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MACHINE FOR FEEDING AND SWAGING BULLETS.

APPLICATION FILED JUNE 24, 1914.

1,154,810.

Patented Sept. 28, 1915.

8 SHEETS—SHEET 1.

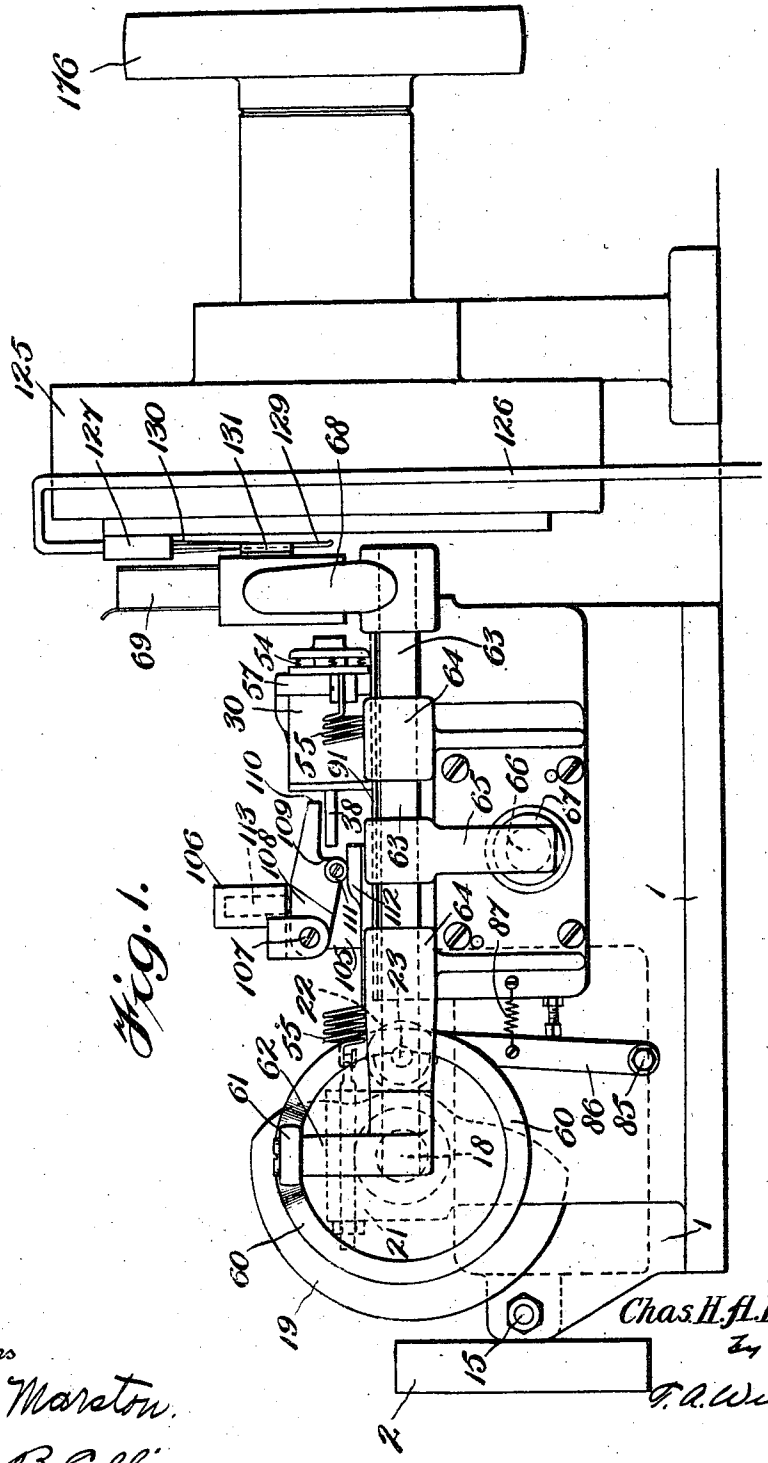

Fig. 1.

Witnesses

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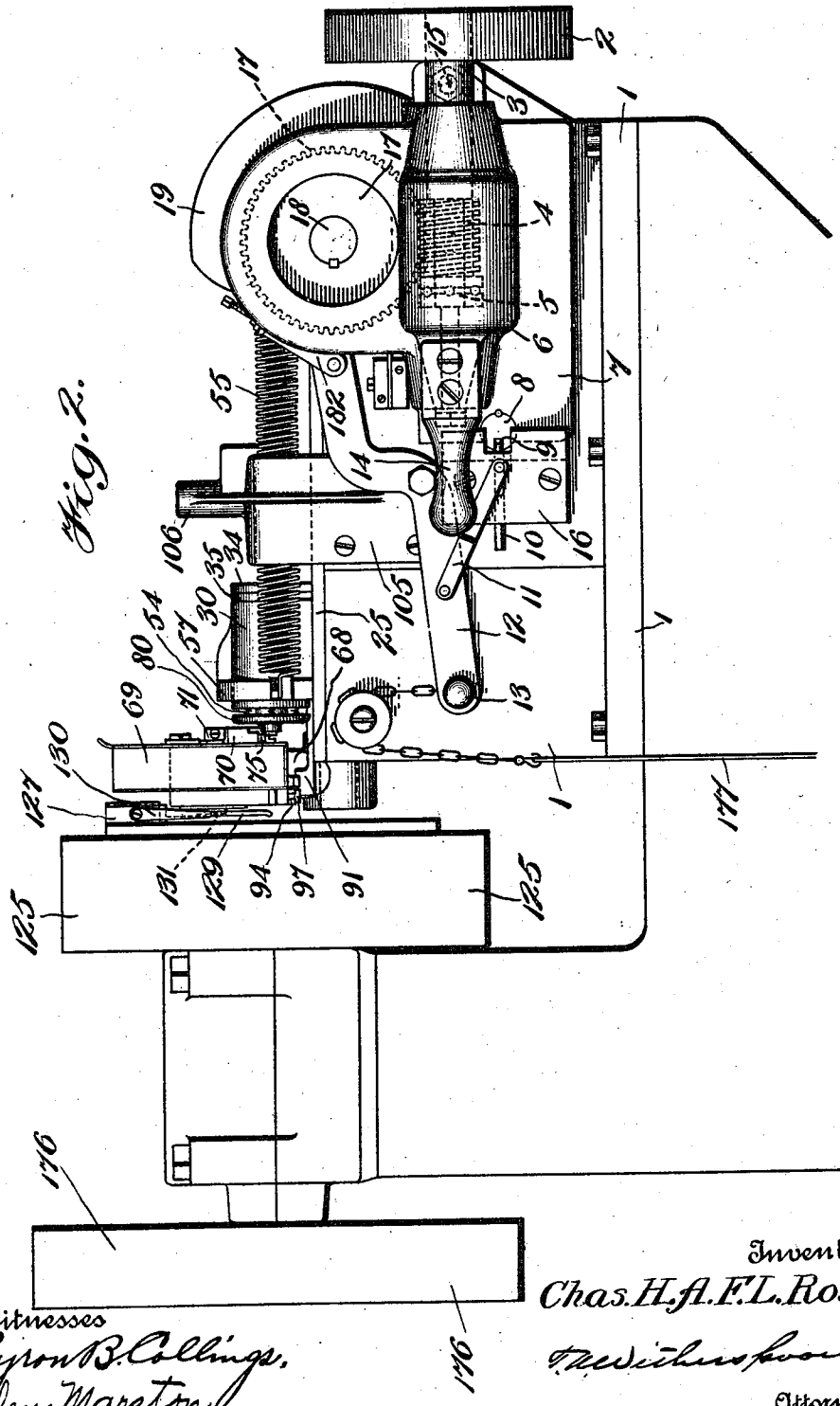

