

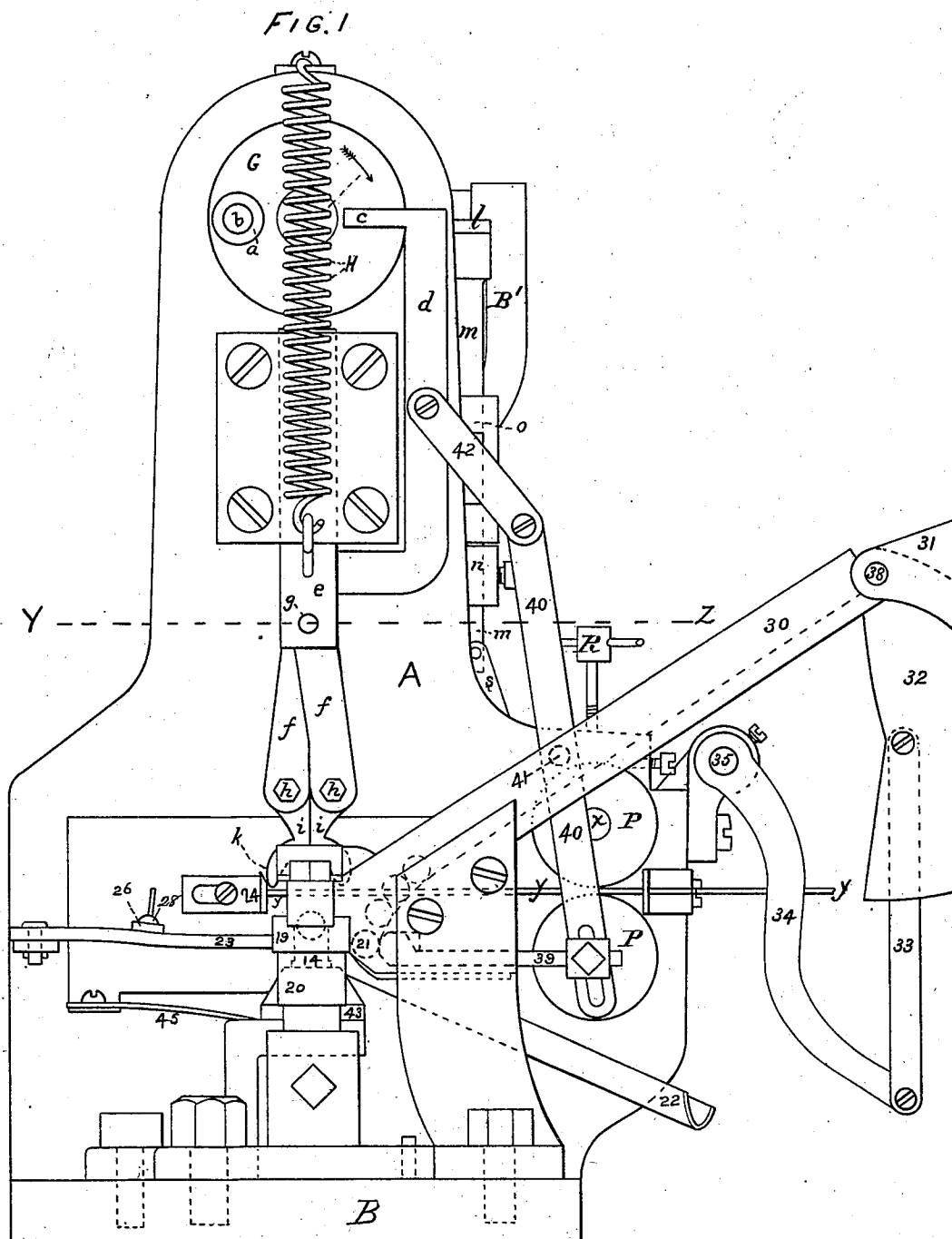
(Model.)

4 Sheets—Sheet 1.

Z. B. PIERCE.
BUTTON MACHINE.

No. 243,723.

Patented July 5, 1881.



