

(No Model.)

7 Sheets—Sheet 1.

E. L. GODING.

MACHINE FOR SEWING ON SHANK BUTTONS.

No. 566,754.

Patented Sept. 1, 1896.

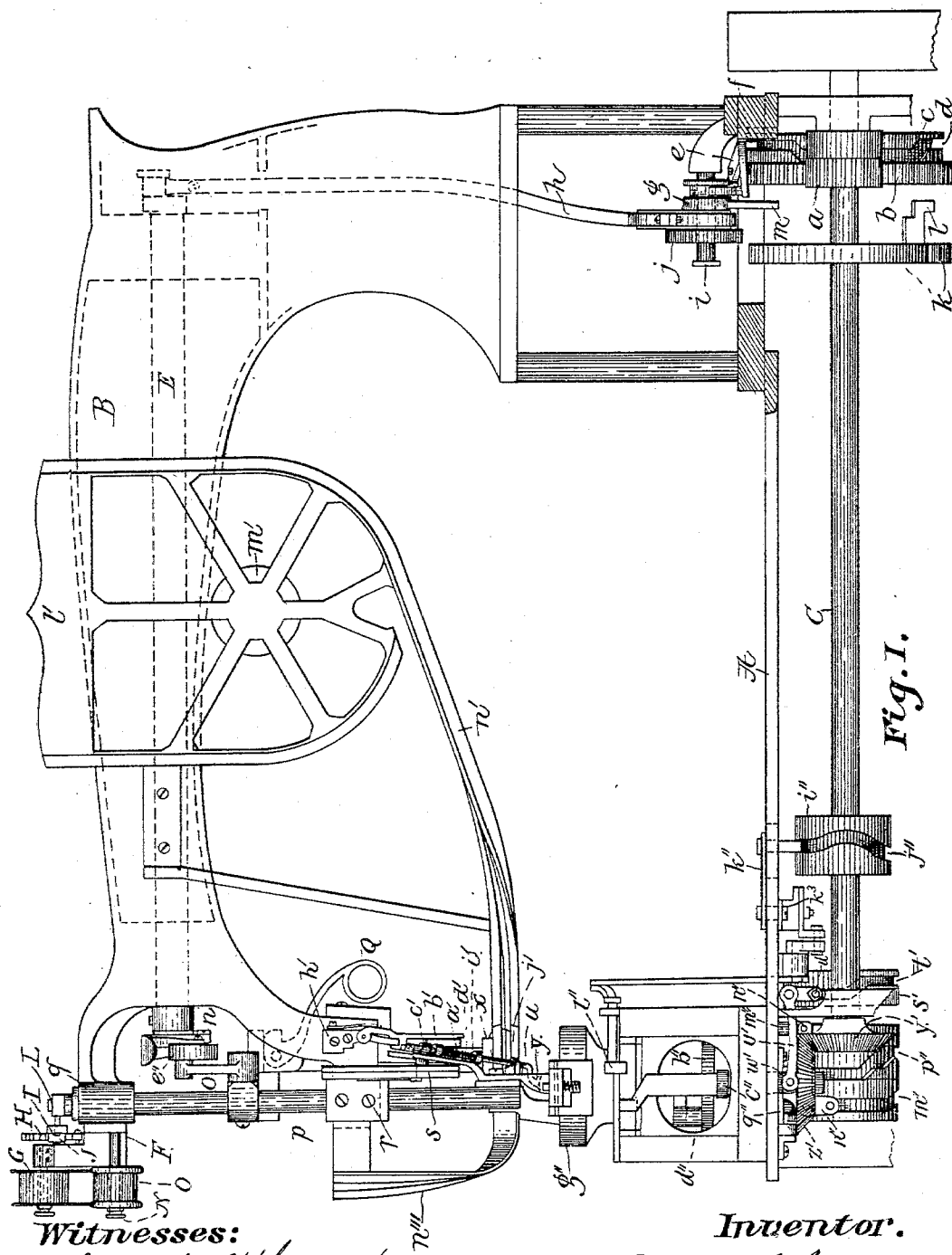


Fig. 1.

Witnesses:

James G. Stephenson
Nathan Clifford

Inventor.

Edwin L. Goding,
By Elym Verille,
Attorney.

(No Model.)

