

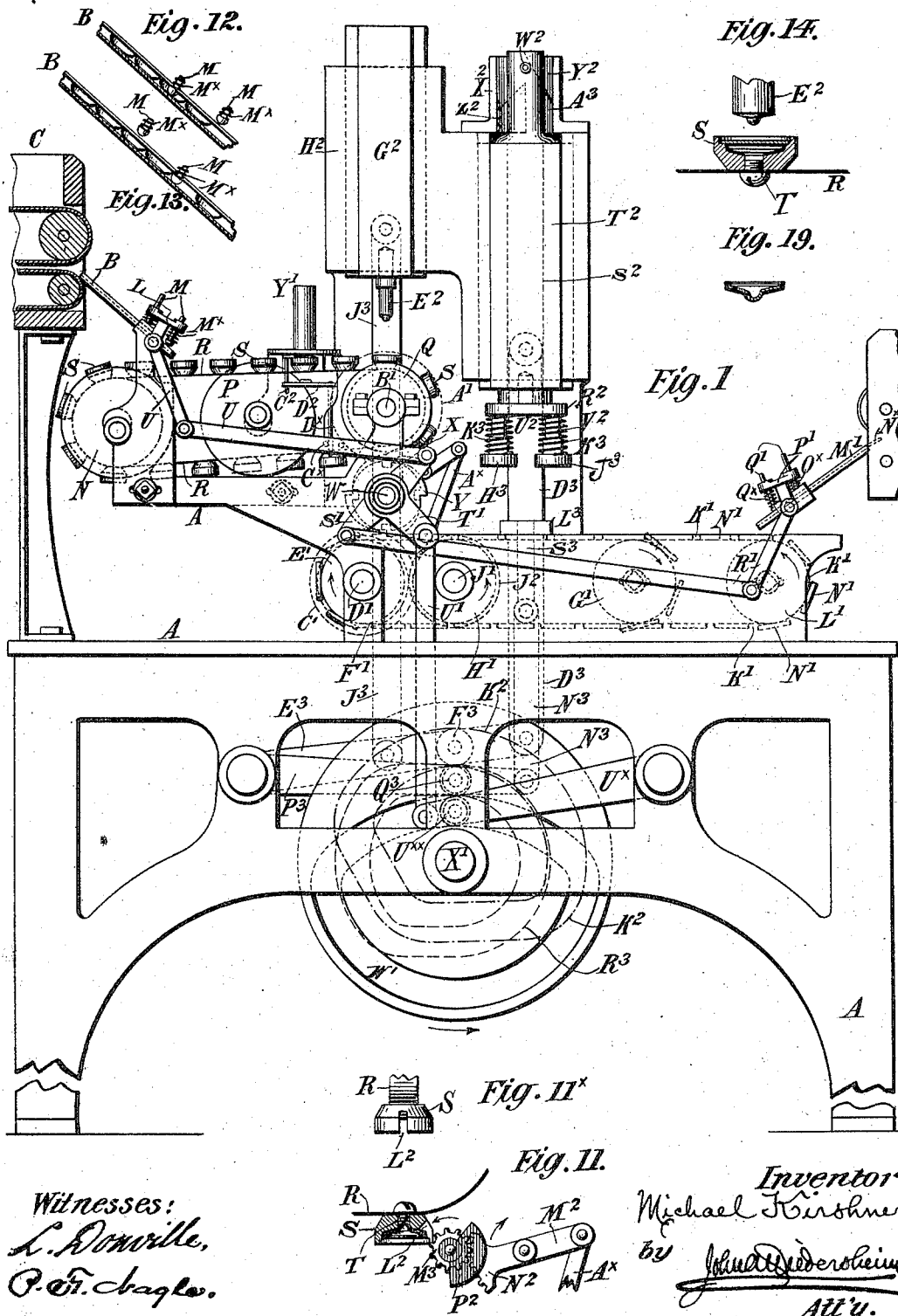
(No Model.)

3 Sheets—Sheet 1.

M. KIRSHNER.
BUTTON MAKING MACHINE.

No. 576,317.

