(No Model.) 3 Sheets—Sheet 1.

G. CARLYLE.

BUTTON FORMING MACHINE.

No. 550,590. Patented Dec. 3, 1895.

Fig. 1.

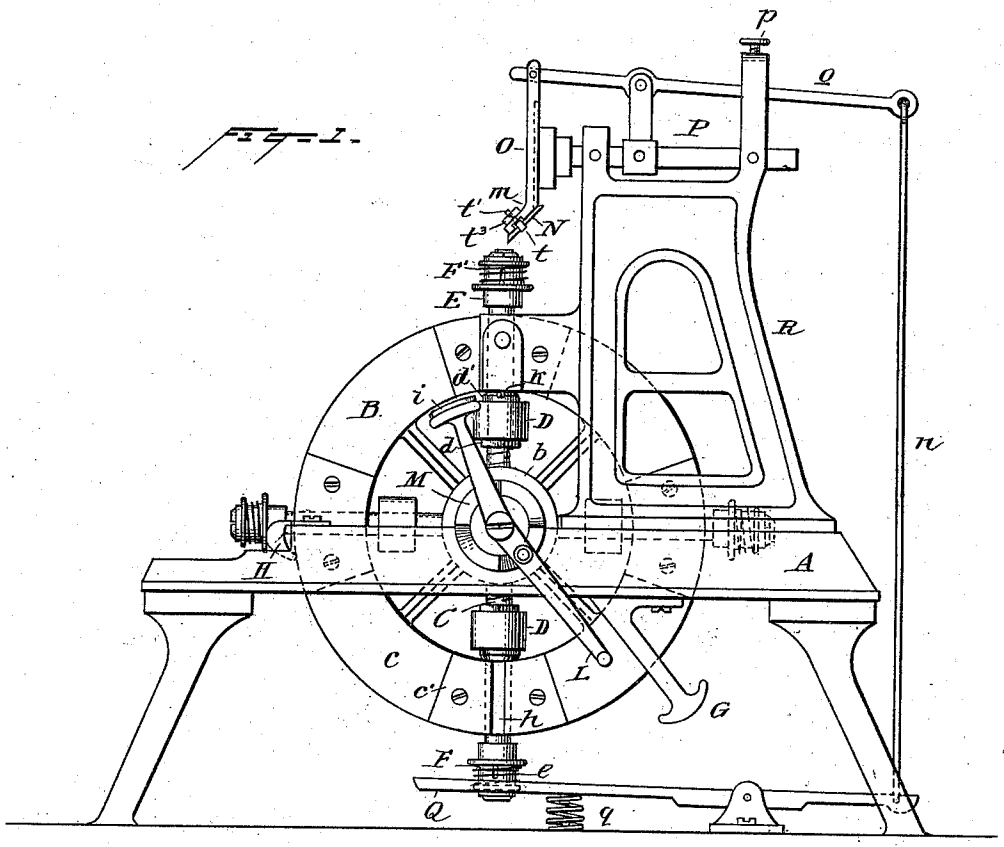
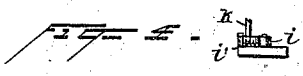


Fig. 4.



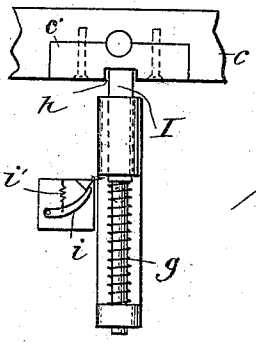


Fig. 3.

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G. CARLYLE.

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Fig. 2.

