

## Making Buttons from Plastic Materials.

Patented Nov. 27, 1866.

A diagram of a vertical beam. At the top, a horizontal force  $P$  is applied to the left. A point  $g$  is marked on the beam. A horizontal force  $H$  is applied to the right at a point  $h$ . At the base, a horizontal force  $H$  is applied to the right, and a vertical force  $V$  is applied upwards. A point  $i$  is marked on the ground line. A horizontal force  $Q$  is applied to the left at a point  $q$  on the ground line. A horizontal force  $U$  is applied to the left at a point  $u$  on the ground line. A horizontal force  $S$  is applied to the left at a point  $s$  on the ground line. A horizontal force  $L$  is applied to the left at a point  $l$  on the ground line. A horizontal force  $R$  is applied to the right at a point  $r$  on the ground line. A horizontal force  $T$  is applied to the right at a point  $t$  on the ground line. A horizontal force  $F$  is applied to the right at a point  $f$  on the ground line. A horizontal force  $G$  is applied to the right at a point  $g$  on the ground line. A horizontal force  $B$  is applied to the right at a point  $b$  on the ground line. A horizontal force  $A$  is applied to the right at a point  $a$  on the ground line.

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## IMPROVEMENT IN MACHINES FOR MAKING BUTTONS.

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*Letters Patent No. 60,053, dated November 27, 1866; antedated November 11, 1866.*

### SPECIFICATION.

#### TO ALL WHOM IT MAY CONCERN:

Be it known that I, LODNER D. PHILLIPS, of the city of New York, in the county of New York, and State of New York, have invented a new and useful Machine for Making Buttons from plastic materials; and I do hereby declare that the following is a full, clear, and exact description thereof, and of its mode or manner of operation, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and making a part of this specification.

The nature of my invention consists in the production of a simple and compact machine, by which the eye of the button is formed and inserted in the material of which the button is to be formed, at the same time that the button is being formed and moulded.

Figure 1 is a general perspective view of the whole machine.

Figure 2 is a detached and enlarged view of the mechanism for feeding the wire and discharging the buttons as formed.

Figure 3 is a side view of the mechanism for forming the eye.

Figure 4 shows the several parts as they are when the button is completed.

Figure 5 is a front view of the guide for the wire and the eye-former.

The frame, A, is solid or firmly connected together, so as to form sufficient support for the several working parts, and may be fixed to any suitable table or other support. The machine may be operated by power, or by the foot acting upon a prolongation of the upright lever, B, which has its fulcrum at C. To the upper end of such lever, B, there connects, by the pin *a*, which works or moves in the angular slot *b*, a cross-bar or head, D, having its bearing or fulcrum at *e*, and to the other end of which is fixed the mechanism for forming the eye of and inserting it in the button. To the same lever, B, below its turning point, there is connected, by the pin *d*, which works in the inclined slot *c*, another cross-head, E, which has its bearing at *f*, to the other end of which is connected the mechanism that forms and moulds the button while the eye is being inserted in it. The eye of the button is formed and inserted in the button as follows: A perpendicular rod or piston, F, a detached representation of which is shown in fig. 3, passes through and moves in a part G of the frame, and connects with the outer end of the cross-head D, through the slot *g*, which permits the necessary lateral motion of the end of the cross-head D, the end of such cross-head moving in an arc of a circle, while the piston or rod F has only a vertical motion. In the lower part of such piston F are suspended by a pivot *h* two jaws, 1 and 2, which are cut away at their lower ends, on their inside surfaces, as shown at *i*, fig. 3, sufficiently to allow the jaws, when brought together, as shown in fig. 4, to pass over and around the former, H, and the wire bent around it to form the eye. Such former, H, over which the wire is bent to form the eye, is fixed to one side of G, as shown in fig. 5, and its lower end, which is rounded to the size required for the button eye, rests upon the plate I, and over it passes the wire 3, as it is fed by the machine. To steady such wire and hold it in position over the former, as the jaws 1 2 descend, a thin plate *j*, having its lower end slit, is fixed to the front of the machine, and extends down over the wire, as shown in fig. 5. As the lower end of the lever, B, is moved in the direction indicated by the arrow, its upper end is carried in an opposite direction, causing the pin, *a*, to move up along the slot, *b*, and raising that end of the cross-head D, and consequently forcing down the other or outer end, and the piston, F, with it. As such piston is forced down, the jaws 1 and 2, the bottom of which are slightly concave, are forced against the wire, 3, and bend it over the former, H, the back edge of the jaw 1 at the same time cutting off the wire a proper length to form an eye. As the piston, F, still further descends, a projection, *k*, fixed to the side of the jaw 2, strikes against an inclined stud, *m*, securely fastened to the plate, I, and at the same time a projection *l*, on the other jaw, 1, strikes against a projection *n* on the machine; and the two jaws are thus forced together, and as they complete their descent they bend the eye into the form shown in fig. 4. The lower ends of such jaws, in completing their descent, pass through a recess in the plate, I, as shown in fig. 4, and an edge view of which recess is also seen in fig. 5. Such recess is, however, only just large enough to receive such jaws, so that none of the plastic material, of which the button is to be formed, can pass around such jaws and between them and the sides of such recess. At the same time that the piston F is being forced down and the button eye formed, as above described, the inner end of the lower cross-bar, E, is depressed or forced downward by the action of the inclined slot *c* on the pin *d*, and its outer end, with the piston J, is carried upward. Upon the upper end of such piston J is fixed the button mould K, fig. 4, in which is placed the plastic material, as glass, softened horn, rubber, or other material, from which the button is to be formed. The pistons,



