

No. 643,073.

Patented Feb. 6, 1900.

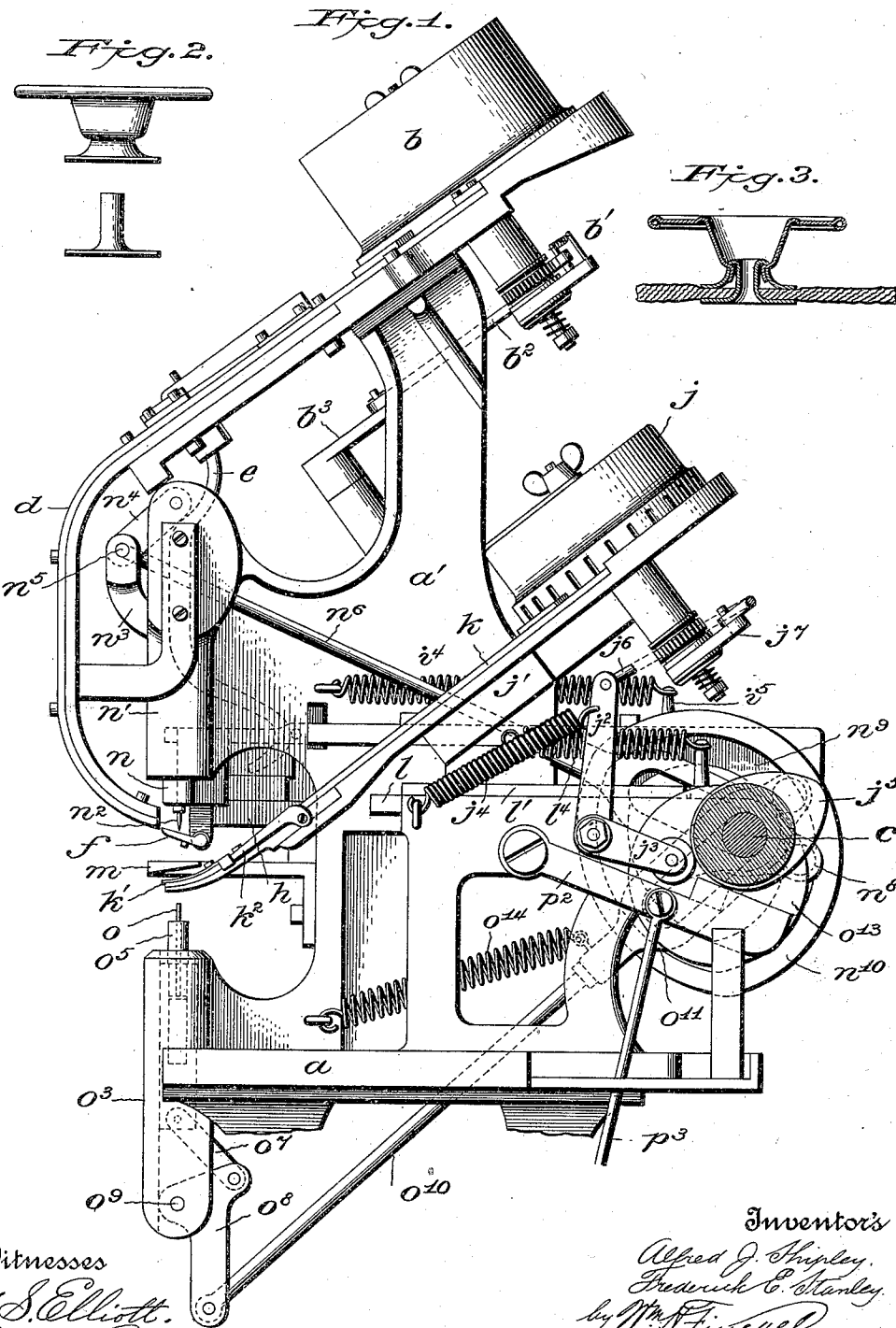
A. J. SHIPLEY & F. E. STANLEY.

BUTTON SETTING MACHINE.

(Application filed July 24, 1899.)

(No Model.)

