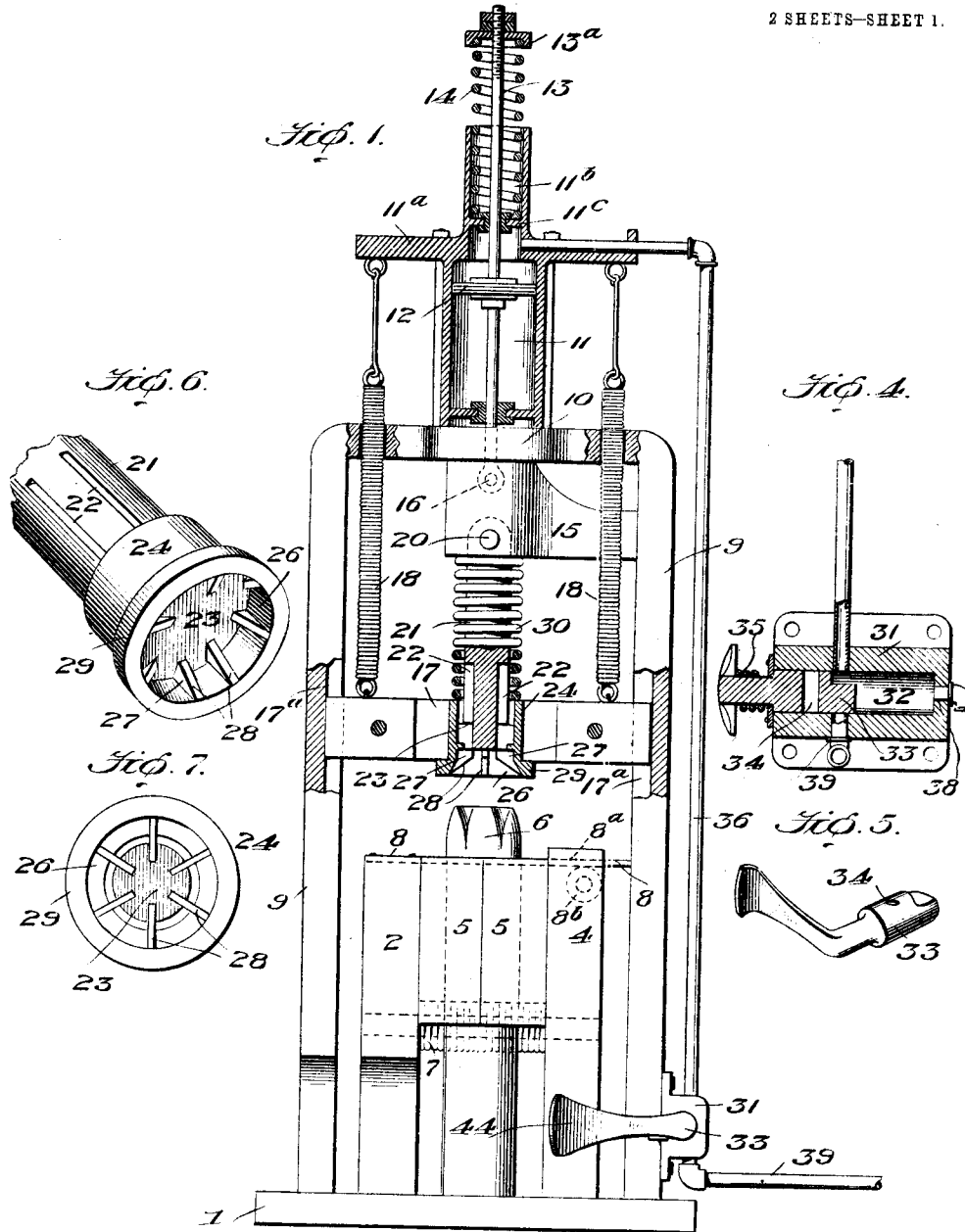


H. AUCHU.  
SHELL CLOSING MACHINE.  
APPLICATION FILED OCT. 13, 1911.

1,058,523.

Patented Apr. 8, 1913.

2 SHEETS—SHEET 1.



Witnesses  
*[Signature]*  
O. V. Lockwood

Inventor  
Henry Auchu  
by *[Signature]*  
his Attorney

1,058,523.