Patented Feb. 2, 1897.



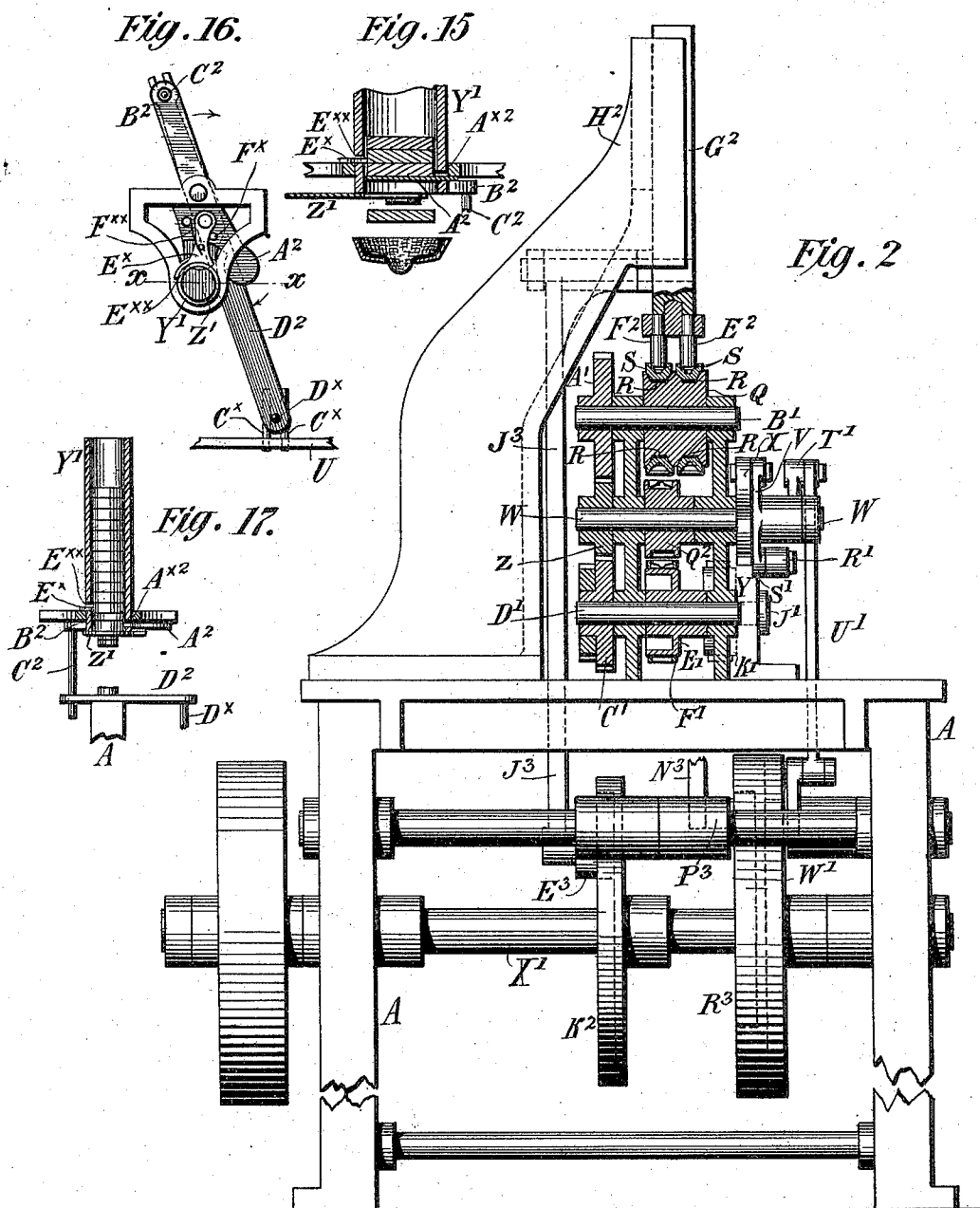
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Fig. 18.

