3 Sheets—Sheet 1.

S. ROCKWELL.

Button-Hole Attachment for Sewing-Machines.

No. 211,932. Patented Feb. 4, 1879.

Fig 1.

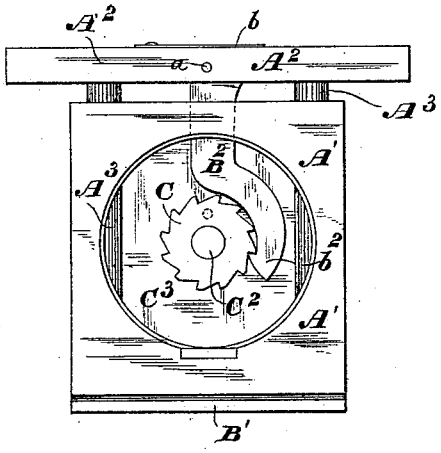


Fig 2.

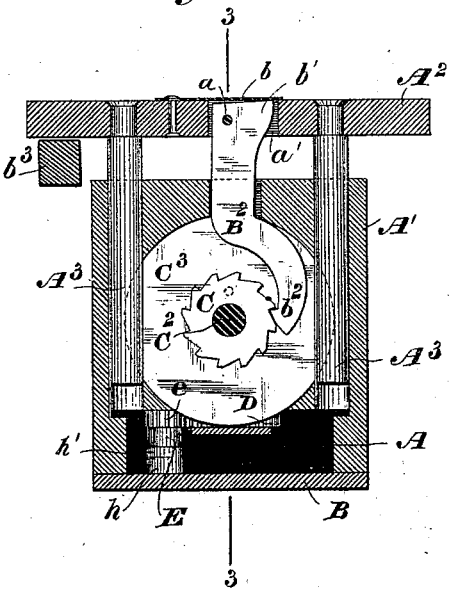


Fig 4.

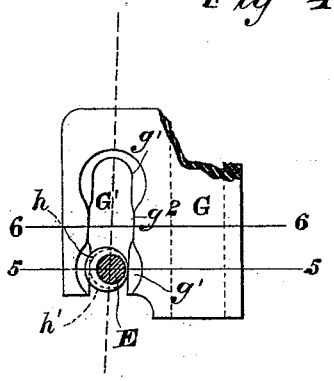


Fig 3.

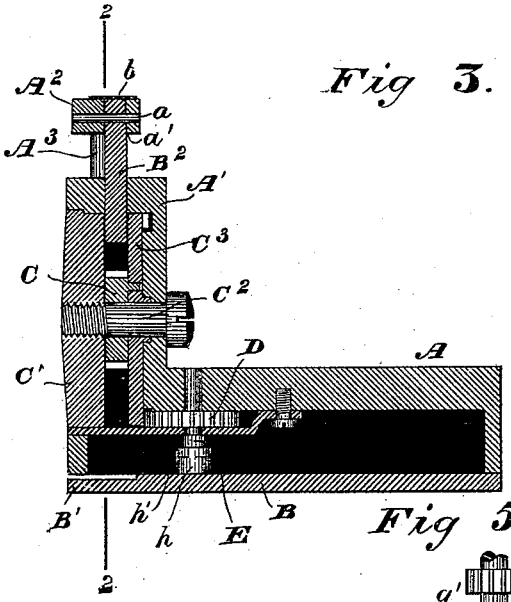


Fig 5.

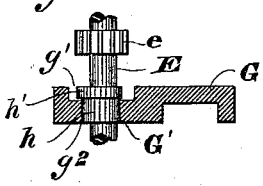
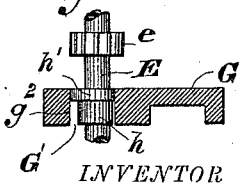


Fig 6.



WITNESSES

Wm A Skinkle

Wm T. Kilgrove

INVENTOR

Samuel Rockwell

By his Attorneys

Baldwin, Hopkins & Peyton.