6 Sheets—Sheet 1.



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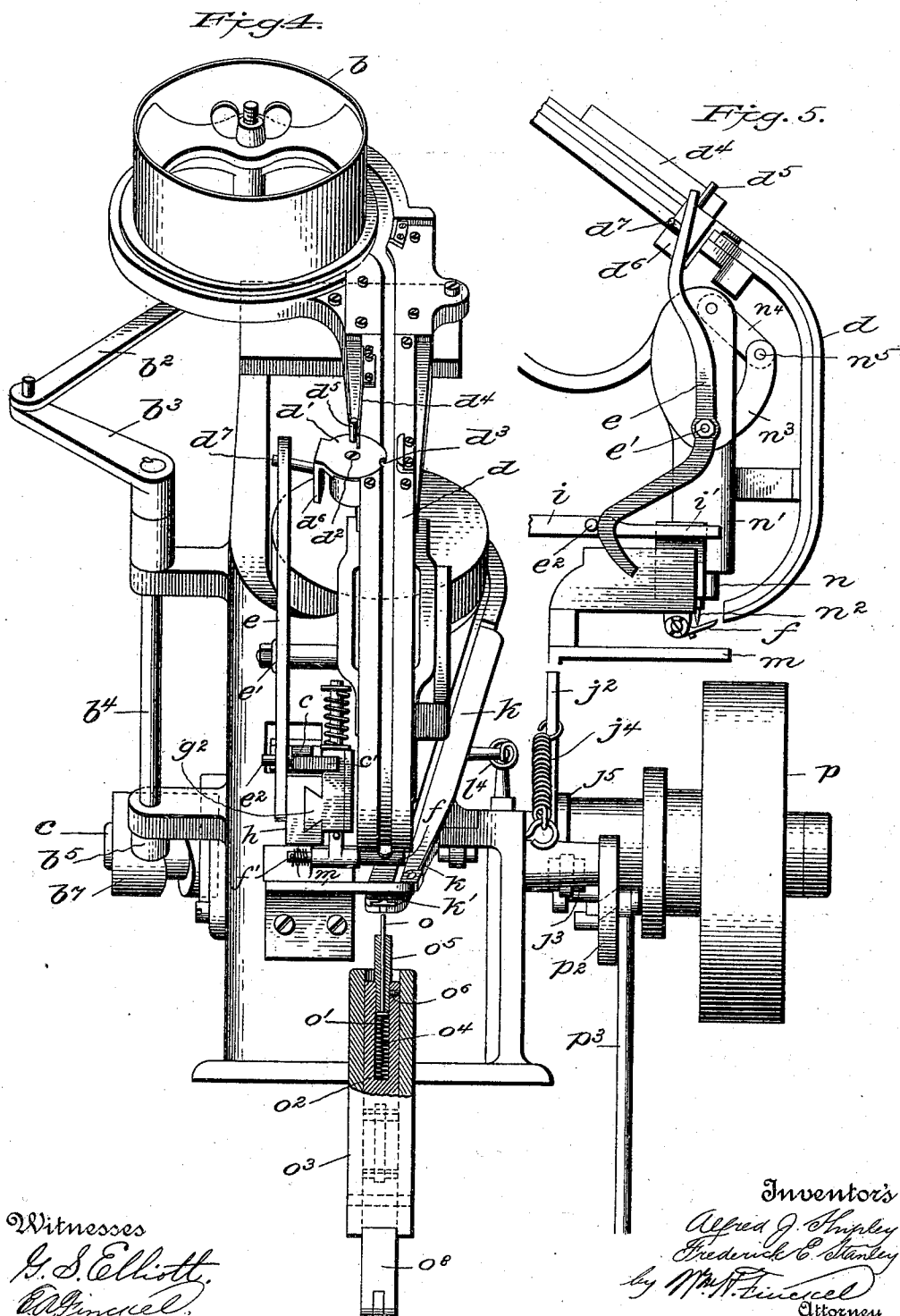
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6 Sheets—Sheet 2