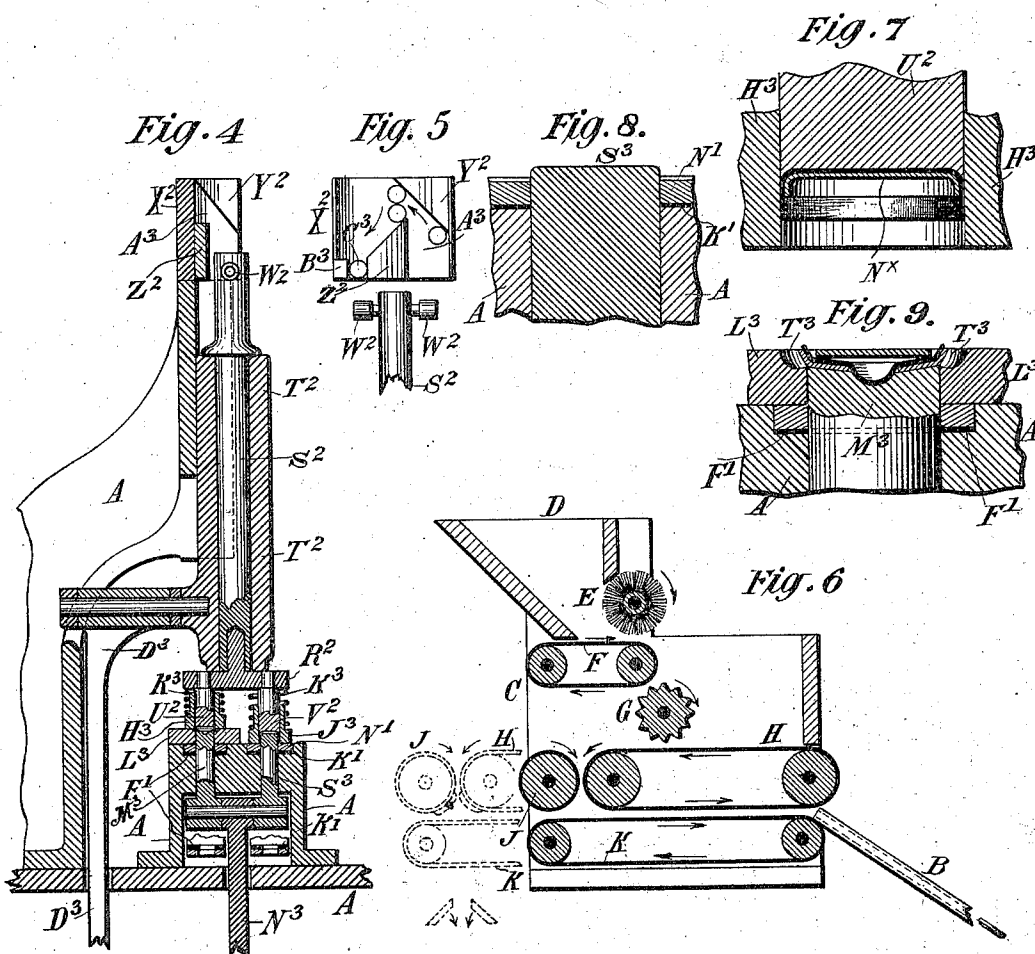
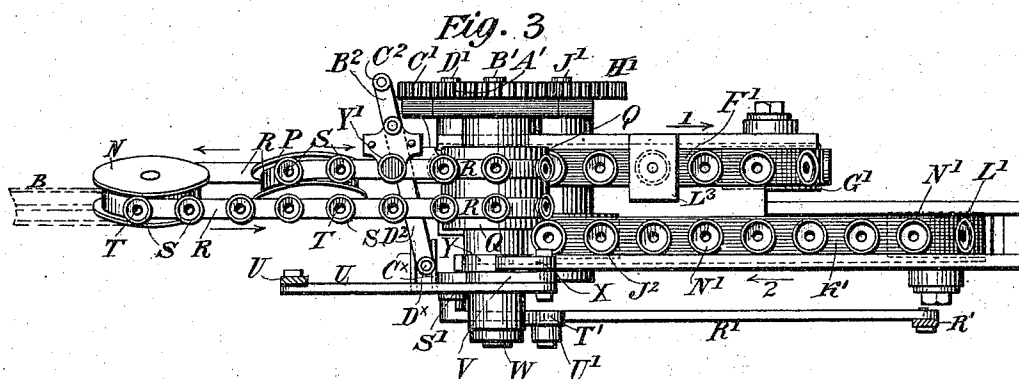


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UNITED STATES PATENT OFFICE.