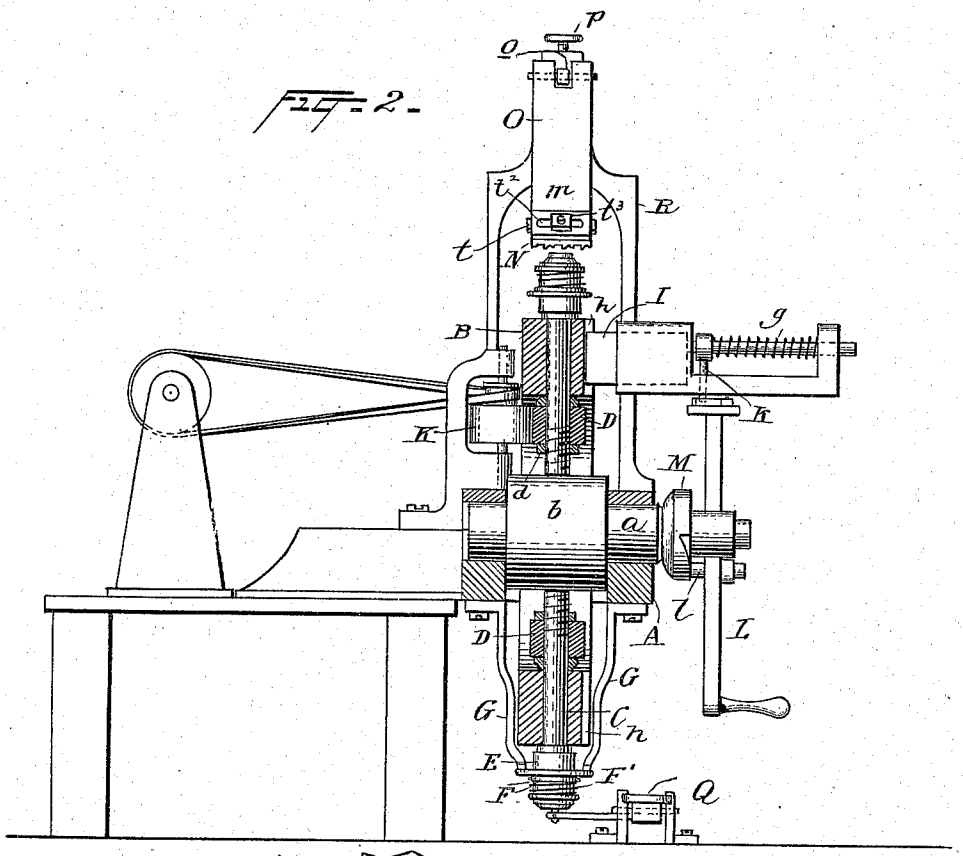
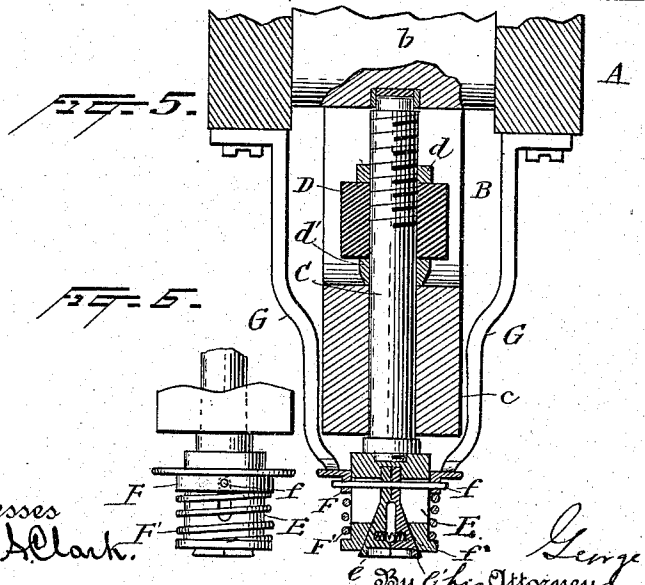


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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BUTTON FORMING MACHINE.

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Fig. 7.

