

1,367,191.

H. V. LECKIE.  
CARTRIDGE NECKING PRESS.  
APPLICATION FILED FEB. 25, 1919.

Patented Feb. 1, 1921.  
3 SHEETS—SHEET 1.

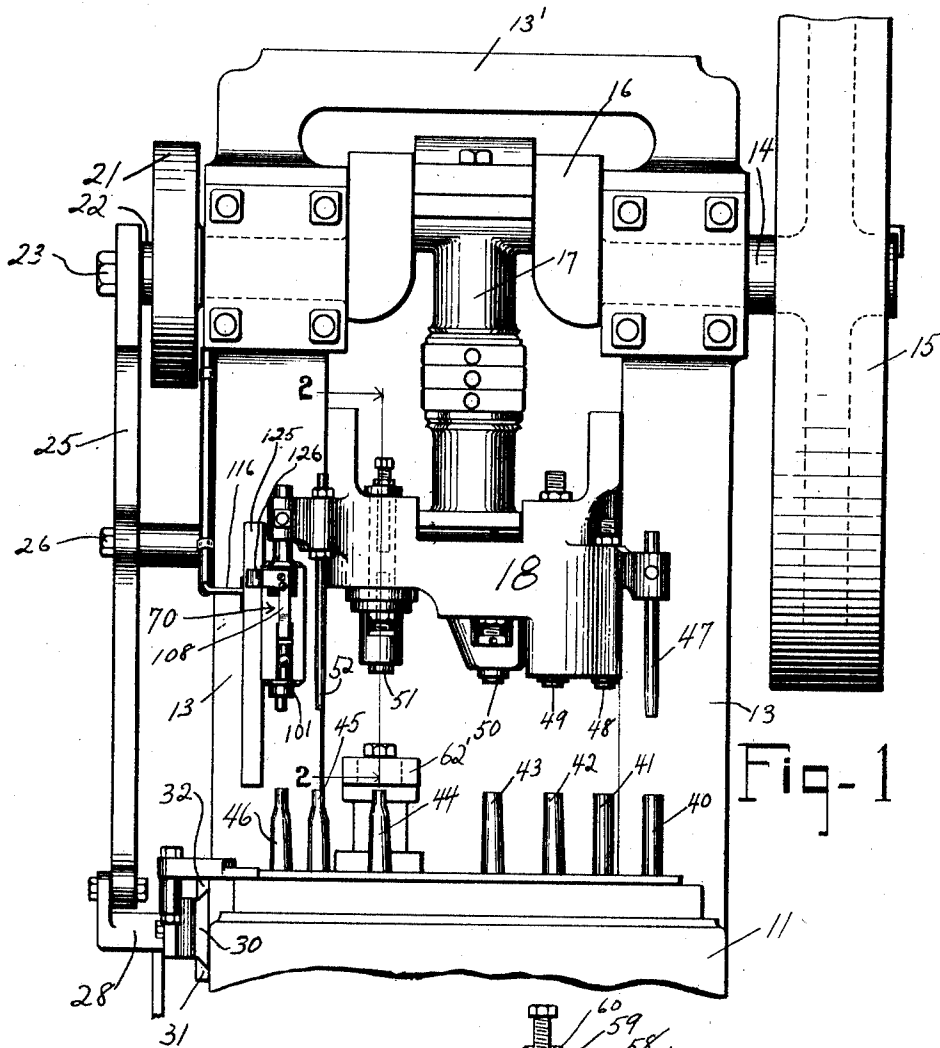


Fig-1