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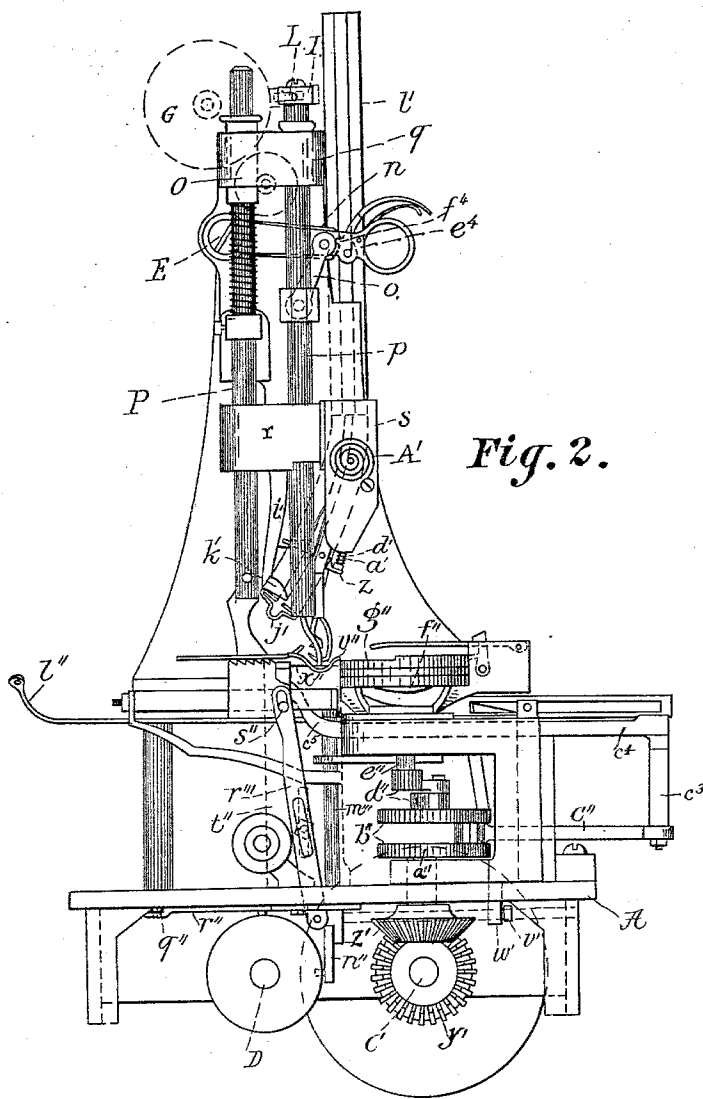


Fig. 2.

Witnesses:

James G. Stephenson
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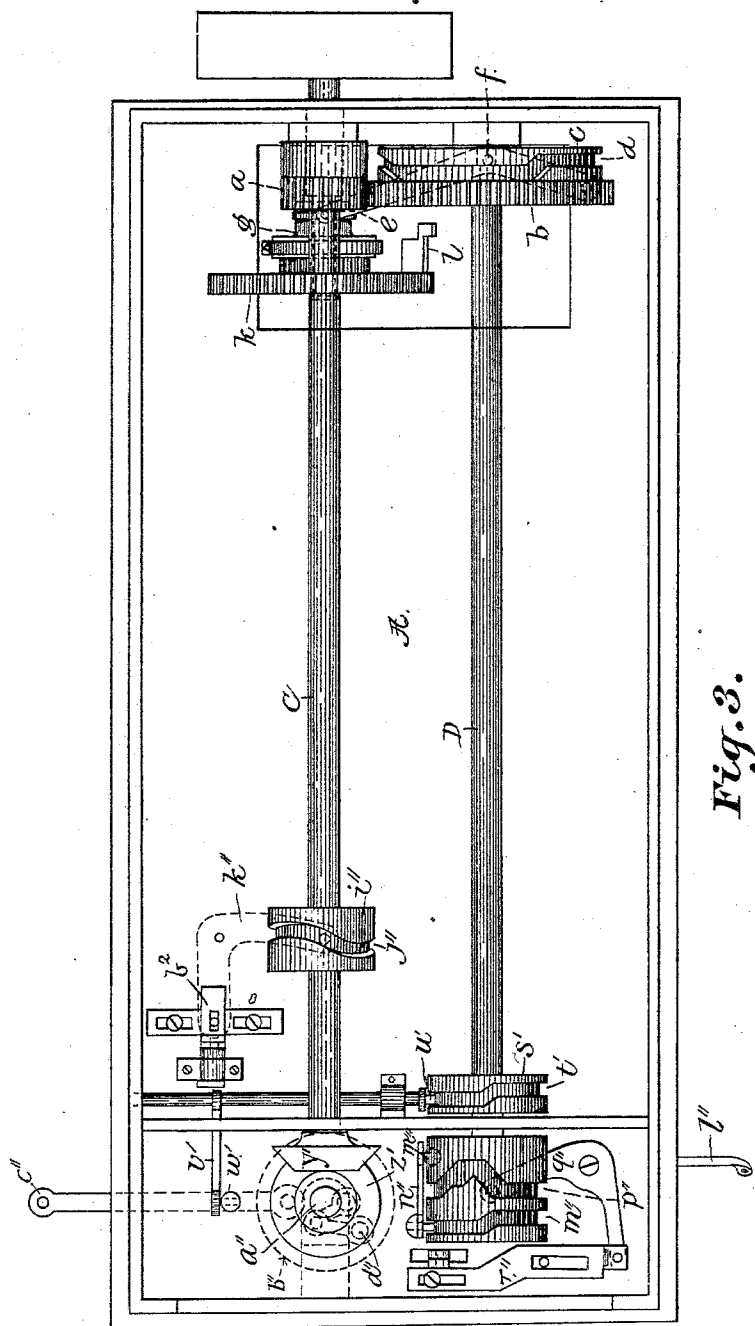


Fig. 3.

