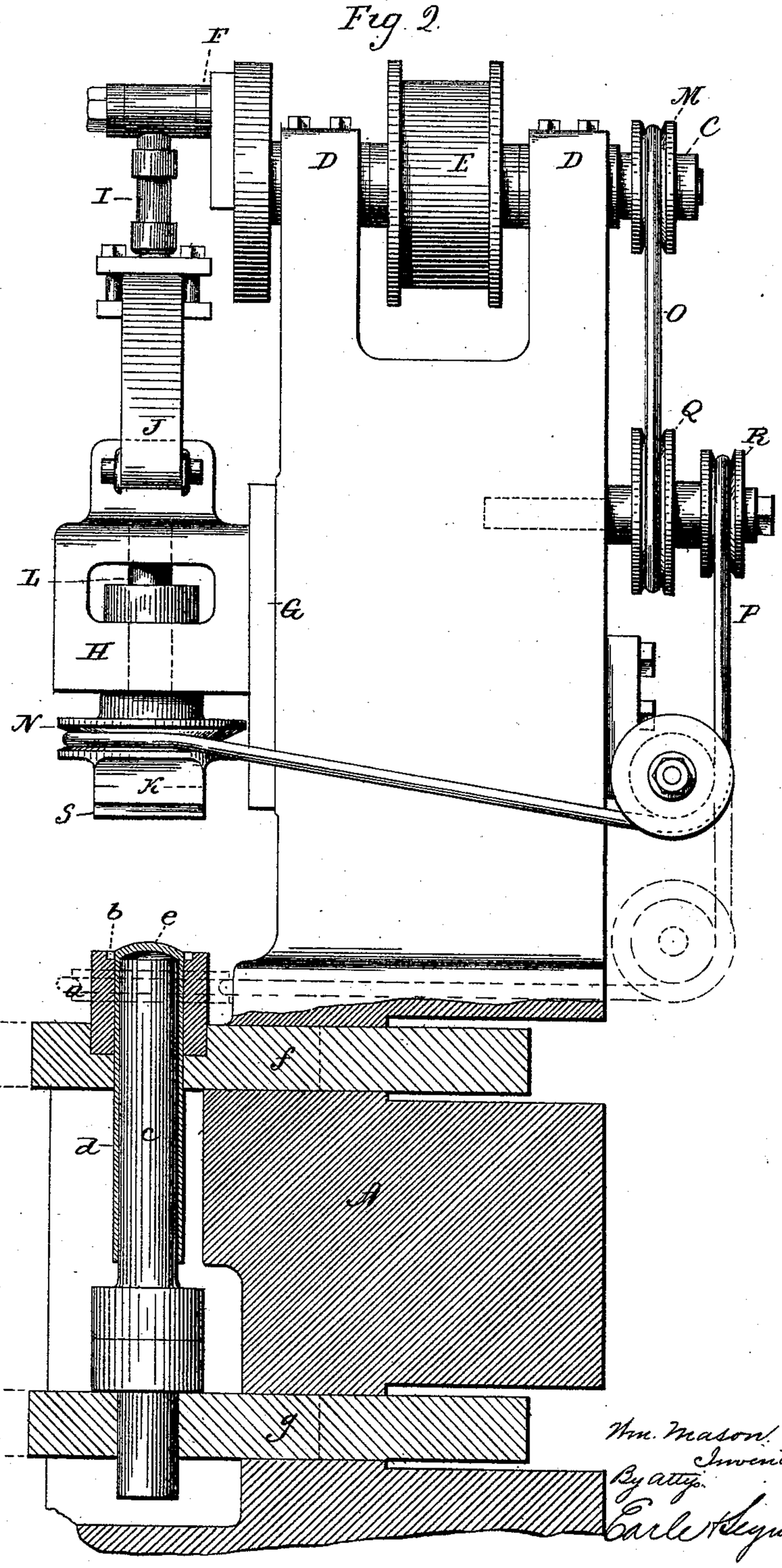

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Fig. 3

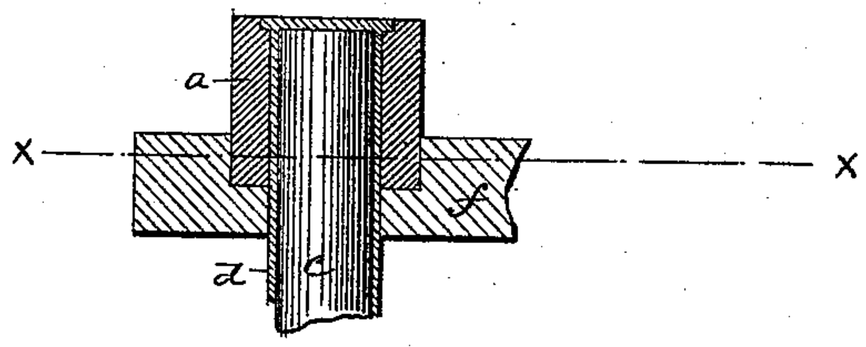


Fig. 4

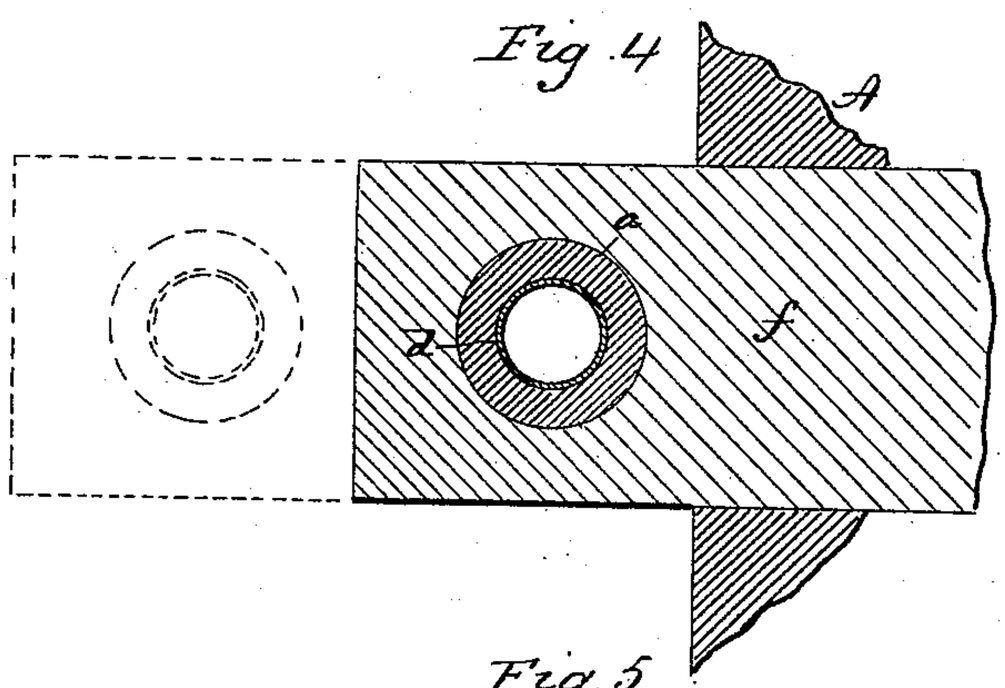
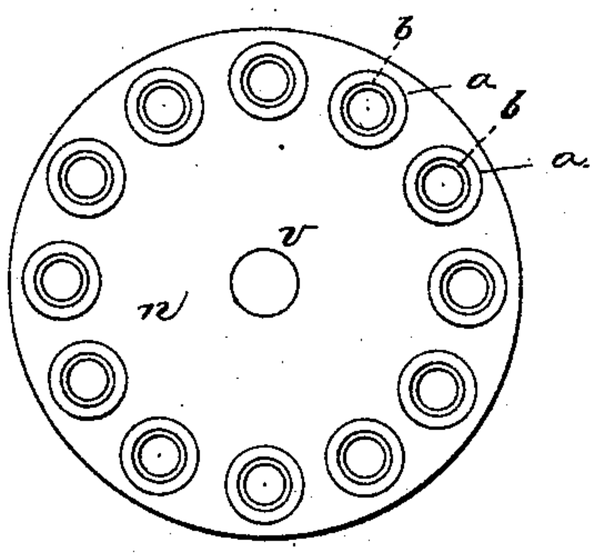


Fig. 5



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UNITED STATES PATENT OFFICE.

WILLIAM MASON, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE WINCHESTER REPEATING ARMS COMPANY, OF SAME PLACE.

MACHINE FOR HEADING CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 437,442, dated September 30, 1890.

Application filed March 10, 1890. Serial No. 343,314. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MASON, of New Haven, in the county of New Haven and State of Connecticut, have invented new Improvements in Machines for Heading Cartridge-Shells; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view of the machine, parts broken away for the purpose of illustration; Fig. 2, a side view showing the anvil, slides, and a portion of the bed in vertical central section; Fig. 3, a vertical section through the anvil, showing the spindle and shell after the heading operation; Fig. 4, a transverse section on line *x x* of Fig. 3; Fig. 5, a modification in the arrangement of the anvil.

