No. 647,903. Patented Apr. 17, 1900.

W. E. NAGEBORN.

BUTTON FACING MACHINE.

(Application filed Apr. 13, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

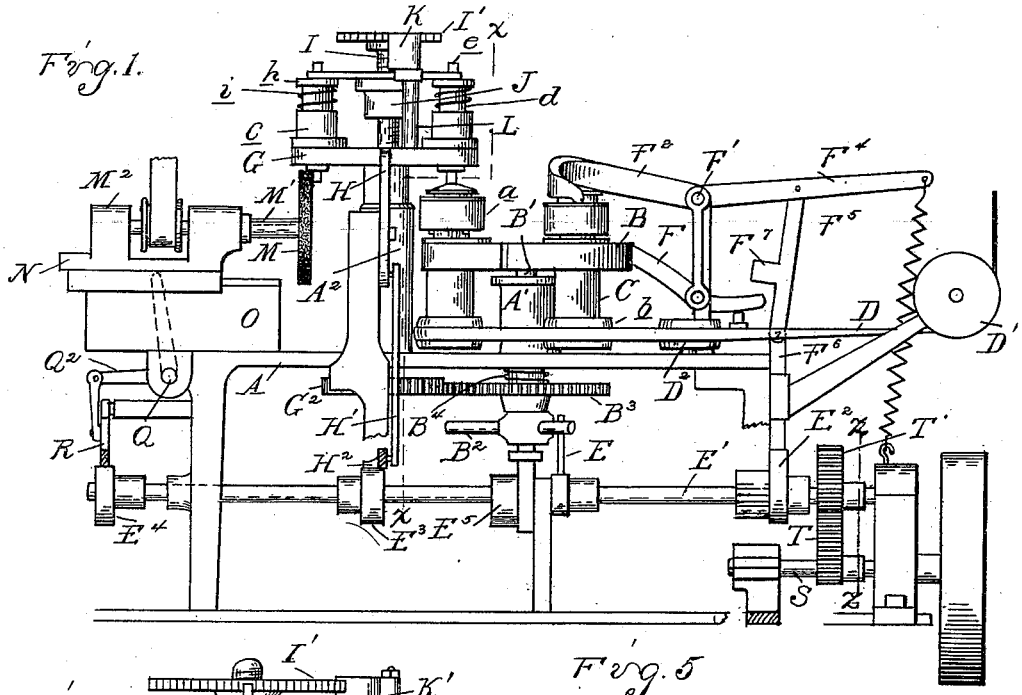


Fig. 4.

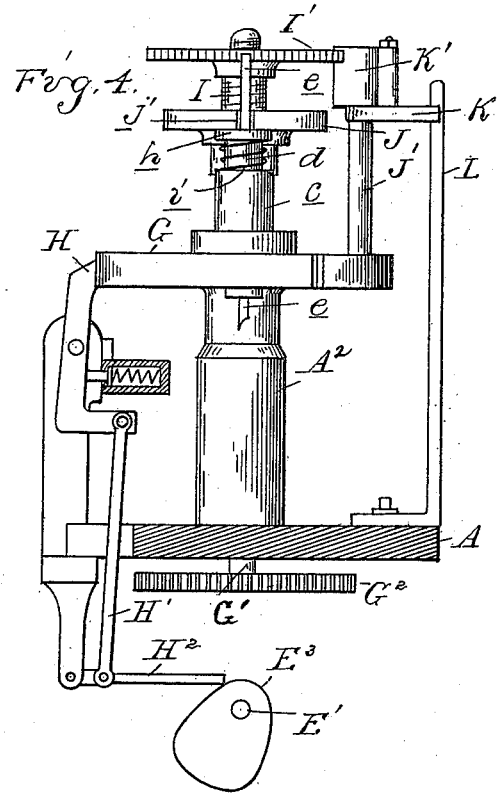


Fig. 5.