Witnesses:

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(No Model.)

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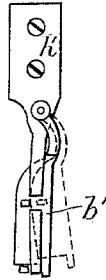


Fig. 4.

Fig. 5.

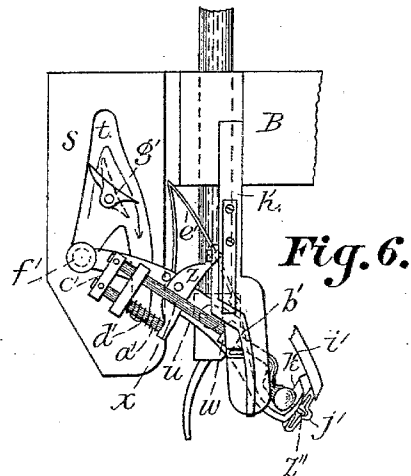
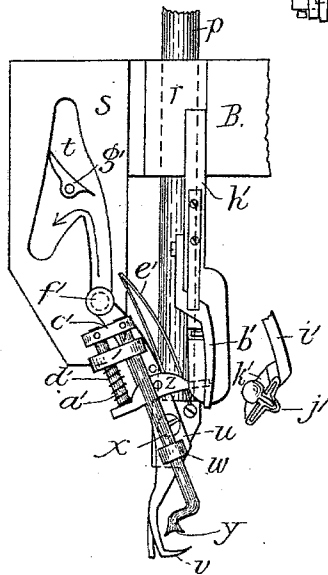


Fig. 6.

Fig. 7.

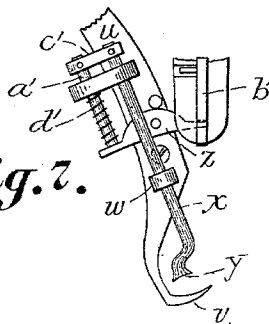
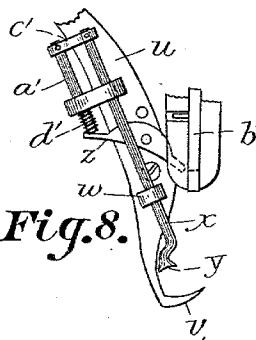


Fig. 8.



Witnesses:

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(No Model.)

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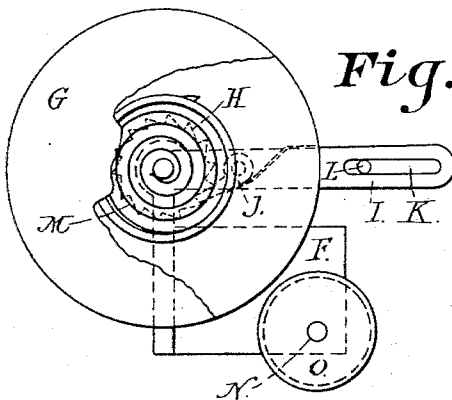


Fig. 9.

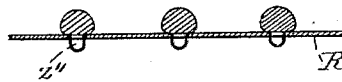


Fig. 13.

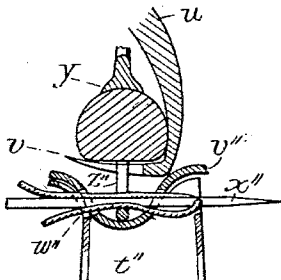


Fig. 10.

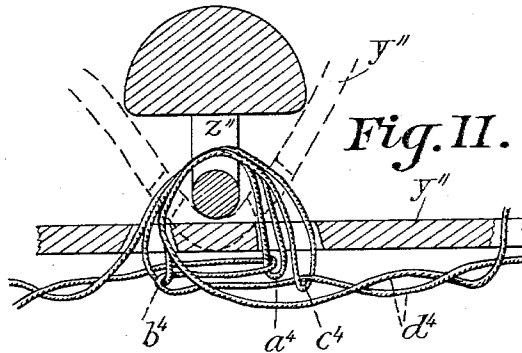


Fig. 11.

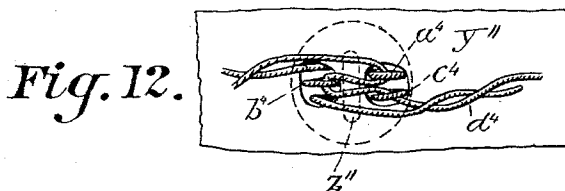


Fig. 12.