Fig. 2.

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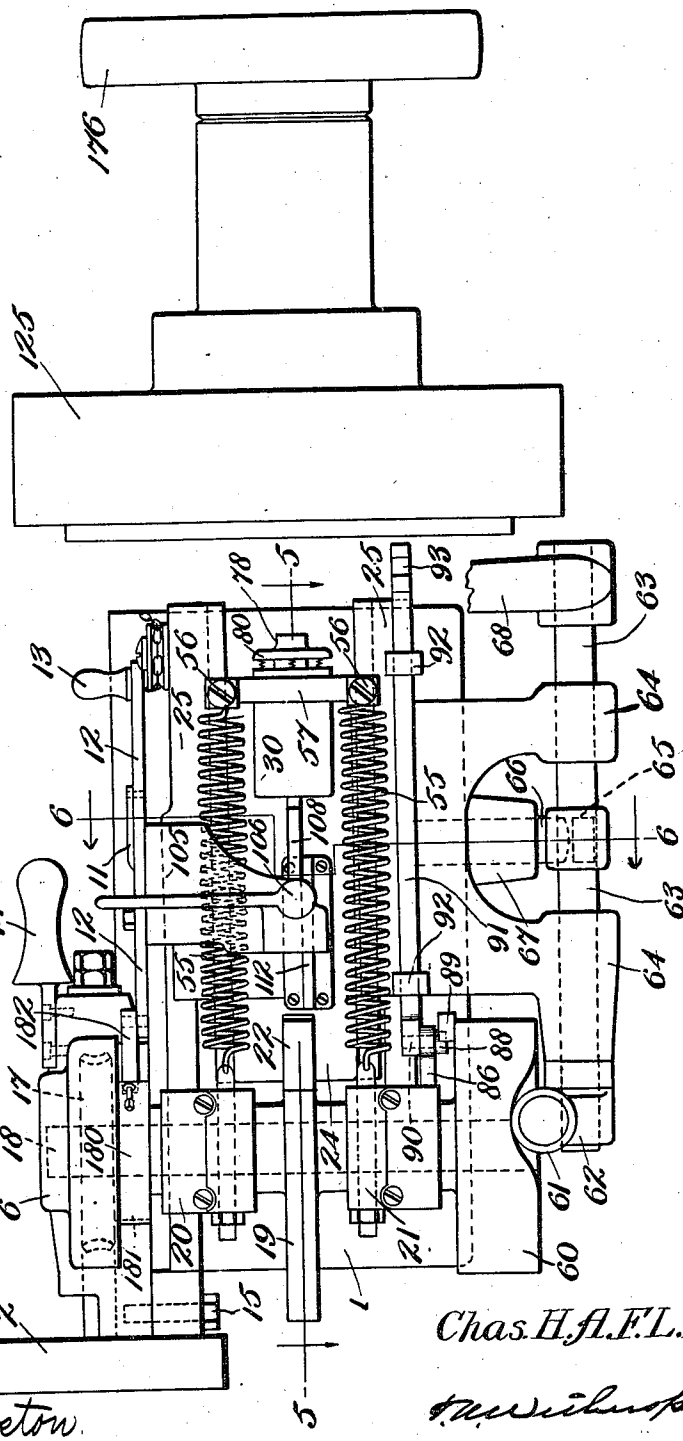

Fig. 3.

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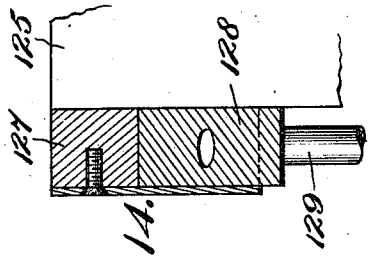

Fig. 14.

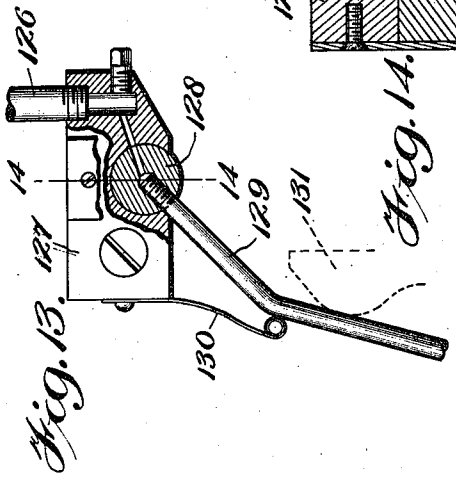

Fig. 13.

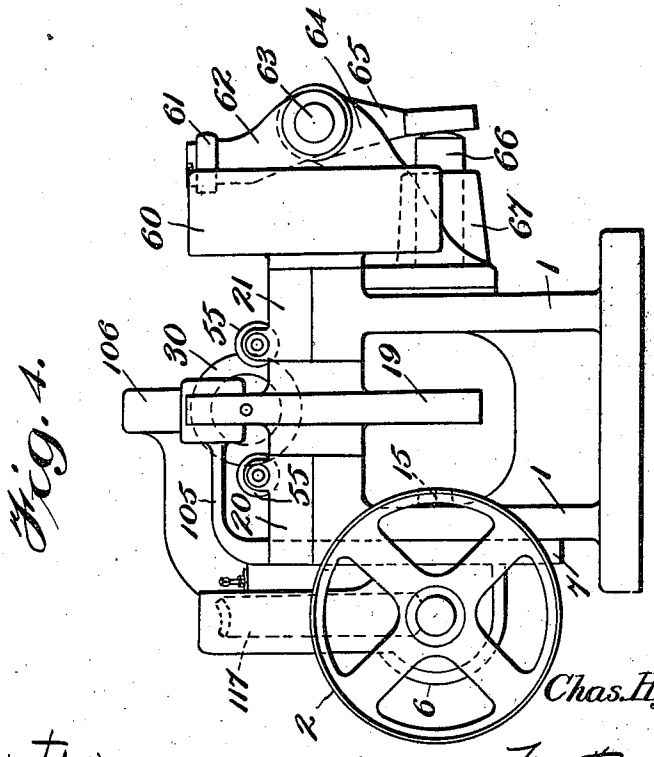

Fig. 4.