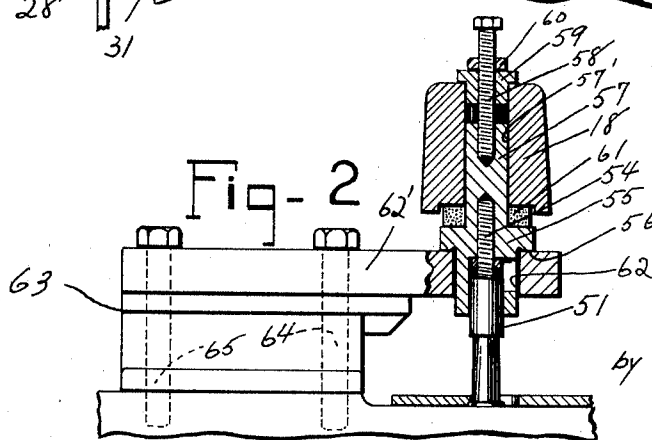
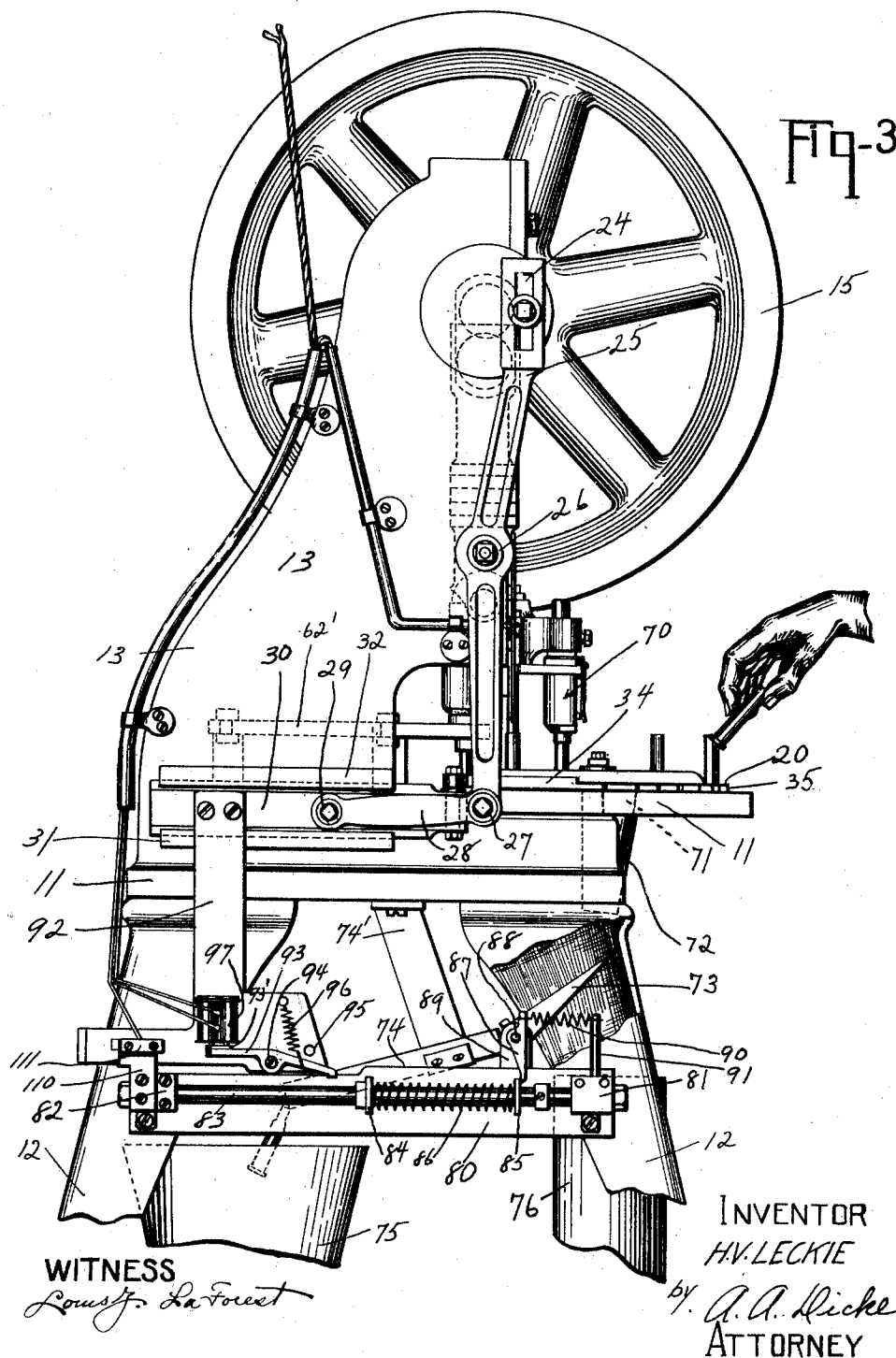


Fig-2

INVENTOR  
H. V. LECKIE  
by *A. A. Riche*  
ATTORNEY

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3 SHEETS—SHEET 2.

