(Model.)

7 Sheets—Sheet 1.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

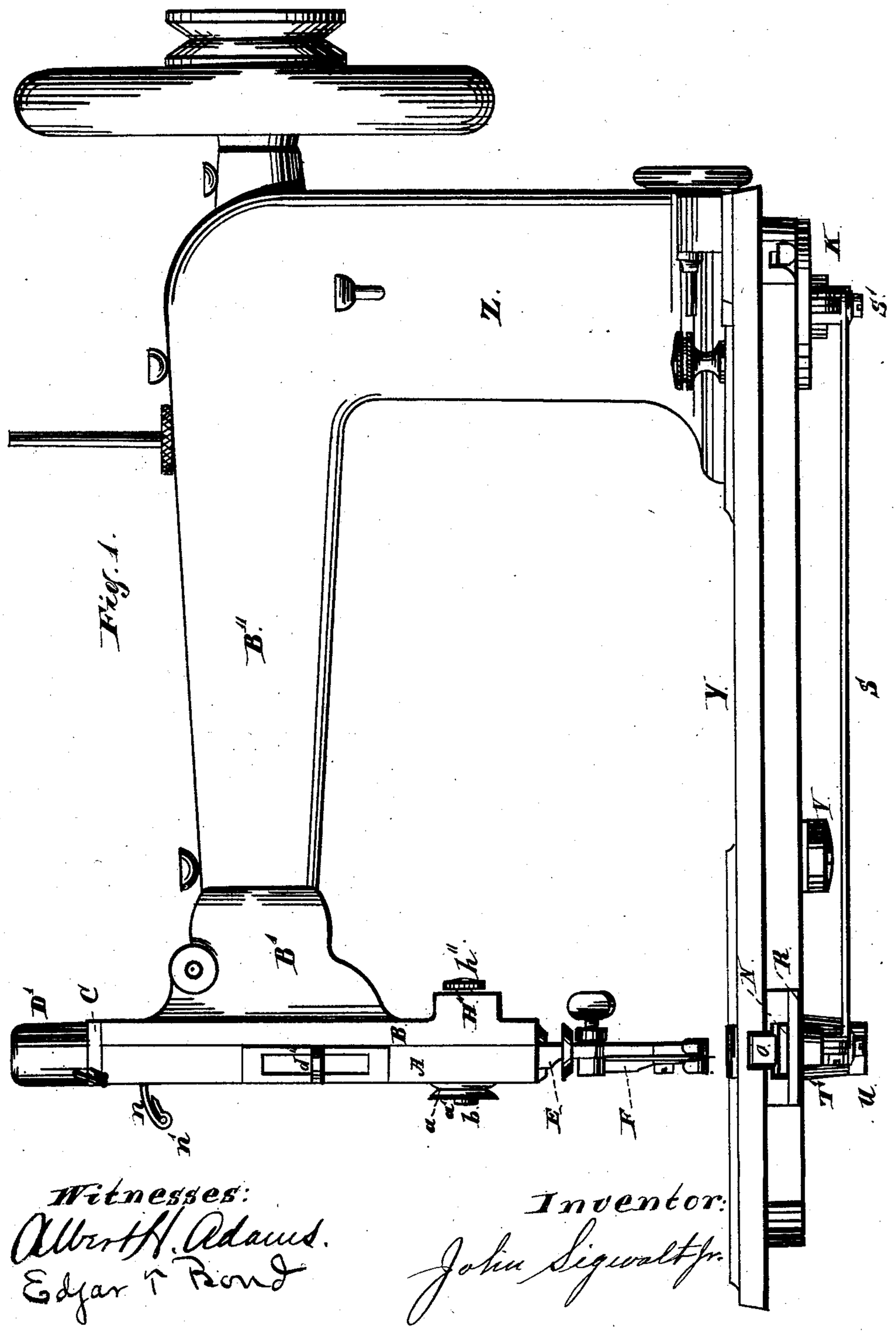


Fig. 1.

Witnesses:
Albert H. Adams.
Edgar T. Bond

Inventor:
John Sigwalt Jr.

(Model.) 7 Sheets—Sheet 2.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

Fig. 3.

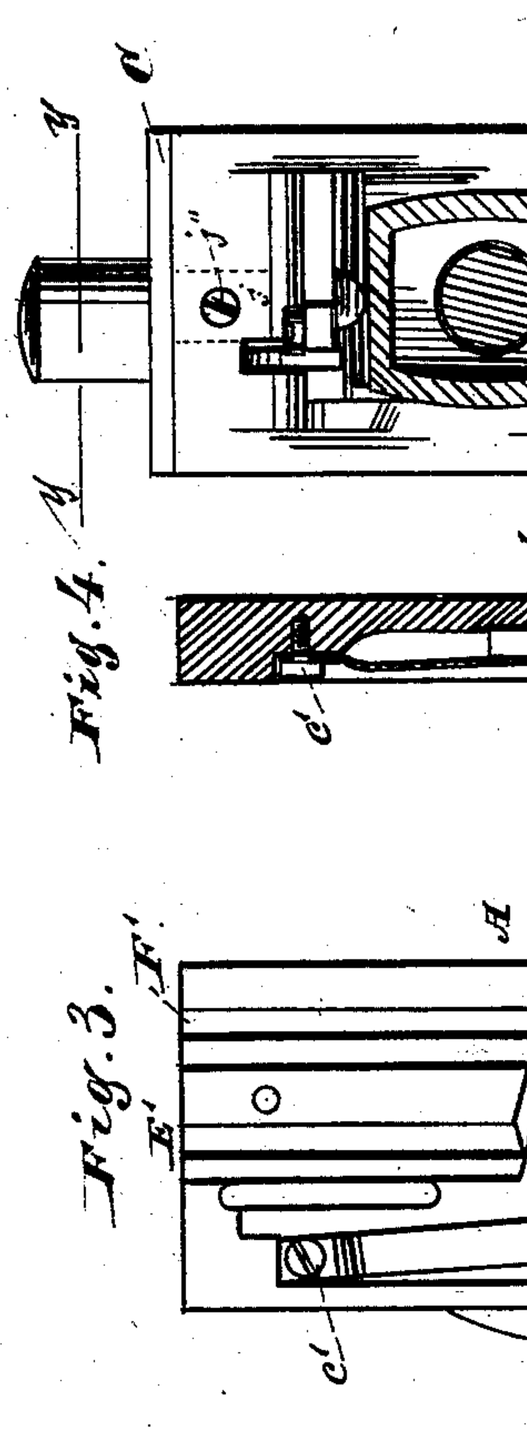


Fig. 4.