Witnesses:

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Nathan Clifford

Inventor:

Edwin L. Goding
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(No Model.)

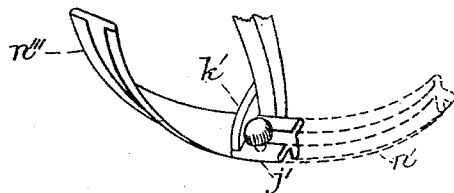
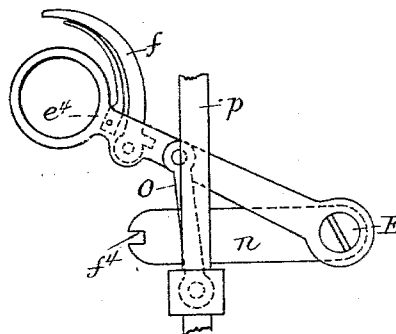
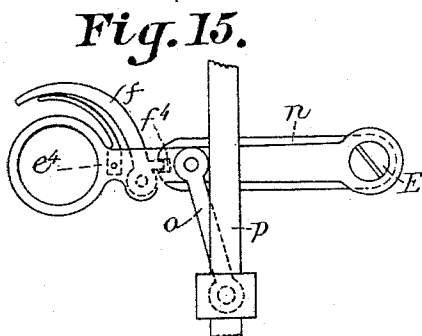
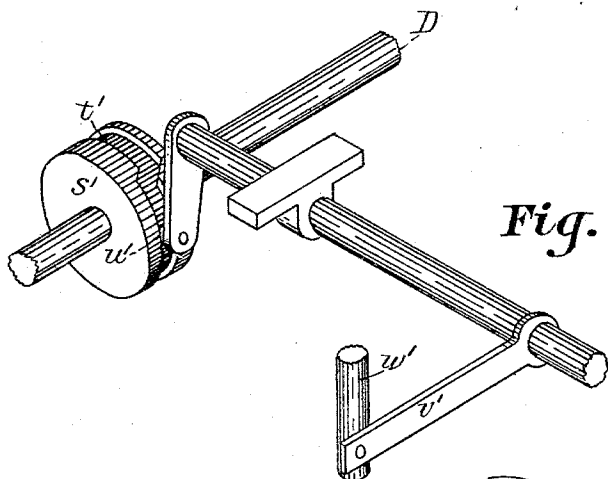
7 Sheets—Sheet 6.

E. L. GODING.

MACHINE FOR SEWING ON SHANK BUTTONS.

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Patented Sept. 1, 1896.



Witnesses:

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(No Model.)

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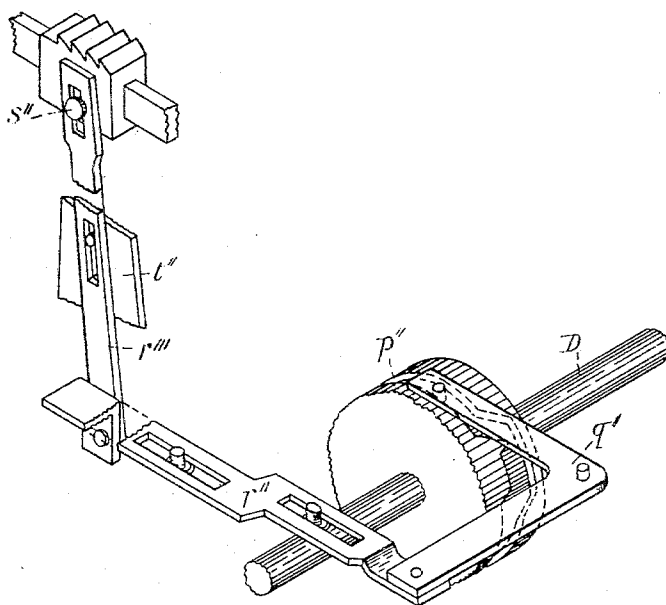


Fig. 18.

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UNITED STATES PATENT OFFICE.

EDWIN L. GODING, OF PORTLAND, MAINE.

MACHINE FOR SEWING ON SHANK-BUTTONS.

SPECIFICATION forming part of Letters Patent No. 566,754, dated September 1, 1896.

Application filed February 3, 1893. Serial No. 460,824. (No model.)

To all whom it may concern:

Be it known that I, EDWIN L. GODING, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Machines for Sewing Shank-Buttons to Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machines for automatically sewing shank-buttons to fabrics.

It consists principally in sewing mechanism, mechanism for feeding the fabric combined with a button-feeding mechanism comprising a ribbon to which is loosely attached a series of buttons, mechanism for moving said ribbon across the path of the needle, and mechanism for taking the buttons successively from said ribbon and conveying them to the fabric.

It further consists in placing in the path of the needle a grooved or recessed plate into which the material and shank of the button are pressed in such position that the needle passes horizontally through the fabric on each side of the shank and through the eye of the button, and in certain other details of construction which will be hereinafter fully described and specifically claimed.