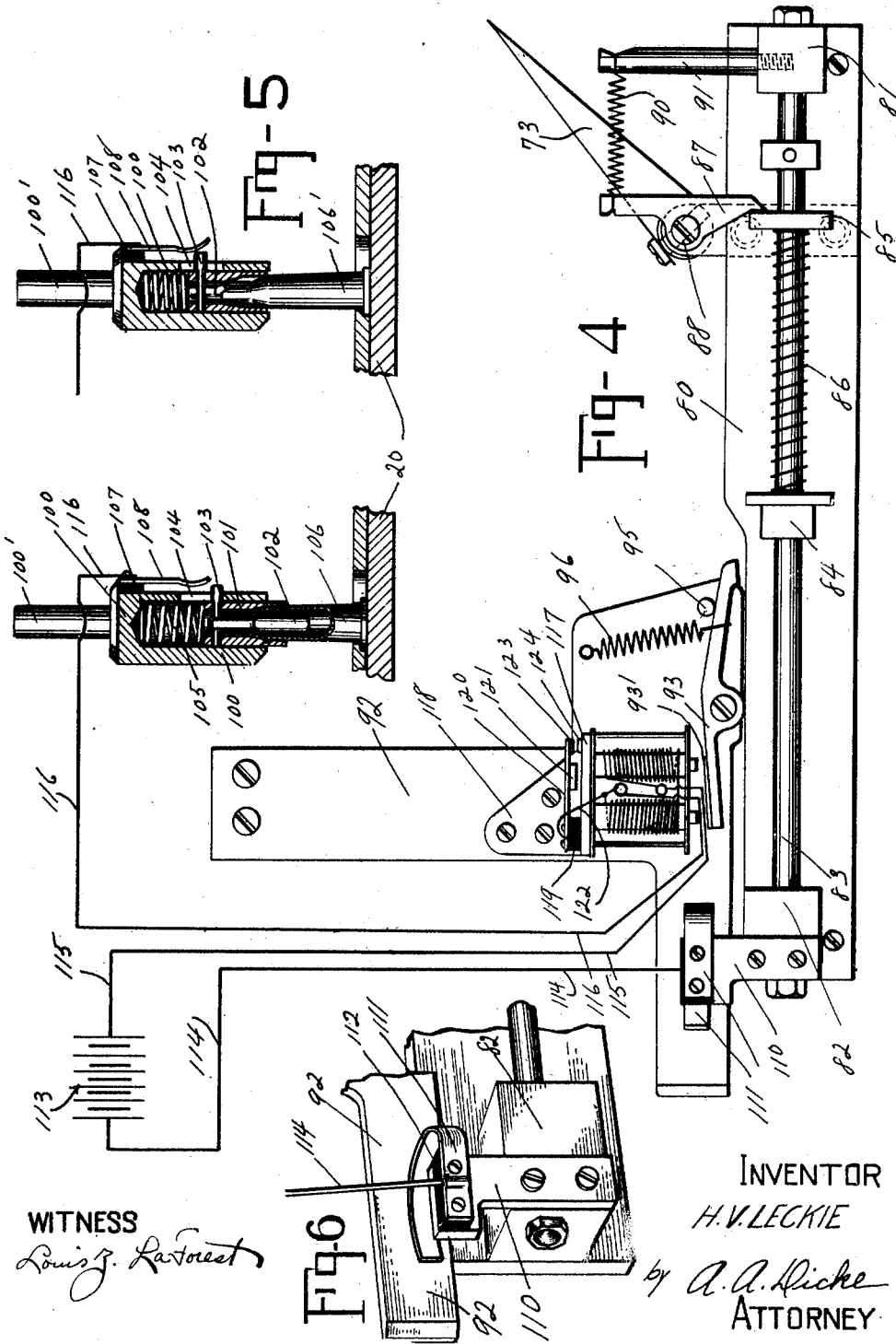


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ATTORNEY

# UNITED STATES PATENT OFFICE.

HERBERT V. LECKIE, OF STRATFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO REMINGTON ARMS COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

CARTRIDGE-NECKING PRESS.