WITNESSES.
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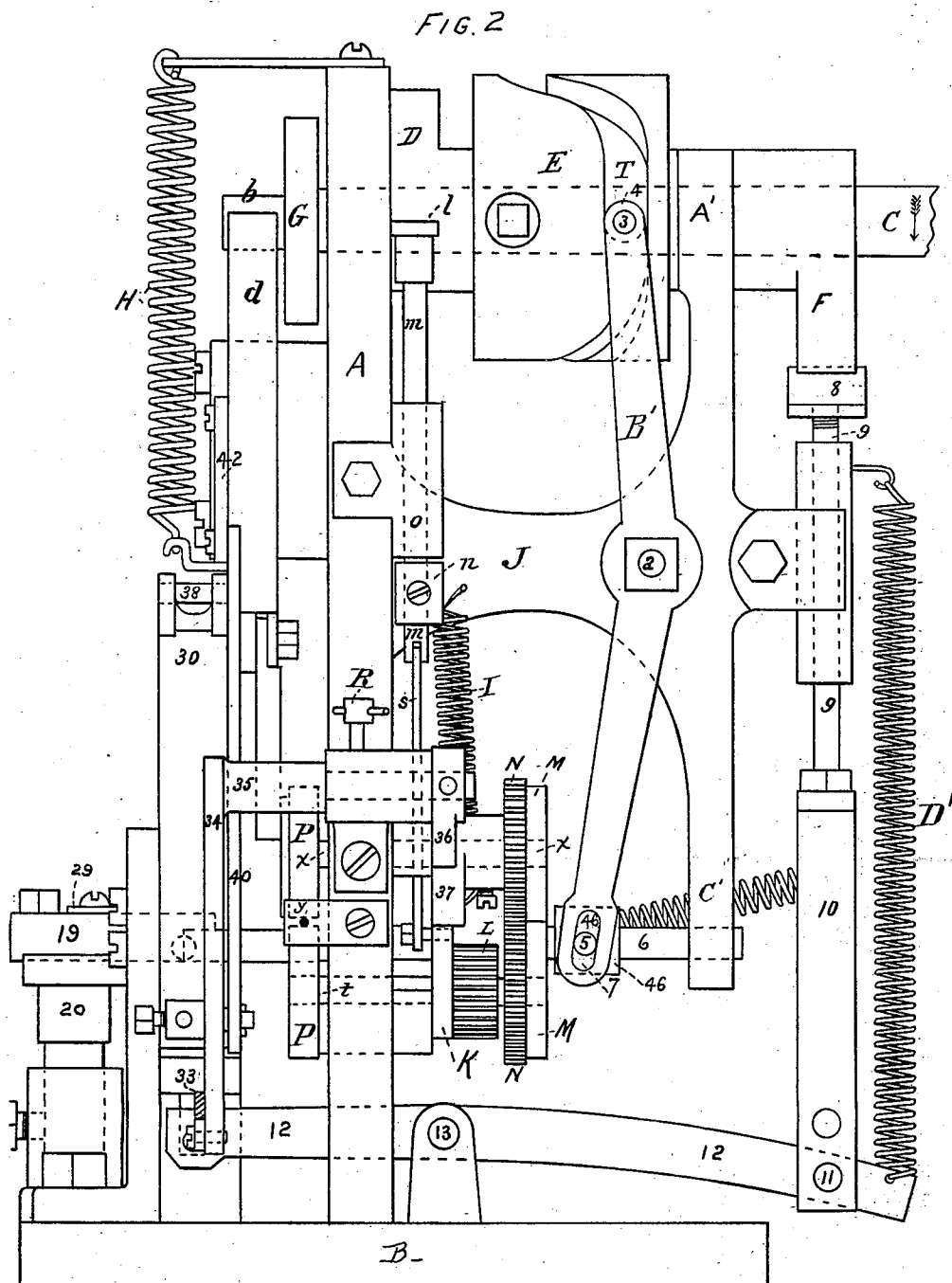
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(Model.)