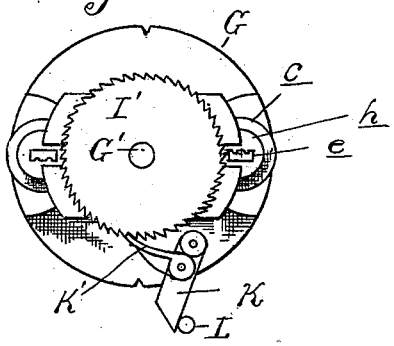
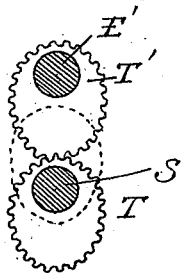


Fig. 8.



Witnesses
[illegible]

Inventor
Wilhelm E. Nageborn

By Mc. A. Sprague & Son
Attys.

No. 647,903. Patented Apr. 17, 1900.

W. E. NAGEBORN.

BUTTON FACING MACHINE.

(Application filed Apr. 13, 1898.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

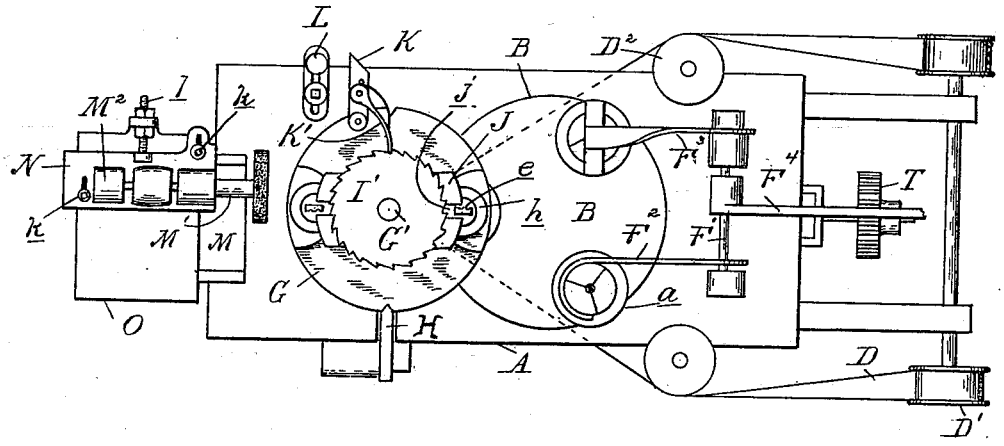


Fig. 3.

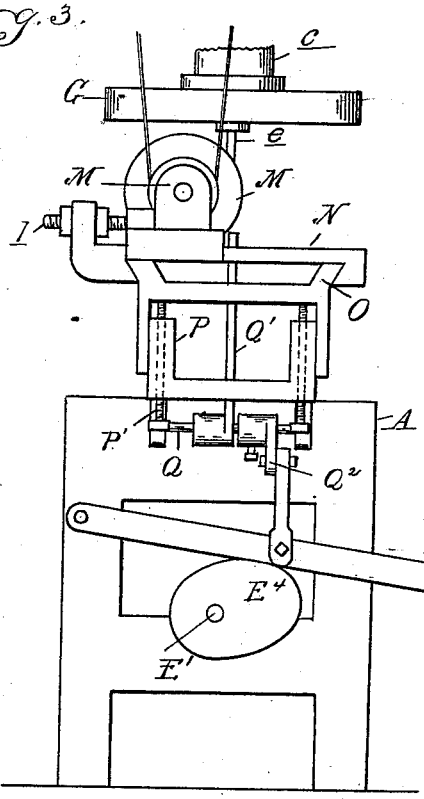
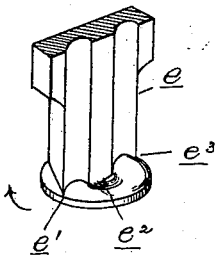


Fig. 9.



Witnesses
R. L. Kelly
Otto F. Barthel

Inventor
Wilhelm E. Nageborn
by Thos. A. Spaight & Son
Attys.

No. 647,903.

Patented Apr. 17, 1900.

W. E. NAGEBORN.

BUTTON FACING MACHINE.

(Application filed Apr. 13, 1898.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 6.