MICHAEL KIRSHNER, OF SALEM, VIRGINIA.

BUTTON-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 576,317, dated February 2, 1897.

Application filed December 18, 1895. Serial No. 572,579. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL KIRSHNER, a subject of the Czar of Russia, residing at Salem, in the county of Roanoke, in the State of Virginia, have invented a new and useful Improvement in Button-Making Machines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a button-making machine embodying a novel feeding device for the shells, means for forming the shanks of the buttons, means for applying wads to the shells, a novel feeding device for the caps, and means for presenting the caps and covering material to the shells as filled and clamping the parts to each other, as will be hereinafter set forth, and pointed out in the claims that follow the specification.

Figure 1 represents a side elevation of a button-making machine embodying my invention. Fig. 2 represents a partial end and partial vertical section thereof. Fig. 3 represents a top view of the endless belts with cups thereon employed in the invention. Fig. 4 represents a vertical section of the plungers for connecting the shell and cap of a button. Fig. 5 represents a vertical sectional view of a boss with spiral cams for rotating the plungers shown in Fig. 4. Fig. 6 represents a vertical section of hopper and feeding mechanism for the shells of the button to be formed. Fig. 7 represents a vertical sectional view of the upper die with a surrounding sleeve. Figs. 8 and 9 represent vertical sectional views of the different plungers for uniting the shell and cap. Fig. 10 represents a sectional view of a portion of a button formed in accordance with my invention. Fig. 11 represents a partial side and partial sectional view of the mechanism for detaching a shell from a cup as embodied in my invention. Fig. 11^x represents a side view of a cup for carrying a shell. Figs. 12 and 13 represent sectional views of the chute and side views of the pins for controlling the discharge of the shells from said chute. Fig. 14 represents a sectional view of a cup for receiving a shell and a side view of the lower end of the plunger for uniting a wad and a shell in said cup. Fig. 15 represents a sectional view of the lower end of the wad-supply

tube with controlling-gates. Fig. 16 represents a top or plan view of the controlling-gates with operating parts shown in Fig. 15. Fig. 17 represents a vertical section on line *xx*, Fig. 16. Fig. 18 represents a cross-section of the apron and cup for carrying the cap of a button. Fig. 19 represents a sectional view of shell employed in my invention.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates the frame of a machine having mounted thereon the inclined feed-chute B, in front of the top of which is a shell-distributing device C, the same consisting of the hopper D, with a rotary brush E at or near the base thereof.

Below the hopper is an endless apron F, which is supported on rollers, whereby motion may be imparted to said apron. Below said apron F at one end thereof is a fluted roller G, below which is an endless apron H, mounted on suitable rollers, so as to receive motion therefrom. At one end of said apron is a roller J, which is separated from said apron to allow the passage of the shell through the same. Below said apron H and roller J is an endless apron K, which is mounted on suitable rollers, so as to receive motion therefrom, it being noticed that a space exists between the aprons H and K, the same being in communication with the top of the chute B, as most plainly shown in Fig. 6.

L designates a rocking arm which is mounted on the frame A and provided with two depending loosely-fitting pins M, which enter a slot in the upper wall of the chute B, said pins alternately rising and falling for preventing the descent of more than one shell at each operation of the arm L, as most clearly shown in Figs. 12 and 13.