Witnesses
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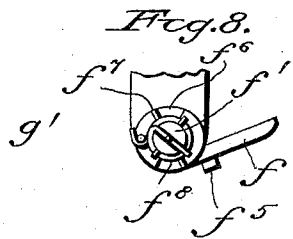
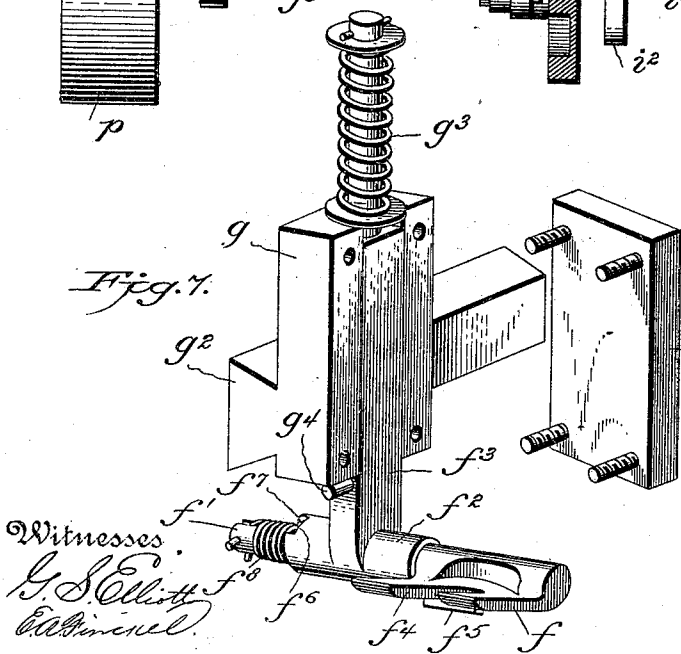
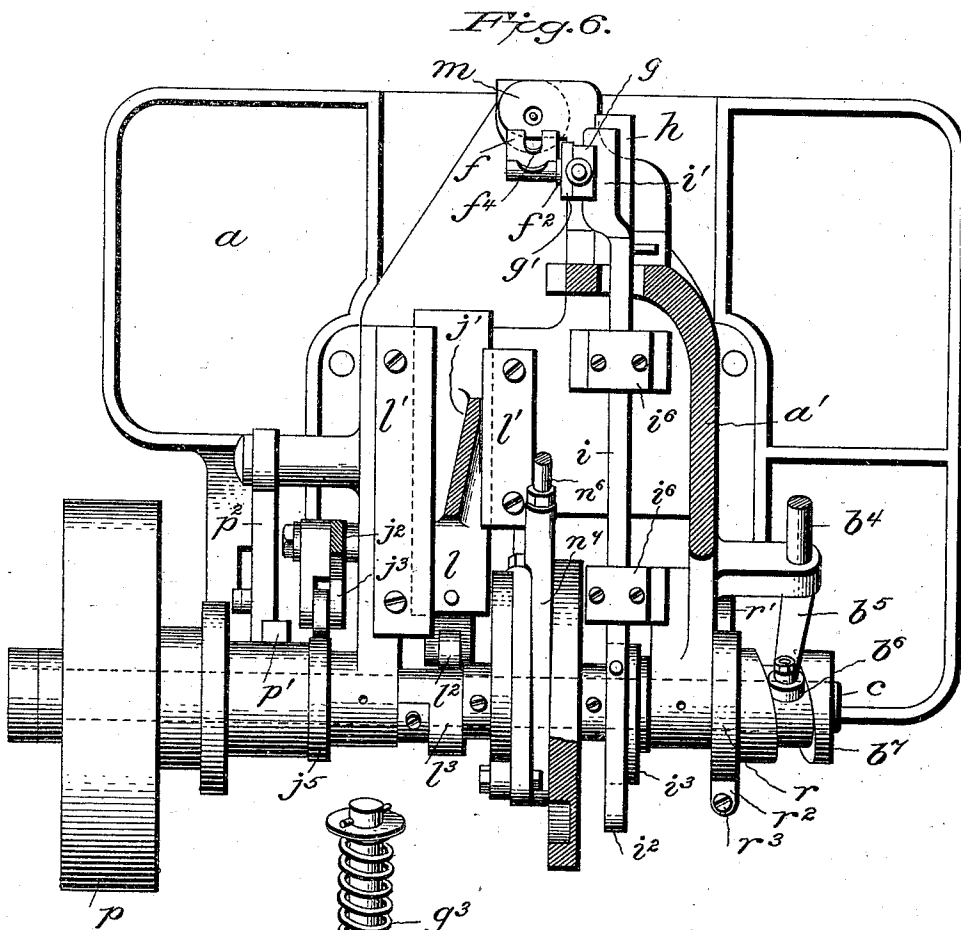
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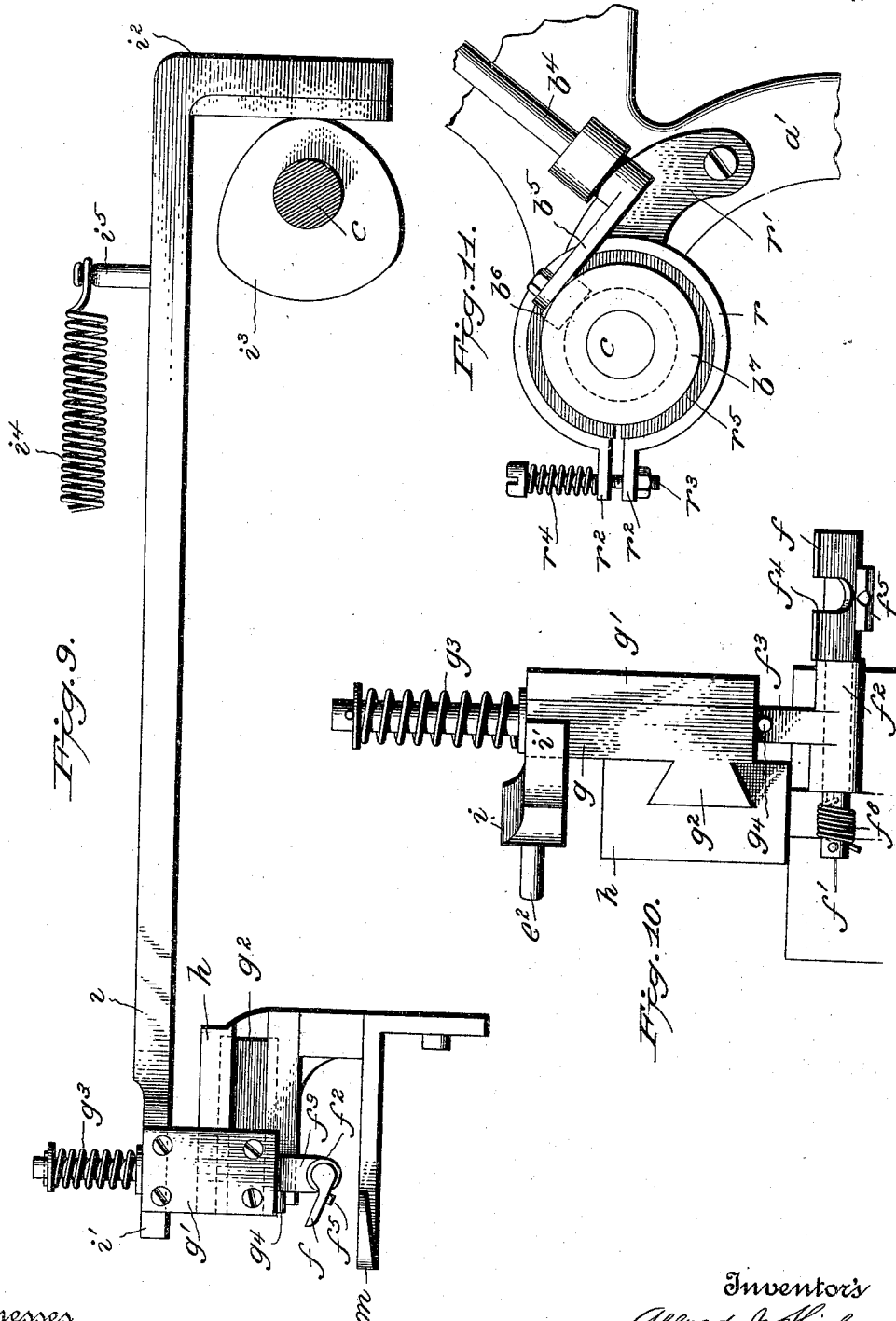
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(No Model.)

