W. A. PENDRY.

BUTTON BLANK CUTTING MACHINE.

(Application filed Jan. 21, 1899.)

INVENTOR.

William Allan Rudry

By Russell S. Wright

Attorney.
UNITED STATES PATENT OFFICE.

WILLIAM ALLEN PENDRY, OF DETROIT, MICHIGAN.

BUTTON-BLANK-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 638,881, dated December 12, 1899.

Application filed January 21, 1899. Serial No. 702,937. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ALLEN PENDRY, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Button-Blank-Cutting Machines; and I 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, reference being had to the accompanying drawings, which form a part of this specification.

My invention is designed to provide certain new and useful improvements in a button-blank-cutting machine; and it consists of the mechanism hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a rear elevation. Fig. 3 is a vertical section through portions of the device and on a somewhat enlarged scale. Fig. 4 is a plan view. Figs. 5, 6, and 7 are detail views of certain parts employed. Fig. 8 is a sectional view of the clutch mechanism. Fig. 9 is a front elevation. Fig. 10 is a detail view of one of the bell-cranks. Fig. 11 is a vertical section of a portion of the table and adjacent parts. Fig. 12 is a detail view of the mandrel. Fig. 13 is a view in horizontal section on the line X X. Fig. 3. Fig. 14 is a detail view of the key k. Fig. 15 is a detail view of the connecting-rod and adjacent parts.

My invention has in view more particularly certain improvements in an automatic button-blank-cutting machine, for which United States Letters Patent were granted to me April 5, 1898, No. 601,675, the object of the present invention being to increase the efficiency of the construction and operation of such a machine. Accordingly, I carry out my invention as follows:

A represents any suitable support provided with a flange α.

A² denotes portions of the supporting framework provided with a flange α', united to the flange α of the support.

B denotes a driving-shaft, preferably provided with one driving-pulleys, (indicated at B') Said pulleys may be belted with a counter-shaft (not shown) in a well-known manner.

C denotes a feed-shaft, preferably provided with cone-pulleys C', which may be belted to a counter-shaft in any customary manner.

The shaft C is constructed with a worm (indicated in dotted lines in Fig. 1 at C) meshing with a worm-gear C₀ upon a shaft C₁.

The shaft C₁ is provided with a cam D, designed to actuate a mandrel F, and also a cam E, designed to operate on the mandrel G. The mandrel F is made rotatable and reciprocating in boxes A² of the framework A².

Within the mandrel is located a plunger H, carrying at its lower end a tubular saw J. At the lower end of the mandrel is a chuck F', provided with jaws f and a cap f'. The jaws f have a wedge-shaped engagement against the adjacent inner face of the mandrel and bear against the saw. It is evident that by screwing the cap upon the mandrel any suitable tension can be given to said jaws of the clutch upon the saw. To prevent injury to the saw and too great a tension being applied thereto, I provide a plug J within the saw, 75 said plug provided with an orifice through which the push-bar G is reciprocated.

To rotate the mandrel, it is provided with a gear F', meshing with a pinion B₀ on the driving-shaft B. To permit the reciprocation of the mandrel, it is constructed with an elongated orifice or keyway, (indicated at f'), into which projects a screw or pin a, passing through the hub F' of the gear F'.

Upon the framework A² is fulcrumed, as shown at k, a bell-crank K, engaged at one extremity with the mandrel and at the opposite extremity provided with a wiper, as at K', to ride upon the cam D, and by which cam said bell-crank is actuated. It will be obvious that when the wiper is raised by the cam the mandrel will be forced downward. L is an additional bell-crank fulcrumed, as indicated at l, upon the framework A², one end being connected by a yoke M, engaged with the upper end of the push-rod G. N is an additional bell-crank fulcrumed upon the framework, as upon the pin k, and provided with a wiper at n, riding upon the cam E. The bell-crank N is united to the bell-crank L by a connecting-rod N', threaded through a block a', connected with the lever L in such a manner that it can oscillate freely upon its axis, said rod being connected also to the lever N.
by a similar block $a^2$, bored to receive the end of the rod, in such a manner that the rod may rotate without longitudinal travel in said block, thus forming an adjustable connect- 5 ning rod uniting the levers N and L. It will be obvious that as the wiper n ascends the yoke M, carrying the push-rod G, will be forced downward. The yoke M is joinedly connected with the adjacent end of the bell- crank L, as at r. A nut $G'$ is preferably provided at the upper end of the push-rod G to hold the push-rod in engagement with the yoke. By unscrewing said nut from the yoke the push-rod may be withdrawn, when the 15 yoke may be thrown to one side, permitting the removal of the plunger from the mandrel whenever it may be desired to sharpen or to renew the saw.