Mounted on the frame A are inclined pulleys N P and the pulley Q, around which pulleys passes the endless apron R, it being noticed that said apron extends from the pulley N to one of the pulleys Q, then around the same to the pulley P, then around it and back to the pulley Q, and then to its starting-place on the pulley N, the apron thus being in two lengths for a portion of its distance. Connected with the apron R is a series of cups S, the cavity of each of which has a recess T in

the base thereof, said cavity receiving one of the shells from which the button is made, as well as the piece of fabric which is placed on said shell and centrally pressed into said recess for forming what may be termed the "shank" of the button, as seen in Figs. 14 and 19.

To the arm L is connected a toggle-lever U, one limb of the latter being pivoted to an arm V, which is loosely mounted on a shaft W, and carries a pawl X, which engages with the teeth of the ratchet Y, said ratchet being firmly secured to the shaft W. On said shaft W is an idler or pinion Z, which meshes with a pinion A' of the shaft B' of the pulley Q, whereby intermittent motion is imparted to the apron R, said idler also meshing with the pinion C', which is secured to a shaft D' of a pulley E', which is located below the apron R. Passing around said pulley E' is an endless apron F', which also passes around a pulley G'. Meshing with the pinion C' is a pinion H', which is secured to the shaft J' of a pulley J², around which passes an endless apron K', which also passes around a pulley L'.

At the outer end of the apron K' and above the same is a feed-chute M' for supplying the cups N' on the apron K' with caps N^x, of which buttons are partly formed. Over said chute M' is a rocking arm P', whose ends are provided with loosely-fitted depending pins Q', the same alternately rising and falling in said chute M', similar to what is shown in Figs. 12 and 13, so as to cause the dropping of but one cap from the chute into the respective cups of the apron K'.

The arm P' is mounted on the frame or support of the chute M' and has connected with it the toggle-lever R', the lower limb of which is pivoted to an arm S' on the shaft W.

The arm T' is also loosely mounted on said shaft W, and to the same is pivoted an arm U', whose lower end is connected with a pivotal arm U^x, which carries a roller U^{xx}, which is engaged by a cam W' on the driving-shaft X' of the machine, whereby motion may be imparted to the ratchet Y, and by means of the intermediate mechanism intermittent motion is communicated to the aprons R F' K' and to the rocking arms L and P'. In practice the arms V S' T' may be connected with a hub common to said parts.

Y' designates a tube for holding the wads which form parts of buttons, said tube being mounted above one length of the apron R.

At the bottom of the tube Y' are two gates Z' A², the gate Z' being adapted to close the bottom of the tube, while the gate A² is adapted to enter a slot A^{xx} in the side of said tube at a distance above the gate Z' about the thickness of one of the wads, said gates being connected with an arm B², which is mounted on the frame of the machine and moved by a proper part of the machine.

Depending from the arm B² is a pin or stem C², which latter has its lower end suitably connected with an arm D², which is pivoted to

the frame A. (See Fig. 17.) The end of the arm D² opposite to the end connected with the pin C² is provided with a depending pin or stem D^x, the latter occupying a position between pins or studs C^x, which project from one limb of the toggle-lever U, so that the reciprocating motion of said toggle-lever imparts motion to the arm D², which in turn imparts motion to the arm B², and consequently to the gates Z' and A².

Pivoted to the arm B² is a spring-actuated clamp or finger E^x, whose motion in one direction is limited by a pin or stud F^x, also secured to the arm B².

When the arm B² is in the position shown in Fig. 16, the gate Z' is in line with the tube Y', and the spring F^{xx} of the finger E^x causes the latter to enter the slot E^{xx} in the lower portion of the tube Y' above the slot A^{xx} (see Fig. 17) and bear firmly against the wad next to the bottom one. By this means the wad thus held is prevented from dropping in the path of the gate A². When, however, the arm B² is in the position shown in Fig. 15, the gate Z' has moved sufficiently to the left to allow the wad that was upon it to drop out of the tube Y' and into a shell in one of the cups S. The gate A² at the same time enters the slot in the side of the tube Y' and closes the bottom of said tube, and the pin or stud F^x on the arm B² causes the spring-actuated finger E^x to release its hold on the wad, thereby permitting all the wads in the tube Y' to drop and thus rest on the gate A².