Witnesses

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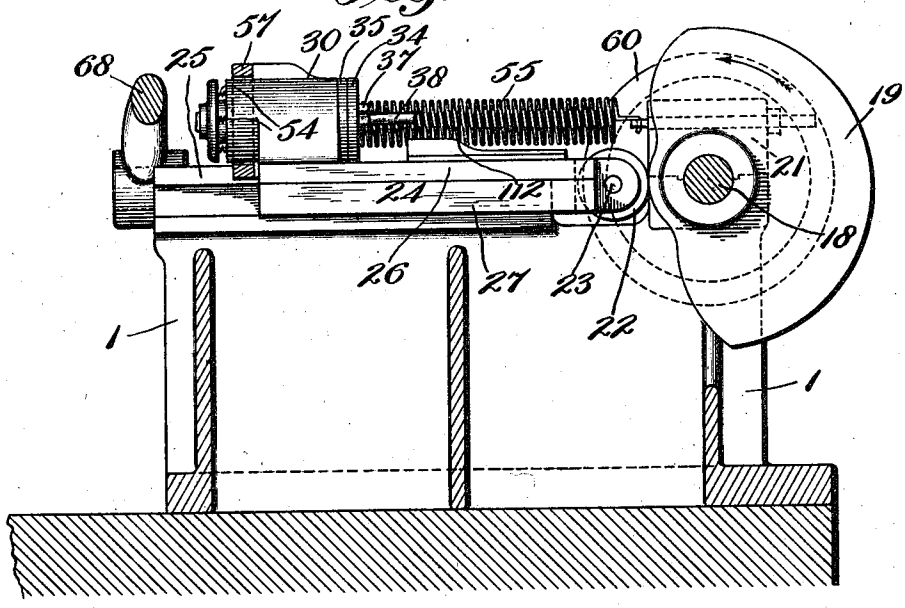
Fig. 5.



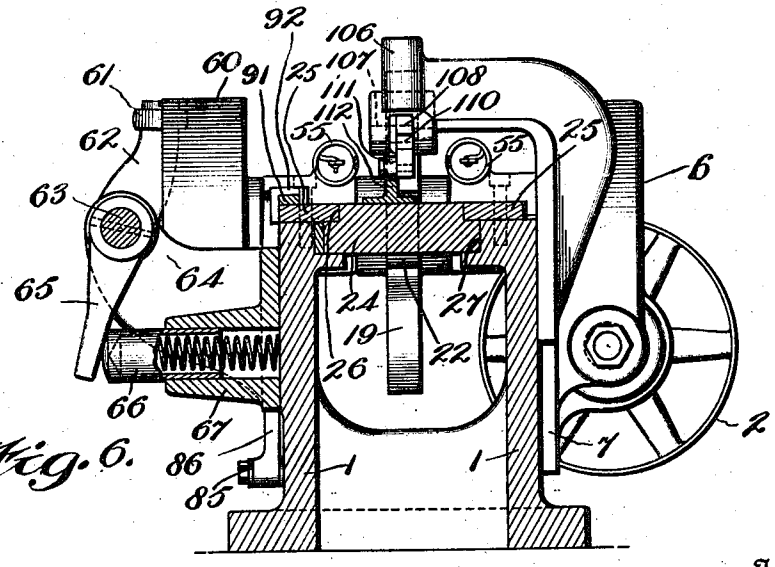


Fig. 6.

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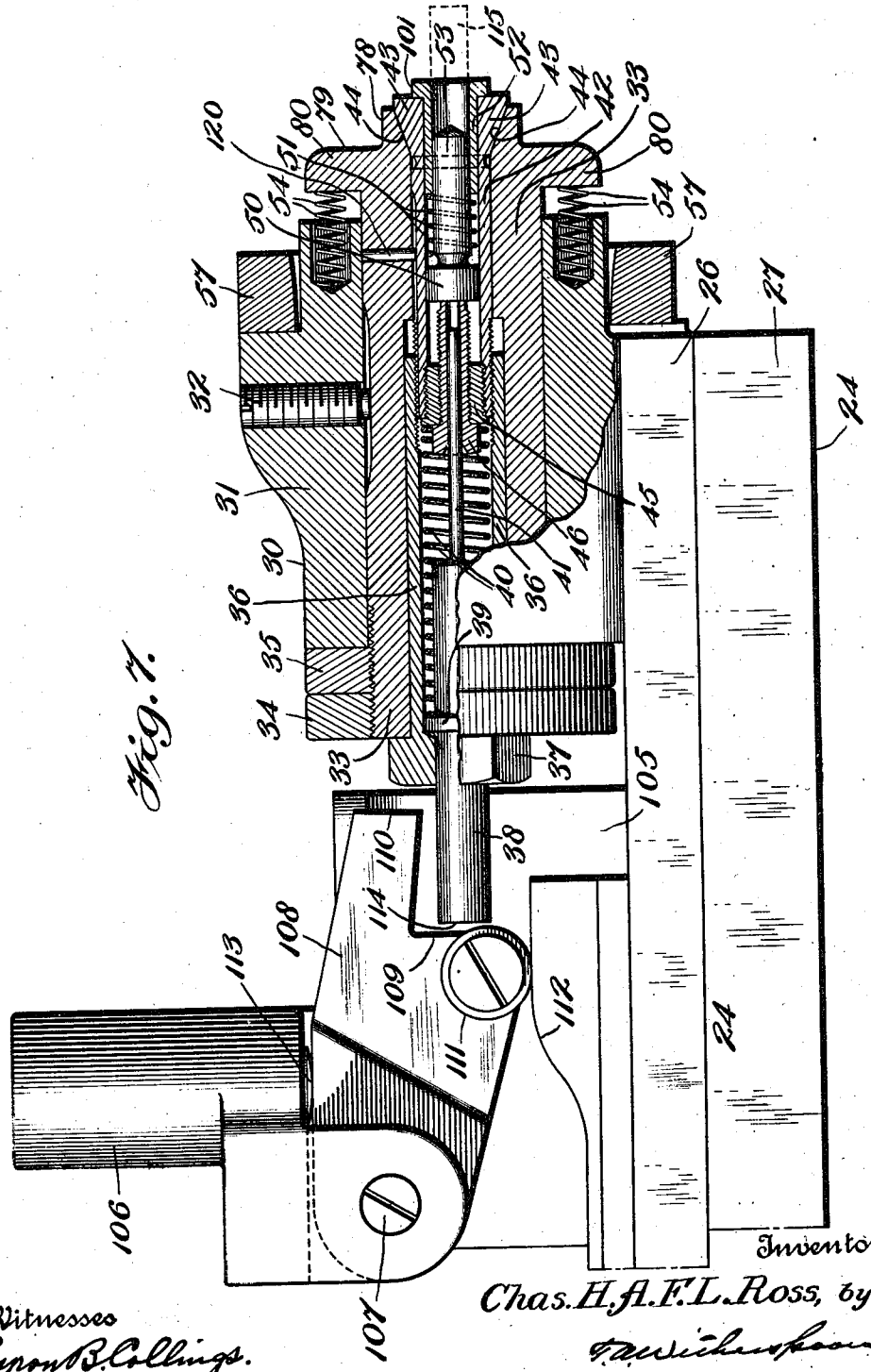

Fig. 7.