1,367,191.

Specification of Letters Patent.

Patented Feb. 1, 1921.

Application filed February 25, 1919. Serial No. 279,051.

*To all whom it may concern:*

Be it known that I, HERBERT V. LECKIE, a citizen of the United States, residing at Stratford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Cartridge-Necking Presses, of which the following is a specification.

In the manufacture of so-called bottle necked cartridges, it is usual to first form a cylindrical shell by a series of drawing operations and then suitably reducing or "necking" the end of the shell. In certain of these bottle necked cartridges, it is very important that the distance between the base of the shell and the shoulder formed by the necking press be very accurately maintained. An example of this is the U. S. Government .30 cal. Springfield cartridge. Cartridges of this type "breech up" on this shoulder and therefore the distance between the shoulder and the base must be very accurately determined in order to get the proper relation between the cartridge and the extractor and firing pin.

It often happens that cartridge shells are crushed or otherwise deformed during the necking process and it is necessary to eliminate such deformed shells before the shells pass on to the next operation.

It is an object of my invention, therefore, to provide an improved press which shall be capable of necking shells or performing similar operations with great accuracy.

It is a further object to provide mechanism for automatically sorting out defectively necked shells and separating them from shells properly necked.

It is a further object of my invention to generally improve the construction and operation of machines of this type so that they may perform their function with a minimum of attendance and repairs, and at a very low cost.

Generally speaking, my invention may be defined as comprising the constructions and combinations recited in the annexed claims and illustrated in certain embodiments in the drawings accompanying and forming a part of this application, wherein:

Figure 1 is a partial front elevation of a press embodying my invention.

Fig. 2 is a partial sectional view on the line 2-2 of Fig. 1 looking in the direction of the arrows, the parts being shown in a somewhat different position.

Fig. 3 is a partial side elevation of the machine looking from left to right.

Fig. 4 is an enlarged view of part of the mechanism shown in Fig. 3, showing also the construction of the gage and the electrical connections.

Fig. 5 shows the gage of Fig. 4 in the act of gaging a defective shell.

Fig. 6 is a perspective view showing a part of the construction shown in Fig. 4.

In these drawings the numeral 11 indicates the bed of the press, preferably supported by suitable legs 12 and formed integral with the side standards 13 connected by a tie bar 13'. These standards are formed with suitable bearings for receiving the horizontal shaft 14 carrying a heavy belt wheel 15 and provided near its middle portion with a crank 16. Operated by this crank is a connecting rod 17 suitably connected to a cross-head or "gate" 18, which carries a number of suitably designed tools for successively operating upon the shells. The shells are carried by a rotatable work holding table 20 and are thereby presented to the successive action of tools carried by the gate. These shells are held in position on the table by any usual mechanism and are presented to this holding means either manually or by a suitably designed automatic feed mechanism.

At its left end the shaft 14 carries a disk 21 having an off-set lug 22 which carries a stud 23 slidable in an elongated slot 24 in the end of feed lever 25 suitably mounted on the side frame 13 as at 26. To the lower end of this lever as at 27 is pivoted a link 28 pivoted at its other end 29 to a slide 30 suitably held against the side frame by guide plates 31 and 32. This slide carries a pivotally mounted pawl 34 spring-pressed by any suitable means against the ratchet teeth 35 on the rotatable work table. It will be seen from this that during each revolution of the wheel 15 the work table is advanced one step and that the parts are so arranged that this feed will take place during the upward movement of the gate.