E² designates a plunger which is located above the cups of the apron R, and the lower end of the same is in line with the discharge end of the chute B, it being noticed that said plunger is over the portion of the apron R in line with the chute B.

Aside of the plunger E² is a plunger F², which is above the part of the apron R opposite to said plunger E², both plungers being connected with a head G², which is vertically guided on the portion H² of the frame A and secured to an arm J³, whose lower end is connected with a pivotal arm E³, the latter carrying a roller F³, which is engaged by a cam K² on the shaft X', whereby rising and falling motions are imparted to said plungers E² and F².

In the bases of the cups S are slots L². (See Fig. 11.) Below the inner end of the apron R is mounted a lever M², which has a segmental rack or head N², which engages with a pinion M³, mounted on a frame A and carrying a plate P² so disposed that when a cup is overturned, as in said Fig. 11, the plate P² enters the slot L² and bears against the contents of the cup to strip the same therefrom.

The lever M² receives motion by means of a link A^x, connected with the same and with the arm T' on the shaft W, as will be seen in Fig. 1.

On the shaft W of the pinion Z is a pocketed wheel Q², (see Fig. 2,) the same being above the apron F', so as to receive the partially-

formed button stripped from the cup S, and carrying it around to said apron F' and depositing it thereon.

R² designates a head which depends from a rotatable stem S², the latter being fitted in a vertical bearing T² on the frame of the machine.

Depending from the head R² are plungers U² V², it being noticed that the plunger U² is above the apron F' and the plunger V² above the apron K'.

The top of the stem S² has rollers W², which are adapted to enter a boss X², which is supported above the bearing T², the inner face of said boss having reversely spiral cams Y² Z², between which is a passage A³ for the ascent of the rollers W².

Between the bottom of the lower cam Z² and a block B³ on the inner side of the boss X² is a passage C³ for the descent of said rollers, whereby rotation may be imparted to the stem S², and consequently to the plungers U² V², as will be hereinafter described.

Rising and falling motions are imparted to the bearing T² by means of an arm D³, the lower end whereof is connected with the arm E³, whose roller F³ is engaged by the cam K² on the shaft X'.

Surrounding the plungers U² V² are sleeves H³ J³, which are connected with the head or tube by means of springs K³.

Interposed between the plunger U² and the apron F' is a bed L³, (see Figs. 1, 3, 4, and 9,) the same having an opening therein, as has also each cup on the apron F' for the passage therethrough of a plunger M³, which is guided in the frame of the machine below the apron F' and connected with the arm N³, the lower end whereof is connected with a pivotal arm P³, which carries a roller Q³, which is engaged by a cam R³ on the shaft X'.

Connected with the arm N³ is a plunger S³, which is guided in a proper portion of the frame beneath the apron K' and adapted to pass through an opening in said apron and consequently the communicating cup. The working or die face of the plunger S³ is slightly convex, and the working or die face of both plungers U² and V² are concave, as shown in Fig. 7. The working or die face of the plunger M³ is concave and centrally depressed to receive the shank of a button, as shown in Fig. 9, and a portion of the bed L³, within which said plunger M³ moves, is recessed to form a channel T³ around the face of said plunger M³.

On the pins M are springs M^x, which bear against the arm L and shoulders on the heads of said pins to restore the latter to their normal position.

On the pins Q' are springs Q^x, which bear against the arm P' and shoulders on the heads of said pins to restore the latter to their normal position.

The operation is as follows: Power is applied to the driving-shaft, whereby the aprons, the plungers, and other movable parts are