In the drawings herewith accompanying and making a part of this application, Figure 1 is a side elevation of my improved machine, a part of the base being removed. Fig. 2 is a front end elevation of the same, the ribbon-take-up mechanism being in dotted lines. Fig. 3 is a bottom plan. Fig. 4 is a detail of the latch for operating the button-holding thumb. Figs. 5 and 6 show the button-holding mechanism in different positions, Fig. 5 being in the normal position and Fig. 6 in the position when raised to take the button from the ribbon. Fig. 7 is a detail showing the button-holding thumb-piece down. Fig. 8 is a detail showing it raised. Fig. 9 is a view of the ribbon-reel with parts broken out to show interior parts. Fig. 10 is a sectional detail

view showing button and material in the recess in the plate and the needle passed through the material and eye of the button. Fig. 11 is a detail in section through button and material, showing the stitch. Fig. 12 is a view showing stitch on the under side of the material. Fig. 13 is a sectional view of a portion of the ribbon with buttons attached. Fig. 14 is a detail showing the cam and table-raising lever. Figs. 15 and 16 are details showing the mechanism for independently raising and lowering the button-feeding mechanism. Fig. 17 is a detail showing section of the ribbon-guideway and the button-stop. Fig. 18 is a detail showing cam and mechanism for operating the feeding-bar.

Same letters refer to like parts.

In said drawings, A represents the base of the machine, and B a raised arm thereon, which supports the button-feeding mechanism and presser-foot. Journaled in the base is a main shaft C and a counter-shaft D. Rigidly mounted on the main shaft is a pinion *a*, which meshes with a gear *b* on the counter-shaft, timed so that four revolutions of the main shaft cause one revolution of the counter-shaft. On the counter-shaft is set a cam-wheel *c*, having in the circumference thereof an irregular cam-path *d*. Pivoted at one end to the machine-frame is a lever *e*, having a cam-roll *f* projecting into cam-path *d*. The other end of said lever is bifurcated and is connected with an eccentric *g*, set in the lower extremity of connecting-rod *h*, by having said bifurcated arm rest loosely in a groove in the hub of said eccentric. Said eccentric is journaled on a shaft *i*, rigidly secured to the frame, and rigidly secured to the inner side of said eccentric and centrally of said shaft is a pinion *j*, adapted to mesh periodically with the gear *k* on the main shaft, gear *k* having a part of the cogs removed. The cam-path *d* is arranged so that once in every four revolutions of the main shaft it will throw the lever, eccentric, and gear toward the center until pinion *j* meshes with gear *k* on the main shaft, and because the connecting-rod is eccentrically set on shaft *i* it will give a vertical reciprocating motion to said connecting-rod. The connecting-rod has a crank connected at the top with a longitudinal rocker-shaft E, which

operates the button handling and feeding mechanisms in the manner hereinafter described. Projecting out from gear *k* is a dog *l*, arranged to engage with a spur *m*, set in the shoulder of eccentric *g*, the purpose and operation of which will be hereinafter fully explained.

Rigidly attached to the other extremity of the rocker-shaft E is a lever *n*, to which is pivotally connected a link *o*, said link being pivotally connected with a perpendicular rod *p*, running in guides *q* and *r*, said rod *p* operating the mechanism which takes the buttons from the ribbon, conveys them to the position where they are to be sewed to the material, and holds them until the button is sewed on.

In order that rod *p* with its connecting mechanism may be raised or lowered independently of shaft E, I pivotally attach to the end of shaft E outside of lever *n* a locking-lever *e*⁴, having a dog *f* adapted to enter a recess *f*⁴ in lever *n* and lock the two together, a pivoted link *o* connecting said lever *e*⁴ with rod *p*. It will thus be seen that when the dog is withdrawn from the recess in the end of lever *n* the rod *p* can be raised and lowered without moving the rocker-shaft or any other mechanism, except the button-gripping mechanism. This is important when a thread breaks or a button gets misplaced, because the button-holding mechanism can be raised by hand to receive another button without changing the relative positions of the other parts of the machine.

Rigidly attached to the arm B is a cam-plate *s*, and in the back thereof is an irregular cam-path *t*. Pivotaly attached to rod *p* is a swinging arm *u*, having its lower extremity bifurcated to form fingers *v*, adapted to pass between the body of the button and the ribbon and surround the shank of the button, as seen in Fig. 6. Passing through a projection *w* on said arm *u* is a rod *x*, having on its lower extremity a thumb-piece *y*, adapted to hold the button upon the fingers. Pivotaly attached to arm *u* is a dog *z*, one end engaging with a rod *a*' and the other adapted to engage with a pivoted latch *b*' as the arm moves upward, whereby the thumb is raised from the fingers, the top of the rod *a*' being connected with rod *x* by a yoke *c*', as seen in Figs. 7 and 8. A coil-spring *d*' constantly tends to keep the thumb down in its normal position, as seen in Fig. 7. A spring *e*' constantly tends to throw the arm *u* outward. Attached to arm *u* is a cam-roll *f*', adapted to travel in cam-path *t*. Pivotaly set in said cam-path is a latch *g*', the pivot extending through the plate and controlled by a coil-spring *A*' on the outside of said plate, as seen in Fig. 2. As rod *p* is drawn up the cam-roll *f*' on the end of swinging lever *u* rises and follows the cam-path in the direction indicated by the arrow in Fig. 5, being forced downward and forward into the position shown in Fig. 6 by spring *e*', thence up-