6 Sheets—Sheet 4.



Witnesses

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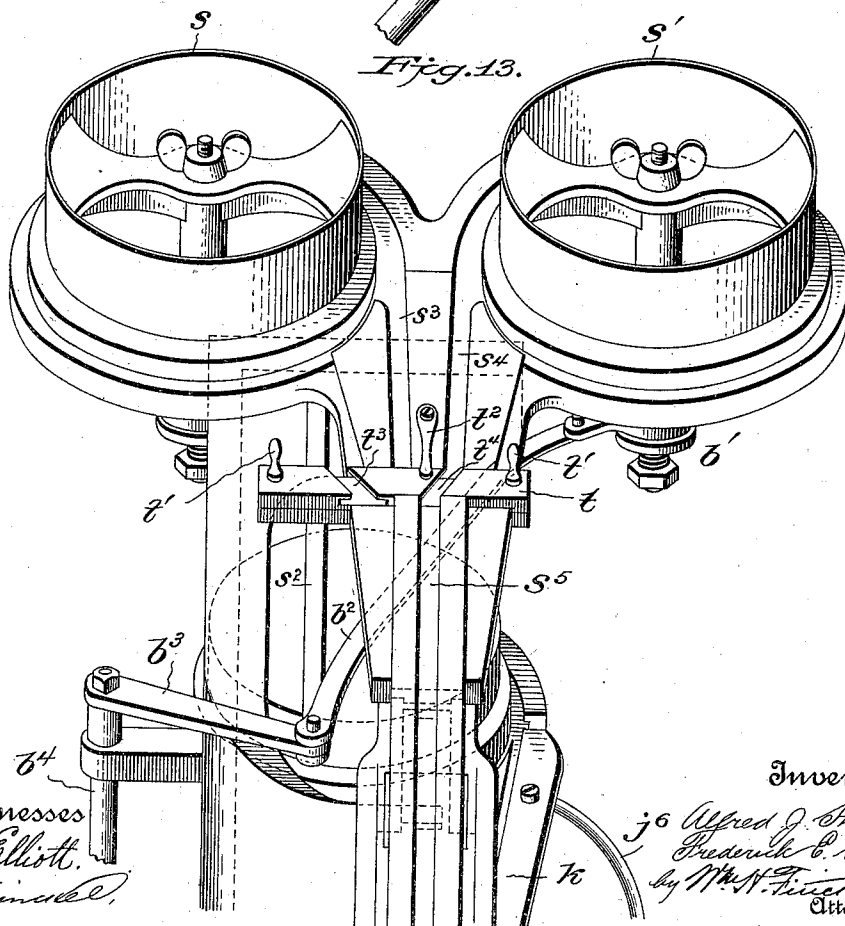
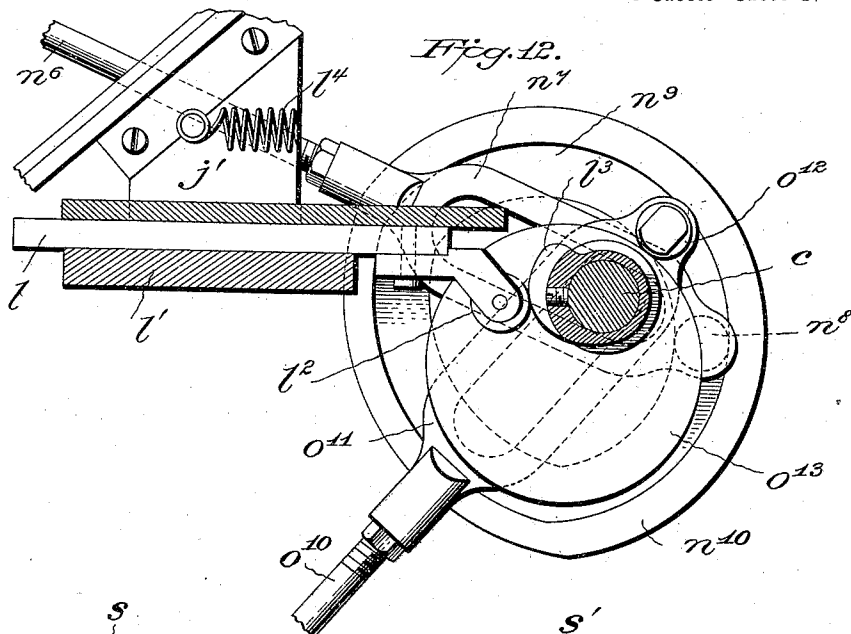
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6 Sheets—Sheet 5.



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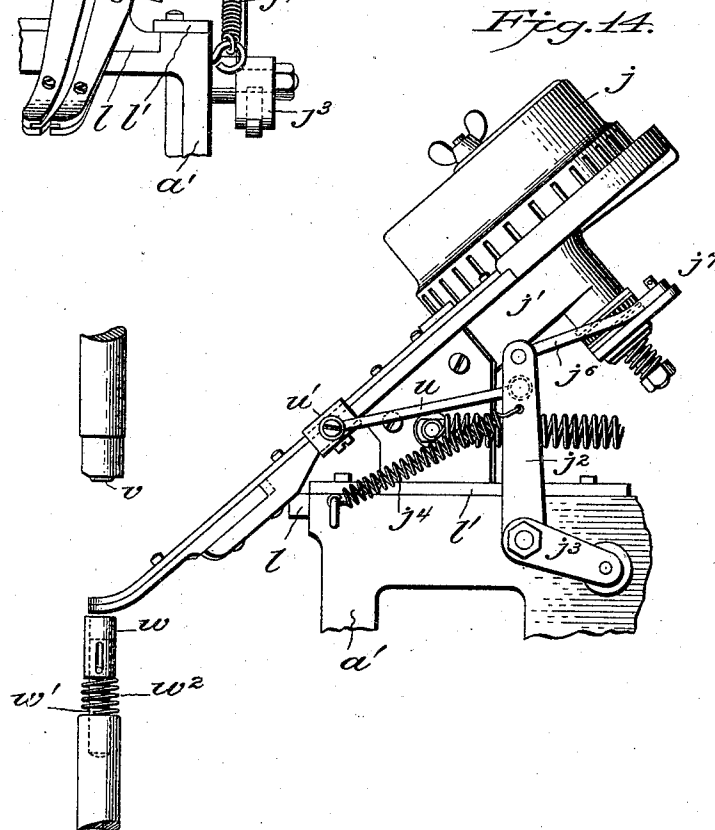
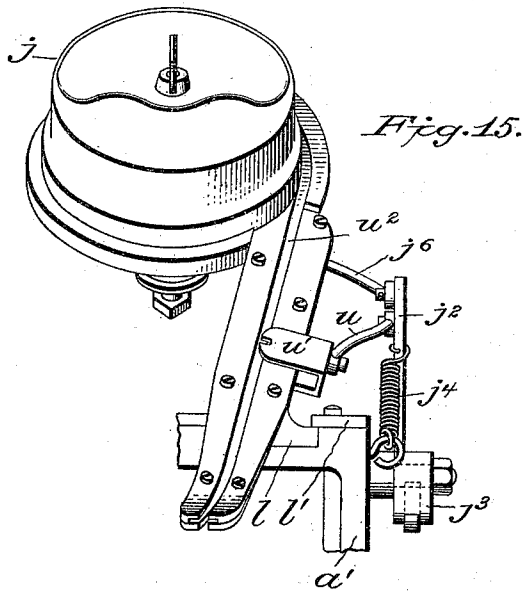
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6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