In Fig. 1 the shells numbered 40, 41, 42, 43, 44, 45, 46 show the condition of the shell after the various operations. Shell 40 is in a position under the opening punch 47 which serves to straighten out any slight defect of the end of the shell. Shell 41 is shown in position under the die 48 which is the preliminary body tapering die which operates on the shell to form the shell shown at 42. Die 49 acts further to finish the body taper and produces the shell shown at 43. Die 50 effects the preliminary necking of the shell and provides the result shown at 44. 51 represents the finish necking die and forms the shell shown at 45 which is then penetrated by the sizing punch 52 which sizes the neck of the shell to properly receive the bullet. 70 is an electric gaging device which serves to separate out those shells which have been improperly necked, in a manner to be described later.

The finish necking die 51 determines the final distance between the shoulder and the head of the shell, and my invention comprises means for determining this dimension with special accuracy.

In machines of this kind it is impossible to avoid a certain amount of looseness or play in the various joints between the main shaft journals and the tool. For this reason it has been very difficult heretofore to accurately locate the shoulders on shells of this type. In order to avoid inaccuracies due to loose bearings I have provided a special mounting for the finish necking die which is shown in detail in Fig. 2. This die 51 is adjustably mounted by means of threaded stem 54 in a die carrier 55 which is provided with a shoulder 56 for a purpose to be described later. This housing has an upward extension 57 received in hole 57' in the gate 18 and is held therein by means of a screw 58 freely carried by a bushing 59 and held in adjusted position by a nut 60. Between the housing and the lower face of the gate 18 I have provided a resilient collar or gasket 61 preferably composed of rubber or similar material. Near the end of the down stroke the die housing 55 passes into an aperture 62 in an anvil or abutment 62' suitably carried on the press bed by a block 63 and held down by means of bolts 64 and 65.

As the anvil 62' is very rigid the die housing and die are moved to exactly the same position at each operation of the press and the work produced thereby will therefore be accurate within very close limits. Any looseness in the various bearings will be compensated for by the resiliency of the gasket 61. I have found that this construction gives excellent results wherever finish operations to very close dimensions are necessary.

After the shell has passed the sizing punch

52 it is positioned in the path of an electric gaging device generally designated by the numeral 70. During the upward stroke of the gate the shell is then moved into position above the aperture 71 in the bed plate 11 through which it now drops. It is deflected in its fall by a shield 72 and if the shell is a perfect one it strikes the wing 73 which directs it through the chute 74 into the receptacle 75 for accepted shells. The chute 74 may be supported in any desirable manner as by a bracket 74'. If the shell is defective the wing 73 will be tilted upwardly so that the shell will drop into the receptacle 76 for defective shells. Rigidly carried by the legs 12 is a plate 80 provided with lugs 81 and 82 which support a horizontal shaft 83. Mounted upon this shaft are abutments 84 and 85, which may be in the form of collars as shown, between which collars is mounted a coil spring 86. Collar 85 rests against a crank arm 87 carried by the shaft 88 which is suitably journaled in lugs 89 and rigidly carries the wing 73. The arm 87 and connected parts are held in the position shown in Fig. 3 by a spring 90 attached to a fixed standard 91.

The slide 30 carries a downwardly extending plate 92 which may be in the form of an inverted T as shown. This plate carries a lever 93 pivoted at 94 and normally drawn against the stop 95 by a suitable spring 96. An electric magnet generally designated by the numeral 97 is carried by the plate 92 and serves to lock the lever 93 against the tension of the spring 96 into the position shown in Fig. 3 whenever the magnet is energized by the closing of an electric circuit by the presentation of the gage to a defective shell. In normal position of the lever 93 its forward end clears the collar 84 and said collar is not moved upon the forward excursion of the plate 92. However, when the gage is presented to a defective shell the magnet is energized by mechanism to be described later, and the lever 93 is moved into the position shown in Fig. 3 and upon the forward motion of the plate 92 the forward end thereof engages the collar 84 and through the spring 86 slides the collar 85 forwardly, thereby moving the wing 73 into rejecting position so that when the defective shell reaches the opening 71, it falls directly into the receptacle 76 for defective shells.