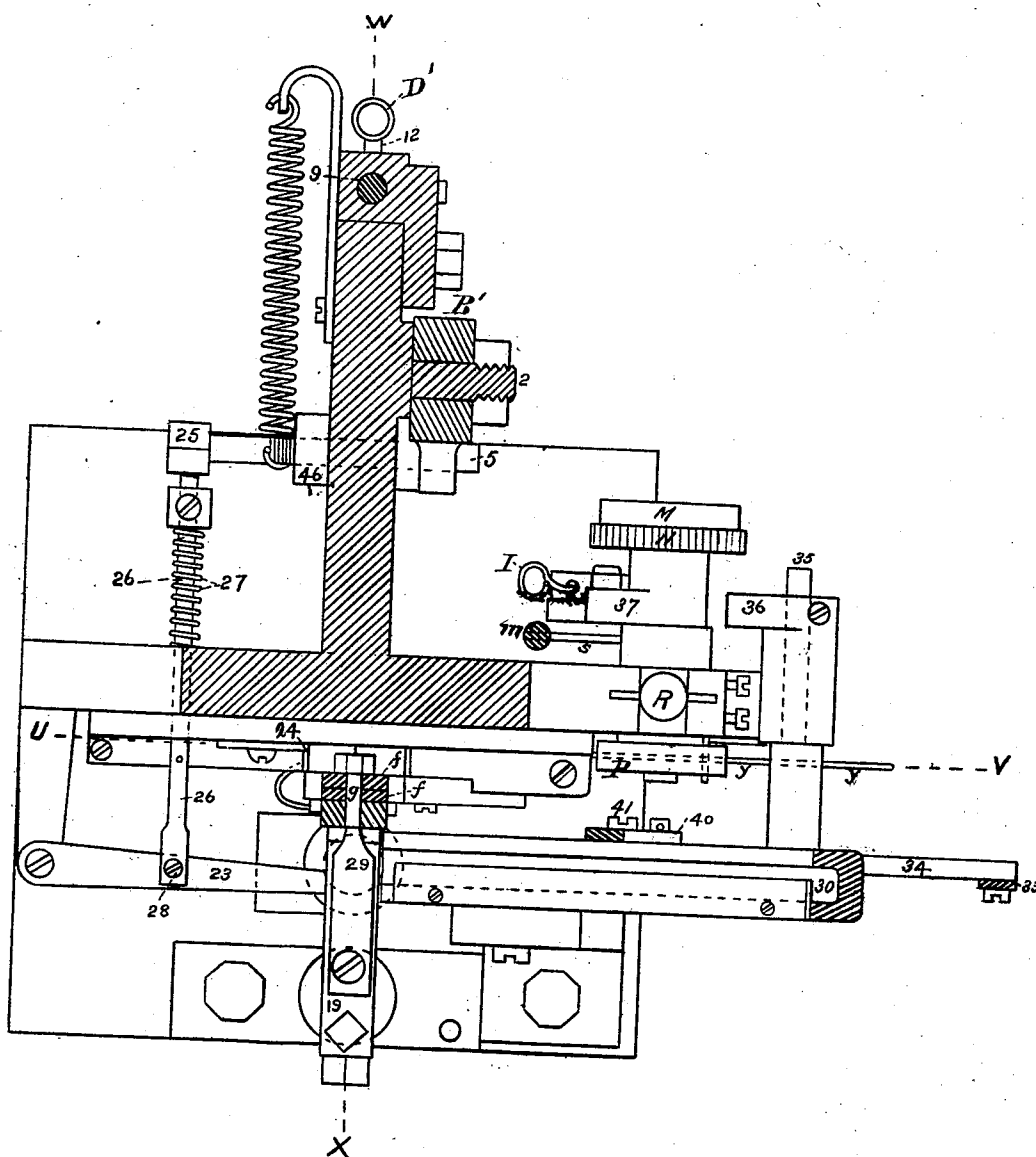
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FIG. 3



WITNESSES.