ALFRED J. SHIPLEY AND FREDERICK E. STANLEY, OF WATERBURY, CONNECTICUT, ASSIGNORS TO THE SCOVILL MANUFACTURING COMPANY, OF SAME PLACE.

BUTTON-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 643,073, dated February 6, 1900.

Application filed July 24, 1899. Serial No. 724,921. (No model.)

To all whom it may concern:

Be it known that we, ALFRED J. SHIPLEY and FREDERICK E. STANLEY, citizens of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Button-Setting Machines, of which the following is a full, clear, and exact description.

The object of our invention is to provide an automatic power-machine for setting or attaching buttons to cloth or garments by means of metallic fasteners and in which the buttons are fed to the setting-tools and dies from and by one chute and the fasteners are brought into conjunction therewith through another and independent chute.

In our machine is employed a peculiar button-receiver, which is held by a spring in line with the button-chute and has a rocker-spindle which is normally elevated by a spring, the said receiver and its said spring-support being carried down by the upper die or tool and the receiver being adapted to be wiped out of the path of the descending die or tool by the latter as said die or tool takes the button from it and having a reciprocating motion toward and from the die or tool to receive and present the button and to withdraw from the path of the setting dies or tools after the button is taken from it and during the active operation of securing the button to a garment. The fastener is fed from a turret or hopper through a chute to the fastener-carrier, and the said chute and its turret have imparted to them a reciprocating motion toward and from the said carrier, so as properly to present the fastener to the carrier as the latter rises, and when the carrier has engaged the fastener the chute withdraws from it, leaving the fastener upon the carrier. Said carrier has a vertical reciprocating motion in a fixed plane.

The tools for setting or attaching the button are positively moved in both directions by independent connections with the main shaft.

Our machine is adapted to receive one or two button-turrets, and if two be employed the machine may be used for attaching but-

tons of different sizes—as, for example, buttons for the waistband for use in connection with suspenders or braces and buttons to be attached to the fly of trousers. Whether one or two turrets be used each is operated by a rock-shaft which is driven positively from the main shaft. These features singly and together and also other parts of a button-setting machine, as hereinafter more particularly set forth and claimed, constitute our invention.

In the accompanying drawings, illustrating our invention, in the several views of which like parts are similarly designated, Figure 1 is a side elevation of the head of the machine, omitting the band-pulley and its immediate adjuncts. Fig. 2 is a side elevation, on a large scale, of the parts of one form of button that may be set with this machine. Fig. 3 is a section of such a button set. Fig. 4 is a front elevation, partly in section. Fig. 5 is a side elevation of the cut-off mechanism. Fig. 6 is a horizontal section taken substantially in planes above the fastener-turret-operating slide and the button-receiver mechanism, but omitting those portions of the superstructure which project below said plane. Fig. 7 is a perspective view of the button-receiver with the face of its box detached. Fig. 8 is an end view of the receiver looking from left to right of Fig. 7. Fig. 9 is a side elevation of the button-receiver and its immediate actuating members. Fig. 10 is a front elevation of the receiver. Fig. 11 is a side elevation of a friction-brake applied to the main shaft to overcome momentum in stopping the machine. Fig. 12 is a sectional side elevation illustrating the devices for moving the fastener-chute and for imparting positive motion to the tools or dies. Fig. 13 is a partial front elevation showing the arrangement of two button-turrets. Fig. 14 is a side elevation of enough of the machine to show its adaptation to use with tack-fasteners, and Fig. 15 is a front view of parts of Fig. 14.

We have herein shown our machine as constructed for use in applying or attaching or setting buttons by means of an eyelet-fastener and also by means of a tack-fastener;

but we wish to state at the outset that we do not limit our invention to its use in connection with any particular kind of fastener.

It is to be noted that in the views, Figs. 4 and 5, the machine is shown in the position where a button has been delivered to the receiver and a fastener is in position to be taken by its carrier, so that in the further rotation of the main shaft the button and its fastener may be set or attached to the cloth or garment.