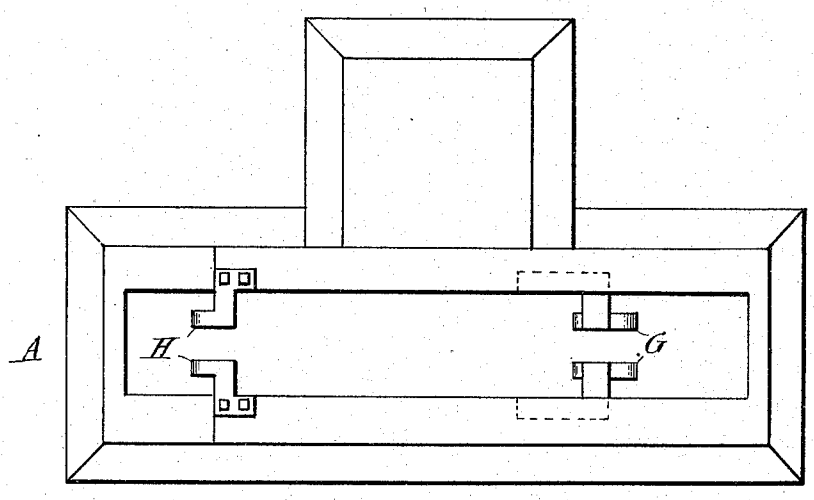


Fig. 8.

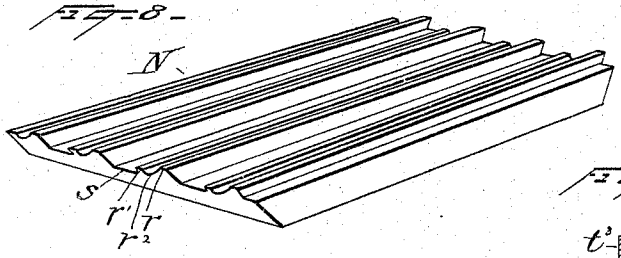


Fig. 9.

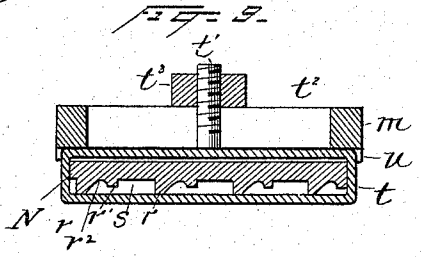
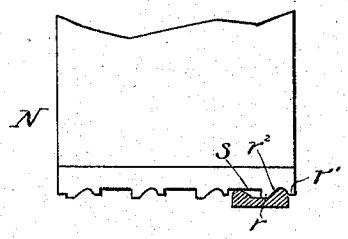


Fig. 10.



Witnesses
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By his Attorneys
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UNITED STATES PATENT OFFICE.

GEORGE CARLYLE, OF DETROIT, MICHIGAN, ASSIGNOR TO HENRY W. CROUSE, TRUSTEE, OF NEW YORK, N. Y.

BUTTON-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 550,590, dated December 3, 1895.

Application filed December 23, 1892. Serial No. 456,180. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CARLYLE, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Button-Forming Machines, of which the following is a specification.

The object I have in view is to produce a machine for forming the faces and backs of buttons, especially those manufactured from mother-of-pearl, which, while enabling a large number of buttons to be formed per day by a single unskilled operator, will at the same time do work of superior quality equal to that which can be done by skilled labor with steel turning-tools.

A further object is to provide a machine of this character with a cutting-tool which can be readily resharpened without danger of modifying the shape of its cutting-edge and will be capable of a large extent of use without resharpening, whereby the expense and delay incident to the resharpening and reshaping of the cutting-tools will be largely avoided.