Fig. 6

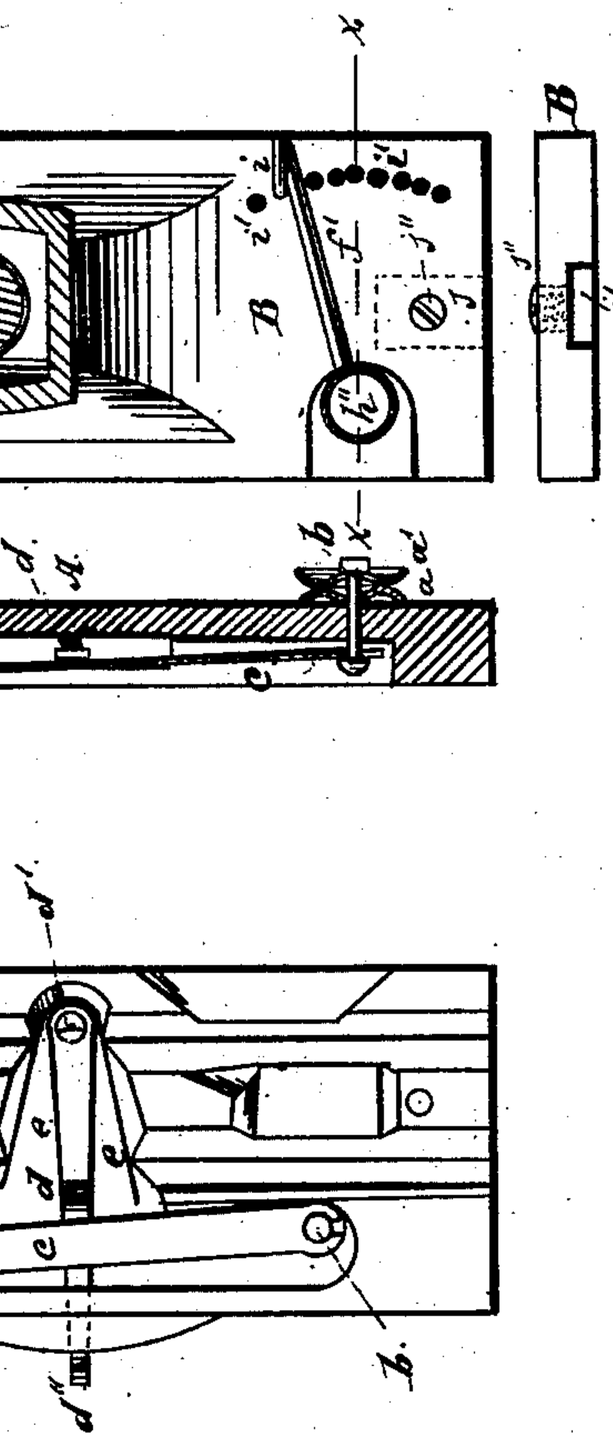


Fig. 7.

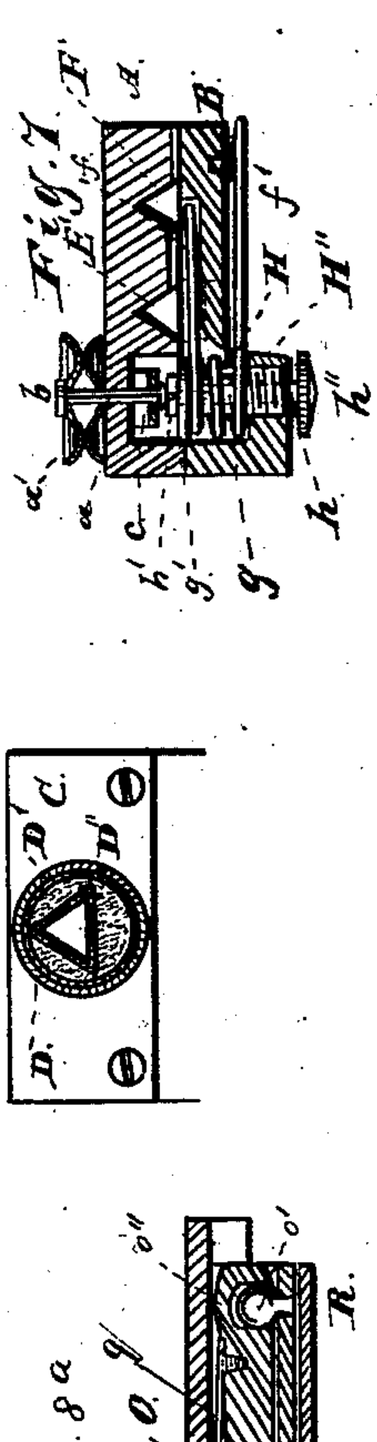


Fig. 8.

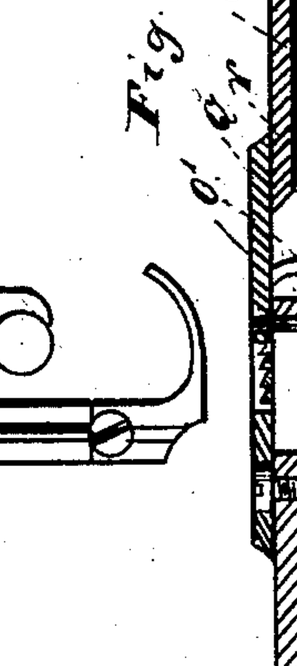
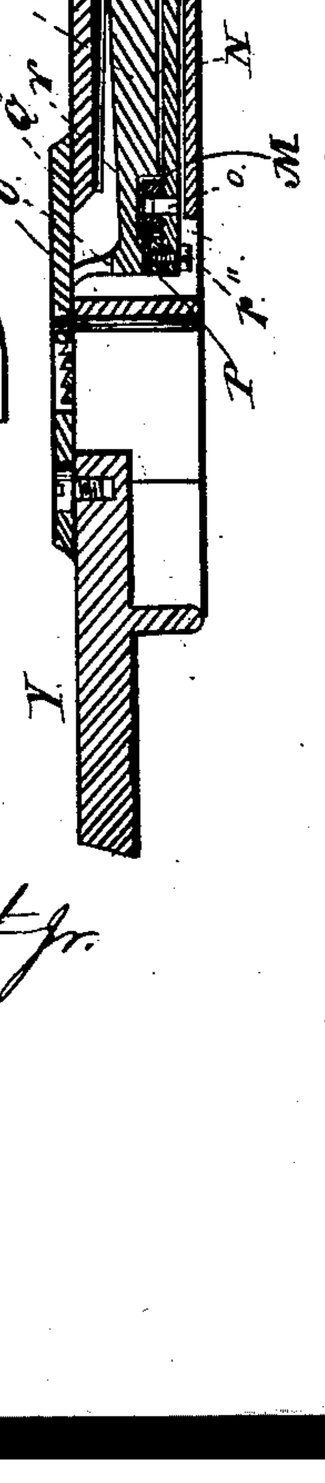


Fig. 2.

Fig. 8a



Witnesses:
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(Model.) 7 Sheets—Sheet 3.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