properly operated. Shells are placed in the hopper D and properly agitated by the brush E, whereby they drop upon the apron F and are carried forward by the same, so as to fall upon the fluted roller G, whereby if any of them stick together they may be separated, after which they drop singly upon the apron H and are carried toward the roller J, between which and the adjacent roller of said apron H they are fed to the apron K, with their edges upwardly, as illustrated by the dotted figures at the left of Fig. 6, in which position the shells reach the chute B and are directed down the same and are discharged therefrom one after another, owing to the rocking action of the arm L and motions of the pins M, which latter alternately enter said chute, as plainly illustrated in Figs. 12 and 13. The shell now drops from the chute upon the first cup S of the apron R, and a disk or piece of fabric from which the shank is formed placed on said cup by hand and the cup and piece carried under the plunger E², whereby the center fabric is pressed into the recess T and the shank formed. (See Figs. 14 and 19.) The cup continues its motion, carrying the shell and pressed fabric with it around the roller P, and consequently under the tube Y', where the wad drops therefrom upon the fabric. The cup now carries the three parts beneath the plunger F², which forces the wad firmly against the fabric on the shell. The cup is now carried under the inner roller of the apron and overturned, as shown in Figs. 11 and 11^x, when the plate P² enters the slot L² and bears against the shell, forcing it from the cup and depositing it loosely in the pocketed wheel Q². The parts are so located and timed that the latter carries it so as to drop it into the cup beneath the same on the apron F', and said cup carries the shell and its parts beneath the bed L³, it being remembered that as intermittent motions are imparted to the aprons F' K' the shell is now again at rest, this time beneath said bed L³. Meanwhile caps are fed to the chute M', whereby they drop singly into the cups N' of the apron K', owing to the rocking motion of the arm T' and alternating motion of the pins Q' in said chute. The covering fabric is now laid on the cap in the cup, the edge of said cap being below, and said cap and fabric are carried in the direction of arrow 2, Fig. 3, until they arrive beneath the plunger U², when the plunger S³ rises and forces said cap and fabric into the face of the plunger U², (see Figs. 7 and 8,) said plunger U² rising owing to the ascent of the bearing T², the latter carrying with it the rotatable stem S², to which the heads of the plungers U² V² are secured. As said stem rises one of its rollers W² comes in contact with the cam Y² of the boss X², this imparting a half-turn to said stem, whereby the plunger U² is carried around and forced over the plunger M³, the latter having also risen at the time of the ascent of the plunger S³,

whereby the shell and its parts are at or about the top of the bed L^3 . The head R^2 continues its descent, the roller W^2 having fully cleared the cam Z^2 , when the plunger U^2 presses the cap N' upon the shell in plunger M^3 and the end of the covering fabric is directed inwardly and upwardly by the recess T^3 in the bed L^3 around said shell and parts, so as to be folded against the inner side of the rim of said cap, and said rim is turned inwardly and dovetailed against the rim of the shell, thus uniting the front and back portions of the button, as will be seen in Fig. 10. The plungers M^3 and S^3 now lower below the aprons F' and K' , so that the latter can continue their motions, and the button as formed drops through the bed L^3 into the cup beneath said bed. When the apron F' continues its motion in the direction of the arrow 1, the button is conveyed around the roller G' , when as said cup is overturned the button drops therefrom upon the floor or into a suitable receptacle. Meanwhile another shell and parts have been advanced on the apron R and reaches the proper cup on the apron F' , and the cap and piece of covering fabric carried by the apron K' beneath the plunger V^2 , which now occupies the position first occupied by the plunger U^2 . When the head R^2 receives rotation, the cap and covering fabric are carried around by said plunger V^2 and meet the shell and its attached parts on the plunger M^3 , when upon the descent of said head the front and back portions of the second button are properly clenched or clamped together, and so the operations may be continued.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a button-making machine, a feeding device with a rotary brush at the base thereof, a horizontal endless apron below the outlet of said hopper, a longitudinally-fluted roller adapted to receive the contents of said apron, aprons below said fluted roller and a feed-chute receiving the material from between said latter-mentioned aprons, said parts being combined substantially as described.

2. In a button-making machine, a feeding device having a hopper, an endless apron below the outlet of said hopper, a longitudinally-fluted roller receiving the articles from said apron, upper and lower endless aprons below said fluted roller, said lower apron extending at one end beyond the upper apron, and a separate roller outside of said aprons, and above said extended portion of the lower apron, said parts being combined substantially as described.