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FIG. 5

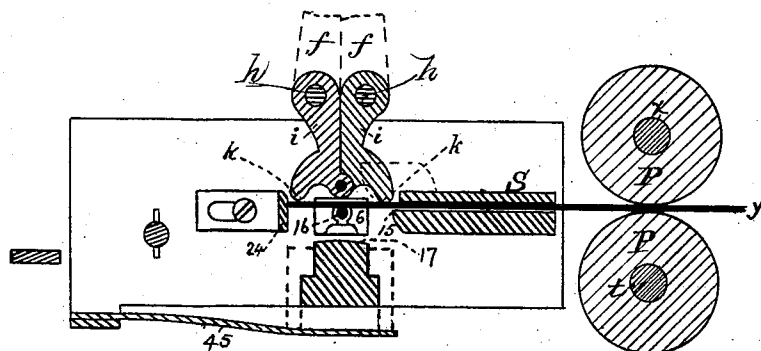


FIG. 6

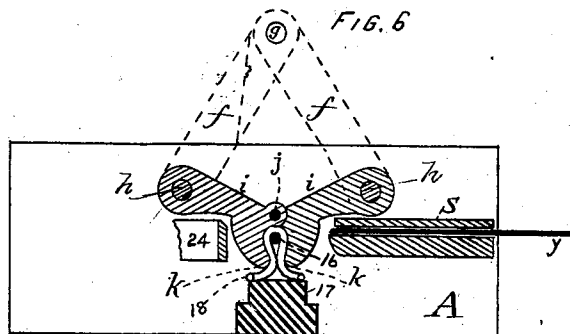


FIG. 8.



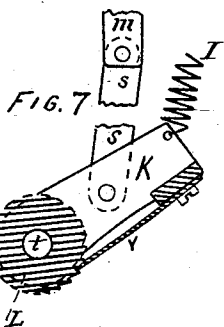
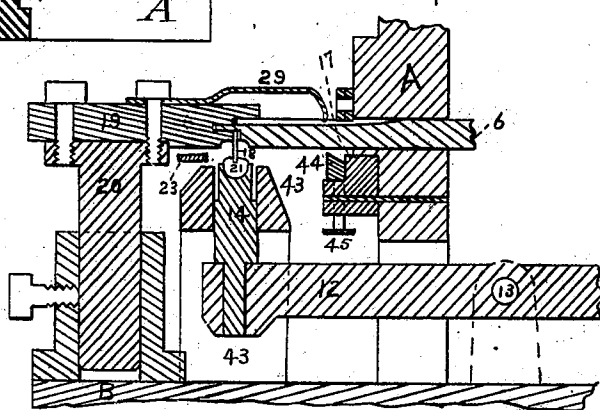
FIG. 9.



FIG. 10.



FIG. 4



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UNITED STATES PATENT OFFICE.

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TO HORATIO L. CUSHMAN, OF SAME PLACE.

BUTTON-MACHINE.

SPECIFICATION forming part of Letters Patent No. 243,723, dated July 5, 1881.

Application filed March 12, 1881. (Model.)

To all whom it may concern:

Be it known that I, ZENAS B. PIERCE, of the city of Taunton, State of Massachusetts, have invented an Improved Button-Machine, of which the following is a specification.

This invention has for its object certain improvements in machines in and by which buttons formed of a plastic material are both molded into form and have also the metallic eye inserted in such plastic body, which eye is cut and bent into form by the machine as required for such insertion in the button; and the invention consists in certain improvements in the devices whereby said results are accomplished, all as will, by the aid of the accompanying drawings, be hereinafter fully described, and specifically defined in the appended claims.

Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation of the machine, taken as viewed from the right in Fig. 1. Fig. 3 is a horizontal section taken on line Y Z, Fig. 1, and showing all below said line in top or plan view. Fig. 4 is a detached vertical section taken as on line W X, Fig. 3, and showing certain of the devices to be explained. Fig. 5 is a detached vertical section taken on line U V, Fig. 3, and showing the wire feeding, cutting, and bending devices by which the button-eye is formed. Fig. 6 is also a detached vertical section taken as on said line U V, but omitting the feeding-rolls, and showing the wire-bending devices as at the completion of the bending of the eye, which latter is shown in position as formed.