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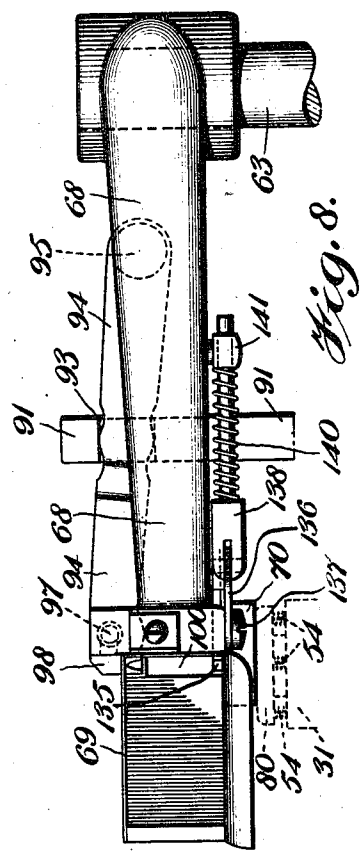

Fig. 8.

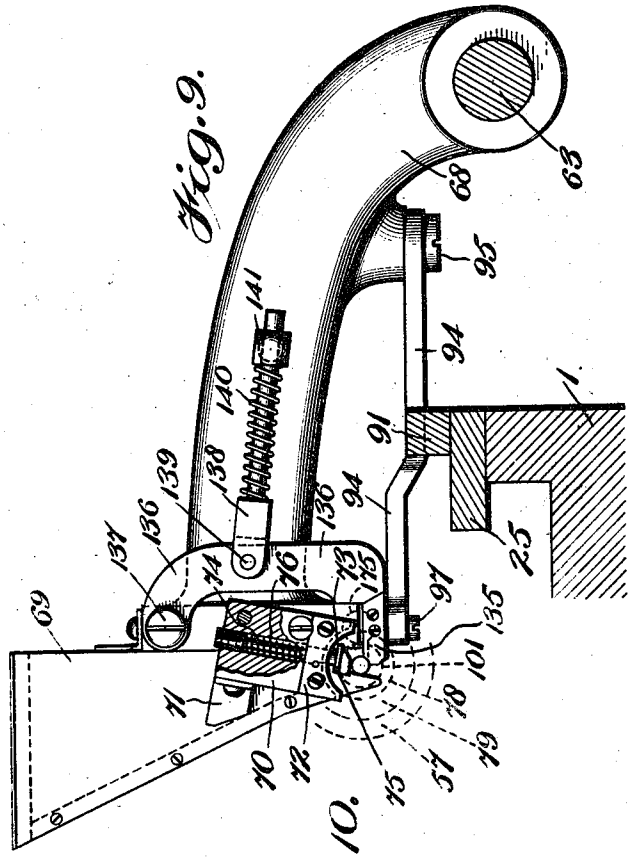

Fig. 9.

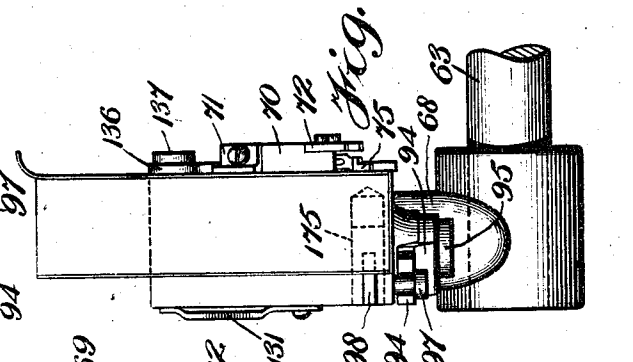

Fig. 10.

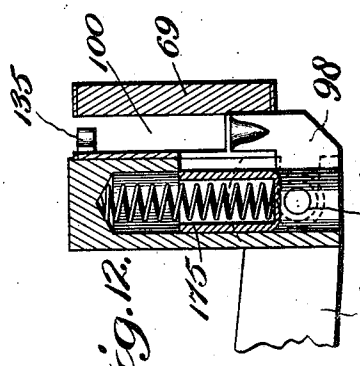

Fig. 12.

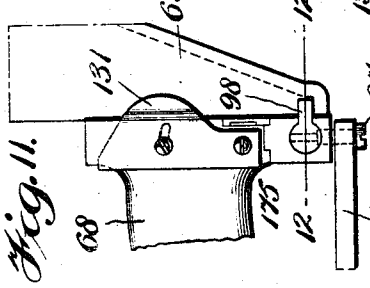

Fig. 11.

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8 SHEETS—SHEET 8.

Fig. 17.

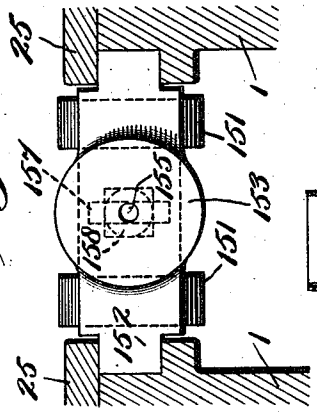


Fig. 15.