Fig. 8b

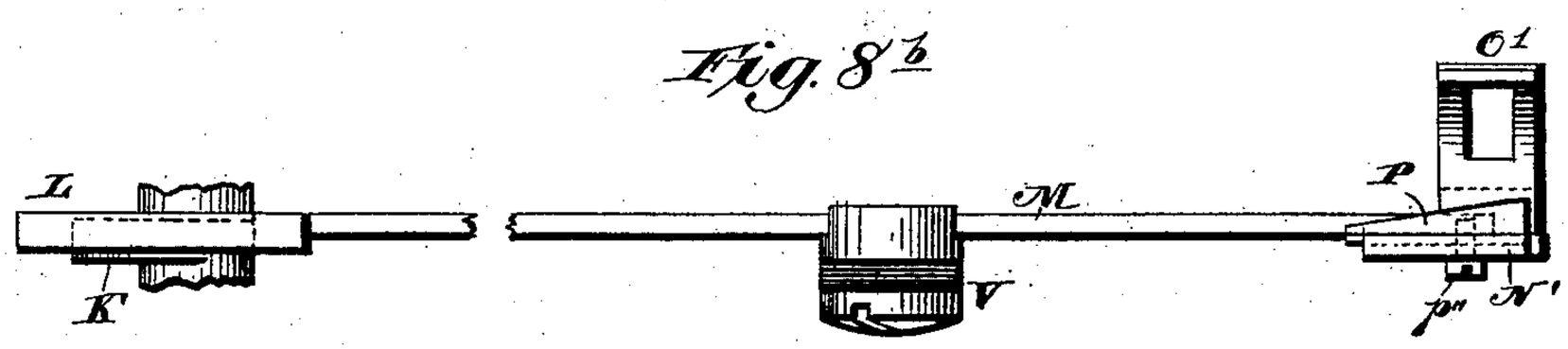


Fig. 8c

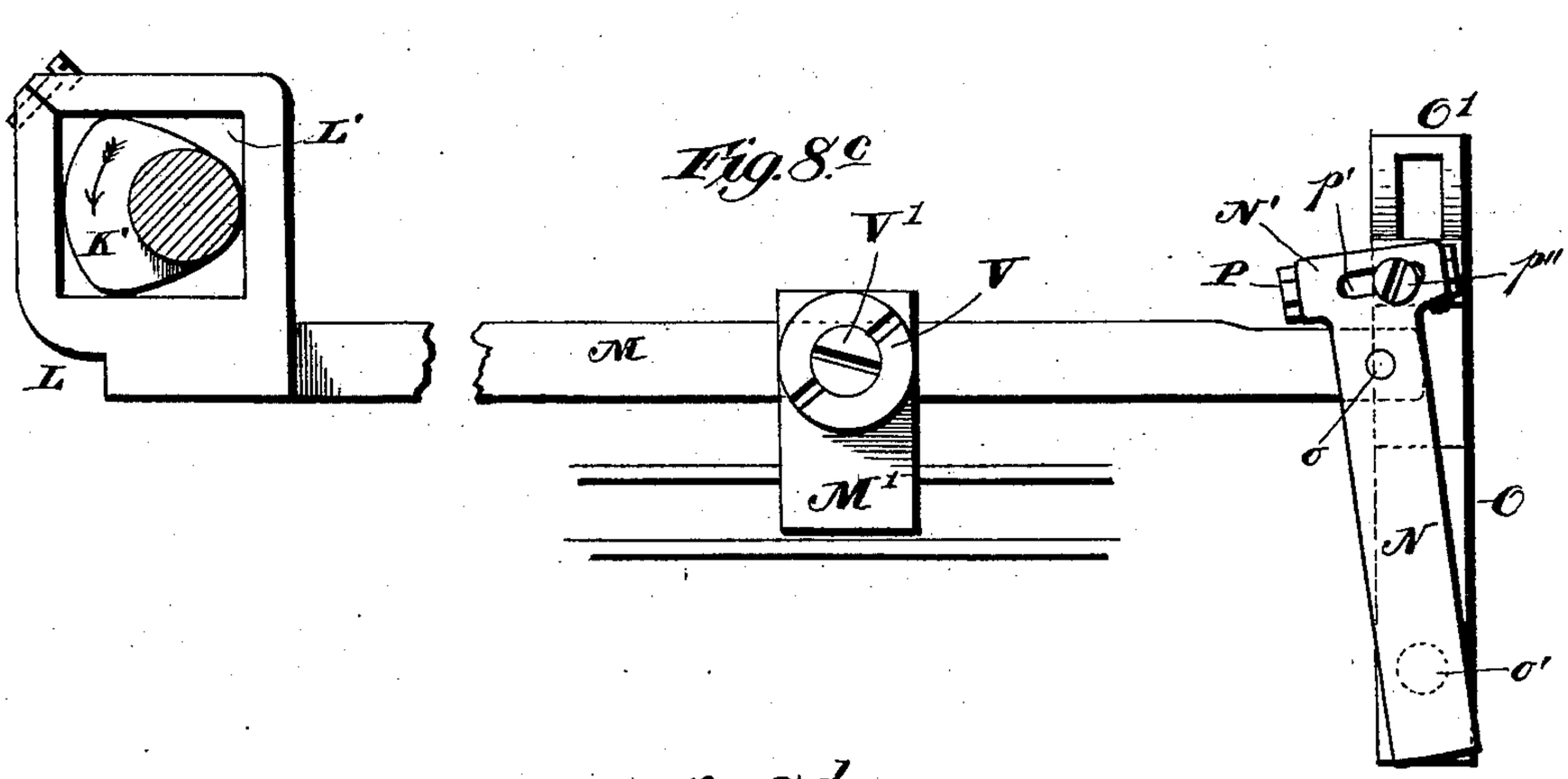
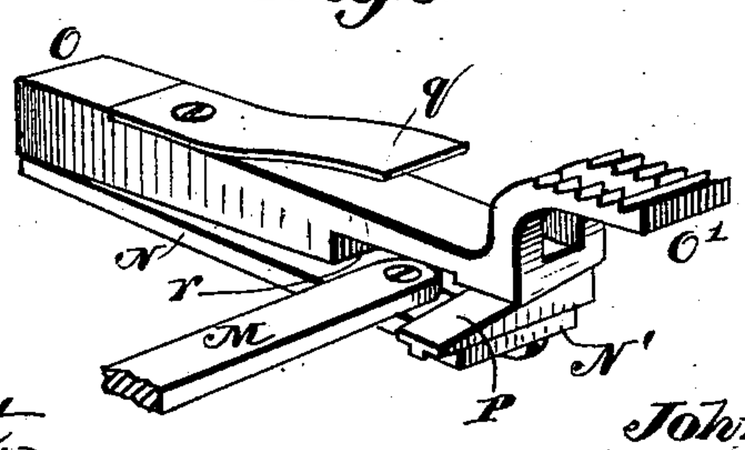


Fig. 8d



Witnesses.
Robert Everett.
J. A. Rutherford

Inventor.
John Sigwalt, Jr.
By West & Bond.
Attys.

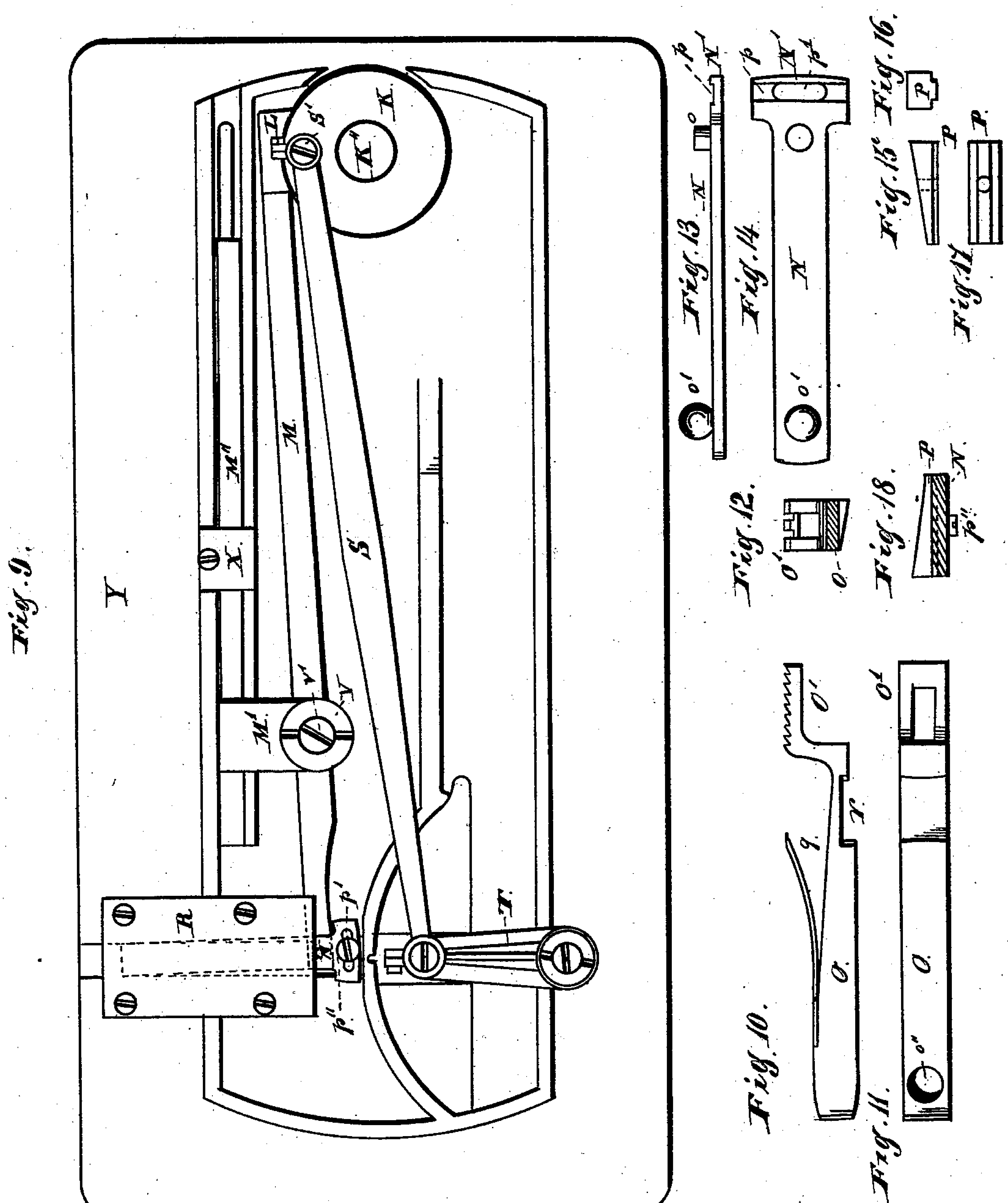
(Model.)