In carrying out my invention I provide a steel cutting-tool made from a plate of steel, one face of which is channeled to form two or more sets of ribs extending the entire length of the plate. The plate being ground to a bevel at one end, so that the ribbed face will form the projecting edge of the bevel, the ribs give the desired configuration to the cutting-edge of the tool, and as that edge becomes dull in use the tool can be ground to a new edge, the configuration of which will always be preserved by the longitudinal ribs on the face of the tool. So long as any of the plate remains the simple grinding of its beveled edge on a flat surface will always produce the desired configuration of the cutting-edge, and consequently there is no care required for the shaping of the tool in grinding, and the resharpening can be quickly and cheaply done. By having a number of sets of ribs upon the face of the tool several independent cutting-edges are formed by the same plate, and as one becomes dull another, by the lateral adjustment of the tool without removing it from the machine, can be brought into action, and thus the length of time that one of these tools can be used without removing it from the machine is increased in proportion to the number of new cutting-edges which are thus available for use. In the machine which I have devised this cutting-tool is mounted so as to be capable of lateral adjustment in a sliding tool-holder adapted to be brought forward by the operator into position to act upon a rotating button-blank. The button-blanks are mounted in spring-chucks carried by spindles, which spindles in turn are carried by a rotating wheel, in the hub and rim of which they are journaled. Cams are provided which open each chuck below the horizontal line to permit the button to fall out of it and to clear the chuck of dirt and also to open each chuck before being brought into position to be acted on by the cutting-tool, so that a blank can be placed in the chuck. Each chuck-spindle is provided with a friction-wheel, of rubber or other suitable yielding material, and as the chuck-carrying wheel is turned to bring a chuck beneath the cutting-tool the friction-wheel on the spindle of that chuck is brought into contact with a continuously-revolving wheel, which rotates the chuck-spindle while its chuck is under the tool, and as the wheel is moved to bring the next chuck into position for cutting the friction-wheel of the first chuck-spindle is moved away from and out of connection with the continuously-revolving wheel. A spring-dog is provided for locking the chuck-carrying wheel in each position of rest, and a swinging operating-handle is also provided, which by its movement first withdraws the locking-dog and then moves the chuck-carrying wheel to bring the next chuck into position, where the wheel is again held by the locking-dog.

The details of the machine will appear by reference to the accompanying drawings, in which—

Figure 1 is a front view of the machine. Fig. 2 is a side view and partial vertical section of the machine. Fig. 3 is a top view showing a portion of the chuck-carrying wheel, the locking-dog, and releasing device. Fig. 4 is an edge view of the releasing device. Fig. 5 is a sectional view of one of the

chucks and chuck-spindles. Fig. 6 is a side view of one of the chucks. Fig. 7 is a top view of the main frame or table of the machine, showing the position of the cams for opening the chucks. Fig. 8 is a perspective view of the cutting-tool. Fig. 9 is a sectional view through the holder and tool, and Fig. 10 is a view showing the tool acting upon the button.

A is the bed-plate or frame of the machine, preferably having the T shape shown in Fig. 7, the main part of the frame having a rectangular opening, in which is placed the wheel B, the shaft *a* of this wheel being journaled in boxes upon the top of the frame. The hub *b* of the wheel B bears at its ends against such boxes, so that the wheel is held against motion lengthwise of its shaft. The rim *c* of the wheel is supported by four solid spokes, as shown, and between these spokes there are mounted upon the wheel four chuck-spindles C. As shown more particularly in Fig. 5, each of these chuck-spindles has a reduced inner end, setting in a socket in the hub and surrounded therein by a steel thimble and bearing upon a disk, of rawhide or other suitable material, in the bottom of said socket. Where each spindle passes through the rim *c* of the wheel, that rim is cut away to give place to a bearing-plate *c'*, which is secured by screws to the rim and completes the bearing for the spindle. Between the rim and the hub each spindle is provided with a rubber friction-wheel D, which is held between a screw-collar *d* and a loose thimble *d'*. By turning the screw-collar *d* the rubber friction-wheel will be compressed between that collar and the loose collar *d'*, thus expanding such wheel to the extent necessary, and by the pressure of the loose collar *d'* on the inner side of the rim of the wheel B the spindle C will be drawn inwardly and held in position in the wheel.