The bed or table *a* may be supported upon a suitable standard or frame, and from said bed rises a frame *a'*, upon which is mounted the button hopper or turret *b*, to which rotary motion is imparted by a pawl-and-ratchet mechanism *b'* from a link *b²* on a crank *b³* of a rock-shaft *b⁴*, which is supported on frame *a'* and is operated through a crank *b⁵*, having a roller *b⁶* engaging a groove in a cam *b⁷* on the main shaft *c*, and this shaft is mounted in the frame *a'*. The button-chute *d* extends from the turret downwardly to the setting dies or tools and is stationary on the frame *a'*, and it is provided with a gate or cut-off *d'* to release one button at a time.

The cut-off *d'* may be and is here shown as a flat plate pivoted at *d²* to the button-chute and projecting across the groove in said chute and there provided with a notch *d³*, which when turned upward toward the turret will engage the shank of a button and carry it past itself and discharge it into the chute below, down which it gravitates bottom up and by which chute it is turned top up or face up, to be delivered thusto the button-receiver, to be described. This cut-off is normally held so as to close the groove of the chute against the descent of buttons by means of a flat spring *d⁴*, attached to the chute and bearing against the pin *d⁵* of the cut-off; but instead of a flat spring arranged as shown we may use a coiled spring on the other side, or any suitable device may be used which will serve normally to throw the cut-off across the groove in the chute, so as to close it against the descent of the button. This cut-off is also provided with a finger *d⁶*, carrying a pin *d⁷*, which is engaged by a lever *e*, pivoted at *e'* to the frame and engaged by pin *e²* on a horizontal reciprocating bar, hereinafter described, which imparts motion to the button-receiver.

The button-receiver which we prefer to use is constructed as follows: *f* is a forked plate projecting from a spindle *f¹*, which is mounted to rock in a hanger *f²* on the end of a vertically-movable slide *f³*. At the base of the notch *f⁴* in this plate is an abutment *f⁵*, arranged transversely of said notch and projecting downwardly therefrom, which serves to engage the shank of the button as it is delivered from the chute to the receiver and to overcome the tendency of the button to jump out of said receiver. The hanger *f²* is provided with a notch *f⁶*, (see Figs. 7 and 8, especially,) and the spindle *f¹* is provided with a stop-pin *f⁷*, working in this notch. A spring

f⁸ has one of its ends secured in or to the spindle and its other end made fast to the hanger and is set so as normally to throw up the plate *f* into the plane of the discharge end of the button-chute, so as always to be in readiness to receive the button from said chute when properly positioned therefor, and this motion of the spring is limited by the pin *f⁷* in the notch *f⁶*. As will presently appear, the plate *f* has imparted to it a downward vibration with its spindle against the tension of the spring, and such downward motion is limited also by the play of the said pin *f⁷* in the notch *f⁶*. Any other appliance may be used to give to the button-receiver plate the motions just described. The slide *f³* is mounted in a box *g*, which may be a block of metal grooved to receive the said slide and provided with a removable face-plate *g'*. This box is provided with a horizontal slide *g²*. The slide *f³* has a limited vertical play in the box *g* and is held normally elevated by means of a coiled or other spring *g³*, interposed between the box and a projecting end of said slide, a pin *g⁴* at the opposite end of the slide coming into contact with the bottom of the box and serving to limit the upward movement of the said slide.

The slide *g²* is mounted in an appropriately-grooved bracket *h*, which is attached to the front of the frame *a'* above the cloth-rest, substantially as shown in Fig. 9. A bar *i* has its forward end *i'* forked, as shown in Fig. 6, to engage the box *g*, and this bar extends rearwardly beyond the main shaft *c* and has a right-angle projection *i²*, which is engaged by a cam *i³* on the said shaft *c*. This cam, shaped substantially as shown in Fig. 9, retracts the bar *i* as the tools move to effect the attachment of the button to the fabric, so as to withdraw the button-receiver from the path of movement of the tools, and holds the button-receiver in such retracted position until the tools move away from the said button and reach their limit of throw in that direction, and then the said bar *i* and the parts carried by it are automatically brought forward by means of a coiled or other spring *i⁴*, which is attached at one end to the post *i⁵* on the said bar *i* and by the other end to the frame *a'*. The bar *i* is mounted to slide in guideways *i⁶* *i⁶* on the frame. (See Fig. 6.)

The fastener turret or hopper *j* is mounted to rotate upon the bracket *j'*, and rotary motion is imparted to said turret by means of a pawl-and-ratchet mechanism of any approved construction actuated by a rock-lever *j²*, which is pivoted to the frame *a'* and is provided with a roller-arm *j³*, which is held by a spring *j⁴* against an oval cam *j⁵* on the main shaft *c*, a curved bar *j⁶* connecting said rock-lever with the pawl-and-ratchet mechanism *j⁷*. The fastener-chute *k* is also mounted upon the bracket *j'*, and its discharge end is provided (in the case of the use of eyelets) with a pivoted gate or cut-off *k'*, normally held by

a spring k^2 in position to close the groove of the chute and adapted to be opened by the eyelet-carrier as the fastener is taken from the chute. The bracket j' rises from and is rigidly secured to a slide l , which is mounted in the guideway l' , secured upon the frame a' , and this slide l is provided with a roller l^2 , which is held in engagement with a cam l^3 on the shaft c by means of a retracting-spring l^4 . The fastener-chute k has its discharge end movable below the cloth plate or rest m .

In the operation of the machine the fastener-turret is rotated automatically, and in order to present the fastener in position to be taken by the eyelet-carrier the said chute is moved forward by the cam l^3 until the end of the said chute in which the fastener is retained by the gate k' is over the said carrier and in line with its path of movement. As the said carrier rises and engages the fastener in the fastener-chute the cam l^3 has its highest point moved past the roller-arm l^2 , and said roller-arm drops into the depression back of said highest point, and thus leaves the spring l^4 free to act to retract the said fastener-chute and move it away from the path of movement of the setting-tools, so as to permit the said setting-tools to act upon and fasten the button to the garment, and the said chute remains in this extreme retracted position until the button is set and the setting-tools recede and are about to begin their next setting-operation movement.