In these views, A represents the vertical standard of the frame or body, and B the horizontal base of said standard, both of which may be formed of such size, form, and proportion as shall best adapt them to receive and support the appended parts, and such base may be supported upon a bench, base, or frame, as may be desired.

In the head of standard A and a vertical arm, A', is journaled the horizontal shaft C, through and by which all the operative parts are directly or indirectly actuated by means of a gear, pulley, crank, or other device attached to such shaft, whereby the same may be rotated in the direction indicated by the arrow shown

in Figs. 1 and 2. Upon said shaft are rigidly mounted the cams D E F, for the purposes to be described, and upon the front end of said shaft is secured the disk G, in which is secured the pin *b*, on which is mounted the loose sleeve *a*, as shown in Fig. 1. The office of said wrist-pin *b* and its sleeve is to actuate the wire-cutting and eye bending and setting devices, which office is effected in the following manner: As shaft C revolves said pin is brought in contact with finger *c* of the angle-arm *d*, which is rigidly secured to or formed upon slide *e*, which is thereby depressed, and which is, when liberated, raised by the action of spring H.

To the lower end of slide *e* the links *f* are pivoted at *g*, and to the lower ends of said links are pivoted, at *h*, the arms *i* of the jaws *k*, whose pivotal center is shown at *j*, Fig. 6. The mode of operation of said jaws *k* with their coacting parts will be hereinafter, in their proper order, fully described.

Cam D, as it revolves and passes cap *l*, secured on rod *m*, serves thereby to successively depress said rod, which is as often raised by spring I, which at its upper end is secured to extension J of standard A and at its lower end to lever K, Fig. 7, the up motion of rod *m* being checked by the contact of its set-collar *n* with the journal-bracket *o*. (Shown in Figs. 1 and 2.) A connecting-rod, *s*, is pivoted to the lower end of said rod *m*, as shown in Figs. 1, 2, and 7, and its lower end is pivoted to said lever K, as shown in detached Fig. 7, said lever being loosely pivoted on shaft *t* and carrying the elastic self-engaging pawl *v*, which acts upon the ratchet L on said shaft *t*. Thus, when shaft C is revolved and rod *m* is depressed by contact of cam D with cap *l*, lever K will be thereby depressed, and its pawl *v* will rotate ratchet L and shaft *t*, to which the ratchet is rigidly secured, and by the proper vertical adjustment of set-collar *n* on shaft *m* the desired amount of rotation of ratchet L at each revolution of cam D may be secured. Upon said shaft *t* are also rigidly mounted a gear, N, and two smooth-faced disks, M P, as shown in Fig. 2, and upon a similar and parallel shaft, *x*, are mounted corresponding disks and an intermeshing gear, such disks and gears

being similarly worked. Said gears and rolls or disks, having such intermitting rotary motion, are employed to feed the wire *y* for the button-eyes to the before-referred-to cutting and crimping jaws *k*, which feeding is effected by inserting the wire between the rolls *P*, as shown in Figs. 2 and 5, and entering it in the tubular guide *S*, whence it is delivered to said jaws to be manipulated, as will be described.

To insure the proper pressure upon wire *y* by the rolls *P*, a pressure-screw, *R*, is arranged as shown in Figs. 1, 2, 3, by which to exert the requisite pressure upon the top of the vertically-adjustable bearing of shaft *x*, and when such pressure is so exerted the smooth-faced rolls *M M* serve to prevent disturbance of the intermeshing gears *N*.

The cam *E* on shaft *C* is formed with a peripheral groove, *T*, in which engages the roll 4, loosely mounted on stud 3 in the upper end of lever *B'*, which vibrates on pivot 2 in arm *J*, the lower end of said lever engaging the sliding rod 6 by means of the pin 5, which enters the slot 7 in said lever, whereby, as said cam revolves and vibrates lever *B'* by its contact with the cam-groove, said rod 6 will be correspondingly reciprocated, the object whereof will be explained in connection with the functions of the eye-forming devices.