ward and around said swinging latch in the direction indicated by the arrow in Fig. 6, and thence downward by the downward movement of rod *p* to the position of starting, as seen in Fig. 5. The latch *b*' is pivoted in a plate *h*', attached to the arm B, so as to permit the dog *z* to return to its normal position by forcing said latch sidewise, as seen in Fig. 4.

Attached to arm B is a downwardly-extended bar *i*', to which is attached a section of the ribbon-guideway *j*' at the point where the button-operating mechanism takes the button from the ribbon. This section consists of a grooved and recessed way having a central open part adapted to admit the shank of a button, as seen in Fig. 17. On the outer end of said section is a raised stop *k*' to stop the button and hold the same in position to be seized by the button-holding mechanism. Attached to the arm B is a suitable supporting-frame *l*', in which is journaled a ribbon-reel *m*', and leading out from said supporting-frame is a channel-guideway *n*', leading down to the ribbon-section *j*', being substantially the same in cross-section, and attached to the end of said arm B is a channel-guideway leading from the opposite end of said ribbon-section *j*', into which the ribbon passes from the ribbon-section *j*'. These three sections may be made in one continuous guideway, if preferred. At or near the top of the arm B is attached a plate F. Mounted on said plate is a ribbon-reel G, a ratchet H, and a lever-arm I, carrying a pawl J, adapted to engage said ratchet, the other end of said lever having a slot K, through which projects a spur L on rod *p*. Inside of the hub of the ribbon-reel is a coil-spring M, attached at one end to the hub, the other end being free, in order that the spring, after it is wound up to a certain tension, may slip, so that the tension of the spring will be constant, whereby the ribbon-reel will draw the ribbon along and wind it up so long as the machine is in operation. On a journal-bearing N, attached to said plate, is a counter ribbon-guide reel O. Rigidly set on the counter-shaft is a cam-wheel *s*', having in its circumference a cam-path *t*'. A rock-shaft journaled in a suitable hanger has on one end an arm carrying a cam-roll *w*', adapted to run in said cam-path *t*', and on the other end a lever-arm *v*', to which is pivotally attached an upright rod *w*', upon which is mounted the work-table, as seen in Figs. 2 and 14. The work-table may be any suitable frame supported on the end of the upright rod *w*' and attached thereto in any convenient manner adapted to support the rotating disks *p*'', the shuttle mechanism, the needle-operating mechanism, and the take-up mechanism, all of which parts rise and fall with the table. As cam *s*' revolves it imparts a rocking motion to the rock-shaft, alternately throwing up and drawing down the upright rod *w*', and with it the sewing-mechanism table. The cam-path is made so

that the table rises and falls twice during each revolution of shaft D. On the end of the main shaft is a bevel-gear y' , meshing with a bevel-gear z' , loosely keyed on a vertical shaft a'' , which, through intermediate mechanism, rotates the shuttle and drives the needle. Shaft a'' has rotating disks b'' , between which a needle-carrying arm c'' is eccentrically pivoted. The needle-supporting arm consists of a horizontal part c'' , a vertical part c^3 , a horizontal part c^4 , and a vertical part c^5 , in the latter of which the needle is supported in a horizontal position. To the top of the upper disk b'' is attached cranks d'' , on the end of one of which is a shaft e'' , which revolves shuttle f'' , resting in the shuttle-case g'' . Said shuttle, case, and bobbin may be of any suitable pattern, that shown being the well-known Wheeler and Wilson.

In the upper extremity of the needle-carrying arm c'' is set the needle x'' , extending in a horizontal direction, as seen in Fig. 2. Inasmuch as the shuttle and needle mechanism are operated directly from the main shaft and the main shaft revolves four times during each revolution of the counter-shaft, the arrangement of the cam-paths causes the shuttle to rotate four times and the needle to make four backward and four forward movements while the button-feeding mechanism presents one button and the fabric-feeding mechanism moves the fabric one space. Rigidly set on the main shaft is the take-up wheel i'' , having in its circumference a cam-path j'' . A crank-lever k'' has on one end a cam-roll adapted to travel in cam-path j'' , and the other end having a vertical set-off l^3 linked to take-up slide b^2 , whereby each revolution of the main shaft imparts a backward and forward movement to said take-up slide.