The setting tools or dies comprise a plunger n , arranged in a head n' of the frame a' , and this plunger has a suitable tool-holder adapted to receive any suitable tool, such as a needle and die n^2 , the needle being capable of taking the button from the button-receiver, projecting through it, and piercing the cloth or garment for the reception of the fastener, if such fastener require such piercing, as does an eyelet. The plunger n has applied to it one member n^3 of a toggle-joint, the other member n^4 of such joint being pivoted in the head n' . These members n^3 and n^4 have pivoted to them at n^5 a rod n^6 , which extends rearwardly and has a slotted end n^7 , which embraces and is supported by the shaft c , and has a roller n^8 , which engages the groove n^9 of a double elliptical cam n^{10} on said shaft c , whereby positive up and down movements are imparted to the upper tool.

The lower tool or die for acting upon the fastener comprises in the case of an eyelet an eyelet-carrier o , constructed as a headed pin arranged in a cavity o' in a plunger o^2 , which has a vertical reciprocating motion in the socket-piece o^3 of the frame. This eyelet-carrier is normally projected by means of a spring o^4 beneath it and confined by the die o^5 , which may be held in the plunger o^2 by a set-screw o^6 , and which die also serves as a guide for the movement of the eyelet-carrier o . The plunger o^2 is supplied with a link o^7 , which is jointed to a T-lever o^8 , having its fulcrum o^9 in the socket o^3 , and this lever o^8 has at-

tached to it a rod o^{10} , which rises to the shaft c and has a slotted end o^{11} , straddling the said shaft and terminating in a roller o^{12} , which rides upon an eccentric o^{13} on the said shaft. The roller o^{12} is kept in contact with the periphery of the eccentric o^{13} by means of the spring o^{14} , which is connected at one end with the rod o^{10} and at the other end with some portion of the frame a' .

As will be understood, the cam n^{10} and eccentric o^{13} give to the respective rods n^6 and o^{10} longitudinally-reciprocating motions, which are converted by the respective mechanisms into positive vertically-reciprocating motions of the tools or dies, and thus is obviated the necessity for the employment of springs. This positive motion of the tools or dies is of especial importance in high-speed automatic machines.

The shaft c is provided with a band-wheel p or other suitable power appliance, and in the case of an automatic power-machine this band-wheel may be provided with a sliding clutch, part of which is shown at p' , Fig. 6, and which coöperates with a shifting lever p^2 , which may have a rod connection p^3 with a suitable treadle. We have found that when such a machine is run at a high speed and the band-wheel is unclutched and the machine thereby stopped there is a certain rebound, which tends to disturb the equilibrium, and in order to overcome this objectionable action we provide a friction-brake, (see Fig. 11,) which consists of a metal band r , encircling, say, the cam b^7 , and supported from a bracket r' , made fast to the frame a' , the ends of the said metal band r being formed with parallel ears r^2 , which are connected by the screw-bolt r^3 , having a spring-tension device r^4 , and this band r is lined with leather or equivalent substance r^5 , arranged next to the cam, and it is held in more or less intimate contact with the cam by the tension that may be placed upon the spring r^4 by adjustment of the screw-bolt r^3 .

If it be desired to attach different sizes of buttons to a garment by one and the same machine, separate turrets for the different sizes may be mounted upon a common standard or frame, such as the frame a' , and, as shown in Fig. 13, these turrets s and s' have independent rotating mechanisms, one of which may be exactly like that hereinbefore described and illustrated in Figs. 1, 4, and 6 and similarly lettered in Fig. 13, while the other may have a pawl-and-ratchet mechanism of approved construction, operated by a link s^2 , which is also attached to the crank-arm b^3 of the rock-shaft b^4 . Individual chutes s^3 and s^4 lead from these turrets to the common chute s^5 , which latter may be otherwise exactly like the chute d , hereinbefore described and illustrated in Figs. 1, 4, and 5. The chutes s^3 and s^4 are divided from the chute s^5 by a switch-plate t , which is arranged to slide transversely in the chutes and may have knobs t' for operating it, with a retaining-spring t^2 ,

and this switch is constructed with the two grooves t^3 t^4 , which by appropriate movement of the switch may be made to open the grooves of the chutes s^3 and s^4 , respectively, and alternately with the groove of the chute s^5 to feed buttons from one or the other of the turrets and cut out the turret whose chute is not opened into the main chute s^5 . Of course such an arrangement presupposes what is usually the fact that one size or style of fastener is applicable alike to the two sizes or styles of button. By this construction buttons of one size may be attached to a waist-band of trousers and buttons of another size or style may be attached to the flies by the same machine.

The operation of the machine is obvious from the foregoing description; but it may be stated briefly as follows: Buttons and fasteners having been supplied to the respective turrets, rotary motion is imparted to the shaft c . We prefer to use a clutch (and the one herein shown is of the character described) which automatically frees the shaft and must be held by the operator's foot on a suitable treadle to effect the engagement of the band-wheel and shaft. The stopping of the machine leaves the tools in their most distant or retracted positions, with the button-receiver in alinement with the end of the button-chute and in position to receive a button from the chute, and the fastener-chute retracted to its rearmost position and the button-chute cut-off moved to throw a button past it into the chute and down into the button-receiver. As the shaft turns the fastener-chute is moved forward, so as to carry a fastener into the path of movement of the fastener-carrier, and said carrier rising enters the eyelet (if that be the kind of fastener used) and takes it upon itself, while the needle descends through the button, and its holder, pressing upon the button-receiver, depresses said button-receiver against the tension of its spring g^3 , and then the cam l^3 becoming inactive the spring l^4 retracts the fastener-chute, the fastener on the carrier being left there by the receding chute and the gate k' immediately thereafter springing back and closing the end of the chute against the escape of other fasteners. The button-receiver at the same time is drawn back away from beneath the needle-holder and when released from the needle-holder rises under the action of its spring g^3 . The tools continuing to operate, the die o^2 is carried up against the die next to the needle and the eyelet clenched within the button. Immediately thereafter the tools recede from one another, and then the button-receiver, having its bar i released from the cam i^3 , is automatically pulled forward by the spring i^4 and advanced beneath the needle and in position behind the discharge end of the button-chute to receive the next button, which meanwhile has been released by the gate d' , and again the fastener-chute is advanced over the fastener-carrier, as before. The gate d' , as already stated, is spring-held, so