P denotes a friction-clutch upon the feed- shaft to engage the feed-pulley $O'$, said clutch being actuated by a foot-lever $P'$, suitably connected therewith.

The frame $A^2$ is constructed with a bracket $A'$, extending downward below the top of the 25 support $A$.

$A^2$ is a movable bed provided with a downward-projecting bracket $a^2$, which is gibbed to the bracket $A'$, as shown at $a^2$. By means of screws $a'$ the movable bed $A^2$ may be adjusted transversely, as may be required. The movable bed $A^2$ is preferably provided with upwardly-projecting flanges, (indicated at $a^2'$,) upon which is located a movable bed or table $A'$, provided with a tubular die $a'$, mounted upon a hollow support $a'^2$, engaged upon the bed $A'$ and preferably made integral therewith, as shown. The bed or table $A^2$ has a longitudinal movement upon the flanges $a^2$ to permit the die being removed from beneath the saw when required to enable the operator to get more conveniently at the saw. The table $A^2$ may be gibbed in a customary manner upon the flanges $a^2$ of the movable bed $A^2$. The saw is made to reciprocate through the $a^2$ and its support $a'$. The blank is cut upon said die and is forced out from the tubular saw and through said die and its support by means of the push-rod G.

To better support the blank when it is being cut, I provide a back peg $R$, carried upon a lever $R'$, fulcrummed upon the table $A^2$, as indicated at $r$, so that when the table $A^2$ is moved the lever will be carried therewith. This back peg is arranged to be dropped out of the way before the push-rod pushes the blank out of the saw and then is made returnable to normal position immediately ready to receive and support the next blank. The lever $R'$ is provided with an arm $R''$, the lever and the arm being preferably cast upon the same hub through which the lever is fulcruummed. The fulcrum $r$ is preferably on or about a level with the top of the die $a'$. Upon the shaft $O'$ is located an additional cam. (Shown in detail in Fig. 7 at V.) The periphery of this cam is made concentric, with the exception of a notch, (indicated at V.)

W indicates a bell-crank fulcrummed upon the frame $A^2$, as shown at $w$, having a wiper $W'$ in contact with the cam V. The lower 70 arm of the bell-crank W is provided with a slot, (indicated at $w'$,) the slot being vertical when the wiper is on the dead-line of the corresponding cam. The arm $R''$ of the lever $R'$ is provided with a block $r''$, supported upon a pin $r''$, passed through the upper arm of the said lever, said block riding in said slot $w'$, the block being permitted to oscillate on the pin $r''$. It will be evident that when the wiper drops into the notch or recess V of the cam the upper arm of the bell-crank W will move upward, thereby throwing the lower arm of said bell-crank forward, carrying with it the arm $r''$ of the lever $R'$ toward the front of the machine, and thereby dropping the back peg out of normal position. As the wiper rides onto the dead-line of the cam again the back peg will be thrown upward into normal position and so held until the wiper again enters the notch of said cam. I prefer to make the lever $R''$ of sufficient weight to cause the wiper to recede into the notch of the cam V when opposite said notch; but any other suitable structure or means may be employed to effect the same result.

The numeral 1 denotes a lever fulcrumed, as at 2, preferably to the body A, said lever being also pivotally connected to the bracket $a^2$, as indicated at 3. A threaded rod 4, preferably provided with a hand-wheel 5, is employed to actuate the lever 1. The rod 4 preferably has threaded connection with the block 5, engaged to the lever 1, as indicated at 6. The rod 4 runs through an extension or bracket 7, projecting from the flange $a'$ upon the frame $A^2$. By means of the lever 1 and its connections the movable bed $A^2$ may be vertically adjusted, together with the devices supported thereupon, to adjust the vertical position of the die, as may be required.