7 Sheets—Sheet 4.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.



Witnesses:
Albert H. Adams.
Edgar T. Bond

Inventor:
John Sigwalt Jr.

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(Model.) 7 Sheets—Sheet 5.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

Fig. 19.

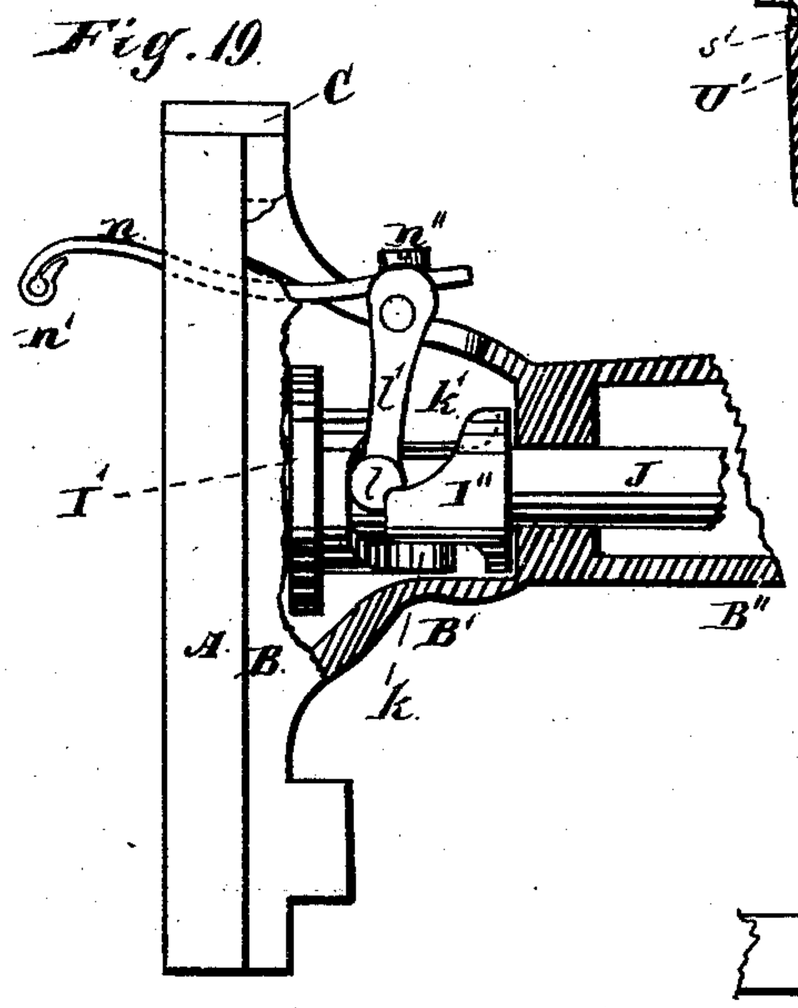
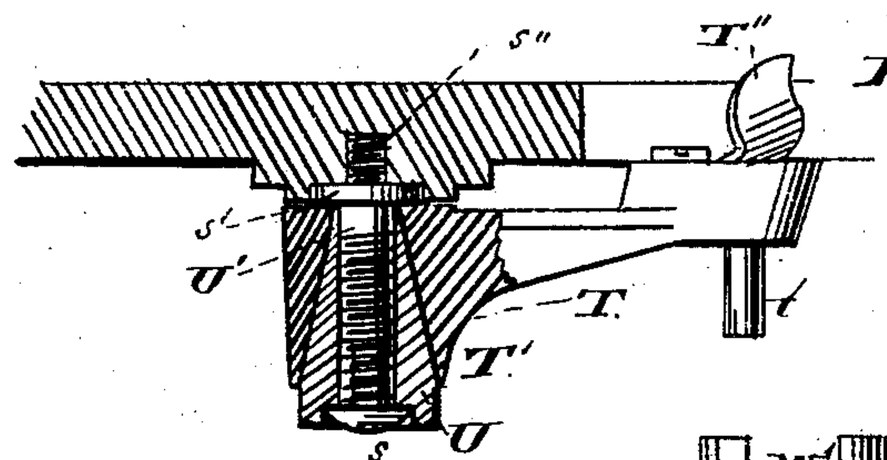


Fig. 24.



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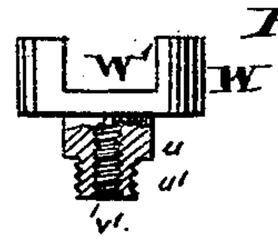


Fig. 25.

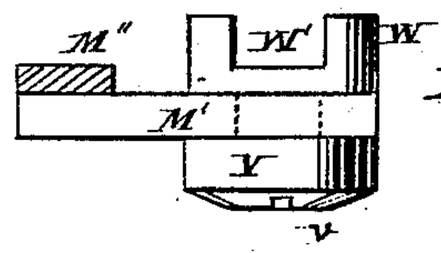


Fig. 20.

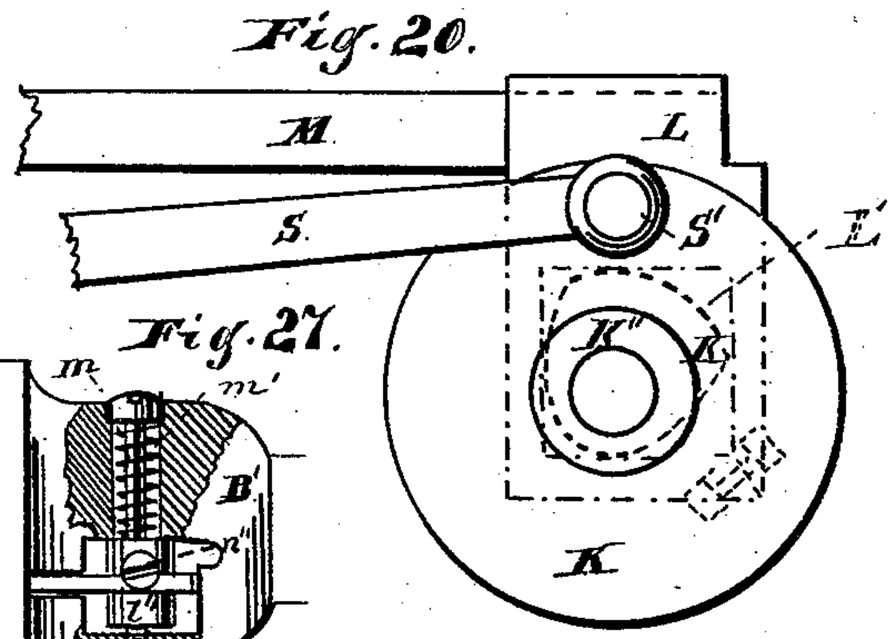
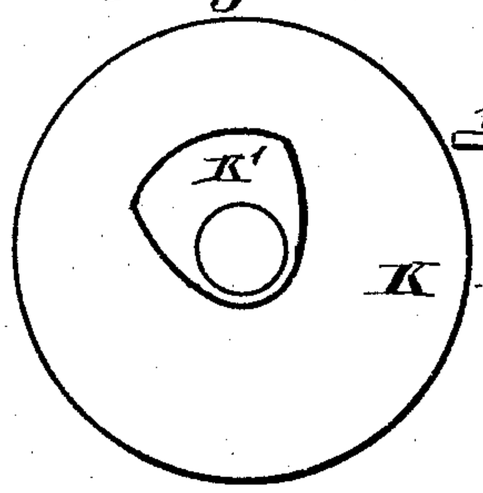


Fig. 27.