3 Sheets—Sheet 2.

S. ROCKWELL.

Button-Hole Attachment for Sewing-Machines.

No. 211,932. Patented Feb. 4, 1879.

Fig 7.

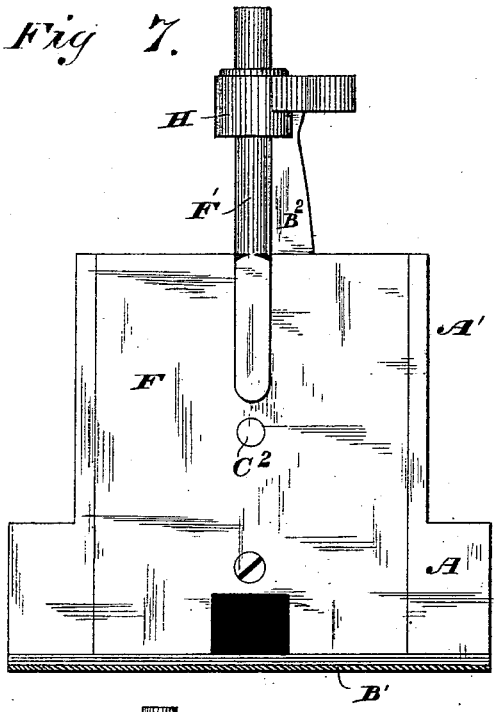


Fig 8.

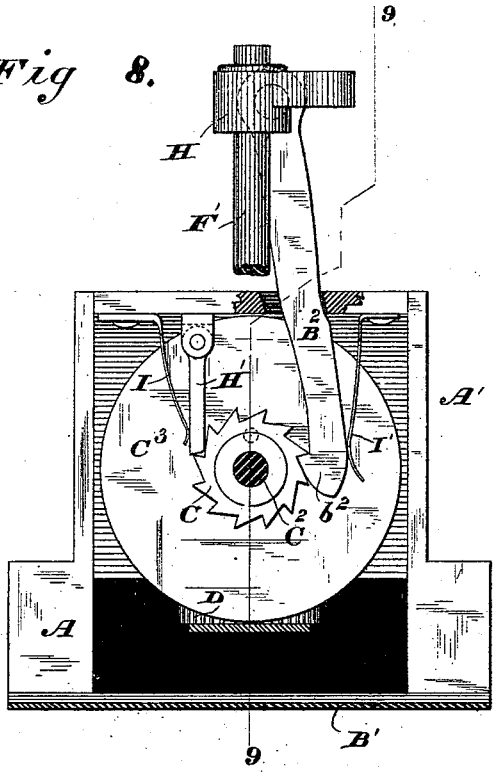
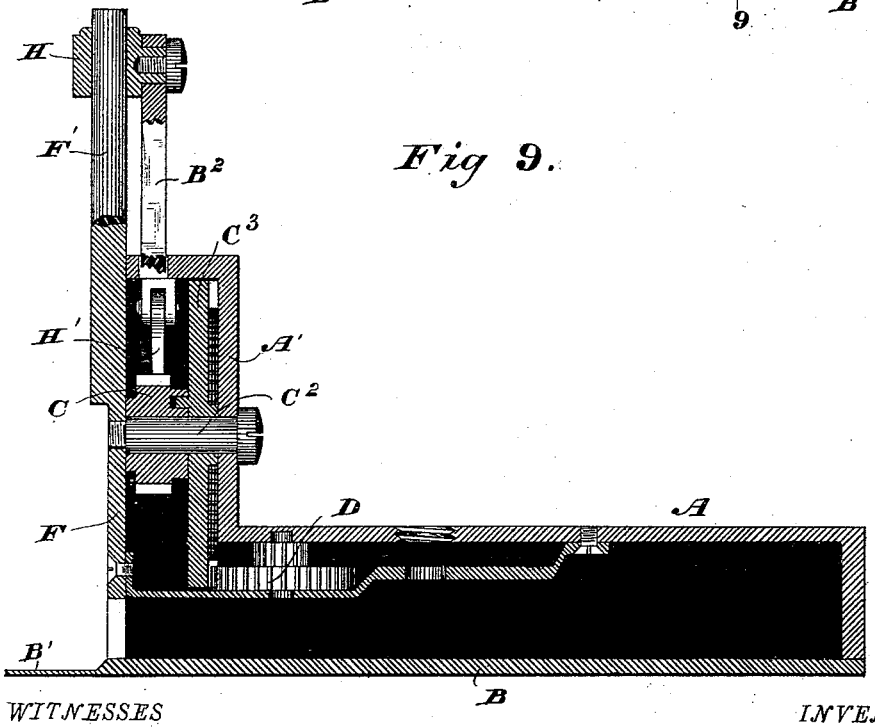