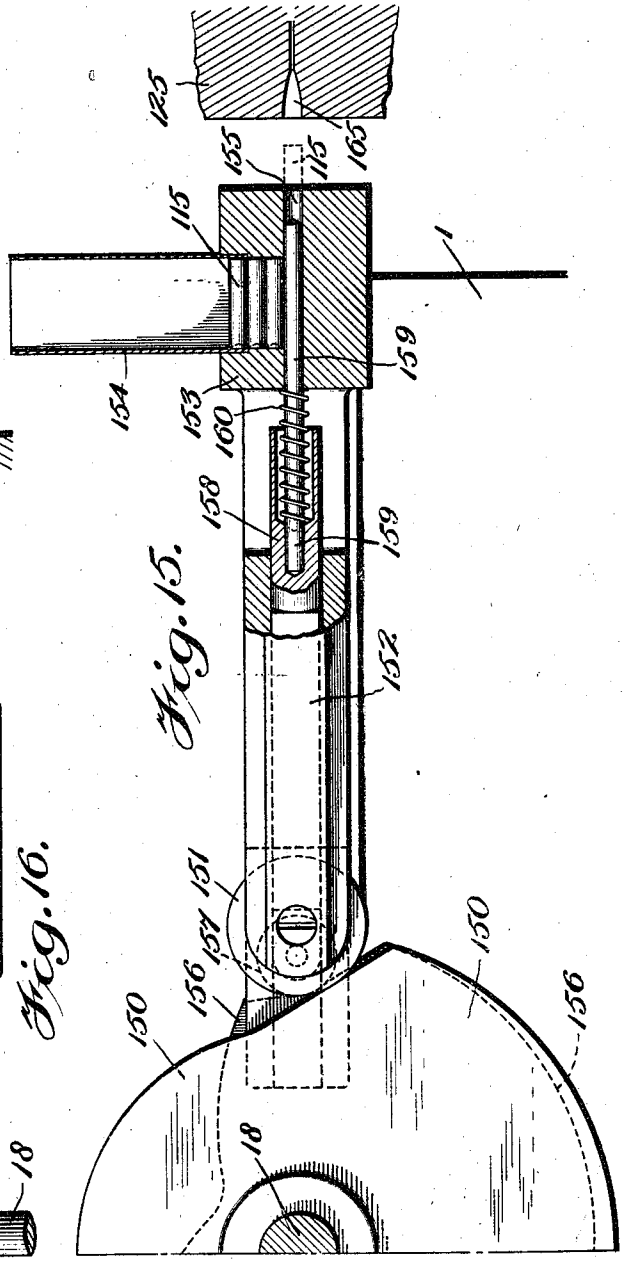
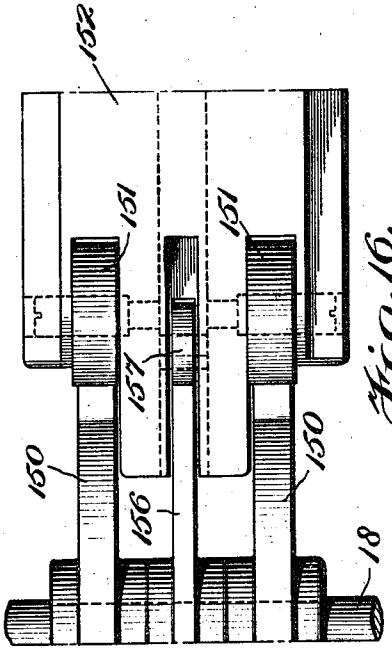


Fig. 16.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FEEDING AND SWAGING BULLETS.

1,154,810. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed June 24, 1914. Serial No. 847,115.

To all whom it may concern:

Be it known that I, CHARLES HENRY AUGUSTUS FREDERICK LOCKHART ROSS, a subject of the King of Great Britain, residing at Balnagown Castle, Rossshire, Scotland, have invented certain new and useful Improvements in Machines for Feeding and Swaging Bullets; and I do hereby 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.

This invention relates to machines for swaging bullets and has for its object to provide a mechanism which will be efficient in action, simple in construction, comparatively inexpensive to construct and less liable to get out of order than those heretofore proposed.

To this end the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views—

Figure 1 is a side elevational view of a machine made in accordance with my invention; Fig. 2 is a view of the machine similar to Figure 1, but seen in an opposite direction; Fig. 3 is a plan view of the parts shown in Figs. 1 and 2; Fig. 4 is an end view of a portion of the parts shown in Fig. 3; Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3 looking in the direction of the arrow; Fig. 7 is an enlarged sectional view of the chuck for holding the bullets with its associated parts shown in elevation; Fig. 8 is a plan view of the hopper and its associated parts for feeding bullets to the chuck shown in Fig. 7; Fig. 9 is an elevational view partly in section of the parts illustrated in Fig. 8; Fig. 10 is an end elevational view of the parts shown in Fig. 8; Fig. 11 is a side elevational view of a portion of the parts shown in Fig. 9, but seen from an opposite direction; Fig. 12 is a sectional view on an enlarged scale taken on the line 12—12 Fig. 11; Fig. 13 is a part elevational, part sectional view of an air valve and its associated parts used in connection with my invention; Fig. 14 is a sectional view on the line 14—14 of Fig. 13; Fig. 15 is a part sectional, part elevational view of a modified form of feeding means for the bullets; Fig. 16 is a plan view of a portion of the parts shown in Fig. 15; and Fig. 17 is an end elevational view of a portion of the parts shown in Fig. 15.

1 indicates any suitable support or framework, 2 any suitable pulley to which power is applied mounted on the shaft 3 and carrying the worm gear 4 best illustrated in Fig. 2. Mounted also on the shaft 3 is a ball thrust bearing 5, and the said worm 4 and bearing 5 are further inclosed in a casing 6 mounted on a plate 7 to which is attached the catch disk 8 provided with a slot 9 adapted to be entered by a pin 10 connected to the link 11 mounted on the controlling lever 12 provided with a handle 13. A handle 14 is also rigid with the casing 6, and 15 represents a pivot about which the worm 4 may turn. 16 represents a bracket for supporting the pin 10 and one end of the link 11.

17 represents a gear with which the worm 4 meshes and the said gear is mounted on the driving shaft 18 carrying the cam 19, and provided with the bearings 20 and 21. The said cam 19 contacts with the roller 22 pivoted as at 23 Figs. 1 and 5 to the guide plate 24 moving in the guides 25, as will be clear from Figs. 1, 3, 5 and 6. The said guide plate 24 as best illustrated in Figs. 6 and 7 is provided with an abrupt shoulder 26 against which fit guide plates 25 and is provided with a vertical edge 27 which fits against a bearing on the frame 1, so that the reciprocations to be disclosed below of the said guide plate are exceedingly steady and even.