In the circumference of a cam mounted on the counter-shaft is a cam-path m'' , and a lever-arm n'' is connected at one end to a perpendicular rod m''' , which supports the frame on which the feed-bar slides, the other carrying a cam-roll operating in said cam-path, so as to cause said lever to raise and lower said rod alternately. In said last-mentioned cam-wheel is a second cam-path p'' . A bell-crank lever q'' , pivoted to the frame in a horizontal position, has on one end a cam-roll adapted to travel in said cam-path and the other end pivotally connected to a horizontal slide r'' . A vertical lever r''' is pivotally attached to slide r'' and is fulcrumed at or near its center on a pivot attached to standard t'' , its other end being pivotally attached to the feed-bar by a pin s'' in such manner that the lever r''' makes one forward and one backward motion, the upper end carrying with it the feed-plate during each revolution of the counter-shaft. Extending transversely to the path of the needle is a channel-plate v'' , supported on the top of standards t'' , as shown in Figs. 2 and 10, over which the cloth is designed to

be fed and into which the bifurcated end of the button-holding mechanism presses the cloth and shank of a button, as seen in Fig. 10. At or near the center of said channel-plate, at a point directly under the shank of a button held in said plate by said bifurcated arm, is a slot w'' , and the needle passes through said slot, the material y'' , and the eye in the shank of the button, as seen in Fig. 10.

Set in guideways attached to the end of the arm B is a presser-foot rod P, said rod being adapted to be raised or lowered by means of a lever Q, pivoted in the main frame and connected with said rod. This is substantially the same as now in common use on sewing-machines. The dog l on cog k , as the cog k revolves, strikes against the spur m on the shoulder of eccentric g before the teeth on cog k mesh with the teeth on pinion j , attached to the eccentric, thus turning the eccentric slightly, thereby raising the rocker-shaft and slightly raising rod p and the button-holding mechanism, as before described. The pivoted lever z , engaging with rod a' , raises the thumb y and allows the button to be released. At the same time the feed mechanism operates to move the fabric along. The dog l , striking against spur m , turns the eccentric and its pinion j as cog k revolves just far enough so that when the pinion is thrown into mesh with the cog-wheel k the wheel and pinion are in the right position to mesh readily with each other, a part of the cogs on cog-wheel k being removed.

Inasmuch as the pinion attached to the eccentric is withdrawn from mesh with the cog-wheel on the main shaft at intervals, it is important that when the lever throws the eccentric with its pinion back into line with said cog-wheel on the main shaft the cogs on the pinion should come into position to mesh properly; otherwise one cog might strike on the end of the other and stop the machine.

The operation of my improved machine for sewing on buttons is as follows: The gear b on the counter-shaft is timed so that once during each four revolutions of the main shaft the eccentric g and its pinion are forced into engagement with a gear k on the main shaft, which rocks the shaft E and raises and lowers the rod p . As the rod p rises the roller on the button finger-arm is made to travel around the cam-path in plate s , thus causing the finger end to be thrown upward under a button, as seen in Fig. 6, the button-holding thumb to descend upon the button, and as the rod descends to force the fingers with the button-shank down upon the material and hold it there during the time it takes the main shaft to make the three following revolutions. During each revolution of the main shaft the shuttle and the mechanism which operates the needle and take-up mechanisms make a complete revolution. The needle passes through the material and shank of the button and forms, with the looper, stitch a^4 . The ta-

ble then drops and the needle forms, with the looper-thread a , stitch b^4 on the under side of the material. The table then rises and the needle again passes through the material and shank of the button, making, with the looper-thread, stitch c^4 . The table then drops, and during the next revolution of the main shaft the button-holding mechanism rises to take another button from the ribbon and the feed mechanism feeds the material along one button-space and the needle forms underneath the material the long or fourth stitch d^4 . The ribbon R, having buttons loosely inserted therein, is wound in a coil upon the reel journaled in the arm B, thence passing through the guideway under the button-handling mechanism, thence upwardly and around the spring-controlled reel G. At each downward movement of the rod the reel is turned by the pawl engaging the ratchet and the ribbon drawn along in the guideway. Should there be a button missing on the ribbon or any unevenness in the spaces between the buttons, the spring in the reel will tend to draw the ribbon down in the guideway until the next button on the ribbon brings up against the stop. The buttons are attached to the ribbon, which may be of paper, by having their shank forced through the paper at or near the center. The buttons may be set in the ribbon by hand or by any suitable machinery, and such machinery may be attached to the machine itself or may be embodied in a separate machine.