Fig 9.



WITNESSES

Wm A. Skinkle.

Wm T. Kilgore

INVENTOR

Samuel Rockwell

By his Attorneys

Baldwin, Hopkins & Peyton

3 Sheets—Sheet 3.

S. ROCKWELL.

Button-Hole Attachment for Sewing-Machines.

No. 211,932. Patented Feb. 4, 1879.

Fig. 10.

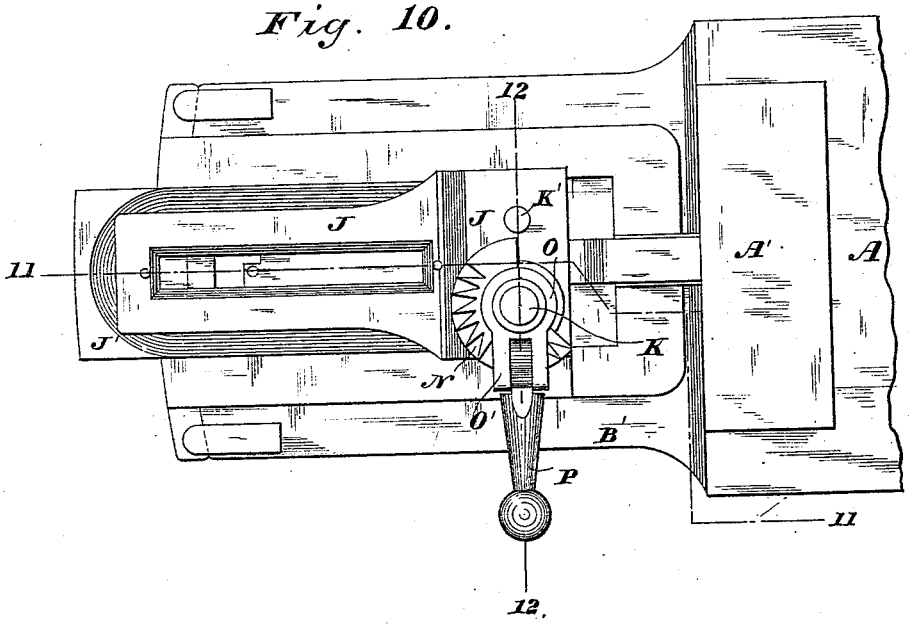


Fig 11.

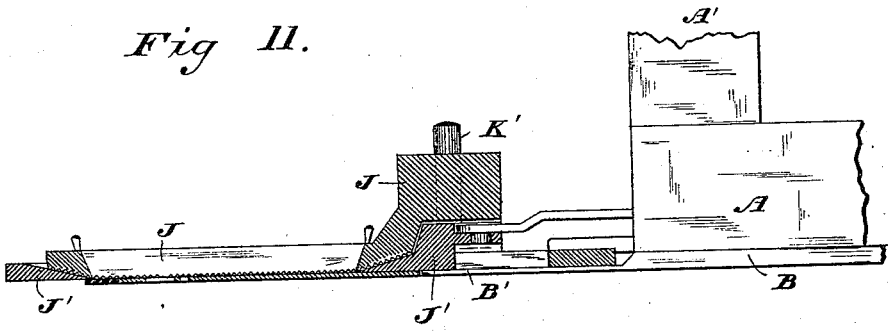
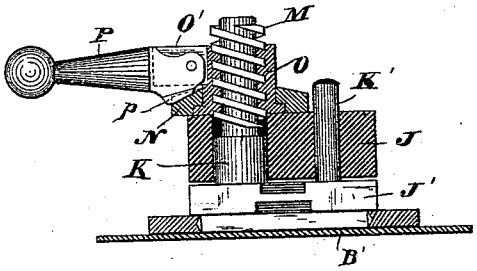