Cam *F* engages cap 8 on rod 9, and thereby depresses the same against the resistance of spring *D'*. Upon the lower end of said rod is a stirrup, 10, in which is pivoted the lever 12 by pivot 11, as shown in Fig. 2, said lever having its pivotal fulcrum at 13, while at its front end it carries the lower molding-die, 14, as shown in Fig. 4.

The operation of forming the eye, inserting the same in the button-blank, and then molding the button is as follows: The wire *y*, being fed forward in its guide *S* by the disks *P*, actuated as before described, is arrested by the adjustable stop 24, Figs. 1, 3, 5, 6, when the properly-timed descent of slide *e* will cause the adjacent jaw *k* and the lip 15 of guide *S* to cut the wire at that point, as shown in Fig. 6. As the jaws *k* continue to descend the piece of wire thus cut will, at its center, rest upon pin 16, in the front end of slide 6, which is actuated by cam *E* through lever *B'*, and as the ends of the wire are carried downward the action of anvil 17 turns them outward, as is plainly shown in Fig. 6, where the fully-formed eye is shown, and marked 18. At the instant that the eye is thus formed slide *e* is released by pin 6 and the spring *H* raises jaws *k*, when slide 6 is carried forward by lever *B'*, so as to bring the eye 18 over the lower molding-die, 14, as shown in Fig. 4, in which die is placed, by means to be described, a button-blank of plastic material and of suitable form. When slide 6 thus moves forward its pin 16 enters a corresponding hole in the end of the die-block 19, which block is mounted upon the vertically-adjustable rest 20, as shown in said Fig. 4, and the eye is firmly squeezed between slide 6 and

block 19, there being a slight depression in the face of each to receive the eye. At the instant when said eye is so held cam *F* on shaft *C* commences to depress rod 9, and thereby, through lever 12, to force up the lower die, 14, in which is seated the button-blank, (marked 21,) which is thereby brought in contact with the outwardly-curved ends or prongs of the eye, which are thus forced into the blank, and when, by the further rising of said die, the blank is compressed between the half-die 14 and the quarter-die cavities in slide 6 and block 19, the blank is closed over the ends of the shank, which are thereby embedded in the body thereof.

In Fig. 8 the button-blank is shown as with the eye just sunk therein, and in Figs. 9 and 10 the button-blank is shown as molded over the prongs or ends of the eye. As soon as the button is thus molded, cam *E*, by the reverse action of lever *B'*, retracts slide 6, thereby liberating the button and leaving it in die 14, whence it is swept into chute 22 by the action of the moving end of lever 23, which is forced forward by the contact of set-screw 25 with rod 26, which slides in standard *A*, and is pivoted to said lever at 28, as shown in Fig. 3. A spring, 27, arranged on rod 26, as shown in Fig. 3, serves to retract said rod as slide 6 is withdrawn, and thereby causes lever 23 to sweep the button from die 14 into chute 22, as stated. Said set-screw 25 is inserted in collar 46 on slide 6, and serves to secure said collar on said slide, in order that pin 5, which engages in slot 7 of lever *B'*, shall serve to carry said slide forward, as described.

To deliver the button-blanks into die 14 at the proper time, I employ the well-known conductor or chute with its hopper and tilting lifter, the button-blanks being placed in quantities in said hopper and by the reciprocating lifter fed into the chute, whence they are delivered into the molding-die. In Figs. 1, 2, 3 said delivery-chute is shown at 30, and to the upper end thereof is affixed the hopper 31, (shown in part in Fig. 1,) and in the center of such hopper is pivoted, at 38, the tilting lifter 32, which is raised by the connecting-rod 33, which is actuated by arm 34, secured on shaft 35, which is actuated by cam 37 on shaft *x*, Fig. 2, by the action of said cam on cam 36 on said shaft 35.

To insure the delivery of a button-blank into die 14 at the proper time and at each descent thereof, the horizontal plunger 39 is so arranged that as it is advanced it will push the lower blank forward into die 14, when the same is depressed, and is at its top even with its tubular holder or guide 43, as is shown in Fig. 4. Said plunger 39 is actuated by lever 40, which is pivoted at 41 on chute 30, and is vibrated by means of connecting-rod 42, which is pivoted to said lever and to the vertically-moving arm *d*, as shown in Fig. 1.