2 SHEETS--SHEET 2.



Henry Archer  
by L. G. H. Smith  
his Attorney

# UNITED STATES PATENT OFFICE.

HENRY AUCHU, OF EMPORIUM, PENNSYLVANIA.

## SHELL-CLOSING MACHINE.

1,058,523.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed October 13, 1911. Serial No. 654,506.

*To all whom it may concern:*

Be it known that I, HENRY AUCHU, a citizen of the United States, residing at Emporium, county of Cameron, and State of Pennsylvania, have invented certain new and useful Improvements in Shell-Closing Machines, of which the following is a specification.

This invention relates to shell closing machines.

My object is to provide a new shell closing machine of simple, inexpensive and durable construction which will be rapid and safe in operation, by which filled paper cartridges or shells containing explosive may be closed or crimped.

Another object is to provide a shell closing machine having novel means for controlling and operating the shell closing mechanism by fluid pressure, preferably compressed air; further, to dispose the controlling means therefor in a new position, whereby the operator may with the same hand simultaneously place the shell in the shell holder and operate the controlling means for the fluid operated mechanism, whereby the operations of placing and closing or crimping the shell may be carried on with one hand, leaving the other hand free to be used in other operations, such as filling the shells with explosives carried on along-side of the machine.

A still further object is to provide, in a shell closing machine, particularly one in which the closing mechanism is operated by fluid pressure, novel means for operating the shell holder to cause the shell to be automatically clamped prior to the closing or crimping thereof.

The foregoing objects are to be considered as illustrative of the scope of the invention, rather than in restriction thereof.

One embodiment of the invention is set forth fully hereinafter, but various modifications may be resorted to.

The crimping or shell closing mechanism used in connection with the present invention is preferably that set forth and claimed in another application on shell closing machine Serial No. 654,505, filed October 13, 1911; the shell which is crimped or closed by the said shell closing mechanism and by the present machine, is separately claimed in another application Serial No. 654,507, filed October 13, 1911.

In the accompanying drawings: Figure 1

is a front elevation with certain parts in section, the holder being closed about a shell and the shell closing mechanism having partially descended; Fig. 2, a side elevation; Fig. 3, a rear elevation; Fig. 4, a vertical section through the controlling valve; Fig. 5, a perspective detail of the valve and its handle; Fig. 6, a perspective of the shell folding means; Fig. 7, an end view thereof; Fig. 8, a longitudinal section through the shell closing means; and Fig. 9, a detail of the shell holder closing device, the holder being open.

Any suitable base 1 may support the parts and this may be located on a table or bench at any suitable height. Fixedly secured to the base 1 is the leaf 2 of the shell holder. Hinged at 3 to said leaf is a laterally movable leaf 4. The leaves 2 and 4 may be provided with any suitable shell holding devices 5, preferably those of the form set forth in my application for shell closing machine Serial No. 654,505, filed October 13, 1911. The paper shell which is to be closed and which is held by the members 5 is shown at 6. The movable leaf 4 is normally kept open by a spring 7 interposed between it and the leaf 2. Connected to leaf 2 is a flexible member 8, such as a strap, cord, or the like which is taut when the leaf 4 is open, its free end running through slot 8<sup>a</sup> and over roller 8<sup>b</sup> on leaf 4.

Rising from the base 1 are the frame members or uprights 9 which have a cross-bar 10 on which is mounted a cylinder 11 having a head 11<sup>a</sup> surmounted by a tubular socket 11<sup>b</sup>. In the cylinder is a piston 12 to which is connected plunger or piston rod 13. A coil spring 14 surrounding the plunger rod 13 above the piston and seated on bottom 11<sup>c</sup> of the socket, is sustained against buckling by the socket and is under the compressing action of the adjustable cap 13<sup>a</sup> on rod 13. This spring is adapted to urge the piston and the shell closing means, presently described, upwardly immediately the fluid pressure above said piston is released.

Secured to the piston rod 13 at 16 is a movable cross-head 15. A split head 17 which is suspended from the cross-head 11<sup>a</sup> by springs 18 has its ends slidably mounted in grooves 17<sup>a</sup> in guides 9 so that it can play up and down, be arrested and yet to permit the head 15 to continue its descent.

