No. 682,600. Patented Sept. 17, 1901.

P. BUTLER.

MACHINE FOR SCORING BULLETS.

(Application filed Jan. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

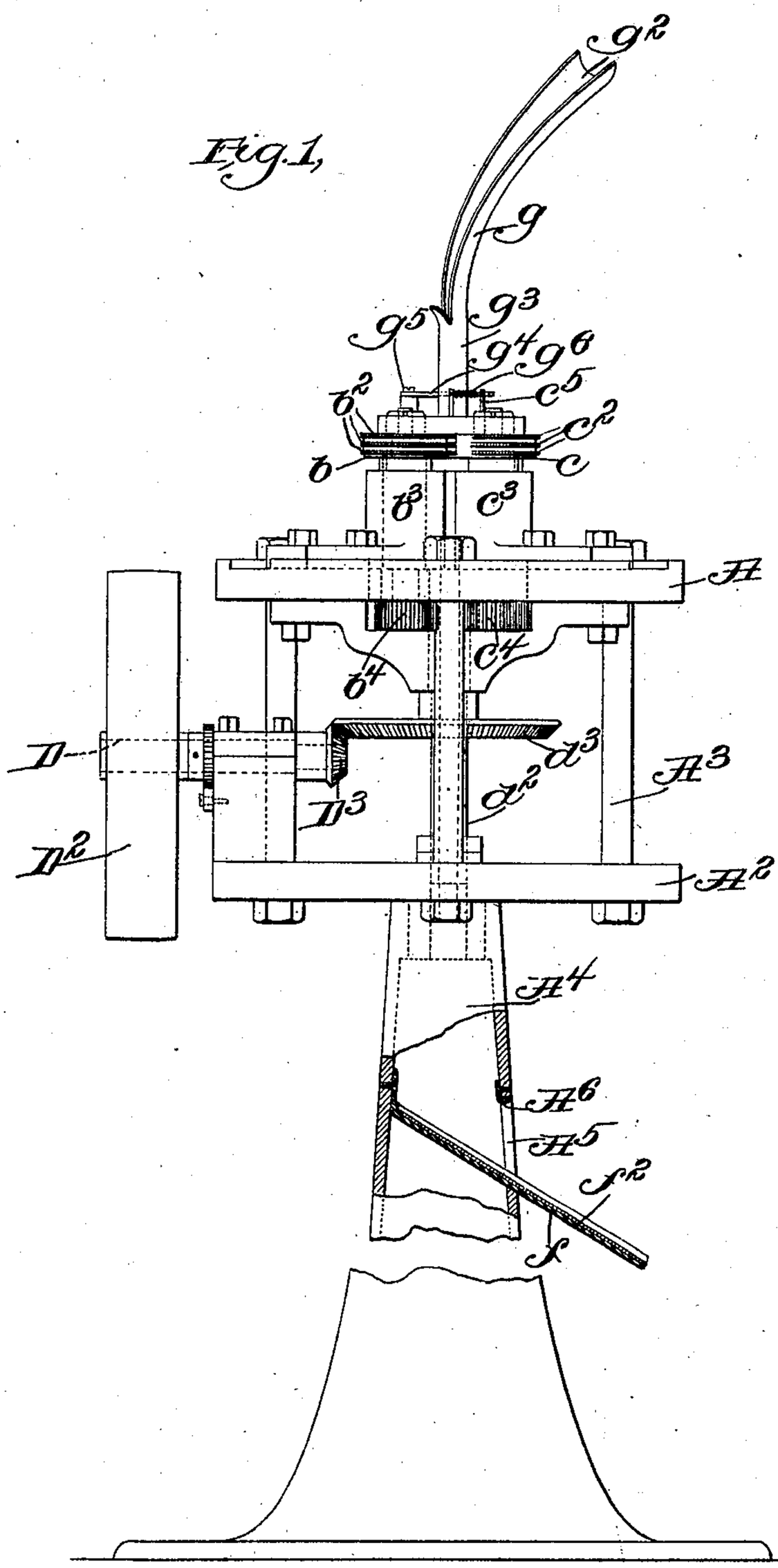

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Fig. 2.