As best shown in Fig. 7 a chuck 30 is rigid with the said guide plate 24 and reciprocates with it. This said chuck is provided with an outer casing 31 provided with a set screw 32 adapted to engage an inner tube 33, screw threaded at its rear end as shown and provided with the adjusting nuts 34 and 35. The said tube 33 accommodates a second tube 36 provided with an enlarged head 37 through which the plunger 38 reciprocates. The said plunger is in turn provided with a collar or head 39 against which takes the spring 40, and the said plunger is also provided with the forwardly extending rod member 41 as shown. The said second tube

36 is also screw threaded at its end opposite the head 37 and receives the third tube 42 provided with the tapered wedge shaped head 43 fitting against an oppositely tapered opening 44 with which the first tube 33 is provided, all as will be clear from Fig. 7. The said third tube 42 is internally screw threaded at its end opposite the tapered member 43 and receives the reducing screw threaded bushing 45 into which is further screw threaded the combined set screw and nut 46 through which passes the rod member 41 carried by the plunger member 38 as shown. The said combined set screw and nut 46 takes against a second plunger member 50 controlled by a spring 51 one end of which takes against the rear end of the said plunger 50 and the other end of which takes against a bushing or feed member 52 adapted to accommodate the bullets as will presently appear. The body 53 of the said plunger 50 fits the said third bushing 52 and reciprocates therein as will be readily understood. Springs 54 are provided to permit the sleeve 33 to yieldingly slide in the casing 30 should it be fed too far forward.

From what has been so far disclosed it will now be clear that power being applied to the pulley 2, it will be transmitted through the shaft 3 to the worm 4, through the gear 17 to the shaft 18 and to the cam 19 which will move the roller 22, the guide plate 24 and the chuck 30. These movements will be reciprocating movements as will be presently disclosed. It is necessary that the members of the chuck 30 be adjusted with exactness in order that the bullet blanks may be efficiently received and held for swaging. To this end the first tube member 33 is adjusted as accurately as possible, by the nut 35 and the set screw 32 serves as a key to prevent said tube 33 from rotating during the swaging operation. The second tube 36 is likewise so adjusted as to cause the tapered end 43 of the third tube 42 to accurately and firmly fit the tapered opening 44 of the tube 43, the pin 120 likewise serves to prevent its rotation. The combined set screw and nut 46 which may be changed for bullets of different dimensions is then accurately adjusted so as to limit the reciprocations of the second plunger 50. The said second plunger 50 is reciprocated by means of the rod like member 41 of the plunger 38 striking the enlarged head of the said second plunger 50 in a manner to be disclosed below. The reciprocations of the said second plunger serve to permit bullet blanks to be received in the bushing 52 and causes the finished bullets to be ejected therefrom as will likewise be disclosed below.

In order that the slide plate 24 may be reciprocated a plurality of springs 55 are provided and one end of said springs are conveniently anchored in the bearings 20 and 21 as will be clear from Fig. 3 while the other end of said springs is conveniently secured as at 56 to a collar 57 straddling the chuck 30 as will be readily understood. It results from this that when the cam 19 forces the roller 22 and the plate 24 forward against the tension of the said springs 55, the said springs 55 will retract and through the collar 57 return the plate 24 and roller 22 as the said cam 19 is revolved.

In order that the bullet blanks may be fed to the bushing 52 of the chuck 30, I provide a hopper and other mechanism now to be described.

Mounted on the power shaft 18 is a cam 60 against which takes a roller 61 mounted on the arm 62 carried by the shaft 63 oscillating in the bearings 64 and having the depending arm 65 taking against the spring controlled plunger 66 mounted in a bracket 67 carried by the main frame 1. Also mounted on the oscillating shaft 63 is the arm 68 carrying the feed hopper 69 best shown in Figs. 8 to 12. The said feed hopper is tapered as illustrated, and its lower end is provided with a block 70 secured to the said hopper as by brackets 71 and a plate 72 provided with a curved surface 73 as shown. Associated with the said block 70 is a spring pressed plunger 74 provided with a head 75 adapted normally to prevent the bullets from being fed out of the hopper 69 but also adapted to be raised against the compression of the spring 76 surrounding said plunger 74 and to permit said bullet blanks to leave said hopper 69.

It will now be clear that as the cam 60 revolves it will oscillate the arm 62 and thereby oscillate the shaft 63 and hopper carrying arm 68. The oscillation of the arm 68 will move the hopper 69 up and down, and when in its upper position the spring 76 will maintain the head 75 over the delivery opening of the said hopper 69 and thereby prevent the bullets from leaving said hopper. On the other hand when the hopper 69 moves to its lowest position the curved surface 73 of the plate 72 will take against the shoulder 78 on the chuck 30 and the flat surface of the plate 72 which extends in a plane at right angles to said curved surface 73 will take against the flat surface 79 of the collar or extension 80 on the tube 33 of the said chuck 30, all as is indicated by the dotted lines in Figs. 8 and 9. The bullet blanks are forced from the hopper 69 into the chuck 30 by the mechanism now to be described.

Pivoted to the frame 1 as at 85 see Fig. 1 is a lever 86 controlled by a spring 87 and extending up to the level of the oscillating shaft 63 and carrying at its upper end a roller 88 as will be clear from Fig. 3. The said roller 88 lies in the path of a pro-

jection 89 on the cam 60, and said roller is also connected as by a pin 90 to one end of a reciprocating bar 91 moving in the guides 92 as illustrated. The other end of said bar 91 is provided with a slot 93 see Fig. 8 into and out of which moves the lever 94 as the hopper arm 68 rises and falls as will presently appear. The said lever 94 is pivoted at one end to the said hopper arm 68 as at 95, and at its other end coöperates with the pin 97 rigid with the slide 98 moving across the delivery opening 100 of the hopper 69 as will be clear from Figs. 8 to 12. Accordingly it follows that as the hopper arm 68 rises and falls the lever 94 will enter and leave the slot 93 in the reciprocating bar 91, but the parts are so timed that when the said lever 94 is in the said slot 93 the reciprocations of the bar 91 will move the slide 98 backward and forward across the delivery openings 100 and thereby force out of the said hopper individual bullets. The parts are further so timed that when the slide 98 is moved in such a direction as to force the bullets into the bushing 52 of the chuck 30, the head 75 of the plunger 74 will be lifted, so as not to obstruct the movement of the said bullets. This is accomplished by the fact that the said head 75 when the hopper 69 is in its lowest position rests upon the shoulder 101 of the bushing 52 as will be clear from the dotted lines in Fig. 9 and the full lines in Fig. 7. The parts are further so timed that when this feeding action of the bullet blanks into the bushing 52 takes place the whole chuck 30 and its associated parts have been retracted by the springs 55 toward the left as seen in Fig. 3. Immediately after this feeding action takes place the hopper and arm 68 are raised in the manner just described and the entire chuck 30, as well as the fed bullet blank is moved toward the right as seen in Fig. 3 by the action of the cam 19 and the projecting end of the said bullet blank entered into the swaging head 125 as will be presently disclosed.