The bell-crank W being provided with the slot $w'$, vertical when in working position, always insures the back peg being kept in proper working position whatever may be the vertical elevation of the table $A^2$. The lever $R'$ being fulcrummed upon the table $A^2$ and movable therewith is thus free to adjust itself vertically in the slot $w'$ to secure the desired result. The table $A^2$ is moved upon the flanges $a^2$ by hand when desired, and any suitable means may be employed to hold it in position.

The push-rod in this instance I prefer to make hollow, the same being opened at both extremities thereof, the nut G' being preferably made funnel-shaped or of such form as to permit the adjustment of a hose-pipe therewith, the idea being to construct the push-rod to permit water flowing therethrough. By providing for the passage of water through the push-rod the saw may be kept cool, while at the same time dust may be prevented. Furthermore, the water will
also prevent the burning of the pearl. The water being inside the saw is prevented from splashing and being thrown over the operator. The water being discharged from the base of the push-rod may be led from the machine, as may be desired. In the support A, I prefer to locate a wire basket, (indicated at R2) as in the patent above referred to, the upper extremity of the basket being provided with a rim R9, fitting snugly into the support A, the basket being removable by opening a drawer A2, provided for that purpose upon the support. My invention contemplates the discharge of water into this wire basket or receptacle R2 in any suitable manner, as by means of a pipe R3, to wash the dust, chips, and any other foreign matter from the button-blanks. More may obviously be admitted through the opening in the die. Beneath the basket R3 is an exhaust-pipe T, which is preferably provided with a funnel-shaped top. It will be understood that it is designed to make the wire basket of such mesh as to permit the dust and chips dropping therethrough, while the button-blanks are retained therein. By this means, the blanks may be efficiently separated from the chips and dust without any hand-labor, either by means of the air or by means of the water, as may be preferred. The basket should be so fitted within the support A that the air, if employed, will be compelled to pass through the basket.

While I have shown an automatic device for forcing the saw and the push-rod to work, I would have it understood that I do not limit myself solely thereto. My present invention, as before, contemplates the employment of a long plunger and the use of a long tubular saw engaged therewith, made adjustable in the mandrel and removable from its upper end. It will be so arranged that by the use of a long tubular saw the saw may be fed to the work as it wears, thereby preventing waste heretofore common in the use of saws, inasmuch as it is impracticable to use a saw after it has been worn down to within a given distance from its upper extremities. The location of the plunger may be controlled as to distance in any suitable manner. The plunger is threaded on its exterior, as shown more particularly in Fig. 3 at h. The plunger is also constructed with a longitudinal slot or spline h, as shown in Fig. 13. A bolt or pin e is provided to engage the threads of said plunger when in the longitudinal position of the plunger. This pin is preferably threaded into the upper end of the mandrel F. By means of said pin and the threads upon the plunger the plunger may be adjusted in the mandrel, as may be desired. In said spline is located a removable key h2. (Shown in detail in Fig. 14.) When it is desired to vertically adjust the plunger, the key h2 is withdrawn, when the plunger may be given a quarter-turn to bring the spline h opposite the pin F2. Then the plunger may be moved vertically, as may be required, after which the plunger is rotated back into normal position and the key h2 is again inserted into place. When it is desired to remove the plunger from the mandrel with its saw, the pin F2 is released from the threads of the plunger. It will be obvious that in feeding the shell from which the blanks are to be cut to the saw the shell may not always be fed in just the desired position, and it will hence be desirable to prevent the descent of the mandrel and of the push-rod, thereby giving opportunity to change the position of the shell. I provide for the feeding and operation of the friction-clutch P, (shown more particularly in Fig. 8,) by which the operator is enabled to stop the descent of the saw. When the saw is operated upon a thick portion of the shell, it is liable to be choked up by the refuse in cutting, rendering it at times necessary to clean it and the kerf in the shell of the refuse. This may be effected by making the shaft C5 reciprocatory in its bearing c, so as to carry the cams D and E out from under the corresponding wipers. This may be done in any suitable manner, as by means of a bell-crank Q, so located as at q, said bell-crank being connected in any suitable manner with a lever Q'. The bell-crank Q, and consequently the shaft C5, may be automatically retracted in any suitable manner, as by a spring Q5. The mandrel and push-rod may also be retracted automatically in any suitable manner, as by springs K5 and M5. I prefer to make various parts of the device self-contained in any proper manner. The foot-lever F may be retracted by a spring P5. I would have it understood that either an exhaust of air or water alone may be used to clear the blanks of refuse matter, either air or water being exhausted in the pipe T. The mandrel and the plunger and other parts therewith are reciprocated to carry the saw through the shell by means of the mechanism above described. The push-rod is carried simultaneously until the saw has cut through the shell. The mandrel then stops its downward movement. The back peg is then moved out of normal position by the mechanism already described, and the push-rod is then given a further downward movement to eject the blanks. The mandrel, with the plunger, the push-rod, and the back peg are then restored to normal position.