Fig. 21.



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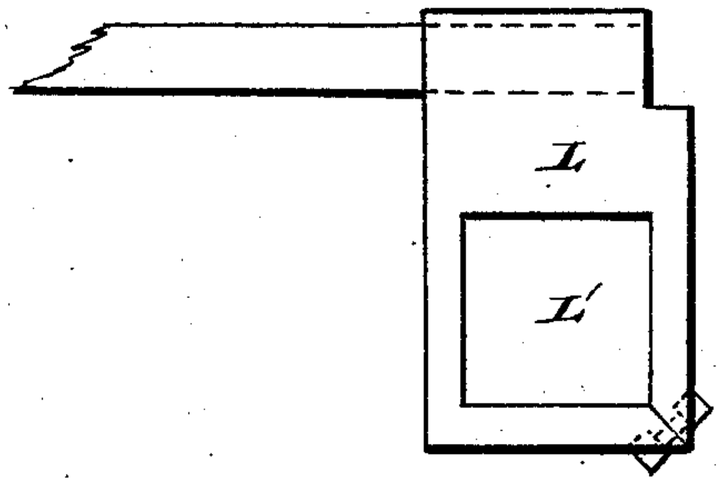
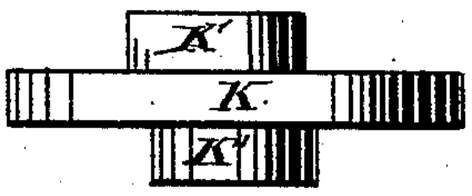


Fig. 22.



Witnesses:
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Edgar T Bond

Inventor:
John Sigwalt Jr.

(Model.) 7 Sheets—Sheet 6.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

Fig. 28

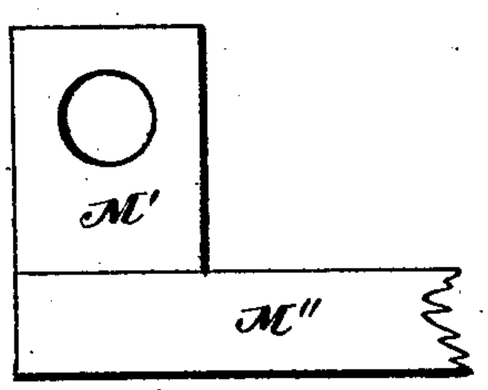


Fig. 29

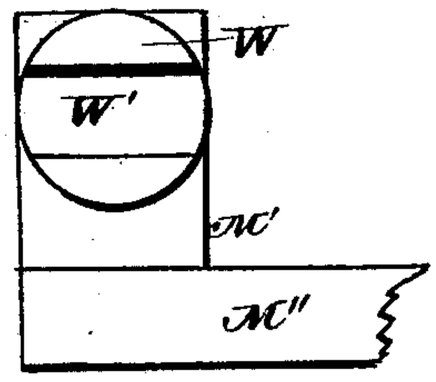
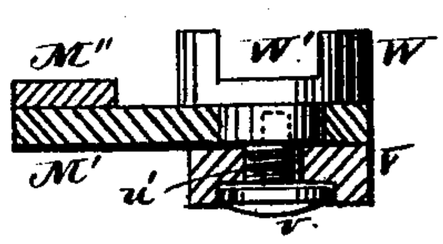


Fig. 30.



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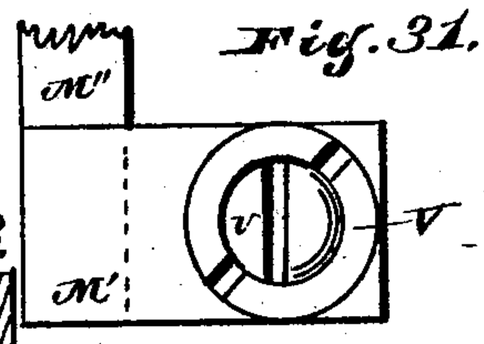


Fig. 32.

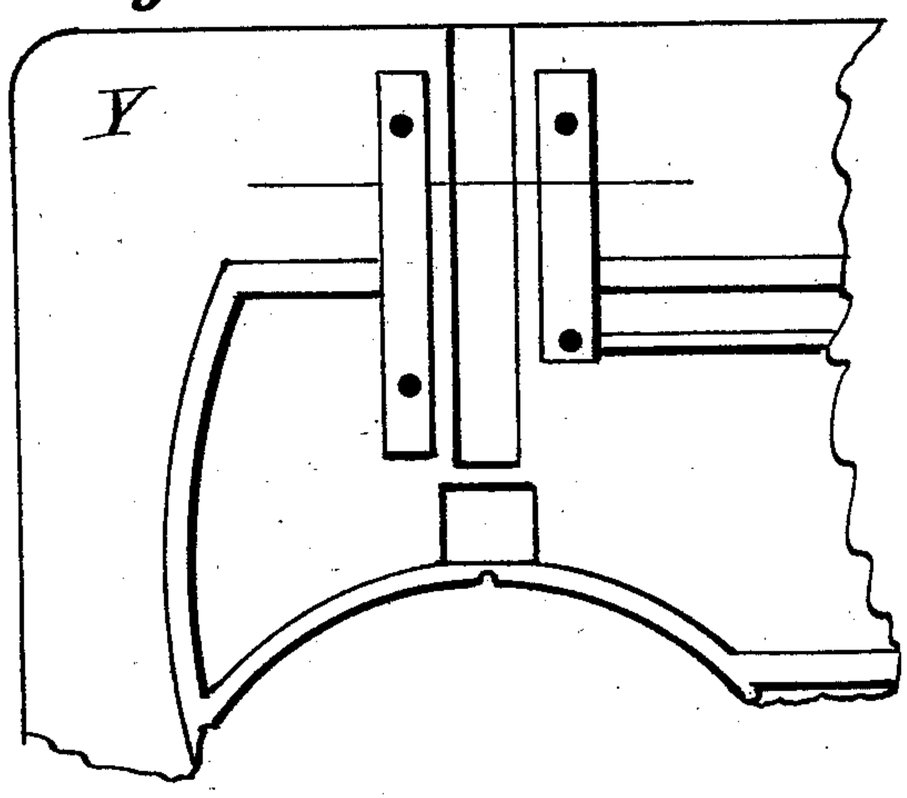


Fig. 33.