Fig. 12.



WITNESSES

Wm A Skinkle.

Wm T. Kilgore

INVENTOR

Samuel Rockwell

By his Attorneys

Baldwin, Hopkins & Peyton

UNITED STATES PATENT OFFICE.

SAMUEL ROCKWELL, OF BALTIMORE, MARYLAND, ASSIGNOR TO GEORGE TRULL, TRUSTEE, OF NEW YORK, N. Y.

IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **211,932**, dated February 4, 1879; application filed September 4, 1878.

To all whom it may concern:

Be it known that I, SAMUEL ROCKWELL, of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Button-Hole Attachments for Sewing-Machines, of which the following is a specification:

My invention relates to improvements in button-hole attachments of the same class as those shown and described in sundry Letters Patent of the United States heretofore granted for inventions of Samuel J. Baird, my improvements being more especially applicable to the button-hole attachment for which United States Letters Patent were granted the assignee of said Baird, dated August 6, 1878, No. 206,768, to which patent particular reference is here made.

My object mainly is to remedy defects in the said Baird patented improvements, which defects are incident to the construction and operation of special parts, as will hereinafter be explained, and so to adapt the attachment to the formation of regular stitches, or those of uniform length, and enable it, with entire success, to be used in working button-holes in heavy goods, leather, &c.

My improvements consist in novel organizations of parts, and in certain combinations of devices, hereinafter first fully described, and then specifically designated by the claims.

In the accompanying drawings I have shown so much only of a button-hole attachment as is necessary to illustrate the improvements claimed, the omitted parts being substantially identical with the corresponding parts shown or described in the Patent No. 206,768, before mentioned, and sundry patents therein referred to.

Figure 1 is a front elevation of the attachment with the covering-disk or securing-plate removed from the front or face of the ratchet-chamber or turret and the cloth-clamp-supporting base-plate detached; Fig. 2, a vertical transverse section on the line 2 2 of Fig. 3; Fig. 3, a longitudinal section on the line 3 3 of Fig. 2. Fig. 4 shows, in detail, a plan or top view of the oscillating cam-frame or shifting-plate and the eccentric or cam in the slot thereof, with its shaft in section. Figs. 5 and 6 are sectional views on the lines 5 5 and 6 6, repectively, of Fig. 4. Fig. 7 is a front elevation of a slightly-modified attachment, the cloth-clamp-supporting base-plate being in section; Fig. 8, a view of the same, partly in front elevation and partly in section, with the securing and protecting plate removed from the front of the ratchet-chamber or turret; Fig. 9, a longitudinal section on the line 9 9 of Fig. 8; Fig. 10, a plan or top view of a portion of the attachment, showing parts omitted in Figs. 1, 3, 7, 8, and 9; Fig. 11, a longitudinal section on the line 11 11 of Fig. 10; and Fig. 12, a section through the cloth-clamp adjusting and securing devices on the line 12 12 of Fig. 10.

The gearing is inclosed and protected in a box or casing, A, having the vertical chamber or turret A^1 and detachable base-plate B, with the extension or cloth-clamp-supporting base-plate B^1, as in the before-recited Patent No. 206,768.