What I claim as my invention is—

1. In a button-blank cutting machine, the combination of a rotatable mandrel, a hollow push-bar within the mandrel, and a hollow push-bar within the plunger open at its extremities, substantially as and for the purpose described.

2. In a button-blank cutting machine, the combination of a mandrel, a plunger carried by the mandrel and adjustable therein, said plunger threaded upon its exterior and provided with a longitudinal spline, a key for
said spline, and a locking device to engage the threaded exterior of the plunger, substantially as and for the purpose described.

3. In a button-blank-cutting machine, the combination of a movable table, a hollow die carried thereupon, a back peg to project upward within said die, and an oscillatory lever fulcrummed to said table and movable therewith to carry said back peg, substantially as and for the purpose described.

4. In a button-blank-cutting machine, the combination of a support, a bed thereon, a movable table upon said bed, a hollow die carried by said table, a lever fulcrummed to said table and movable therewith provided with a back peg to project upward within said die, a bell-crank to actuate said lever, and means to actuate said bell-crank, said lever having an adjustable connection with the bell-crank, substantially as described.

5. In a button-blank-cutting machine, a hollow die, a movable support therefor, a back peg to project upward within said die, a lever fulcrummed to said support carrying said back peg, and a device to move said lever to carry said back peg out of normal position within the die, and to restore said back peg to normal position, said lever having an adjustable connection with said device, whereby the back peg will be kept in proper working position whatever may be the position of the support, substantially as described.

6. In a button-blank-cutting machine, the combination of a hollow die, a movable support therefor, a movable back peg fulcrummed to said support to project upward within said die, and adjustable mechanism to carry said back peg, whereby the back peg will be kept in proper working position whatever may be the position of the support, substantially as described.

7. In a button-blank-cutting machine, the combination of a support, a supporting-frame, a rotatable mandrel sleeved through a portion of said frame, a plunger within the mandrel and carried thereby, means to simultaneously reciprocate the mandrel and plunger, a saw carried by the plunger, a push-bar within the plunger, means to reciprocate the push-bar, a hollow die carried upon said support, a back peg to project within the die, and adjustable mechanism to retract said back peg, substantially as described.

8. In a button-blank-cutting machine, the combination of a support, a supporting-frame, a rotatable mandrel sleeved through a portion of said frame, a plunger within the mandrel, means to simultaneously reciprocate the mandrel and plunger, a saw carried by the plunger, a push-bar within the plunger, means to reciprocate the push-bar, a movable bed upon said support, a movable table carried upon said bed, a hollow die carried by said table, a back peg to project within the die, and adjustable mechanism to retract said back peg, substantially as described.

9. In a button-blank-cutting machine, the combination of a hollow die, a support therefor, a back peg to project within said die, a lever carrying said back peg, a bell-crank to actuate said lever, and a rotatable cam to actuate said bell-crank, said lever having an adjustable connection with the bell-crank, substantially as described.

10. In a button-blank-cutting machine, the combination of a movable table, a hollow die supported thereupon, a back peg to project within said die, a lever fulcrummed to said table carrying said back peg, a rotatable cam and a bell-crank actuated by said cam to actuate said lever, said lever having an adjustable connection with said bell-crank, substantially as described.