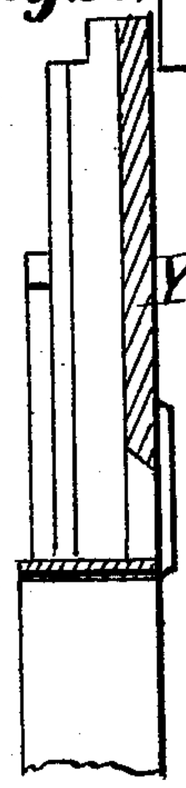
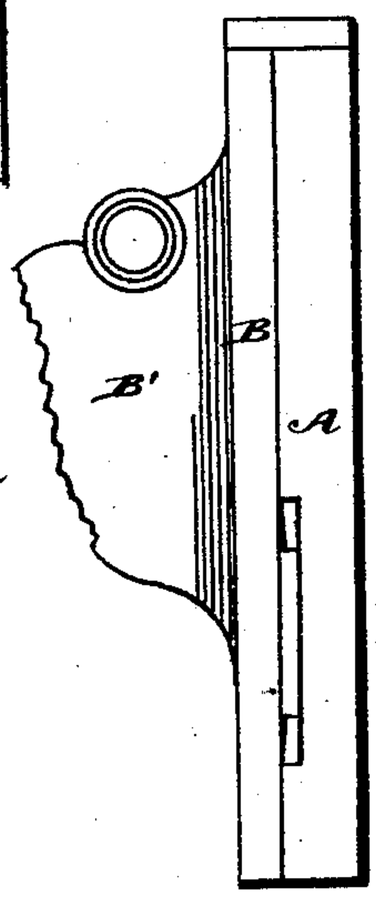


Fig. 34

Fig. 35.



Witnesses:
Albert H. Adams.
Edgar T. Bond.

Inventor:
John Sigwalt jr.

(Model.) 7 Sheets—Sheet 7.

J. SIGWALT, Jr.

SEWING MACHINE.

No. 275,427. Patented Apr. 10, 1883.

Fig. 36

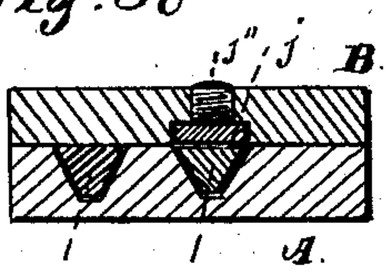


Fig. 37

Fig. 38

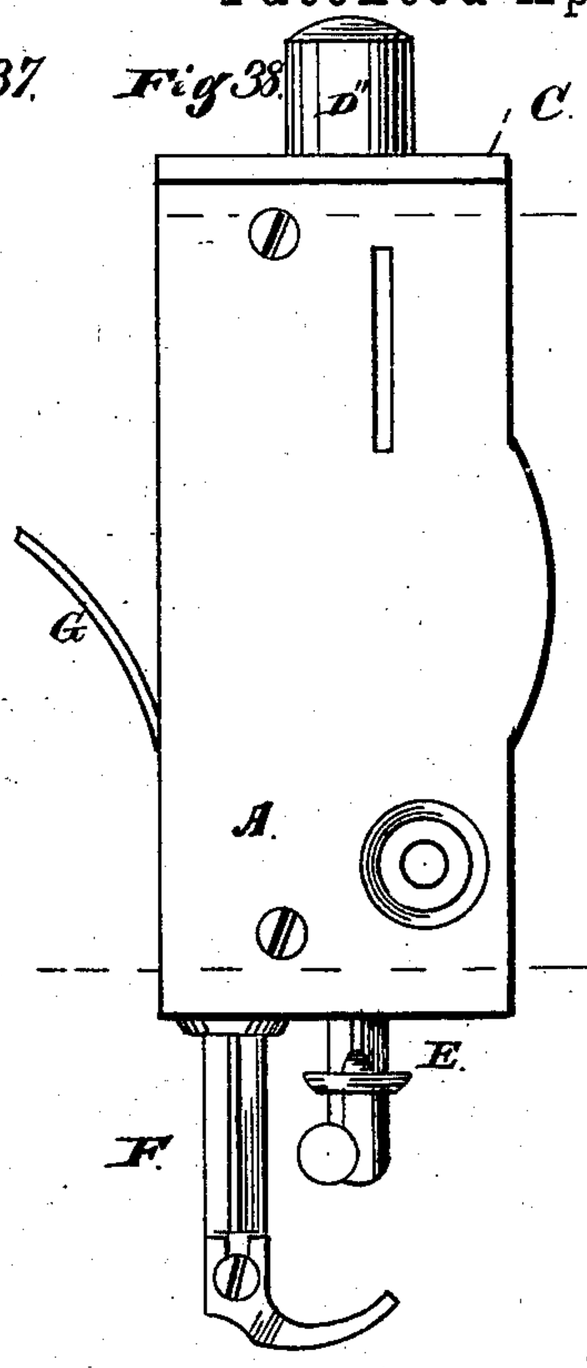


Fig. 39.

Fig. 42.

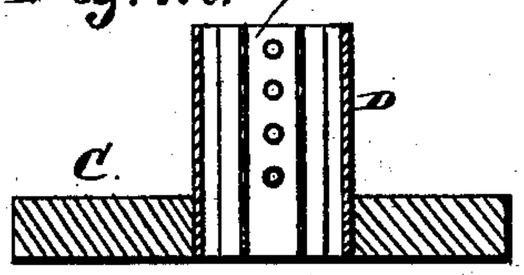


Fig. 43.

Fig. 44.

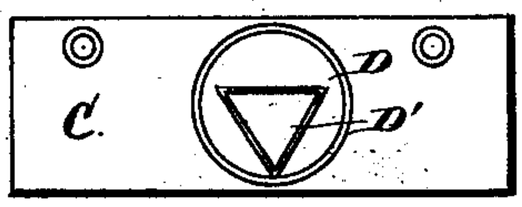


Fig. 40.

Fig. 41.

Fig. 45.

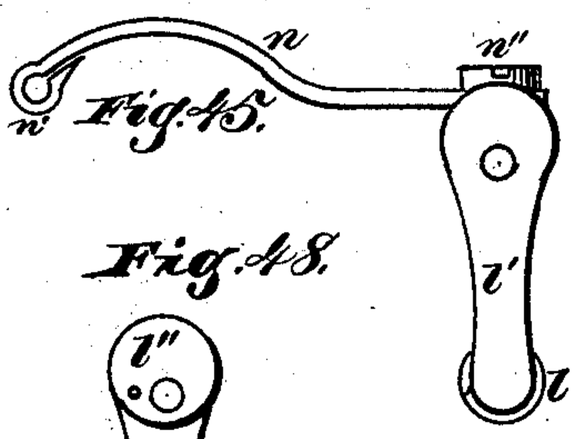


Fig. 46.

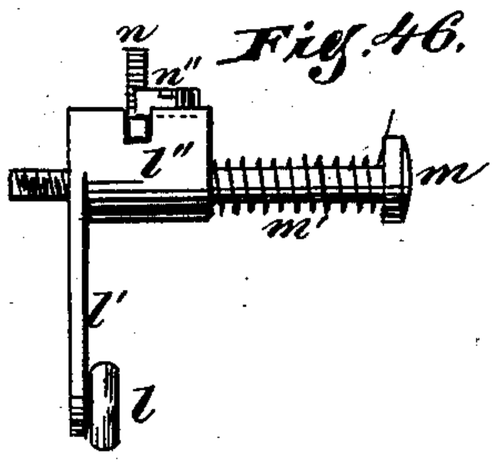


Fig. 48.

Fig. 49

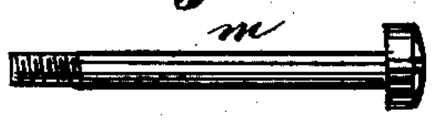


Fig. 47

Witnesses:
Albert H. Adams.
Edgar Bond

Inventor:
John Sigwalt Jr.

UNITED STATES PATENT OFFICE.

JOHN SIGWALT, JR., OF CHICAGO, ILLINOIS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 275,427, dated April 10, 1883.

Application filed August 2, 1881. (Model.)