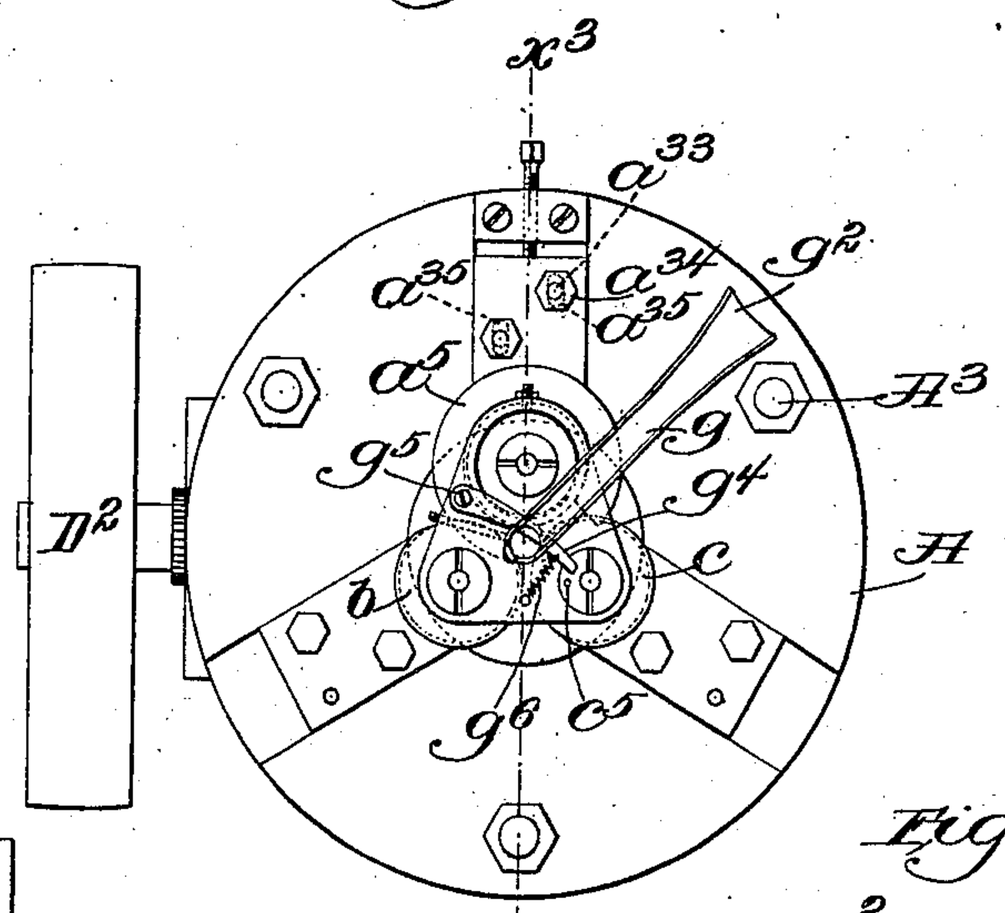

Fig. 4.

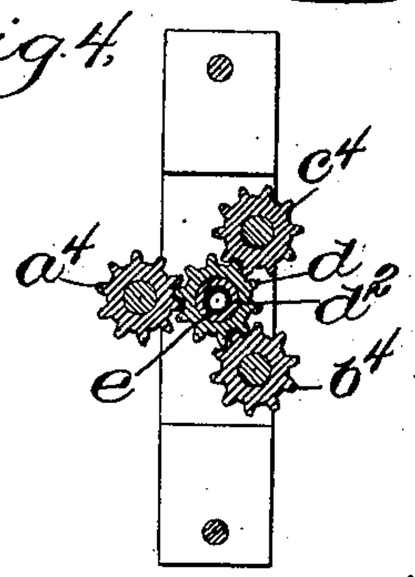

Fig. 5.

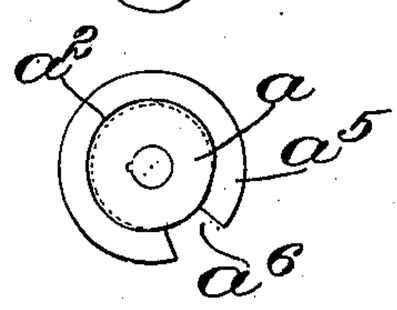

Fig. 3.