11. In a button-blank-cutting machine, the combination of a hollow die, a support therefor, a back peg to project within said die, a lever carrying said back peg, a rotatable cam and a bell-crank actuated by said cam to actuate said lever, said bell-crank constructed with a slot vertical in position when the machine is operating to cut a blank, said lever engaged in said slot, substantially as and for the purpose described.

12. In a button-blank-cutting machine, the combination of a support, a frame provided with a downwardly-projecting bracket, a vertically movable bed upon said support provided with a downwardly-projecting bracket engaged with the bracket of said frame, a table horizontally movable upon said bed, a hollow die carried by said table, a back peg to project within the die, and adjustable mechanism to retract said back peg, substantially as described.

13. In a button-blank-cutting machine, the combination of a hollow die, a support therefor, a back peg to project within said die, a lever carrying said back peg, and automatic mechanism to actuate said lever, said lever having an adjustable connection with said mechanism, substantially as described.

14. In a button-blank-cutting machine, the combination of a support, a supporting-frame formed with a downwardly-projecting bracket, and a movable bed provided with a downwardly-projecting bracket gibbed to the first-named bracket, substantially as described.

15. In a button-blank-cutting machine, the combination of a supporting-frame, a rotatable mandrel sleeved through a portion of said frame, a plunger within the mandrel and carried thereby, means to simultaneously reciprocate the mandrel and plunger, a saw carried by the plunger, a push-bar within the plunger, means to reciprocate the push-bar, a hollow push-bar within the plunger open at its extremities, and means to reciprocate the push-bar, substantially as and for the purpose set forth.

16. In a button-blank-cutting machine, the combination of a rotatable mandrel, a plunger within the mandrel and carried thereby, a saw carried by the plunger within said mandrel, a push-bar within the plunger, a rotatable shaft, a bell-crank actuated from said
said support and movable therewith, and a back peg carried by said lever projecting within the die arranged to support a blank when being cut, substantially as and for the purpose set forth.

20. In a button-blank-cutting machine provided with a cutter and with a reciprocatory push-rod, of a movable support, a hollow die carried by said support, a back peg to project within the die and means to remove the back peg from the die before the push-rod forces the blank out of the cutter, and to restore the same to normal position, and whereby the back peg will be kept in proper working position whatever may be the position of the support, for the purpose described.

21. In a button-blank-cutting machine, a hollow die, a support therefor, a receptacle within said support beneath said die to receive the blanks, and an inlet-pipe discharging into said receptacle, substantially as described.

22. In a button-blank-cutting machine, the combination of a rotatable mandrel, a plunger within the mandrel, a push-bar within the plunger, a rotatable shaft, means mounted upon the shaft to actuate the mandrel and plunger, and a back peg to project within the die, a lever to carry said back peg, a bell-crank to actuate said lever, an additional cam upon said shaft to actuate the bell-crank, and means to throw said cams out of operation, substantially as described.

23. In a button-blank-cutting machine, a hollow die, a support therefor, a receptacle within said support beneath said die to receive the blanks, and an inlet-pipe discharging into said receptacle, substantially as described.

24. In a button-blank-cutting machine, the combination of a rotatable mandrel, a plunger within the mandrel and carried thereby, a saw carried by said plunger, a push-bar within the plunger, a bell-crank to actuate the mandrel and the plunger, an additional bell-crank to actuate the push-bar, mechanism to actuate said bell-cranke, and an adjustable device connecting said bell-cranke, substantially as described.

25. In a button-blank-cutting machine, a support, a movable bed, and a movable table having a transverse movement upon said bed, the movable table gibbed upon the movable bed, substantially as set forth.

26. In a button-blank-cutting machine provided with a cutter and with a reciprocatory push-rod, of a hollow die, a support therefor, a movable bed, a movable table upon said bed, a hollow die carried by said table, a back peg to project within the die, a lever carrying said back peg fulcrumed upon said table, and means to actuate said lever to remove said back peg from the die before the push-rod forces the blank from the cutter, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.