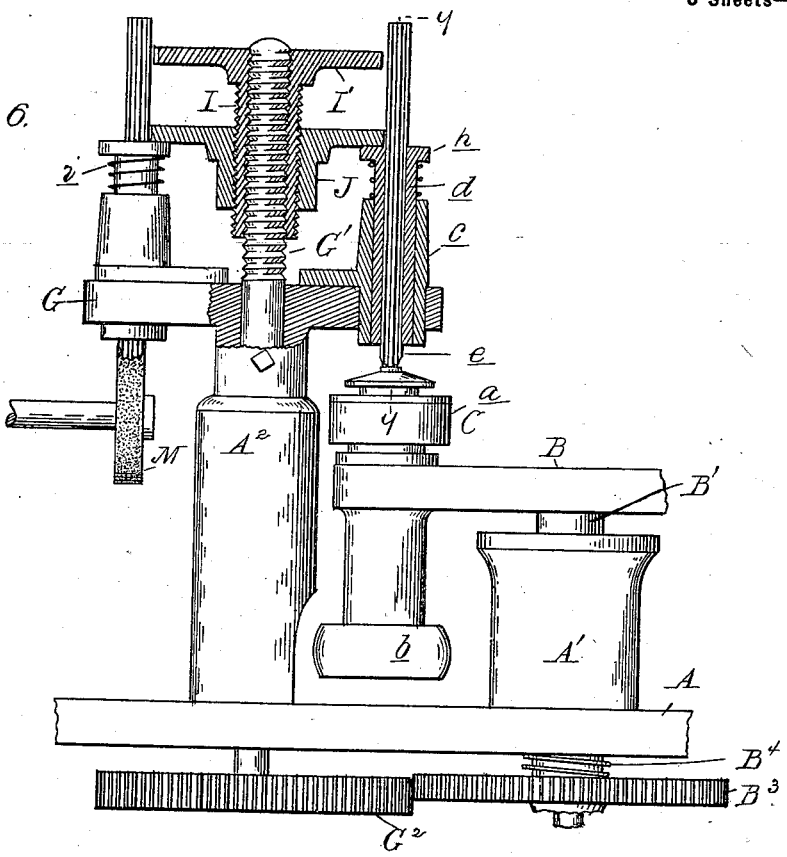
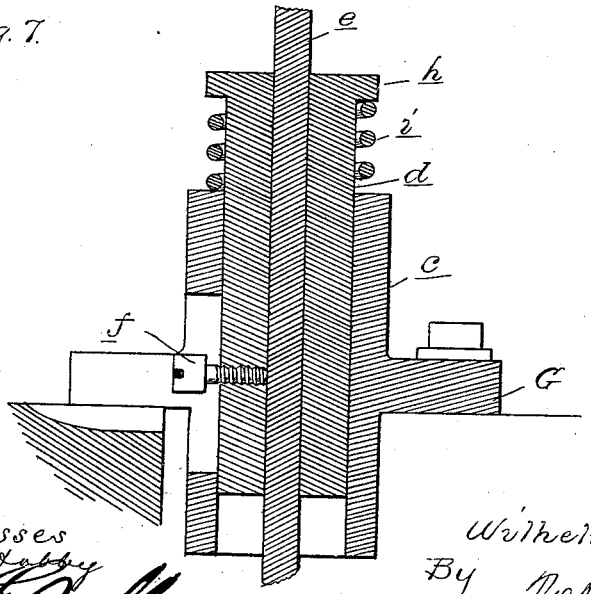


Fig. 7.



Witnesses
A. L. Habby
Otto F. Barth

Inventor
Wilhelm E. Nageborn
By Thos. G. Morgan & Son

UNITED STATES PATENT OFFICE.

WILHELM E. NAGEBORN, OF DETROIT, MICHIGAN, ASSIGNOR TO THE MONITOR BUTTON COMPANY, OF SAME PLACE.

BUTTON-FACING MACHINE.

SPECIFICATION forming part of Letters Patent No. 647,903, dated April 17, 1900.

Application filed April 13, 1898. Serial No. 677,404. (No model.)