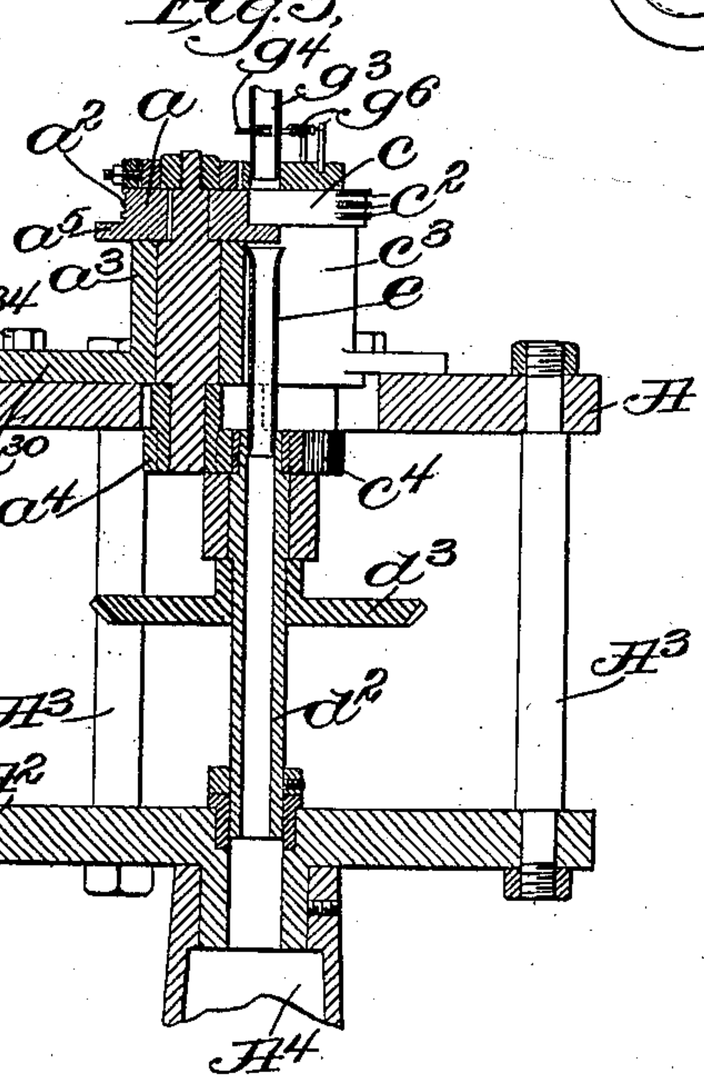

Fig. 8.

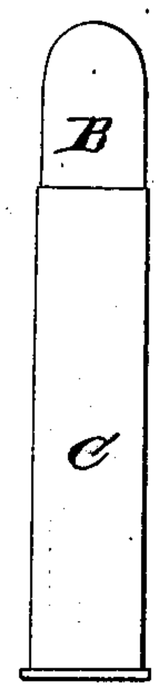

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

PAUL BUTLER, OF LOWELL, MASSACHUSETTS.

MACHINE FOR SCORING BULLETS.

SPECIFICATION forming part of Letters Patent No. 682,600, dated September 17, 1901.

Application filed January 9, 1899. Serial No. 701,655. (No model.)

To all whom it may concern:

Be it known that I, PAUL BUTLER, of Lowell, county of Middlesex, and State of Massachusetts, have invented an Improvement in Machines for Scoring Bullets, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a machine for scoring the bullets which are used in metallic cartridges—that is to say, producing the annular grooves near the base of the bullets to contain lubricant when the cartridge is finished.