The advantages of the herein-described machine over those now in use are many and important. In machines for this purpose as now constructed the buttons are placed in mass in a hopper and fed down through an inclined guideway to position where they are to be sewed to the fabric. It happens from various causes that sometimes an oversupply of buttons gets into the guideway and is thrown out on the table or floor, and sometimes, by reason of irregularities in the shape of the buttons or their shanks, the buttons in the guideway get clogged and the supply is not equal to the demand, in which case the operator must stop and work the buttons down along the guideway by hand. Both of these difficulties are obviated by the present method of feeding the buttons, whereby the buttons are presented in constant and regular order.

Again, in the machines as at present constructed special threads have to be made, and these threads have to be waxed to give them sufficient stiffness to form the necessary loops. Besides being an additional expense the waxed threads are objectionable to the trade because they soil the under face of the material to which the buttons are attached. In my machine any thread can be used and the thread does not require to be waxed.

In the machines as now constructed, on account of the buttons passing down the inclined guideway from a mass, it is necessary,

before the buttons are thrown into the hopper, that they be hand-sorted, so that any irregular-shaped buttons may be picked out, else the buttons would become clogged in the guideway to such an extent as to render the machines practically useless. By the present method of feeding the buttons this is entirely unnecessary.

The buttons when attached by my improved machine present on the face side of the material exactly the same appearance as they would had they been sewed by hand. In the old single-line machines the stitches are formed through and around the shank of the button in a very irregular and, to the trade, unsatisfactory manner. The under side of the material, after the buttons are attached by my machine, presents a neat even appearance, without knots or bunches, the threads between each two successive buttons being simply twisted around each other.

Another great advantage of the present invention is that the buttons need not have so large eyes or so long shanks as are required by the machines now in use.

It will be evident that other sewing mechanism and other fabric-feeding mechanism may be used, and that many of the minor details shown in this construction may be changed without altering the principles involved in this invention, and I do not intend hereby to limit myself to any particular sewing mechanism or fabric-feeding mechanism, or to the particular system of gears, cams, and levers herein described for operating my machine and the several parts thereof, except as hereinafter specifically set forth in the claims.

Having thus described my invention and its use, I claim—

1. In a machine for sewing buttons to fabrics, sewing mechanism, mechanism for feeding the fabric, intermittent button-feeding mechanism comprising a ribbon with a series of shank-buttons attached thereto by having their shanks pass loosely through said ribbon, tension mechanism tending constantly to move said ribbon transversely to the path of the needle, and mechanism for taking the buttons successively from said ribbon and conveying them to the fabric, substantially as and for the purposes set forth.

2. In a machine for sewing buttons to fabrics, sewing mechanism, mechanism for feeding the fabric, a recessed plate over which the fabric is fed, button-feeding mechanism comprising a ribbon with a series of shank-buttons attached thereto by having their shanks pass loosely through said ribbon, mechanism tending constantly to move said ribbon transversely to the path of the needle, and mechanism for taking the buttons successively from said ribbon, conveying them to the fabric and forcing the fabric and shank into said recess, substantially as and for the purposes set forth.

3. In a machine for sewing shank-buttons

to fabrics, the combination with fabric-feeding mechanism, button-feeding mechanism comprising a plunger and button-holder and sewing mechanism, substantially as described, of a rocker-shaft, an arm on the end of said shaft pivotally connected with the plunger of the button-feeding mechanism, an eccentric, means whereby the eccentric is adapted to operate said rocker-shaft, a cog and spur on the eccentric, a cog on the main shaft and a spur on said cog adapted to engage the spur on the eccentric and thereby partially raise the button-holding mechanism and release the button, substantially as and for the purposes set forth.

4. In a machine for sewing shank-buttons to fabrics, sewing mechanism, fabric-feeding mechanism, button-feeding mechanism comprising a button-carrying ribbon and actuating mechanism therefor, and button-handling mechanism comprising a plunger, a bifurcated carrier pivotally attached to said plunger, a cam-path, a cam-roll on the end of said bifurcated carrier adapted to move in said cam-path to give direction to said carrier, a thumb-piece adapted to hold a button on said bifurcated carrier, and means for operating said thumb-piece independently of said carrier, substantially as and for the purposes set forth.

5. In a machine for sewing shank-buttons to fabrics, sewing mechanism, fabric-feeding mechanism, a ribbon-guideway extending transversely to the path of the needle, a raised stop for the buttons on said guideway, a ribbon holding a series of shank-buttons loosely attached thereto, means for removing said buttons from said ribbon, and mechanism constantly tending to move said ribbon in said guideway, when the machine is in operation, to bring a button against said stop, substantially as and for the purposes set forth.

6. In a machine for sewing shank-buttons to fabrics, sewing mechanism, fabric-feeding mechanism, a ribbon-guideway extending transversely to the path of the needle, a raised stop on said guideway, a ribbon having a series of buttons attached thereto and mechanism tending constantly, when the machine is in operation, to move said ribbon along said guideway and bring the forward button against said stop, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

EDWIN L. GODING.

Witnesses:

ELGIN C. VERRILL,
ELIZABETH KNOWLES.