Attached to the frame 1 is a bracket or casting 105 see Figs. 2, 5 and 7, provided with an extension 106 to which is pivoted as at 107 the dog 108 having the shoulder 109, the projection 110 and roller 111. Secured to the slide plate 24 see Fig. 7, is the cam surface 112 which moves under the roller 111 as the said slide plate 24 reciprocates, and therefore said cam surface 112 serves to raise the dog 108 into its full line position shown in Fig. 7, while gravity aided by a spring pressed plunger indicated at 113, causes said dog 108 to fall to such a position that its shoulder or projection 110 will come opposite the extreme end 114 of the plunger 38. It results from the movements just disclosed after the projection 110 is moved down behind the extreme end 114 of the plunger 38, owing to the chuck 30 and the plate 24 having moved toward the right as seen in Fig. 7, that the next movement of the plate 24 and chuck 30 toward the left as seen in Fig. 7 will cause the said end 109 to contact with said projection 110 and the said plunger 38 together with its said rod like extension 41 to contact with the plunger 50 and cause the body portion 53 thereof to force the finished bullet out of the bushing 52, as will be more fully disclosed below. But, before the chuck 30 moves to the left as seen in Fig. 7, and in the manner just disclosed, it of course has to move to the right as seen in said figure, and the bullet blank 115 being held in the bushing 52, the said blank is caused to enter the swaging head 125, whereupon the bullet blank 115 is properly shaped and the bullet thereupon finished. After this finishing operation the chuck 30 then moves to the left as seen in Fig. 7 and the finished bullet is discharged in the manner just stated.

The swaging head 125 may be of any suitable and well known construction, but I prefer to employ the well known hammer swaging type of head in which a number of hammer blows are successively delivered onto the bullet blank and the metal brought to shape. Associated with the swaging head 125 is an air supply pipe 126 leading to an air casing 127 provided with an air valve 128 as best illustrated in Fig. 13. Leading from the valve 128 is a discharge pipe 129 against which presses the spring 130 in order to keep the valve normally closed. In order to automatically open the valve at the proper time, I provide the hopper arm 68 with a suitable cam 131, see Figs. 11 and 13, which contacts with the said delivery pipe 129 at the proper moment, and thus turns the said pipe against the action of the spring 130 to open the valve. When contact between the cam 131 and the pipe 129 is not had, the spring 130 swings the pipe 129 to the right as seen in Fig. 13 and out of the way of the swaging head. On the other hand when said pipe is brought into the position shown in Fig. 13 its extreme end is in close proximity to the swaging head and the air delivered therefrom blows away any particles of metal or other particles which would interfere with the accurate shaping of the bullet. When bullet blanks are fed out of the hopper 69 into the bushing 52 they are first caught by the blank controlling member 135 carried by the angular shaped arm 136 pivoted as at 137 to the hopper 68. A rod member 138 pivoted as at 139 to said angular member 136 is controlled by the spring 140 and slides through the lug 141, and thus controls the movements of the said arm 136 and the blank controlling member 135. The action of this bullet controlling member 135 is to

support and hold the bullet blank before and just after entering the bushing 52; and as the arm 68 and the hopper 69 rise that portion of the bullet blank 115 which projects beyond the said bushing 52 snaps past the said controlling member 135, so that the bullet blank then remains free to be projected into the swinging head 125.

In the modified form of my bullet feeding mechanism illustrated in Figs. 15, 16 and 17 on the shaft 18 are mounted the two cams 150 which take against the rollers 151 carried by the slide plate 152 to which is rigidly secured the magazine supporting member 153 carrying the magazine 154 and provided with the bullet delivery opening 125. Also mounted on the shaft 18 is the third cam 156 taking against a third roller 157 mounted on a second slide 158 moving relatively to the plate 152 and carrying the plunger rod 159 surrounded by the spring 160. The said plate 152, supporting member 153 and magazine 154 are returned against the action of the cams by means of the springs 55 illustrated in Figs. 1, 2, 3 and 5. The second sliding member 158 and rod 159 are returned against the action of the cam 156 for the said rod being rigid with the said member 158, and the said spring 160 taking against the member 153 the said member 158 and rod 159 are forced to the left, and for a distance sufficient to permit a bullet blank 115 to fall down and register with the delivery opening 155. Upon the continued rotation of the cam 156 the said rod 159 is forced forward into the position shown in Fig. 15 and the said bullet blank 115 is fed partially out of the opening 155, which is provided with a bushing (not shown) in all respects the same as the bushing 52 illustrated in Fig. 7. The members 152 and 153 are next moved toward the right as seen in Fig. 15 until the face of member 153 contacts with the face of the swaging head 125. The said member 153 now remains stationary and the bullet blank 115 being forced into the opening 165 of the swaging head 125, is suitably shaped. The finished bullet is next ejected from the opening 155, by reason of the members 152 and 153 being moved to the left while the rod 159 remains stationary, and the parts return to their original positions. The faces of the parts 153 and 125 being close together during the swaging action, all buckling or distortion of the bullet is prevented.

The operation of my machine may be briefly summarized as follows: The hopper 69 having been filled with bullet blanks, the machine may be started by raising the handle 14 and with it casing 6, thus engaging the worm 4 with the worm wheel 17. Power is now transmitted from pulley 2 through shaft 3 and worm 4 to worm wheel 17 and cam shaft 18, thus revolving cams 19 and 60. As cam 60 revolves, roller 61 bears against the cam face and engages the cut away portion of said cam, as shown in Fig. 3. This causes the shaft 63, upon which is mounted the arm 68 carrying hopper 69 to be moved through an arc of a circle. The action of the spring pressed plunger 66 and lever 65 then moves said shaft in an opposite direction and thereby completes its oscillations. The hopper 69 is thus brought down to its feeding position and returned. In said feeding position the head 75 of the bullet retaining plunger 74 engages the shoulder 101 of the bushing 52, thus raising said plunger against the compression of spring 76 clear of the bullet blank feeding opening, while the curved surface 73 of plate 72 engages the shoulder 78 of chuck 30. When the parts are in the positions just stated, the hopper 69 is ready to feed a bullet blank to the chuck 30. This feeding is accomplished through the medium of the cam 60, bar 91 and the bullet blank feeding member 98 as follows:—By the time hopper 69 has assumed the above described position, cam 60 has revolved far enough to bring the projection 89 mounted on said cam into contact with roller 88 connected by pin 90 to bar 91 and thus moves said bar to the left as shown in Fig. 3. This movement of bar 91 is transmitted to lever 94 resting in the notch 93 in the end of said bar and to bullet blank ejector 98 carried by said lever 94. Ejector 98 is thus caused to force a bullet blank 115 through the opening in the side of hopper 69 into the bushing 52 of chuck 30.

It will be understood that the ejector 98 does not feed the bullet blank 115 far enough to entirely clear the hopper 69 and its associated parts. For the projecting end of said bullet blank continues to rest upon the concave portion of the controlling member 135, which normally supports the blank and prevents it from dropping out of the hopper 69 through the opening 100. Now, as the cam 60 continues to revolve the projection 89 on said cam first disengages the roller 88, while the ejector 98, lever 94 and bar 91 are returned to their original positions by the spring pressed plunger 175, Fig. 12, connected to said lever 94 by the screw 97, whereupon the next bullet blank drops down in a position to be fed to the chuck.