This invention relates to an improvement in the construction of a machine for heading cartridge-shells of the larger sizes.

In the more general construction of machines for heading cartridge-shells, the shell is held in a die, and the heading-instrument is forced directly against the closed end to upset the head to form the flange, and this is performed at a single operation; but in the larger class of shells it is difficult to thus upset the metal and so as to form perfect heads.

The object of my present invention is the construction of a machine which may effectually and practically head this larger class of cartridge-shells and form a perfect and solid flange; and the invention consists in an anvil through which the shell may be introduced, the face of the anvil corresponding to the shape of the flange to be produced, and having a concentric spindle within the opening through the anvil upon which the blank will rest, and so that its upper end may properly shape the interior of the head, combined with a reciprocating and rotating hammer arranged to strike successive blows upon the head of the shell resting upon the anvil, the rotation of the hammer producing successive blows at different points radially on the head, and whereby the metal is gradually upset into the recess in the anvil to form the flange and complete the head.

A represents the bed or base of the machine, and upon which the frame B rests or is made a part of the base, the said frame carrying the hammer-operating mechanism.

C represents the driving-shaft, supported in suitable bearings D in the frame, and to which shaft a rapid rotation is imparted by means of a pulley E thereon. This shaft carries at its front end a crank F.

Below the crank and in suitable vertical guides G the hammer-head H is arranged, so as to move freely up and down, and to this head reciprocating movement is imparted from the crank by means of a pitman I, connected to the said head, preferably through an elliptical spring J, in a well-known manner of connecting a crank with a forging hammer, and so that a quick elastic blow may be imparted to the hammer. This hammer-head, however, may be operated by any of the known mechanisms for imparting reciprocating movement thereto.

In the head H a hammer K is arranged upon a vertical shaft L, supported in said head, so that the hammer may receive a rotation in a horizontal plane. This rotation is imparted from a pulley M on the driving-shaft, connected with a pulley N on the hammer through belts O and P, working upon intermediate pulleys Q and R, and so that as the driving-shaft revolves to impart vertical reciprocating movement to the hammer, there will at the same time be imparted to the hammer a rotative movement in a horizontal plane. The face of the hammer presents a narrow surface S. As here represented, this surface is produced by the introduction of a bar diametrically across the face of the hammer. The width of the striking-face is considerably less than the diameter of the head of the shell; but the length of the face should be at least equal to the full diameter of the completed head. Below this reciprocating and revolving hammer the anvil *a* is arranged. This anvil has an opening through it corresponding in diameter to the exterior of the shell, and so that the shell may be introduced and pass through from the upper side down-

ward. Around the opening in face of the anvil a recess *b* is formed, corresponding to the flange to be produced on the shell. Inside the anvil is a vertical spindle *c*, concentrically arranged and supported, this spindle *c* corresponding substantially to the interior of the shell, and so that the shell may be set through the anvil onto the spindle, (seen in Fig. 2,) *d* representing the shell. The shell is produced in the usual manner, the head end *e* of sufficient thickness to afford metal for the formation of the flange, and is usually made convex upon its outer surface, as shown. The upper end of the spindle corresponds to the interior shape of the shell, and is in the same relation to the recess *b* in the anvil that the interior of the head end of the shell is required to be in relation to the flange, and so that the space around the spindle within the anvil and the recess *b* in the anvil correspond substantially to a longitudinal section through the head end of the shell. The blank shell to be headed is introduced through the anvil onto the spindle *c*, as represented in Fig. 2, the end of the shell projecting above the face of the anvil. The hammer is then set into operation, and through its reciprocating movement imparts a succession of blows to the protruding end of the shell, these blows being diametrically across the head and striking a portion of the surface considerably less in width than the diameter of the head. At the same time the hammer is caused to rotate, as before described, and so that successive blows of the hammer will be made radially or diametrically across the head, but at different points, these repeated blows upsetting the metal at the point struck, and until the whole surface has been operated upon and the metal of the head portion of the shell upset and forced outward into the space *b* in the anvil to form the flange around the head end of the shell, as seen in Fig. 3. Then the thus completed shell is removed and another blank introduced and operated upon in like manner. By thus operating upon a small portion of the surface of the head at each blow very little power is required to produce the upsetting. The distribution of metal under the repeated diametrical blows is equal, and the flange and head produced by such successive blows are of the most perfect character.