as to close the button-chute against the descent of buttons, and it is operated positively against such spring by the lever e as the bar i is moved forward under the action of its spring i^4 at the time when the parts are taking position for the setting or attaching of another button.

As will be observed, a single drive-shaft only is employed for effecting the movements of the parts of the machine, and thus the construction and operation of the machine are simplified.

As already indicated, our machine is capable of use for setting buttons with other fasteners than eyelets. For example, it may be used for setting buttons with tacks and whether the buttons contain within themselves anvils for upsetting the points of the tacks or not, the changes necessary being mainly in the form of tools or dies and carriers that may be required to this end and in the tack-feed. One form of such machine is shown in Figs. 14 and 15. The rock-lever j^2 may have attached to it a rod u , which operates a cut-off w' instead of the gate k' on the tack-feeding chute w^2 , which corresponds otherwise in function and operation with the eyelet-chute. The upper tool has the die v and the lower tool the tack-carrier w , made as a sleeve supported upon the plunger w' and a spring w^2 .

We do not limit our invention to mere details of construction, excepting as hereinafter specifically claimed, for it is obvious that our machine is susceptible of a variety of alterations without materially departing from the spirit and scope of our invention.

Practical use of the machine has demonstrated its capacity for very rapid running or high speed and very perfect work.

What we claim is—

1. In a machine for setting buttons, button-feeding mechanism, fastener-feeding mechanism, and setting-tools, combined with a button-receiver, having a vertically-yielding motion and also an independent vibratory motion, means to move said receiver into position to receive the button from the button-feed and to deliver it to the setting-tools and thereafter to withdraw the said receiver from the path of movement of the said setting-tools and hold it in that position until the button is set and the button-setting tools retracted, substantially as described.

2. In an automatic button-setting machine, button-feeding mechanism, fastener-feeding mechanism, and setting-tools, combined with a button-receiver, a main shaft, a cam thereon, a reciprocating rod connecting the receiver with the cam and adapted to withdraw the receiver from the setting mechanism in the act of attaching the button to a garment, and means to return the said button-receiver to position to receive the next button, substantially as described.

3. In an automatic button-setting machine, a button-receiver having a forked plate, a hori-

zontal slide on which it is mounted, a guide-way for said slide, a cam and cam-shaft, a sliding rod connecting the horizontal slide with the cam to move the same positively in one direction and a spring for moving the said slide in the opposite direction, substantially as described.

4. In a machine for setting buttons, a button-feed, a fastener-feed, and setting-tools, combined with a button-receiver having a forked plate, a spindle upon which it is mounted, a spring-slide in which said spindle is supported, a horizontal sliding box containing said slide, a cam and a connection between the said box and cam, substantially as described.

5. In a button-setting machine, a button-receiver, comprising a forked plate having a spindle, a hanger in which said spindle is mounted, means to permit a limited vibratory movement of said plate in said hanger, and means to move the said button-receiver toward and from the button-chute of the machine, substantially as described.

6. In a button-setting machine, a button-feed, a fastener-feed, and setting-tools having a rectilinear motion in a single plane, a button-receiver comprising a forked plate, a spindle to which it is affixed, a hanger in which said spindle is mounted, means to permit a limited rocking motion of the plate in said hanger, a slide supporting the hanger, a box in which said slide has a longitudinal vertical motion, a spring for supporting said slide and adapted to yield to permit the descent of the receiver-plate under the action of the setting-tools and to restore the said plate to normal position when released from the setting-tools, and means to move the said button-receiver toward and away from the button-feed, substantially as described.

7. In a button-setting machine, a button-receiver, comprising a forked plate having an

abutment ^f arranged transversely at the base of its notch and projecting downwardly therefrom, substantially as and for the purpose described.

8. In a button-setting machine, a button-feed comprising a chute, a vibratory gate to control the passage of buttons through the said chute, a button-receiver, means to impart thereto a movement toward and from the said chute, and a lever pivoted to the frame of the machine, with one end engaged by the button-receiver-operating device and its other end in operative connection with the said gate, to actuate the said gate, substantially as described.

9. In a button-setting machine, a button-feed comprising a chute, a vibrating gate for discharging the buttons one by one from said chute, a button-receiver, means to move said receiver horizontally, a lever pivoted to the frame of the machine and having its opposite ends in contact with the said gate and the button-receiver to actuate said gate, substantially as described.

10. In a button-setting machine, button-setting tools, fastener-feeding means, and a plurality of button-turrets, combined with a single button-delivering chute, independent button-chutes leading from said turrets into the delivering-chute, and a switch-plate arranged to slide transversely in the chute and having two grooves for opening one of the individual button-chutes to the delivering-chute and simultaneously closing the other, substantially as described.

In testimony whereof we have hereunto set our hands this 22d day of July, A. D. 1899.

ALFRED J. SHIPLEY.
FREDERICK E. STANLEY.

Witnesses:

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