Referring to Figs. 4 and 5, the numeral 100 designates the gage housing provided with an upwardly extending tang 100' received in an aperture in the gate 18. The gage housing contains a conformation gage 101 and a plug gage 102 held together by a pin 103 one end of which slides freely in an elongated slot 104 in the gage housing. The gages are held in downward position by coil spring 105. If the gage is presented to

a perfect shell such as 106 the plug gage will enter therein and the conformation gage will surround the shell in the position shown in Fig. 4. If, however, the shell is a defective one as the one indicated by 106' in Fig. 5, the gages are arrested by the shell and upon the further movement of the gage housing the pin 103 will come into engagement with the contact finger 108 insulated from the gage housing by the block 107 of fiber or other insulating material. The lug 82 carries a plate 110 upon which is mounted a contact spring 111 insulated therefrom by a suitable block 112. The contact spring 111 is continuously in contact with the plate 92 except when said plate is in extreme forward position at which time the contact is broken.

The source of current which may be any suitable battery or generator, is indicated by the numeral 113. One terminal thereof is connected to the spring 111 by a suitable connector 114. The other terminal thereof is connected with one terminal of the magnet 97 by the connector 115. The other terminal of the magnet is connected by means of the conductor 116 to the spring finger 108. The particular means for doing this may comprise a stationary plate 125 upon which slidably bears an extension 126 of the finger 108. (See Fig. 1.) It will be obvious that if the pin 103 comes into contact with the finger 108 that a circuit will be completed through the battery and magnet as follows: conductor 114, spring 111, thence through the body of the machine to the pin 103, finger 108, extension 126 plate 125 conductor 116 thence through the magnet and back to the battery through the conductor 115. The magnet will thereby be energized and the armature 93' on the lever 93 will be attracted thereby and said lever moved into the position shown in Fig. 3.

As the contact made by the gauge is of very short duration I found it necessary to provide special means for retaining the lever 93 in operated position until it has been able to cause the shifting of the selecting wing 73. The magnet is carried by an L shaped bracket comprising a horizontal arm 117 and a vertical arm 118 rigidly attached to the plate 92. The arm 117 carries an insulating block 119 upon which is mounted a spring 120 preferably made of brass and provided with a soft iron armature 121 and a contact 123 located adjacent contact 124 on the arm 117. The spring arm 120 is placed into electrical connection with the conductor 116 by a short connector 122.

It will be seen that if the circuit is momentarily closed by the connection of the parts 103 and 108 that the magnet will be energized and attract the armature 121 which will cause the contact 123 to engage the contact 124 and thereby establish a shunt

circuit through the conductors 122, 120, contacts 123, 124 plate 117 to the plate 92. If the circuit is now broken at the gage, the magnet will nevertheless remain energized and hold the lever 93 in operated position.

The operation of the machine may be restated as follows: If the gage is presented to a perfect shell, the shell follows its normal course to the receptacle 75. If the shell is a defective one, however, an electric circuit is closed by the engagement of the parts 103 and 108. The magnet is thereby energized and attracts the armatures 93' and 121 moving the lever 93 into the position shown in Fig. 3 and closing a shunt circuit through contacts 123 and 124, thereby retaining the lever 93 in operative position. Upon the forward excursion of the plate 92 the lever 93 engages the collar 84 and through the connections described hereinbefore moves the wing 73 out of operative position whereby the shell is permitted to drop into the receptacle 76 for defective shells. Near the extreme forward position of the plate 92 the end thereof clears the contact spring 111 which breaks the electric circuit and de-energizes the magnet. On the next stroke of the machine the parts are permitted to return to the position shown in Fig. 4.

Besides serving to accurately control the tool 51 in performing the finish necking of the shell, the abutment 62' serves to limit the movement of the gate 18 by taking up the back lash and thereby controls the limit of movement of the electric gage. As the proper functioning of the gage depends upon its presentation to the shell to a specified extent, the gage and abutment cooperate to some extent for best results. However, they may be used separately if desired.