Upon the outer end of each spindle is screwed a solid chuck-block or socket E, having bored through it a central opening which is made tapering at the outer end of the chuck-block. In this tapered opening are the two pieces *e e'*, forming the chuck-jaws. These chuck-jaws fit the tapered opening and are held therein by a transverse pin *f*, which passes through a slot in the chuck-block E and through a collar F, surrounding said chuck-block. The collar is forced inwardly by a spiral spring F', also surrounding the chuck-block, thus drawing the chuck-jaws into the block and closing them upon each other by reason of the tapered opening in the chuck-block. A spiral spring *f'* tends to force the chuck-jaws apart, so that if the collar F is forced outwardly against the tension of the spiral spring F' it will push the chuck-jaws *e e'* out of the tapered opening in the chuck-block and such jaws will be spread apart by the spring *f'*. To accomplish the opening of the chuck-jaws there are two sets of cams G and H, mounted upon the frame or bed and engaging with the collar F of each chuck as the wheel B is rotated. The cams G are on the under side of the bed-plate and act upon the chucks after they have left the cutting-tool, as will be presently explained, while the cams H are on the upper and opposite side of the bed-plate and serve to open the chucks to receive new blanks. Since the blanks are operated upon by the cutting-tool when the chuck-spindles reach the top of the wheel, a locking-dog I is provided to lock the wheel in this position. This dog is forced forward by a spiral spring *g* and engages with slots *h* in the rim of the wheel or in the plates *c'*. For rotating the spindles when being acted upon by the cutting-tool there is provided a wheel K, continuously rotated by a belt connection, as shown in Fig. 2, and with which each rubber friction-wheel D is brought in contact as the spindles come to rest opposite such wheel. To release the locking-dog and rotate the wheel, there is pivoted on the end of the shaft *a*, where it projects beyond the front of the frame, a swinging arm L. The upward extension of this arm carries a pivoted tongue *i*, which engages with a pin *k*, projecting downwardly from the bolt I. When the handle of the arm L is swung to the left, the upper end of the arm will pass from the left to the right under the locking-dog and the tongue *i* will engage with the pin *k* and withdraw the locking-dog, so as to release the wheel B. In the return movement of the tongue *i* from the right to the left the pin *k* will pass back of the tongue *i*, which will spring outwardly against the tension of the light retracting-spring *i'* and will not disturb the position of the locking-dog.

A ratchet-disk M is fixed to the shaft *a* and has four ratchet-teeth on its face with which engages a spring-pawl *l* on the arm L. The teeth of the disk M are so arranged with relation to the pawl *l* that in the movement of the arm L the tongue *i* will first strike and withdraw the locking-dog before the pawl *l* engages with one of the teeth of the ratchet-disk M. This engagement, however, takes place and the wheel begins to turn while the dog is still held out of engagement by the tongue *i*. When the tongue *i* has passed by the pin *k* on the dog and the dog is released, it cannot again enter the slot *h* from which it has just been withdrawn, because the wheel has advanced and the dog bears against the rim of the wheel until the next slot *h* is presented, when it drops into that slot and locks the wheel with the next chuck under the cutting-tool.

The cutting-tool N is mounted upon a tool-holder *m*, which forms the foot of a sliding plate O, mounted upon the head of an adjustable spindle P. The plate O is moved up and down by means of a foot-lever Q through a rod *n* and a lever *o*, an adjustable stop *p* being provided to limit the movement of these parts and a spring *q* being also provided for throwing the pedal Q upwardly and retracting

the cutting-tool. The spindle P is mounted upon a frame R, resting upon the bed-plate A and supporting the tool above the top of the wheel B in position to bring the tool into connection with each blank when the chuck-holding blank has reached the highest point in the revolution of the wheel. The tool N is a flat steel plate having channeled or ground in one of its faces two or more sets of ribs $r\,r'$, extending the entire length of the plate. Each set of these ribs $r\,r'$ with the intervening channel r^2 form the edge of a tool for turning a button, which edge may be of any desired configuration. The higher rib r, forming the more advanced point of the tool, cuts the center of the button, while the rib r' forms its outer edge, and between these ribs there may be one or more intermediate ribs to give any desired configuration to the button. If the button to be formed does not have a depressed center, the rib r will be partly or wholly omitted. Between each set of ribs $r\,r'$ and the next set is a channel s, which is wide enough to permit the button-blank in turning to clear the nearest rib of the next set, as shown in Fig. 10. The edge of this tool is formed by grinding the end of the plate to a bevel, as shown, leaving the ribbed side of the plate as the projecting edge of the bevel. The tool N is secured to the tool-holder m by means of a strap t, which surrounds the tool and from which projects a bolt t', passing through a lateral slot t^2 in the tool-holder and held by a nut t^3. The strap t is drawn into a lateral groove u on the under side of the tool-holder m, so that the tool is clamped against the under side of the tool-holder and is prevented from any pivotal displacement. The slot t^2 permits the tool to be readily adjusted laterally, so as to bring either set of ribs into position for operating upon a button-blank. Each set of ribs forms a complete tool for turning a button, and hence the tool N can be adjusted laterally until all the cutting-edges are dulled before it is necessary to remove the tool from the machine. Then by simply grinding the beveled end of the plate a new cutting-edge of the desired configuration will be formed.