Instead of the two reciprocating driving rods or shafts employed in the before-referred-to patented improvements of Saml. J. Baird, a single reciprocating shouldered or hooked ratchet-actuating bar or driver, B^2, is employed. This driver is (in the construction I prefer) pivoted or pin-jointed at its upper end to a horizontal piece or cross-head, A^2. The pivot *a*, by which the driver-bar is jointed to the cross-head, passes through the bar near one edge, and secures it in a slot, *a'*, in the cross-head. A spring, *b*, over the slot acts upon the heel b^1 or top end of the driver at the edge opposite that near which the pivot is located.

The driver-bar is curved so as to conform to the turret-cavity, and moves up and down through a way or slot in top of the turret, (see Fig. 2,) in which slot it may also play laterally a distance sufficient to disengage its hook or shoulder b^2 from the ratchet C on the downward stroke.

During the downward movement of the driver its inclined nose slips past the ratchet-teeth as the spring *b* yields.

The turret is drilled through its top wall to form two parallel holes or guides, in which reciprocate two rods, A^3 A^3, for steadying and

controlling the movements of the reciprocating cross-head and its attached ratchet-driver.

The cross-head, at its projecting end, may be acted upon by the vertically-vibrating bar b^3, Fig. 2, actuated from or vibrating in unison with the needle-bar of the sewing-machine, to which the attachment may be clamped, or the reciprocating movements be given the driver in other and suitable ways—such, for instance, as described in the Patent No. 206,768, and the other patented improvements of Saml. J. Baird, the connections varying with the different machines to which the attachments may be suited, and being such as would readily be suggested to the skilled mechanic or manufacturer.

It is absolutely essential to proper operation of the ratchet-actuating bar or driver B^2 that it be caused to ascend with the needle and perform its office of imparting motion to the ratchet on the upstroke of the needle when it is out of the goods, and that it be caused to slip past the ratchet on the downstroke of the needle, so as not to disturb the fabric while the needle is in it. Suitable means for actuating the driver have been referred to. No particular devices are required so long as the required movements at the proper time, as stated, are given the driver.

As in the aforesaid Patent No. 206,768, the ratchet C is covered by the disk C^1 upon the front or face of the turret A^1, and detachably secured by the screw C^2, which serves as the shaft or bearing for the ratchet and a crown-wheel, C^3. Unlike the attachment covered by said patent, however, the ratchet is operated but once at each complete reciprocation or advance and return stroke of the driver B^2, the ratchet being actuated upon the upstroke only of the driver.

The advantages in operation arising from my improvements over the before-recited patented improvements will hereinafter fully be explained.

As in said Patent No. 206,768, a main spur-gear or master wheel, D, is driven by the crown-wheel C^3, and the master-wheel in turn drives the pinion *e* and cam-shaft E. By suitable gearing motion is imparted by the master-wheel to the various parts of the complete attachment, as will readily be understood by reference to the before-referred-to patented improvements of Saml. J. Baird, particularly the patent of August 6, 1878, No. 206,768.

It is not deemed necessary to show by the drawings and herein particularly describe all the parts of a complete attachment, such as the horizontally oscillating or vibrating lever, the cloth-clamp or fabric-holder reciprocated in the front end thereof, the devices for operating the cam-frame or shifting-plate to change from one side to the other of the button-hole and secure its ends, and to give the longitudinal movements to the cloth-clamp, said parts being fully shown and described in Baird's patents, particularly Patent No. 206,768. In the following respects, however, my improvements (in addition to those hereinbefore in part described) materially differ from Baird's.

The cam-frame or shifting-plate G, (see Figs. 4, 5, and 6,) slotted at G′, (the slot being formed and inclined as described in Patent No. 206,768,) is adapted to operate in connection with the cams of the driven shaft E, so as to prevent "lost motion," and guard against the liability of the fabric being accidentally and improperly moved by vibrations of the cam-frame independently of the cams, as it might be in the said patented improvements, where, as in the present instance, the slot is widened by recesses g^1 g^1 at each side of the narrow portion g^2, the width of this central portion g^2 being slightly increased from the plane or level of the recess bases to the bottom of the plate.