3. In a button-machine, a frame, the inclined pulleys N and P and the vertical pulley Q journaled thereon, the endless apron R passing around said pulleys, forming two lengths, cups on said belt, a feeding-tube for the cups on one of said lengths, and a plunger for the cups on the other length, said parts being combined substantially as described.

4. In a button-making machine, a continuous two-length apron, having its lengths aside of each other, cups on said apron, a filling-tube for the cups on one of said lengths, and a plunger for the cups on the other length, said parts being combined substantially as described.

5. In a button-making machine, a revolving endless apron having two lengths, cups on said apron, a filling-tube for the cups on one of said lengths, a plunger for the cups on the other length, and a detaching device below the plunger end of said apron for loosening the contents of said cups therefrom, said parts being combined substantially as described.

6. In a button-making machine, an endless apron having a cup thereon, with a slot in its base, an oscillating plate adapted to enter said slot and mechanism for imparting a reciprocating motion to said parts, said parts being combined, substantially as described.

7. In a button-making machine, an endless apron with cups thereon, a feeding-tube and a plunger for said cups, a detaching device for the contents of said cups, an endless apron with cups to receive the contents detached from the cups of the first-mentioned apron, and an endless apron parallel to said second-mentioned apron and provided with cups, two plungers having a common rotating head and stem above said parallel aprons, and two plungers opposite said last two plungers and below said parallel aprons, said parts being combined substantially as described.

8. In a button-making machine, a revolving apron with cups thereon, having slots in their sides, an oscillating shaft having a pinion and a plate thereon, and a pivoted lever having a segmental rack engaging said pinion, said parts being combined substantially as described.

9. In a button-making machine, two parallel endless aprons with cups thereon, two plungers above said aprons having a common rotating head and stem with rollers thereon, two plungers opposite said first plungers and below said belt, and a boss with spiral grooves in which said rollers work for rotating said stem and connected plungers, said parts being combined substantially as described.

10. In a button-making machine, the plunger M^3 , the endless belt F' and the cup thereon, and the bed L^3 above said cup, said plunger being adapted to pass through said belt cup and bed, in combination with the plunger U^2 having concave working face, said plunger being over the plunger U^3 , the portion of the bed around said plunger M^3 being recessed as at T^3 substantially as described.

11. In a button-making machine, two endless aprons with cups, a stationary table above one of said aprons, and having an opening therein, two plungers above said aprons having a common head and stem, means for rotating said stem, and two plungers opposite said first plungers and below the upper length

of said aprons, said parts being combined substantially as described.

12. An endless belt running in two lengths and two parallel endless belts respectively at 5 the ends of said two lengths, in combination with cups on said belts, a shank-forming plunger, and a wad-forcing plunger over the two lengths, a carrying-plunger over one of the parallel belts, and a clamping-plunger 10 over the other parallel belt, said parts being combined substantially as described.

13. In a button-forming machine, a head carrying a plunger, and two endless cup-carrying belts beneath the same, a rotary 15 shaft connected with said head, a rising-and-falling bearing for said shaft, and a boss on the frame of the machine having two reversely spiral cams for engagement of said shaft, whereby rotation is imparted to the 20 head, and the plungers shifted from one belt to the other, substantially as described.

14. Endless belts with cups thereon, in combination with a shank-forming plunger, a wad-forcing plunger, and additional belts 25 with a carrying and clamping plunger thereover, and rising-and-falling plungers below

the last-named plungers, and cams and intermediate mechanism for operating the several plungers, substantially as described.

15. In a button-making machine, a frame 30 two parallel endless aprons, each having cups thereon, mechanism for revolving said aprons, a table having an opening therein, above one of said aprons, two plungers having a common head and a stem with rollers thereon, a rising- 35 and-falling support for said stem, and a stationary boss with spiral grooves engaged by said rollers, said parts being combined substantially as described.

16. In a button-making machine, two plung- 40 ers having a common head and stem, rollers on said stem, a rising-and-falling support for said stem and a stationary boss having spiral grooves engaged by said rollers, so that during a portion of rising and falling it is rotated, 45 said parts being combined substantially as described.

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