To all whom it may concern:

Be it known that I, WILHELM E. NAGEBORN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Button-Facing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention consists in the means employed for maintaining the tool constantly in perfect condition for operating upon the work and producing uniform results therein, and more particularly in the means for holding the tool and for feeding and grinding it between operations.

The invention further consists in the peculiar combination, with said tool-holding means, of a work-carrier, and, further, in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of my machine. Fig. 2 is a plan view thereof. Fig. 3 is a rear elevation. Fig. 4 is a cross-section on line $x\,x$, Fig. 1. Fig. 5 is a plan of the parts shown in Fig. 4. Fig. 6 is a longitudinal section, partly in elevation, through the tool-carrier. Fig. 7 is a section on line $y\,y$, Fig. 6. Fig. 8 is a section on line $z\,z$, Fig. 1. Fig. 9 is a perspective view of the end of the tool and the button on which it is operating.

Upon a suitable framework or table A is mounted the rotary head B, carrying a series of button-holding chucks C. As these chucks form no part of my present invention, I shall omit describing them in detail and will simply say that the jaws of the chucks are adapted to hold the button-blanks and are spread to grasp or release said blanks by depressing an annular ring or collar *a* surrounding the chuck. There are preferably three of these chucks mounted free to rotate in bearings in the rotary head B, their shanks passing through said bearings and being provided at their lower ends with the pulleys *b*.

D is a drive-belt passing over idler-pulleys D′ D^2 and around the pulley *b* of the chucks, the idlers D^2 serving to hold said belt out of contact with all but one of said chuck-pulleys.

The head B is mounted upon a vertical spindle B′, passing through the bearing A′ on the frame A and having at its lower end a head provided with radial arms B^2, corresponding in number to the chucks. The head B is intermittently turned through a partial rotation by a radial arm E, extending from a head on a horizontal shaft E′ and adapted to engage successively with the arms B^2.

F is a spring-pressed dog having a V-shaped end adapted to engage with V-notches in the periphery of the head B to stop and hold said head in exact position after each partial rotation

F′ is a rock-shaft journaled in standards on the frame, having the rock-arms F^2 and F^3 secured thereto and adapted to engage with and depress the ring *a* of two of the chucks, so as to spread the jaws thereof, and thereby release the finished button from one and permit the operator to place a blank in the other.

F^4 is an actuating rock-arm for the shaft F′, and F^5 is a pitman connecting this arm with a vertically-sliding head F^6, which is intermittently raised and lowered by a cam E^2 on the shaft E′, the pitman F^5 having an arm F^7, adapted to engage with and retract the dog F in the downward movement of said pitman.

The mechanism so far described forms no part of my present invention, which comprises the following construction and arrangement of parts:

G is a head secured to a spindle G′, journaled in the standard A^2 upon the frame in proximity to the head B. This head is provided with two tool-carriers arranged on diametrically-opposite sides thereof adapted in the rotation of said head to be carried over the third chuck of the head B. The head G is actuated by a gear-wheel G^2, meshing with a gear-wheel B^3 on the shaft B′, which gears are so proportioned that each third of a revolution of the head B will cause a half-revolution of the head G.

H is a spring-pressed holding-dog similar to the stopping and holding dog F and engag-

ing with notches in the periphery of the head G, being adapted to be retracted by a rod H′, connected to a lever H^2, engaging with a cam E^3 on the shaft E′.

The spindle G′ extends above the head G and is screw-threaded.

I is a sleeve interiorly threaded to engage with the spindle G′ and having an exterior thread of slightly-lesser pitch.

I′ is a ratchet-wheel secured to the upper end of the sleeve I.

J is a centrally-apertured head interiorly threaded to engage with the sleeve I and extending over the tool-carriers. These tool-carriers comprise the bearings *c*, secured to the head G, in which are vertically slidingly secured the sleeves *d*, having the tool-bars *e* passing centrally therethrough and secured therein by a set-screw *f*. At the upper end of the sleeves *d* are the collars *h*, between which and the top of the bearings *c* a spring *i* is secured.