Instead of wipers or narrow lug-like cams or mere arms projecting from the sides of the cam-shaft, as in the patent hereinbefore most particularly referred to, I provide the shaft with two cams, *h* *h*′, formed by circular enlargements eccentrically applied to or formed upon the shaft, the one, *h*, to act upon the walls of the narrow portions of the slot at its ends or on either side of its middle, and moving clear of the slot-walls when the shaft is at the middle or narrow top part of the slot, and the other, *h*′, to act upon the slot-walls at the middle slightly-widened top part, and moving clear of them when the shaft is revolved at either end of the slot, at which time this cam *h*′ moves in the cut-away or recessed parts of the slot, and is inoperative. The cams or eccentrics *h* *h*′, completely encircling the shaft E, and being of the proper diameters to snugly fit in or fill those parts of the slot G′ in which they are respectively intended to operate, effectually prevent any injurious vibratory movement of the plate G, and consequently guard against the work, if properly clamped, being manipulated or shifted laterally independently of the action of the cams.

As will readily be understood, (reference being had to Patent No. 206,768, hereinbefore particularly referred to,) the lateral or oscillating movement of the cloth-clamp is produced by the action of the ratchet-attached crown-wheel C^3, the master-wheel D, pinion *e*, shaft E, and cams *h* *h*′. When the cam-frame or shifting plate G is moved endwise so as to bring the smaller cam into action at either end of the slot G′, short vibrating movements are given; and when the larger cam, *h*′, is acting, the lateral throw is increased, so as to insure the proper end-stitching of the button-holes.

The crown-wheel C^3, master-wheel D, and pinion *e* are respectively provided with the proper number of teeth, and so arranged or timed relatively to each other and to the ratchet and its driver B^2 that a half-revolution is imparted to the cam-shaft upon each upstroke of the driver, and at and near the finish of this stroke after the needle is out of the work. No movement of the ratchet-wheel

is imparted upon the downstroke of the driver; consequently the cam-shaft and cams are held stationary while the needle is in the goods, and all vibratory movement and endwise-feeding movement of the fabric is prevented while the needle is in it.

In the Baird attachment, which my invention is particularly designed to improve and perfect, the endwise feed is, in part, imparted upon the downstroke of his driving-rods; and the shifting-plate G therein, not having its slot at all times filled or crossed by one or the other of the cams on the cam-shaft, is capable of being accidentally and injuriously moved laterally. These imperfections are remedied by my improvements in the initiatory or primary parts of the attachment.

By changing from the two driving-shafts to the single driver, operating on the finish of the upstroke solely instead of both on the up and down stroke, and imparting a half-revolution to the cam-shaft at each actuation instead of a quarter-turn, as in Baird's attachment, I am enabled to sew leather and other tough or thick fabrics without breaking or bending the needle or slitting the goods by its movement therein, and, further, to insure uniform stitching, while still leaving the attachment equally as serviceable for light work as before.

In Figs. 7, 8, and 9 of the drawings are shown some slight modifications of my invention. These figures show the attachment as especially designed for use in connection with the well-known Singer (No. 2) sewing-machine. A vertically-sliding ratchet-covering plate, F, is shown instead of the disk C', and this removable plate is provided with a standard, F', upon which slides a sleeve, H, to which the driver B^2 is jointed. The ratchet C is acted upon by a detent, H', held to its work by a light spring, I, so as to prevent accidental reverse movement of the ratchet, instead of depending entirely upon the resistance to be overcome to guard against the backward movement, as in the preferred construction before described. Instead of the spring *b*, acting upon the top of the driver, as in Figs. 1, 2, and 3, I employ the internal spring I' to keep the hooked or shouldered end b^2 of the driver to its work on the upstroke.