I have illustrated the crimping and closing mechanism which is set forth and claimed

in my application for shell closing machines Serial No. 654,505, filed October 13, 1911, as that is particularly adapted for use in connection with the present invention, but I wish it understood that I consider  
 5 said shell closing and crimping mechanism to constitute an independent invention and, further, that other shell closing and crimping devices could be used in connection with  
 10 the present machine without modifying or affecting the operation thereof which will presently appear.

Secured at 20 to the cross-head 15 is a center folding plunger 21 whose lower end is provided with a plurality of longitudinally extending grooves or channels 22 and having a flat lower end 23 through which  
 15 said channels open. The tubular crimper 24 is telescoped over and slidable relatively to the lower end of the plunger 21, and is adapted to permit the plunger to continue  
 20 its downward movement after the arrest of the crimper 24. The mouth of the crimper is of tapered or bell shape, as shown at 26, and arranged preferably radially of the  
 25 crimper and disposed inside of it are folders 27 which are relatively thin and whose planes extend lengthwise of the crimper. The lower edges 28 of these folders are beveled or inclined. The crimper is received  
 30 between and clamped by the parts of the head 17 and has a flange 29 which bears against the under side of said head. Interposed between the heads 15 and 17 and surrounding the plunger 21 is a coil spring 30  
 35 which tends to hold the head 17 with the crimper 24 downwardly and to cushion the downward movement of the head 15 after the crimper 24 has been arrested by engaging  
 40 the shell 6 to thereby permit the plunger 21 to be projected through the crimper to cause the infolding of the end of the shell. The grooves or channels 22 receive the thin folders 27 which are slidable in  
 45 said grooves or channels.

Disposed on the base 1 or the frame 9, or otherwise conveniently positioned is a valve casing 31 (Fig. 4), in the chamber 32 of which slides a controlling valve 33 having  
 50 a transverse port 34 and pressed by a spring 35. Any suitable means, such as a spline, feather or guide, may be provided to prevent the valve from turning.

Leading from one side of the valve casing 31 is the pipe 36 which runs to the head  
 55 of the cylinder 11, pipe 36 being for the purpose of supplying air or fluid pressure to the cylinder and for exhausting it therefrom. There is a port 38 in the casing 31  
 60 to keep the cylinder 11 open to the atmosphere when the valve is in normal position, as shown in Fig. 4. Air or other fluid pressure is supplied to the casing 31 by a pipe 39 leading to any suitable source of pressure.  
 65 When the valve 33 is pushed inwardly, the

port 34 registers with the pipes 36 and 39, whereby the air or other fluid pressure is supplied to the cylinder and thereupon forces the piston 12 downwardly, and when the valve is released, the spring 35 forces  
 70 said valve outwardly, thereby closing communication pipes 39 and 36 and opening communication pipe 36 and port 38, allowing the pressure in cylinder 11 to exhaust to the atmosphere.

Secured to the head 15 is a casing 40 in which is a coil spring 41 (Fig. 9) which tends to force downwardly a plunger 42 which is connected to the free end of the flexible connection 8.  
 75

I prefer to so dispose the valve casing 31 that there may be provided on the valve 33 a presser bar or handle 44 which extends laterally adjacent the end of the shell holder, as shown in Fig. 1, in such position that  
 80 when the operator places the shell 6 in the shell holder, his hand which is grasping the shell naturally comes in contact with the presser bar 44 and thus at one operation the shell is placed in the holder and the bar 44  
 85 pressed upon so that the valve is pushed inwardly to admit pressure to the cylinder 11. This feature I consider an improvement by itself, as the invention in its broadest aspect contemplates the provision of either  
 90 a sliding or rotary valve for controlling the admission and exhaust of the fluid pressure to the cylinder 11 and it is not essential that the valve mechanism be constructed and located as heretofore set forth, although its  
 95 position and the use of the presser bar 44 has the peculiar advantage and constitutes the new combination heretofore set forth.  
 100