The machine embodying the invention comprises rotatable members provided with projecting ribs to engage the bullet which is supported between two or more of such members, so that as they rotate they correspondingly rotate the bullet, the projecting members pressing into the surface of the bullet and producing an annular groove or grooves extending completely around the same. The machine is preferably arranged with three of such rotating members so that they all coöperate in holding the bullet in position, the members being triangularly arranged and equidistant from each other, the space between them at the adjacent parts being of such size as to contain the bullet. In order to hold the bullet in position during the operation, the machine is provided with a gage or support therefor, the said gage being shown as arranged to be moved out of the way at the end of the operation and permit the bullet to be delivered past the gage from the machine. Each of the rotating members has one portion of its periphery substantially smooth, the bullet being inserted when the said smooth portions are adjacent to each other, the ribs beginning to act upon the bullet during the further rotation of said members, and the smooth portions again acting on the sides of the bullet prior to its discharge from the machine in order to smooth the sides of the same and take off any bur or projecting portions which may be left after the operation of the ribs.

To feed the bullets, the machine may be provided with a feed-chute down which the bullets travel endwise, the said feed-chute being provided with a cut-off, which is arranged to support the column and to be moved out of the way at each complete rotation of the operating members, so as to permit one bullet and one only to drop into position.

Figure 1 is a side elevation of a machine embodying the invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical section on the line x^3 of Fig. 2. Figs. 4 and 5 are details to be hereinafter referred to. Fig. 6 is a view of a bullet before it is operated on. Fig. 7 is a view of a bullet after it has been operated upon, and Fig. 8 is a view of a complete cartridge.

The operating members *a*, *b*, and *c* are herein shown as disks, each provided along a portion of its periphery with projecting ribs a^2, b^2, and c^2, and are so arranged that their peripheries are equidistant from each other, so that if a bullet is placed between them all three disks will engage the cylindrical surface of the same. The said members are shown as mounted in bearings a^3, b^3, and c^3, supported on the upper plate A of the frame of the machine. To produce the rotation of said members each is provided with a gear-wheel, (a^4 b^4 c^4,) the said gear-wheels intermeshing with a similar gear *d* upon a shaft d^2, which is arranged to be driven by a main shaft D, having a bearing upon a portion A^2 of the frame of the machine, which frame is shown as consisting of the plate A and the portion A^2, connected together by bolts A^3 and supported upon a post A^4. The shaft d^2 is shown as provided with a bevel-gear d^3, intermeshing with a corresponding bevel-gear D^3, so that in the rotation of the shaft D through the agency of the pulley D^2 it will produce a corresponding rotation of the shaft d^2 and the operating parts *a*, *b*, and *c*.

To support the bullet in position to be operated upon by the members *a*, *b*, and *c*, the machine is provided with a gage or support for the base of the bullet, the said gage being herein shown as consisting of a flange a^5, Figs. 3 and 5, projecting beyond the periphery of the member *a* and below the main portion thereof, so as not to interfere with the operation of the members *b* and *c*. As best shown in Fig. 3, the bullet placed in position between the said members will rest upon or

be longitudinally positioned by the said flange a^5 and in the rotation of the said members will be engaged by the projecting ribs a^2, &c., which will press into and groove the surface of the bullet. To deliver the bullet from the machine after the operation is finished, the operating devices are shown as mounted on vertical axes, so that as soon as the support is removed the bullet will drop by force of gravity into the chute e, below the support. As herein shown, the shaft d^2 is hollow, and the chute e communicates with the bore thereof, so that the finished bullet drops through the shaft upon an inclined guideway or deflector f, arranged within the post A^4, and slides down the said guideway, being thus finally delivered from the machine. The said guideway is preferably covered with a layer f^2 of yielding substance, such as leather, to prevent the bullets from being dented or otherwise injured when they strike the same and is shown as projecting through an opening A^5 in the side of the post. The upper edge of said opening is also preferably provided with a covering A^6 of yielding material to prevent injury to any of the bullets which may rebound from the guideway f and strike the same. In order that the support may be removed from the bullet to allow the said bullet to be delivered after the operation is finished, the flange a^5 is shown as provided with an opening a^6, or, in other words, is extended only partially around the member a, the said opening being arranged to come in line with the chute e at the end of the complete operation. The bullets are fed just after the said open portion has passed the chute or middle position occupied by the bullets between the members, so that a bullet placed in such a position will rest upon the flange and be engaged and operated upon during substantially a complete rotation of said members, thereby becoming scored or grooved during such operation by the projecting ribs, which, however, terminate, as indicated by the dotted lines, Fig. 5, with the part which is adjacent to the opening a^6. The bullet, therefore, at the end of the operation, being then no longer engaged by the said ribs or supported by the flange, drops into the chute e finished.