If from any cause there should be no blank in die 14 when the eye is advanced over the

same, then, to insure the removal of the eye from pin 16 in slide 6 when the same is retracted, I employ the curved spring-clearer 29, the lower point of which is in a slight groove in the top of slide 6, and is so curved that when said slide is advanced the eye will pass under said clearer; but when the slide is retracted it will, with the aid of the lower clearer, 44, detach the eye from pin 16, thereby preventing the accumulation of two eyes thereon, as would result if the unused eye remained on the pin and a second one was then formed. Should the button be carried back with slide 6 by reason of the eye adhering to pin 16, or from other causes, then the clearer 44, which is seated upon the spring 45, Figs. 4 and 5, and which has a limited vertical movement, will, by its contact with the button, detach the same and cause it to fall out of place, the top clearer, 29, acting upon the eye at the same time, as described. When the button blank or body 21 is raised by die 14 and forced upon the eye 18, the latter enters the body of the button, as is shown in Fig. 8, which shows the body in central section and the eye in side elevation; but when the button is compressed between the half-die 14 and the quarter-dies in slide 6 and block 19, the separated material is closed over the embedded shanks or ends of the eye, as is shown in Figs. 9 and 10, whereby the shank is, after the solidification of the button by baking or otherwise, rendered inseparable from the body except by breaking the same.

I am aware that it is not unusual to insert and secure the metallic eyes of buttons in the bodies thereof by forming an inwardly-diverging cavity in the body when in a plastic state, and when hardened passing the slightly-opened ends of the eye into such cavity, whereby, when said ends are brought in contact with the bottom of such cavity, they are spread apart and interlocked therein; but my method of securing the eye in the button-body is unlike that above described, in that the ends of the eye are spread open when the eye is formed and are forced into the body when it is in a plastic condition, after which the separated portion of the body is closed over the inserted part of the eye by subjecting the button to pressure in a mold.

I claim as my invention—

1. In a button-molding machine, the combination of the vertically-reciprocating half-die 14, the stationary die-block 19, and the horizontally-reciprocating die-slide 6, with mechanism to actuate such slide and vertically-moving die, when such respective parts of the die are adapted to receive, compress, and mold the button-blank and insert the eye therein, substantially as specified.

2. The combination of slide 6, with its eye-pin 16, the bending-jaws *k k*, and the anvil 17, all so constructed and arranged that the converging of said jaws shall bend the wire over said pin and the contact of the ends of the eye with said anvil shall turn said ends outwardly, substantially as specified.

3. The combination of tubular guide S, adjustable stop 24, jaws *k*, slide 6, with its eye-pin 16, and the bending-anvil 17, all constructed and combined to guide and stop the wire, and to cut, bend, and form the part so cut into an eye, substantially as specified.

4. In combination with slide 6, with its eye-pin 16, the upper clearer, 29, and the vertically-adjustable lower clearer, 44, arranged to remove from said pin at the backward movement of the slide the eye adhering to said pin, substantially as specified.

5. In combination with the molding-dies, the delivery-chute 30, and the advancing plunger 39, to insure the presence of the blank in the rising mold, and the automatic clearer 23, to insure the detaching of the molded button from the vertically-moving die, substantially as specified.

6. The combination of shaft C, with its cams D E F, and disk G, with its wrist-pin *b*; a connecting mechanism whereby cam F actuates the die-carrying lever 12 and a returning-spring, D'; a pivoted lever, B', so connected and arranged that cam E shall thereby reciprocate rod 6; a connecting mechanism whereby cam D serves to actuate ratchet L and a returning-spring, I; and a connecting mechanism whereby wrist-pin *b* serves to actuate the cutting-jaws *k*, with a returning-spring, H, all substantially as specified.

ZENAS B. PIERCE.

Witnesses:

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H. L. CUSHMAN.