From the description already given the operation of the cutting-tool in conjunction with the rotating chuck-carrying wheel B will be evident. The button-blanks are placed in the chucks when they are opened by the cams H, the operator holding the blank in the open chuck until the wheel has been started and the chuck closes. The buttons which are released from the chucks by the cams H fall into a suitable receptacle. After moving each chuck into position under the operating-tool the operator depresses the pedal Q, which brings the tool into contact with the blank and causes it by the rotation of the spindle to cut the blank to the proper shape.

What I claim as my invention is—

1. In a button-forming machine, a cutting tool having two or more sets of ribs upon one face, forming two or more separate cutting edges of the desired configuration, which can be resharpened without altering the configuration by simply grinding away the end of the plate, substantially as set forth.

2. In a button-forming machine, the cutting tool composed of the plate N, provided with two or more sets of cutting ribs and intermediate clearing channels extending throughout the length of the plate on one side and adapted to form two or more independent cutting edges by the grinding of the end of the plate, substantially as set forth.

3. In a button-forming machine, the combination of a cutting tool having two or more separate cutting edges of the desired configuration, and a holder for said tool adapted for lateral adjustment to permit the several cutting edges of the tool being brought into operative position, substantially as set forth.

4. In a button-forming machine, the combination of an intermittently moving chuck-carrier, two or more rotary blank-holding chucks, power transmitting devices for rotating said chucks independent of each other, and a single non-rotating forming tool adapted to act upon a button-blank during the intervals of rest of the carrier, substantially as set forth.

5. In a button-forming machine, the combination of an intermittently moving chuck-carrier, two or more rotary blank-holding chucks, a single non-rotating forming tool adapted to act upon a button-blank during the intervals of rest of the carrier, and power transmitting devices for rotating the chucks when beneath the forming tool, substantially as set forth.

6. In a button-forming machine, the combination with an intermittently rotating wheel, of two or more rotatable chuck spindles mounted radially in said wheel, by the rotation of which wheel, the blank-holding chucks carried by said spindles are brought under the cutting tool, and a reciprocating cutting tool adapted to act upon a blank during the intervals of rest of the wheel, and means for rotating said chuck spindles only when the chucks are under the cutting tool, substantially as set forth.

7. In a button-forming machine, the combination with an intermittently rotating wheel, two or more rotatable chuck spindles mounted radially upon said wheel, a yielding friction wheel on each chuck spindle, a rotating wheel with which the friction wheel of each chuck spindle is brought in contact when the chuck is under the cutting tool, and a reciprocating cutting tool adapted to act upon a button blank during the intervals of rest of the wheel, substantially as set forth.

8. In a button-forming machine, the combination with a rotating carrying wheel, of chuck spindles mounted radially thereon, a locking dog for such wheel, a pawl and ratchet, and an arm for moving said wheel through the pawl and ratchet and for disengaging the locking dog, substantially as set forth.

9. In a button-forming machine, the combination with a chuck-carrying wheel, of a chuck socket, a number of separate jaws within said socket, a pin passing through said jaws, whereby said jaws are pivoted together, a spring for drawing said jaws within said socket, stationary cams for forcing said jaws outward, and a spring within the jaws for opening same when forced outward, substantially as set forth.

This specification signed and witnessed this 3d day of December, 1892.

GEORGE CARLYLE.

Witnesses:
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GEORGE B. CRONK.