The bullets B are commonly molded, as shown in Fig. 6, with a slight annular projection or flange B^2 at the lower end, and it is to be understood that the smooth portions of the operating-disks are separated from each other far enough to permit this projecting flange to pass between them. In the scoring or grooving operation, moreover, the material of which the bullet is formed is forced outward to a certain extent, the material between the grooves being displaced by the action of the projecting ribs, so that the diameter of the bullet between the grooves is slightly enlarged, as shown in Fig. 7. The grooves are thus formed without materially compressing the bullet, but merely displacing the material thereof, the grooved portion of the bullet becoming of the proper diameter to closely fit the cartridge-shell C, as shown in Fig. 8, while the projecting portion of the bullet is somewhat less in diameter than the shell, as is desirable in cartridges of this kind.

To feed the bullets to the machine, the said machine is shown as provided with a feed-chute g, having a flaring end g^2, in which the bullets can be easily placed with the base forward or downward, the said feed-chute terminating in the tubular portion g^3, leading vertically toward the space between the portions a, b, and c. If, therefore, bullets are placed in the said chute, they will drop by gravity until the lowermost bullet rests upon the support a^5 in a position to be operated upon.

To control the delivery of the bullets and prevent those in the chute from dropping with the finished bullet when the opening a^6 is in line with the space between the members a, b, and c, the said chute is provided with a stop or cut-off g^4, shown as pivoted at g^5 and extending through a lateral slot in the side of the chute far enough into the same to underlie or support the bullets therein. The said stop is so situated as to extend between a bullet which has just been fed toward and positioned by the flange and the bullet next adjacent thereto, so that when the opening in the flange comes in line and the finished bullet is dropped or delivered the bullets remaining in the chute are supported by the stop and are prevented from falling. It is necessary, however, as soon as the finished bullet has been delivered to permit a new bullet to be fed in, and for this purpose the stop is arranged to be moved out of the way as soon as the support is in position to receive the bullet to be operated upon. As herein shown, this is accomplished by means of an engaging portion projecting from one of the members, such as the pin or projection c^5, which stands vertically above the member c and is arranged (see Figs. 1 and 2) to engage the end of the stop g^4 in the rotation of the member c and swing the same upon its pivot out of the path of the bullets in the chute. The stop is shown as arranged to be restored after the projection c^5 has passed by means of a spring g^6, so that the stop is restored automatically before the bullet which is being operated upon is released and delivered from the machine.

In order that the machine may be adjustable for wear, the bearing a^3 for the member a is shown as mounted on the slide a^{50}, which is movable radially toward the axis of the chute e, the said slide being shown as controlled by an adjustable screw a^{31}, threaded in a block a^{32}, suitably secured to the plate A. To secure the slide in its adjusted position, the same is provided with bolts a^{33} and nuts a^{34}, the said bolts extending through elongated slots a^{35} in the slide in order to provide for the longitudinal movement thereof.

It is not intended to limit the invention to

the specific construction herein shown and described, since modifications may obviously be made without departing from the invention.

I claim—

1. A machine for scoring or grooving bullets comprising a plurality of rotatable operating members provided with ribs or projections; means for rotating all of said members to operate upon the bullet interposed between them, each member having an unribbed portion arranged to be adjacent to the similar portions of the other members at a certain period in the operation; and means for automatically feeding the bullet into the place between said unribbed portions, as set forth.

2. A machine for scoring or grooving bullets comprising a plurality of rotatable operating members provided with ribs or projections; means for rotating all of said members to operate upon the bullet interposed between them, each member having an unribbed portion arranged to be adjacent to the similar portions of the other members at a certain period in the operation; means for automatically feeding the bullet into the space between said unribbed portions; and a gage or stop to position the bullet thus fed, as set forth.