It will be seen that I have provided means for admirably carrying out the objects set forth above and while I have shown and described particular means preferred by me, it is to be understood that the invention may be embodied in other form without departing from the principle thereof. However, what I claim as my invention and desire to secure by Letters Patent of the United States is:

1. In a cartridge necking press, a reciprocable tool carrier, a cartridge necking tool resiliently carried thereby and a rigid stationary abutment engaged by the tool near the end of the stroke of the tool carrier, whereby the motion of the tool is terminated at precisely the same point at each operation irrespective of any variation in the limit of movement of the tool carrier.

2. The combination of a reciprocable tool carrier having an aperture therein, a tool provided with a shoulder and a reduced portion above said shoulder, said reduced portion being received in said aperture, a resilient means between said shoulder and

tool carrier and an abutment for terminating the motion of said tool.

3. The combination of a reciprocable tool carrier having an aperture therein, a tool  
5 provided with a shoulder and a reduced portion above said shoulder, said reduced portion being received in said aperture, a resilient means between said shoulder and tool carrier and an abutment for terminating  
10 the motion of said tool, said abutment being provided with a hole through which said tool extends.

4. In a machine for operating on cartridge shells or similar bodies, a movable deflector  
15 plate so constructed and arranged as to distribute the bodies operated upon into either one of two groups depending upon the position of said plate and electro-magnetic means for determining the position of said  
20 plate.

5. In a machine for operating on cartridge shells or similar bodies, a movable deflector plate so constructed and arranged as to distribute the bodies operated upon into either  
25 one of two groups depending upon the position of said plate and electro-magnetic means for determining the position of said plate, said electro-magnetic means comprising an operating magnet, a source of current  
30 a gage controlled circuit closer and suitable connections therebetween.

6. In a machine for operating on cartridge shells or similar bodies, a movable deflector plate so constructed and arranged as to distribute the bodies operated upon into either  
35 one of two groups depending upon the position of said plate and electro-magnetic means for determining the position of said plate, said electro-magnetic means comprising  
40 an operating magnet in circuit with a source of current, a gage controlled primary circuit closer for closing said circuit, and a secondary circuit closer for maintaining the circuit after the primary circuit closer has  
45 been opened.

7. A reciprocable gage housing, a gage slidably carried thereby and spring pressed into normal position and electric contacts brought into engagement by movement of  
50 the gage in the gage housing.

8. A reciprocable gage housing, a gage slidably mounted therein and spring pressed into normal position, a contact spring insulatively carried by said housing adjacent  
55 said gage whereby movement of gage will

establish a connection between said contact and said gage.

9. In a machine for operating on cartridge shells or similar bodies, a movable deflector plate so constructed and arranged as to distribute the bodies operated upon into either  
60 one of two groups depending upon the position of said plate, means for determining the position of said plate comprising an operating pawl normally out of operative position, an abutment operatively connected  
65 with said plate and engageable by said pawl when in operative position, and electro-magnetic means for moving the pawl to operative position.

10. In a machine for operating on cartridge shells or similar bodies, a movable deflector plate so constructed and arranged as to distribute the bodies operated upon  
70 into either one of two groups depending upon the position of said plate, means for determining the position of said plate comprising an operating pawl normally out of operative position, an abutment operatively  
75 connected with said plate and engageable by said pawl when in operative position, and electro-magnetic means for moving the pawl to operative position said electro-magnetic means comprising an operating  
80 magnet, a source of current, a gage controlled circuit closer and suitable connections therebetween.

11. In a machine for operating on cartridge shells or similar bodies, a movable deflector plate so constructed and arranged  
90 as to distribute the bodies operated upon into either one of two groups depending upon the position of said plate, means for determining the position of said plate comprising an operating pawl normally out of  
95 operative position, an abutment operatively connected with said plate and engageable by said pawl when in operative position, and electro-magnetic means for moving the pawl to operative position said electro-magnetic means comprising an operating  
100 magnet in circuit with a source of current, a gage controlled primary circuit closer for closing said circuit, and a secondary circuit closer for maintaining the circuit after  
105 the primary circuit closer has been opened.

In witness whereof I have signed my name hereto this 20th day of Feb., 1919.

HERBERT V. LECKIE.