As cam 60 continues to revolve, roller 61 will be forced out upon the raised portion of said cam and through arm 62 and shaft 63, the hopper arm 68 and hopper 69 will be raised clear of chuck 30. As hopper 69 moves upwardly the projecting end of the blank 115, which blank is now rigidly held by the chuck, will snap past the member 135, forcing said member back against the compression of spring 140. As soon as hopper 69 has been raised far enough to clear the blank 115, member 135 will be forced back by

said spring and will prevent the next blank from dropping out of the hopper through opening 100.

During the time hopper 69 is in its downward position, cam 131 has contacted with the air pipe 129, forcing it over against the action of spring 130 until its lower end is opposite the opening 165 in the swaging head 125; and at the same time rotating the valve 128 to its open position as shown in Fig. 13. This permits air to be blown into the said opening the object being to remove any particles of metal which may have been left by a previous swaging operation. As hopper 69 is raised, spring 130 moves pipe 129 over out of the way and at the same time closes valve 128 shutting off the air supply.

Cam 19 is so designed and timed that it now forces the slide or guide plate 24 carrying the chuck 30 forward, thus feeding the bullet blank to the swaging head. As said slide moves forward it carries with it the cam 112 upon which rides the roller 111, carried by the dog 108. As the cam travels forward the roller 111 follows the contour of said cam under the pressure of the spring pressed plunger 113, and causes the dog 108 to drop until its nose 110 is in line with the plunger 38 of the chuck.

When the swaging operation is completed the cam 19 permits the slide 24 to be returned to its initial position by the action of the springs 55. The chuck 30 being integral with said slide of course returns with it and as the nose 110 is now in alinement with the plunger 38, the end 114 of said plunger contacts with the said nose, thereby stopping the movement of said plunger temporarily. Plunger 38 now being stationary, upon further movement of the chuck to the left, as seen in Fig. 7, plunger 50 will next be brought into contact with the rod like extension 41 of plunger 38, whereupon the movement of plunger 50 will be arrested, and upon still further movement of the chuck in the same direction the finished bullet will be forced from the chuck and will drop down into a suitable receptacle, not shown, and the operation repeated. The swaging head 125, may be operated through any suitable source of power, as for example, the pulley 176.

The feeding mechanism may be stopped either by lifting the handle 13 and lever 12, or by pulling down on the connecting rod 177, in either of which cases the link 11 will withdraw the pin 10 from the notch 9 (Fig. 2) and permit the casing 7 and worm 4 to fall by gravity out of engagement with the gear 17. At the same time the brake strap 180 is applied to the brake drum 181 carried by the shaft 18, through the link 182 connected at one end to said lever 12 and to said strap 180.

It should be observed that the above mechanism is adapted to accurately shape a large variety of bullets, and especially sharp pointed ones. It is further adapted to shape such bullets whether they are made of solid metal, or of an alloy. If the bullets are of the jacketed variety, this machine will accurately shape them whether the jackets be of steel, of a copper-nickel alloy, or of other metal or alloy.

It is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of my invention, and therefore I do not wish to be limited to the above disclosure except as may be required by the claims.

What I claim is:

1. In a bullet blank feeding machine the combination of a holding means for feeding bullet blanks to a swaging machine; means for forcing said blanks out of said holding means after the swaging operation; and means for feeding bullet blanks one at a time to said holding means, substantially as described.

2. In a bullet blank feeding machine the combination of a holding means for feeding bullet blanks to a swaging machine; means for moving said holding means toward and from said swaging machine; means for forcing said blanks out of said holding means after the swaging operation; and means comprising a reciprocating hopper for feeding bullet blanks one at a time to said holding means, substantially as described.

3. In a bullet blank feeding machine the combination of a holding means for feeding bullet blanks to a swaging machine; means for forcing said blanks out of said holding means after the swaging operation; and means comprising a hopper, an arm carrying said hopper, and a shaft on which said arm is mounted for feeding bullet blanks one at a time to said holding means, substantially as described.

4. In a bullet blank feeding machine the combination of a driving shaft; a cam mounted on said shaft; a slide provided with a roller operated by said cam; a chuck mounted on said slide; means associated with said chuck automatically forcing the swaged blanks out of said chuck; a second cam mounted on said shaft; a hopper adapted to feed bullet blanks one at a time to said chuck; and connections between said second cam and said hopper for imparting a reciprocating motion to said hopper, substantially as described.

5. In a bullet blank feeding machine the combination of a driving shaft; a cam mounted on said shaft; a slide operated by said cam; a chuck mounted on said slide; a second cam mounted on said shaft; a hopper adapted to feed bullet blanks one at a time

to said chuck; and connections comprising a shaft, a spring pressed arm, and an oscillating supporting arm between said second cam and said hopper for imparting a reciprocating motion to said hopper, substantially as described

6. In a bullet blank feeding and swaging machine the combination of a chuck for holding bullet blanks; a reciprocating plate on which said chuck is mounted; a cam on said plate; a dog coacting with said cam; and means associated with said dog and chuck for forcing the swaged blanks out of said chuck, substantially as described.

7. In a bullet blank feeding and swaging machine the combination of a chuck for holding bullet blanks; a reciprocating plate on which said chuck is mounted; a cam on said plate; a dog coacting with said cam; means associated with said dog and chuck for forcing the swaged blanks out of said chuck; a hopper for feeding blanks one at a time to said chuck; and a swaging means for acting on said blanks while held by said chuck, substantially as described.

8. In a bullet blank feeding means the combination of a reciprocating plate; a cam carried by said plate; a dog pivoted in the path of movement of said cam; a chuck adapted to hold bullets rigid with said plate; a spring controlled plunger carried by said chuck adapted to be moved by said dog; and means associated with said plunger adapted to force swaged bullets out of said chuck, substantially as described.

9. In a bullet blank feeding and swaging machine the combination of a chuck for holding bullet blanks; a swaging means adapted to act on said blanks while being held by said chuck; means for feeding said blanks one at a time to said chuck; and means for reciprocating said chuck to cause said blanks to enter and leave said swaging machine, substantially as described.

10. In a bullet blank feeding and swaging machine the combination of a chuck for holding bullet blanks; a swaging means adapted to act on said blanks while being held by said chuck; an air blast associated with said swaging means; means for feeding said blanks one at a time to said chuck; means associated with said blank feeding means for controlling said air blast, and means for reciprocating said chuck to cause said blanks to enter and leave said swaging machine, substantially as described.

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

CHARLES HENRY AUGUSTUS
FREDERICK LOCKHART ROSS.

Witnesses:
T. N. WITHERSPOON,
FRANK C. TITUS.