The head J is adapted to bear against the upper end of the sleeves *d* and has the slots *j*′, through which the tool-bars *e* pass.

J′ is a post on the head G, having pivotally secured thereon at the upper end the rock-arm K, which is adapted in the rotation of the head to strike against a post L on the frame.

K′ is a pawl carried by the arm K and engaging with the ratchet-wheel I′, the width of this pawl being sufficient to permit it to move some distance vertically in relation to said ratchet-wheel without being disengaged therefrom.

M is a grinding-wheel secured to a horizontal arbor M′, which is journaled in bearings M^2. These bearings are laterally adjustably secured, preferably by means of the clamping-bolts *k* and adjusting-screws *l*, to the head N, the latter being longitudinally slidingly secured to ways upon the plate O.

The plate O is vertically adjustably secured to the standard P on the frame, preferably by means of the adjusting-screws P′, passing through said standard.

Q is a rock-shaft journaled in the frame below the sliding head N, having the upwardly-extending rock-arm Q′ engaging with a slot in said head.

Q^2 is another rock-arm on the shaft Q, connected by the link R with the weighted lever R′, resting on a cam E^4 on the shaft E′.

E^5 is a cam on the shaft E′, on which the lower end of the spindle B′ rests.

B^4 is a spring interposed between the gear-wheel B^3 and the bottom of the table A.

The tool-bars *e* are of such a shape that when sharpened by being ground obliquely the edge will be of the proper contour and will extend completely across the button or equally upon opposite sides of the center thereof.

The parts being thus constructed, the operation of the machine is as follows: Motion is imparted to the shaft E′ from a drive-shaft S through the medium of the elliptic gears T and T′, these driving the shaft E′ at a variable speed. The rotation of the shaft E′ will cause the cam E^2 thereon to raise the sliding head F^6 and through the pitman connection F^5 and rock-arm F^4 will rock the shaft F′, causing the rock-arms F^2 and F^3 to depress the collar *d* of the chucks C beneath said arms, and thereby to open the jaws of said chucks. This will allow the operator to place a button in one of said chucks, which as the arms F^2 and F^3 are raised again by the further movement of the cam will be clamped firmly in position by the jaws of the chuck. Each rotation of the shaft E′ will cause the arm E to turn one of the arms B^2 through a third of a revolution and the head B correspondingly. At the completion of this movement the dog F will engage with the notch in the periphery of the head, drawing and holding said head in a position where that chuck C in which the button has just been placed will be exactly in line with the tool in the carrier on the head G. The movement of the head B is accomplished during the fast part of the rotation of the shaft E′, and the continued slower rotation of said shaft will cause the cam E^5 to raise the spindle B′ and lift the head B. This will carry the chuck C which is in line with the tool upward into operative relation thereto, while the belt D will impart a rotary movement to said chuck. Thus if the chuck is rotated to carry the button in the direction indicated by the arrow in Fig. 9 it will cause the edge of the tool between the points *e*′ and e^2 to cut into the button and shape it to the desired form, while that portion of the tool edge between the points e^2 and e^3 will scrape and smooth the shaped surface. After the button is faced a further movement of the cam E^5 will lower the head B, dropping the faced button away from the tool. The arm E on the shaft E′ will then again come into engagement with one of the arms B^2 and rotate the head B through another third of a revolution, carrying the faced button into a position where the depression of the arm F^2 will cause the opening of the chuck-jaws and allow the button to drop through the hollow spindle of the chuck and into a suitable receptacle below the same. At every movement of the head B the head G will also be rotated through the gears B^3 and G,^{2} which will carry the tool that has just operated upon the button into a position where it can be operated upon by the grinding-wheel M. Each revolution of the head G will cause the rock-arm K on the post J′ to strike against the post L, which will rock said arm and cause the pawl K′ carried thereby to turn the ratchet-wheel I′ one or more notches. This will feed the sleeve I slightly downward upon the threaded spindle G′. The head J, however, being held from rotation will not be carried down to the same degree as the sleeve I, but will allow said sleeve to feed downward therethrough. Thus the actual downward movement of the head J is only the difference