The movable section of the cloth-holder—that is, the cloth-clamp proper, J, (shown by Figs. 10, 11, and 12)—is used in connection with the preferred as well as the modified form of the attachment. The cloth-clamp main section or base-plate J' has two short upright posts or stud-rods, K K', upon its inner portion, the former having a screw-thread, M, upon its upper end and therefrom downwardly for the greater portion of its length. The inner or heel end of the clamp J, or movable upper section of the holder, is thickened or otherwise suitably shaped, and formed with holes or guideways, through which the posts pass. The clamp is movable up and down upon its guide-posts, and to whatever position it may be vertically adjusted is always parallel upon its under serrated face with the upper surface of the holder, lower section, or base J'. Upon the top of the heel of the clamp J is formed or secured a ratchet-toothed projection, plate, or disk, N. A screw-collar, hub, or nut, O, is fitted to the top of the clamp, and centrally in the ratcheted projection, so as to be capable of revolving freely, but having no endwise or vertical movement independently of the clamp J and its attached ratchet. A vertically-swinging lever handle or arm, P, is pivoted to the screw-collar O, and provided with a teat or inclined stop-lug, *p*, on its under side to engage the ratchet-teeth. The lever is pivoted in the bifurcated lug O' of the screw-collar, so that it may be thrown up out of the way.

It will readily be seen that by elevating the lever-handle, should it be in its locked position, and thus disengaging the locking-teat from the ratchet, the clamp J may be elevated or lowered by turning the handle to the right or to the left, and the goods be removed or placed in position and securely held by the nut whether the lever is locked or not.

As I have already stated, the apparatus hereinbefore described is in some respects identical with, and in others substantially similar to, the patented improvements heretofore invented by Saml. J. Baird, and I make no claim to any of said patented improvements; but I have in some respects materially changed the apparatus, and thereby attained greater accuracy of work, and rendered it more perfect in operation, as well as adapted it to a greater variety of work than it was heretofore well suited to perform.

I claim as of my own invention—

1. The combination of the chambered turret, the single pivoted reciprocated driver, and the ratchet-wheel actuated by the driver on its upward movement only, and serving to impart motion, by way of the crown-wheel, to cloth-clamp actuating mechanism, substantially as and for the purpose hereinbefore set forth.

2. The combination, substantially as hereinbefore set forth, of the box or casing, the cam-frame or shifting plate, the intermittently-operated cam-shaft, having the cams *h h'*, snugly fitting in the slot of the cam-frame, and mechanism, substantially such as described, for imparting a half-revolution to the cam-shaft at intervals, for the purpose described.

3. The combination, substantially as hereinbefore set forth, of the single reciprocated driver, the ratchet actuated on the upward movement only of the driver, the crown-wheel, the master-wheel, the cam-shaft, the circular cams or eccentrics on said shaft, and the cam-plate or shifting frame in the slot in which the cams snugly fit, for the purpose described.

4. The combination of the chambered turret, the ratchet therein, the single driver, the reciprocated bar or cross-head in a slot in which the driver is pivoted, and the spring

acting upon the top of the driver, substantially as hereinbefore set forth.

5. The combination of the box or casing having the chambered turret, the ratchet secured in the turret, the slotted reciprocated bar or cross-head, having guide-rods working in holes in the turret, and the curved driver pivoted in the slot in said bar or cross-head, acting, by its hooked end, upon the ratchet on its upward movement only, and yieldingly held in working position by a spring, these members being constructed and operating substantially as hereinbefore described.

6. The combination, substantially as hereinbefore set forth, of the cloth-holder, lower section or base-plate, the cloth-clamp movable section, the threaded post on the base-plate, the ratchet on the movable section of the clamp, the threaded hub acting on the screw-post, and the swinging stop-lever secured thereto.

7. The combination of the posts K K′ on the base-plate of the cloth-holder, the adjustable clamp-section J, its ratchet-projection or disk, and the turning hub or nut acting upon the threaded end of the post K, and adapted to be locked with the ratchet, substantially as hereinbefore set forth.

In testimony whereof I have hereunto subscribed my name.

SAML. ROCKWELL.

Witnesses:

E. C. DAVIDSON,

JOHN F. PARET.