For the convenience of introducing the blank and the removal of the headed shell the anvil and spindle are arranged upon horizontal slides *f g*, working in the bed, and so as to be moved backward and forward, that the anvil and spindle may be drawn forward from beneath the hammer for the introduction or removal of the shell, and then returned beneath the hammer for operation, and as indicated in broken lines, Figs. 2 and 4. These slides are operated by means of connection with a vertical rock-shaft *h*, supported in bearings *i* on the bed. This rock-shaft carries an arm *l*, which is connected by a link *m* to the slide *f*, and the shaft also carries a second arm *n*, which is connected by a link *p* to the slide *g*, and the shaft is also provided with a hand-lever *r*, by which rotation may be imparted to the said shaft, such rotation of the shaft causing the slides *f g*, with the anvil and spindle they carry, to move correspondingly outward or inward.

To insure the return of the anvil and spindle to their proper position, a locking device (here represented as a spring-bolt *s*) is arranged in the bed, which when the slides are in their working position will engage one of said slides, as *f*, as indicated in Fig. 1, the bolt provided with a handle *t*, by which it may be disengaged when it is required to withdraw the anvil and spindle from beneath the hammer.

I have represented the mechanism for imparting rotation to the hammer, as by belts and pulleys; but it will be understood that for such mechanical appliances other equally well-known mechanical appliances may be employed to communicate the rotative movement of the shaft to the hammer, such appliances being too well known to require illustration, it only being essential to the invention that the hammer shall receive both a reciprocating movement toward and from the anvil, combined with a rotative movement in a plane at right angles to the axis of the anvil.

Instead of arranging the anvil and spindle upon slides to be moved backward and forward, as I have described, there may be substituted therefor the device commonly known in this class of machines as "dial-feed." This dial-feed is illustrated in Fig. 5, the dial *u* being arranged to revolve upon an axis *v*, and the dial constructed with a series of anvils and spindles corresponding to the anvil and spindle *a c*, before described, each anvil and spindle being adapted to receive a blank, and so that under the rotation of the dial blanks thus introduced will be successively presented beneath the hammer, and then after the heading of the shell the dial advanced to present a new blank and permit the removal of the headed blank.

I have illustrated the machine as arranged in a vertical position, and so that the reciprocation of the hammer is vertical and its rotation horizontal, and this position I prefer; but I do not wish to be understood as limiting the invention to such position, I having used the terms "horizontal" and "vertical" as the preferred position of the parts.

Instead of imparting the rotation in a horizontal plane to the hammer, whereby the blows will be struck upon the head of the shell in different radial lines, the rotation in the horizontal plane may be imparted to the die carrying the shell, so that the shell itself will revolve, while the hammer will remain stationary as to such rotation. A modification for this illustration is represented by broken lines, Fig. 2, which represents the band P as carried downward with the pulley N arranged upon

the anvil, so that the anvil itself carrying the shell will rotate in the same manner as described for the hammer, so that successive blows will be struck in different radial directions; but I prefer to impart this rotation to the hammer. I however wish to be understood by the expression as hereinafter used "imparting rotary movement to the hammer" to include such rotation whether imparted to the hammer or to the anvil or both, it only being essential to the invention that there shall be a rotation of one or the other in order to change the point at which the successive strokes are made.

I claim—

1. In a machine for heading cartridge-shells, the combination of an anvil having an opening through it corresponding to the external diameter of the blank to be headed, with a recess in the face of the anvil around said opening corresponding to the flange to be produced, a spindle centrally arranged within said anvil and corresponding to the interior of the shell, with a hammer presenting a face in width less than the diameter of the head to be formed, mechanism for imparting reciprocating movement to said hammer toward and from the face of said anvil, and mechanism to impart rotation to said hammer in a plane at right angles to the axis of the said spindle and anvil, substantially as and for the purpose described.

2. In a machine for heading cartridge-shells, the combination of an anvil having an opening through it corresponding to the exterior of the shell to be headed, and constructed with a recess in its face around said opening corresponding to the flange to be formed, a spindle within said opening corresponding to the interior of the shell, a hammer-head arranged in guides and so as to reciprocate in a path parallel with the axis of said spindle and anvil and toward and from the face of said anvil, mechanism for imparting such reciprocating movement to said head, a hammer arranged upon an axis in said head, the said axis of the head substantially in line with the axis of said spindle and anvil, with mechanism substantially such as described for imparting rotative movement to said hammer during its reciprocating movement, substantially as described.

3. In a machine for heading cartridge-shells, the combination of a vertically-reciprocating and horizontally-rotating hammer, an anvil having an opening through it corresponding to the exterior of the shell, the face of the anvil toward said hammer constructed with a recess around said opening corresponding to the flange to be formed, a spindle within said anvil corresponding to the interior of the shell, the said anvil and spindle arranged upon horizontal slides, with mechanism substantially such as described to operate said slides to move the anvil into or from the position beneath the hammer, substantially as described.

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