between the pitch of the inner and outer threads on the sleeve I. By this arrangement I am enabled to obtain an extremely fine feed of the tool, the head J pressing the sleeve *d* downward in the bearings *c* against the tension of the springs *i*. After each movement of the head G the lever E^4 on the shaft E′ will lift the weighted lever R′ and through the medium of the link R, rock-arm Q^2, rock-shaft Q, and rock-arm Q′ will slide the head N forward on the ways O, carrying the grinding-wheel M across the end of the tool *e*, while the weight on the lever R′ will carry said grinding-wheel back again. This reciprocation of the grinding-wheel will cause the grinding off of the end of the tool to whatever degree said tool has been fed downward in the rotation of the head.

The tool may be ground to any desired angle by properly adjusting the position of the grinding-wheel. Thus if the wheel is adjusted backward and upward the tool will be sharpened to a more acute angle, and if the wheel is adjusted forward and downward the angle of grinding will be more obtuse. These adjustments may be readily made by means of the adjusting-screws *l* and P′.

What I claim as my invention is—

1. In a button-facing machine, a feed for the tool comprising the spindle or shaft screw-threaded, a sleeve engaging therewith, a head having a screw-threaded engagement upon the sleeve, the threads upon the interior and exterior of the sleeve being of slightly-different pitch, the tool, the head being connected to the tool, and driving means for the sleeve.

2. In a button-facing machine, the combination with a revoluble head having an intermittent rotational movement and provided with a series of chucks, of a tool-holder having a complementary movement through a different orbit in a parallel plane, carrying a series of tools, means for registering a tool with a chuck and causing the tool and button to contact and to separate after the button is faced and means for grinding the tool at an intermediate position in its movement.

3. In a button-facing machine, the combination with a revoluble head having an intermittent rotational movement, a series of chucks thereon, a tool-holder having a complementary movement through a different orbit, a series of tools thereon, means for holding the tool-holder and the head stationary at the point where the tool and chuck are alined, means for rotating the chuck, means for causing the chuck to approach the tool and to recede therefrom after the blank is faced and means for grinding the tool at an intermediate position of its movement.

4. In a button-facing machine the combination with the tool and a grinder therefor, of a revolving head for carrying said tool alternately to its working and its grinding positions, and means for feeding the tool comprising a tool-head, a differential screw connecting said tool and carrier heads and means for turning said screw slightly at each revolution of the carrier.

5. In a button-facing machine, the combination with the tool, a grinder therefor and a rotary head for carrying said tool alternately to its working and its grinding positions of feeding means for the tool comprising a central threaded shank on said carrier, a centrally-apertured tool-head surrounding said shank, a sleeve having differential interior and exterior screw-threads engaging respectively with said shank and tool-head, a ratchet-wheel on said sleeve, a pawl carried by said carrier-head, and a stationary finger or stop adapted to actuate said pawl in each rotation of the carrier.

6. In a button-machine the combination of the rotary tool-carrying head, tool-holding sleeves slidingly secured in bearings on diametrically-opposite sides of said head, a tool-head bearing on said sleeves and counteracting-springs on the sleeves, a central threaded spindle on the carrier-head, a feed-sleeve having differential interior and exterior screw-threads respectively engaging with said spindle and tool-head, a ratchet-wheel on said sleeve, a pawl carried by said carrier-head and a stationary stop or finger by which said pawl is adapted to be actuated in each rotation of the carrier.

7. In a button-facing machine, the combination with the tool of a rotary head carrying work-holding chucks, a vertical spindle for said head having radial arms corresponding in number to the chucks, a variable-speed drive-shaft below said spindle carrying an arm thereon adapted to engage with said radial arms in the fast portion of the movement of the shaft, and a cam adapted to raise said spindle in the slow movement of the shaft for the purpose described.

8. A button-facing tool having an edge adapted to extend completely across the face of the button-blank and of similar contour on opposite sides of the center, one half of said edge forming a cutter and the other half a scraper.

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

WILHELM E. NAGEBORN.

Witnesses:

JAMES WHITTEMORE,

OTTO F. BARTHEL.