To all whom it may concern:

Be it known that I, JOHN SIGWALT, Jr., residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Sewing-Machines, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2, a front elevation of the head for the needle-bar and the presser-foot bar, with the face-plate or cover removed to show the interior arrangement, and showing also the bed-plate of the machine in cross-section; Fig. 3, an inside view of the face-plate or cover of the head, showing the arrangement of the tension devices; Fig. 4, a longitudinal vertical section of the face-plate or cover of the head; Fig. 5, a rear elevation of the body of the head for the needle and presser-foot bars, with the bracket or supporting-arm in section, showing the devices for increasing or diminishing the pressure of the presser-foot bars; Fig. 6, an under side or end view of the body or rear portion of the head for the needle and presser-foot bars; Fig. 7, a cross-section on line *x x* of Fig. 5, looking down; Fig. 8, a cross-section through the oil-receptacle, on line *y y* of Fig. 5, showing a top or plan view of the head, with the needle-bar in cross-section; Fig. 8^a, a longitudinal sectional view through the feed-dog and vibrating bar; Fig. 8^b, a detached side elevation of the vibrating and reciprocating lever for operating the devices which actuate the feed-dog; Fig. 8^c, a bottom plan view of Fig. 8^b; Fig. 8^d, a detached perspective view of the feed-dog and its actuating devices; Fig. 9, an under side view of the bed-plate, showing the mechanism for operating the feed and the shuttle; Fig. 10, a detail, being a side elevation of the feed dog or bar; Fig. 11, a bottom view of the feed dog or bar; Fig. 12, a detail, being an end view of the feed head or block, with the dog or bar in section; Figs. 13 and 14, details, being respectively a side and top or plan view of the vibrating arm or lever for moving the feed dog or bar; Figs. 15, 16, 17, and 18, details showing different views of the wedge or incline for raising and lowering the feed and adjusting the feed-dog and supporting it in position when adjusted; Fig. 19, a detail, being a side elevation of the head and a portion of the bracket or head-supporting arm, partly in section to show the take-up lever and devices for operating the same; Fig. 20, a detail, being a side or face view of the crank disk or wheel and the devices for operating the feed and the shuttle; Fig. 21, a detail, being a side or face view of the crank disk or wheel, showing the cam for operating the feed-arm; Fig. 22, a detail, being an edge view of the crank disk or wheel; Fig. 23, a detail, being a side or face view of the strap or head with which the cam operates to move the feed-arm; Fig. 24, a detail, partly in section, showing the bearing for the shuttle-carrier; Figs. 25 and 26, details showing the joint or coupling for the feed lever or arm, with the stitch-regulating arm; Fig. 27, a detail, being a top or plan view, partly in section, of the head for the needle and presser-foot bars, showing the take-up devices; Fig. 28 is a detail showing a portion of the stitch-regulating bar and the plate or arm connecting it with the feed-bar; Fig. 29, a detail, being a similar view of the parts shown in Fig. 28 and joint or coupling for the feed-lever added; Fig. 30, a detail, being a cross-section through the coupling or connecting plate and the stitch-regulating bar; Fig. 31, a detail, being an under side view of the parts shown in Fig. 30; Fig. 32, an under side view of a portion of the bed-plate, showing the channel or slot in which the feed-dog is located, and the flanges or ribs to which the cover for holding the feed-dog and its operating-lever in position is secured; Fig. 33, a detail, being a cross-section through the corner of the bed-plate, showing the feed-dog channel or slot; Fig. 34, a detail in section, showing the feed-dog channel or slot and the flanges or ribs for attaching the cover shown in Fig. 32; Fig. 35, a detail, being an edge view of the head for the needle and presser-foot bars; Fig. 36, a cross-section through the plates composing the head for the needle and presser-foot bars; Fig. 37, a side elevation of the presser-foot bar; Fig. 38, a front elevation of the head; Fig. 39, a side elevation of the needle-bar; Figs. 40 and 41, cross-sections through the presser-foot and needle-bars, respectively; Fig. 42, a section longitudinally through the cap or end plate and the oil-receptacle. Fig. 43, a

section through the cover of the oil-receptacle; Fig. 44, a top or plan view of the cover or end plate of the head and the oil-receptacle; Fig. 45, a side elevation of the take-up devices; Fig. 46, a similar view, showing the edge of the vibrating lever instead of the side; Fig. 47, a top or plan view of the take-up devices; Fig. 48, a side elevation of the vibrating arm or lever; Fig. 49, a side elevation of the journal or pin of the take-up.

The objects of this invention are: to produce a better, more uniform, and reliable tension on the thread, and have the tension device simple in construction and positive and certain in its action; to give the presser-foot a varying amount of pressure to adapt it to different thicknesses of material and to the feed of the machine; to prevent breakage of the thread as the needle passes through the material by giving the take-up devices a wider range of movement as the eye of the needle enters the material; to insure a constant supply of oil or other lubricant to the needle-bar and have such oil or lubricant automatically applied to the bar; to improve the form, construction, arrangement, and operation of the feed devices and give the feed a more positive and reliable action, and have the devices constructed and arranged to readily, quickly, and easily change the feed and adapt it to the work being done; to improve the pivotal connection of the shuttle-carrier and overcome the liability of such connection becoming loose from wear, and to improve generally a sewing-machine in respect to the features of controlling the thread as to the tension and take-up devices and the operation of the needle-bar, the operation of the feed and the devices by which such operation is attained, and the operation of the shuttle-carrier and devices by which it is operated in their several relations to each other and to the machine as a whole, and thereby increase the working qualities of these several features and the operation of the machine. These objects I accomplish by the mechanism illustrated in the accompanying drawings, and which I will now proceed to describe in detail.

In the drawings, A represents the face-plate or cover for the head of the needle and presser-foot bars; B, the stationary or main portion of such head; C, the cover or end plate for the upper end of the head; D, the exterior wall of the oil-receptacle; D′, the interior wall of such receptacle; D″, the cover of the oil-receptacle; E, the needle-bar, of a triangular shape, made of steel or other suitable material, having at its lower end a jaw or clamp for the needle, as usual; E′, the triangular-shaped opening in the face-plate or removable portion of the head for the reception of the needle-bar; F, the presser-foot bar, made of steel or other suitable material, and having its lower end formed to receive the presser-foot, as usual; F′, the triangular-shaped opening in the face-plate or removable portion of the head for the reception of the presser-foot bar; G, the lever for raising the presser-foot bar, pivoted at its inner end to the face of the main body of the head, and having its arm or lever portion passing through a slot to the outside of the head, and provided with a head or lifting portion to engage the presser-foot bar and lift such bar by depressing the lever in the usual manner; H, the pressure-spring for regulating the amount of pressure of the presser-foot bar; H′, the cavity or space in the stationary portion of the head, in which the arm of the pressure-spring is located; H″, a boss or projection on the plate B; I, the needle-bar cam, located on the needle-bar, and constructed, arranged, and operating in the usual manner of such cams for giving the needle-bar its vertical movements; I′, the crank wheel or disk, having a stud or roller to enter the groove of the cam I for operating such cam in the usual manner; I″, the hub of the crank disk or wheel I′, by means of which it is connected to the main driving-shaft, as usual; J, the main driving-shaft, arranged and located in the bracket or support for the head, and operated in the usual manner to rotate the crank disk or wheel and operate the needle-bar; K, the crank wheel or disk for operating the feed and the shuttle-carrier; K′, the cam on the disk or wheel K for operating the feed arm or lever; K″, the hub or center of the disk or wheel K for giving the wheel a long bearing; L, the strap or head in which the eccentric K′ acts to give the feed bar or lever the required movement. These parts K, K′, K″, and L are constructed, arranged, and operated in the usual manner, and are located beneath the bed-plate of the machine, as usual. M, the feed lever or bar; M′, the arm or plate connecting the feed bar or lever with the stitch-regulating bar or lever; M″, the stitch-regulating bar or lever, of the usual construction and arrangement, by means of which the length of the stitch is regulated in the usual manner; N, the vibrating bar or arm for operating the feed-dog; O, the feed-dog; O′, the head or raised portion of the feed-dog, having the serrations or notches; P, the adjusting wedge or incline for raising and lowering the feed-dog, and for giving the acting end or head of the feed-dog the required throw to produce the feed; Q, the ordinary throat-plate, arranged and located as usual; R, the plate or cover for keeping the vibrating arm and feed-dog in position; S, the pitman or bar for operating the shuttle-carrier arm; S′, the crank or wrist pin on the disk K for the attachment of the pitman or bar S; T, the shuttle-carrier arm; T′, the head or hub of the shuttle-carrier arm; T″, the shuttle-carrier; U, the conical bearing for the shuttle-carrier arm; U′, the screw-threaded pin or stud for the bearing U; V, the clamping or nut portion of the swivel joint or coupling for the feed-lever with the link or arm M′; W, the receiving or main portion of the joint or coupling for the feed-lever and the connecting link or arm; W′, the slot or opening for the stitch-regulating bar; X, the guide for the stitch-regulating bar, located on the bed-plate of the