Taking a shell 6 which has been filled with explosive except for its upper end, the operator places it in the shell holder and at  
 105 the same time presses upon the presser bar 44, thereby pressing in the valve 33 and opening communication between the pipes 39 and 36, whereupon the air pressure forces  
 110 piston 12 and the heads 15 and 17 and folding and crimping mechanism carried thereby, downwardly. At the first movement of the head 17, the plunger 42 bears upon the strap or flexible member 8, forcing it down-  
 115 wardly and drawing the member 4 against the shell 6 so that the latter is firmly held. Further downward movement of the piston causes the casing 40 to slide downwardly over the stem 42, compressing the spring 41  
 120 which by its yielding, permits the further descent of the crimping mechanism so that the bell shaped mouth 26 of the crimper receives the end of the shell 6 and immediately thereafter the folders 27 form the  
 125 creases which are shown at the top of the shell in Fig. 1 as the shell originally is tubular at its upper part. The crimper 24 eventually is arrested by its engagement with the shell and the movement of head  
 130

17 stops. The head 15 continues to descend, pushing down the plunger 21 which presses in the end of the shell, completing the closing thereof. Immediately the operator releases the presser bar 44, the valve 33 is pressed outwardly and the pressure to the cylinder cut off. The air now exhausts through pipe 36 and port 38 and the spring 14 instantly forces the plunger upwardly in the cylinder, and with the springs 18 restoring the parts to normal position. When the plunger 42 rises it relieves the tension on the flexible member 8, and the spring 7 opens the shell holder and thereupon the shell is released and can be taken out and another substituted therefor.

The cap 13<sup>a</sup> being adjustable on the plunger rod 13 by the nuts on the screw-threaded end of the rod, any desired tension can be put on the spring 14 and, further, the extent of descent of the rod 13 and folding plunger 21 can be regulated at will, as the engagement of the cap 13<sup>a</sup> and upper end of socket 11<sup>b</sup> determines the extent of descent of the plunger 21 and extent of infolding the end of the shell 6.

The disposition of the presser bar 44 as heretofore set forth enables the operator to conduct the closing operation of the shell with one hand, leaving his other hand free to perform other operations such as tamping shells with explosive.

The operative parts of the machine may be arranged in a horizontal or any other position than a vertical one.

The number of channels 22 and folders 27 can be increased or lessened as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a shell closer, the combination with a normally open shell holder adapted to open and close and a shell closer, said holder and closer being adapted for relative movement, and means for effecting said movement, of means set in operation by the relative movement of the shell holder and shell closer acting to cause closing of the shell holder when the relative movement of the shell holder and shell closer is effected.

2. In a shell closer, the combination with a shell holder adapted to open and close and a shell closer adapted for relative movement, and means for effecting said movement, of devices carried by the shell holder

and shell closer, respectively, which are adapted for coöperation when such relative movement is effected, to cause closing of the shell holder.

3. In a shell closer, the combination with a shell holder having relatively movable members, of a flexible connection between said members, a shell closer adapted for movement in relation to the shell holder, means for effecting said movement, and a spring pressed device carried by the shell closer which is adapted to engage the flexible connection aforesaid and close the shell holder when the shell closer advances to close the shell.

4. In a shell closer, the combination with a shell holder adapted to open and close, and a shell closer, said holder and closer being adapted for relative movement, of means for effecting said movement, and means on the shell holder and shell closer adapted for coöperation to close the holder when the shell closer advances to close the shell.

5. In a shell closer, the combination with a shell closing device, of a shell holder, fluid operated means for moving the shell holder and shell closer in relation to each other, means for causing opening and closing of the shell holder by the movements of the shell closing device, and a manually actuated controlling device for said fluid operated means which is arranged adjacent the shell holder so that it can be operated by the operator substantially at the same time he places the shell in the shell holder.

6. In a shell closer, the combination with the shell closing device, of a spring-opened shell holder, fluid operated means for moving the shell holder and shell closer in relation to each other, means operated by the shell closer adapted to close the shell holder when they move in relation to each other, and a manually operated controlling device for said fluid operated means which is arranged adjacent the shell holder so that it can be operated by the operator substantially at the same time he places the shell in the shell holder.

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

HENRY AUCHU.

Witnesses:

H. W. Cox,

W. S. SWARTWOOD.