3. A machine for scoring or grooving bullets, comprising a plurality of rotatable operating members provided with ribs or projections; means for rotating all of said members to operate upon the bullet interposed between them, each member having an unribbed portion arranged to be adjacent to the similar portions of the other members at a certain period in the operation; means for automatically feeding the bullet into the place between said unribbed portions; a gage or stop to position the bullet thus fed; and means for discharging the bullet when the unribbed portions of the several members are again adjacent to each other.

4. A machine for scoring or grooving bullets, comprising a plurality of rotatable operating members provided with ribs or projections, and a gage or support for the end of the bullet to properly position the same with relation to said members, substantially as described.

5. A machine for grooving bullets comprising three operating members arranged to rotate on vertical axes, said members being triangularly arranged and adapted to engage a bullet between their peripheries, projecting ribs extending partially around said members to form the grooves in the bullets, a gage or support for the bullet which is being operated upon, and means for removing said gage when the unribbed portions of said members are adjacent to each other, substantially as described.

6. A machine for grooving bullets comprising three operating members, each consisting of a disk mounted on a vertical axis and provided along its periphery with one or more projecting ribs extending partially around the same, means for rotating said disks, said means being so arranged that the unribbed portions of the several disks are adjacent to each other at one period in the rotation, and a supporting-flange formed on one of said disks below the periphery thereof to support the bullet interposed between the said disks, substantially as described.

7. A machine for grooving bullets comprising three operating members, each consisting of a disk mounted on a vertical axis and provided along its periphery with one or more projecting ribs extending partially around the same, means for rotating said disks, a supporting-flange formed on one of said disks below the periphery thereof to support the bullet interposed between the said disks, and an opening in the said flange to permit the bullet to drop out from between the said disks, substantially as described.

8. A machine for grooving bullets comprising three operating members, each consisting of a disk mounted on a vertical axis and provided along its periphery with one or more projecting ribs extending partially around the same, means for rotating said disks, a supporting-flange formed on one of said disks below the periphery thereof to support the bullet interposed between the said disks, an opening in the said flange to permit the bullet to drop out from the said disks, and a feed-chute to feed the bullets toward said supporting-flange, substantially as described.

9. A machine for grooving bullets comprising rotatable disks arranged to engage the bullets between their peripheries, ribs projecting from said disks to form the grooves in the bullets, a portion of the periphery of each disk being unribbed, a feed-chute for feeding bullets to a position between said disks by gravity when the unribbed portions are adjacent, and means for controlling the bullets in said feed-chute to prevent the feed of a bullet during the removal of the bullet previously operated upon, substantially as described.

10. A machine for grooving bullets comprising disks rotatable on a vertical axis and arranged to receive a bullet between their peripheries, ribs projecting from said disks to form the grooves, a support for the bullet during the operation of said disks thereon, means for removing the said support to allow the bullet to drop from the machine at the end of the operation, a feed-chute arranged to feed bullets by gravity toward the support, a controlling device to support the bullets in the chute when the said support is removed, and means for operating said controlling device to permit a bullet to descend and rest upon said support when said support is in position to receive the same, substantially as described.

11. In a machine for grooving bullets the combination with the operating members *a*, *b* and *c*, each having ribs extending partially

around it, the unribbed portions being arranged to become adjacent to permit a bullet to be inserted between said members, of a chute arranged to contain a column of bullets, said chute leading toward a position between said members, a stop extending across the said chute and arranged to support a column of bullets therein, a spring to hold the stop in normal position, and a projection from one of said members to engage and remove the said stop from its normal position, substantially as and for the purpose described.

12. In a machine for grooving bullets, the combination with the operating members *a*, *b* and *c*, each having ribs extending partially around it, the unribbed portions being arranged to become adjacent to permit a bullet to be inserted between said members, of a support for the bullet which is being operated upon, means for removing said support at the end of the operation to permit the bullet to fall by gravity, and a deflector below the support, said deflector being covered with a layer of yielding material to prevent the bullet from being dented or otherwise injured, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL BUTLER.

Witnesses:
HENRY J. LIVERMORE,
NANCY P. FORD.