F and J, are vertically in line with each other, and their movements toward each other are such that as the jaws 1 2 are descending to form the eye, as before described, the mould, with its contents, is also being elevated; and while the eye is being formed it is also forced or driven into the button, K, as shown in fig. 4; and is firmly fixed therein as the plastic material cools or hardens. The mould *k*, which is fixed to the top of the piston J, gives shape only to the face and sides of the bottom; the under side of the button is formed by the under side of the plate, I, and the ends of the jaws 1 and 2 (which pass through the plate, I, as before described,) which are shaped, as shown in figs. 4 and 5, to correspond with the desired form, flat, convex, or concave, of the under side of the button. The drawings show that part of the mould which is formed in the plate, I, as being convex. That part of the mould which is fixed to the piston J is, however, a little larger than that part of the mould formed in the under side of the plate, I, so that as the piston J is forced up against the plate, I, the sides of the mould, *k*, will shut over the mould in the plate, I, as shown in fig. 5, and cut or shave off any of the plastic material which may be forced out between the two parts of the mould. As soon as the button has been so formed, the lever, B, is moved in the opposite direction, and the pistons, F and J, recede from each other, and the button is left suspended by its eye from the former, H, from which it is discharged, as hereafter mentioned. The wire, 3, is fed, as required for each successive eye, in the following manner: From the inner end of the cross-head, D, extends a bar, L, which connects also with the curved arm, M, the outer end of which is geared, and meshes into the toothed wheel N, which rotates the roller, *o*, carrying along the wire, 3, which passes between such roller and the roller P. The toothed wheel, N, is fixed to the plate N', fig. 1, and both are loose upon the axle, *o*, so as to move freely in either direction. As the inner end of the cross-bar, D, is raised the curved arm, M, is raised, rotating the wheel, N, backward, or in the direction indicated by the arrow in fig. 2, such wheel then turning freely on the shaft, *o*; but as the inner end of such cross-bar, D, is depressed, or as the piston F is elevated, the arm, M, is forced downward, rotating the wheel N and plate N' in an opposite direction, or forward. As such wheel and plate are so revolved, a pawl *p* upon the plate N' falls into a ratchet-wheel, *r*, fixed to the axle, *o*, and thus gives motion to the roller, O, which carries forward the wire over the former, H, and in position to be shaped into an eye by the next descent of the piston F. The distance from tooth to tooth in the ratchet, *r*, is such as to deliver, at every descent of the arm, M, sufficient wire for a button eye. The wire is thus delivered as the parts of the mechanism, which form the button, are receding from each other, and is fully delivered before such parts again approach each other. To the plate N' is also fixed a pin, *s*, which, as such plate is revolved by the descent of the arm, M, drops into a recess or hook on the end of the arm R, drawing such arm backward, and thereby rotating the plate, I, to which such arm R is attached, sufficiently far to carry the button from off the former, H, on which it was left suspended, as before mentioned. As the outer end of the cross-head, D, again begins to descend, the curved arm, M, is lifted, revolving backward the plate N' and moving forward the arm R, and carrying or moving the plate, I, back to its proper position for the formation of another button. As the motion or rotation of the plate, I, required to discharge the button from off the former, H, is much less than the extent of the revolution of the plate N', the arm R is cut or sloped away from the hook in it before mentioned and toward the plate, I, on a curve the radius of which is equal to the distance from the axle *o* to the pin *s*, so that when the plate, I, has been carried to its proper position the pin *s*, as the plate N' is further revolved, will pass up along such curve out of the hook in the arm R without further moving the plate I. When the plate N' is revolved in the opposite direction by the descent of the arm M, the pin *s* passes down such curve and does not begin to act upon the arm R until such pin has passed into the hook or recess before described. Such arrangement also permits the plate I to be at rest at the times when the jaws are passing through it in the formation of the eye, and also while they are passing out of it. The drawings represent a machine constructed to form but a single button at one operation, but the machine can be made to form a number of buttons at one and the same time.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The general construction and arrangement of the entire machine for forming buttons from plastic materials, the several parts constructed and operating, severally and in combination, substantially as described.
2. The combination and arrangement of the operating lever B, with the two cross-heads or levers, D and E, substantially as described, by which the outer ends of such cross-heads are made to approach or recede from each other simultaneously, substantially as and for the purposes set forth.
3. The construction and arrangement of the movable jaws, in combination with the former, or its equivalent, for making and shaping the eye of the button, the several parts constructed and operating substantially as described.
4. The construction and arrangement, substantially as described, of the mould to form the button, the same being in two parts, one fixed and the other movable, and the latter shutting over or upon the former, substantially as and for the purposes set forth.
5. The construction and arrangement of the oscillating plate between the mechanism that forms the eye and the movable part of the mould, such plate supporting the former while the eye is being formed, and constituting also a portion of the mould for shaping the button, and by its oscillating motion discharging the buttons as they are formed.
6. The combination of the several parts forming the eye of the button with the parts which mould or shape the button, and their relative motions toward each other, and operating substantially as described, whereby the eye of the button is formed and inserted in the button at the same time the latter is being moulded and shaped.
7. The arrangement of the mechanism for feeding the wire to form the eye, arranged and operating substantially as described.

8. The construction of the arm, B, in combination with the pin e, or their equivalent, for oscillating the plate I, substantially as and for the purposes set forth.

L. D. PHILLIPS.

Witnesses:

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FRED. B. SEARS.

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