machine and arranged in the usual manner; Y, the bed-plate of the machine; Z, the vertical portion of the arm or bracket; *a a'*, the tension-disks for the thread; *b*, the pin or stud on which the disks *a a'* are mounted; *c*, the tension-spring; *c'*, the pin or screw for attaching the end of the spring *c* to the face-plate or cover A; *d*, the lever for regulating the pressure of the spring *c*; *d'*, the pivot of the lever; *d''*, the projecting end of the lever; *e*, the space in the face-plate A in which the lever moves; *f f'*, the arms of the spring H; *g*, the sleeve or collar forming the stud around which the spring H is coiled; *g'*, the flange or head of *g*; *h*, the sliding pin or thumb-piece for releasing the tension; *h'*, the set-screw for retaining the pin *h* in position; *h''*, the head of the pin *h*; *i*, the locking end of the arm *f'* of the spring H; *i'*, the adjusting-holes in the head for holding the arm *f'* in position when adjusted; *j*, the plates for adjusting the wear of the needle-bar; *j'*, the opening for the plates *j*; *j''*, the set-screws for moving the plates *j* and holding them in position; *k*, the cam-groove in the head or hub I''; *k'*, the enlarged portion of the groove *k*; *l*, the anti-friction roller of the take-up; *l'*, the vibrating arm, carrying the roller; *l''*, the rocking head of the arm *l'*; *m*, the journal or pin for the head *l''*; *m'*, the take-up spring; *n*, the take-up arm, carrying the thread; *n'*, the opening for the thread; *n''*, the set-screw for attaching the arm *n* to the head *l''* and adjusting the position of the arm longitudinally; *o*, the stud or pin forming the pivot for the feed-lever, with the vibrating arm or bar N; *o'*, the ball on the end of the arm or bar N; *o''*, the socket or opening in the end of the feed-dog; *p*, the groove in the face of N for the reception of the wedge or incline P; *p'*, the slot in N for adjusting the wedge or incline; *p''*, the set-screw for holding the wedge or incline in position when adjusted; *q*, the spring for keeping the feed-dog down; *r*, the opening in the feed-dog for the passage of the bar M; *s*, the set or clamp screw for holding the conical bearing U; *s'*, the flange or collar on the stud U'; *s''*, the screw-threaded end of U' for attachment to the bed-plate; *t*, the pin or pivot for attaching the pitman S to the shuttle-carrier arm or lever T; *u*, the pivotal portion of the head or section W of the joint or coupling; *u'*, the screw-threaded end of *u* for receiving the head or section B; *v*, the set-screw for holding the head or sections of the coupling or joint when adjusted; *v'*, the screw-threaded opening in *u u'* for the set or jam screw *v*.

The head is made in two sections or parts, as usual, one of which, A, forms a face-plate or removable portion, and is provided with a V-shaped or triangular-shaped opening, E', extending its entire length, to receive and support a V-shaped or triangular-shaped needle-bar, E, and with a similar opening, F', extending its entire length, to receive and support a V-shaped or triangular-shaped presser-foot bar, F, which openings E' and F' are arranged in proper relation to each other to bring the needle-bar and the presser-foot bar in proper position to do their respective work, as usual.

The plate or cover C is located on the upper end of the head, and is secured in place by means of screws or otherwise, so as to be held firmly. On this plate C is located the oil-receptacle, the exterior or outer wall, D, of which is circular in form, and may be cast with the plate or suitably secured thereon, and the interior wall, D', of which is triangular or V-shaped to form a triangular or V shaped opening corresponding to the shape of the needle-bar, through which opening the needle-bar passes, which wall may also be cast with the plate, or be formed independent and suitably secured thereon, the plate having a V-shaped opening corresponding with the opening in this wall. Between these exterior and interior walls is the oil space or receptacle, in which is placed the oil or other lubricant and some absorbent material which will hold the oil or other lubricant and allow it to pass gradually to the needle-bar, the interior wall being provided with suitable perforations or holes in each of its faces or sides, through which the oil or lubricant can pass to the bar. By this arrangement the bar will be kept lubricated or oiled at all times, and the oil or lubricant will be supplied thereto, as required, without requiring any special care or attention, as all that is necessary to be done is to fill the receptacle between the walls with the oil or lubricant at intervals, after which the oil will be self-supplied to the needle-bar, as required, passing through the openings or holes in the interior wall and lubricating the surface of the bar.

The tension-disks *a a'* have their adjacent faces curved to form a guide or opening for the passage of the thread between them, and they may be made of sheet metal or other suitable material, which can be stamped or otherwise formed in the shape shown or other suitable shape. These disks are located on the outer face of the cover or removable portion A of the head, and are mounted on the end of a pin or journal, *b*, passing through the plate or cover, and having on that end which is inside of the plate or cover a head or enlarged portion, with which the lower end of the spring *c* is made to engage, the end of the spring being forked or having a notch to receive the body of the pin or journal *b*. This spring *c* is straight and of considerable length, and is attached at its upper end by a pin or set-screw, *c'*, to the interior face of the plate A, the plate being suitably recessed to allow the spring to operate, and the force of the spring is increased or diminished to give the required pressure on the disks *a a'* by means of a lever or arm, *d*, pivoted at one end by a pin or stud, *d'*, to the face of the plate A, and extending back with its outer end, *d''*, outside the edge of the plate, and formed into shape to be grasped and held by the fingers. This lever *d* is located in a recess, *e*, having diagonal side faces, and formed in the plate A, and midway of its

length, where it comes in contact with the spring, it is bent or curved, so that by moving the lever *d* up or down the lower end of the spring will be made to act with diminished or increased force, the upward movement producing a diminished pressure and the downward movement an increased pressure of the spring. By this arrangement the amount of tension of the disks *a a'* can be easily and quickly changed to suit the work. If but small tension is required, the operator throws the outer end, *d''*, of the lever *d* up, decreasing the pressure of the spring *c* on the pin or journal *b* and holding the disks *a a'* together with but little force; and if greater tension is required, the operator presses the end *d''* of the lever *d* down, causing the end of the spring to exert a greater force on the pin or journal *b* and draw the disks *a a'* more firmly together, increasing the tension accordingly, and the tension can be adjusted to the precise point required by moving the lever up or down and stopping it at the point where the spring will act to draw the disks *a a'* together to the required extent and produce the tension desired.

The spring H is formed from a piece of wire, coiled at the center to form the spring proper, and having two side pieces or arms, *f f''*, one of which, *f*, has its outer or free end arranged to engage with the face of a notch or a projection on the presser-foot bar and act with a downward force on such bar, the arm or side piece *f* being located in a suitable recess, H', formed therefor in the face of the plate B, as shown in Figs. 2 and 6, and the other arm or side piece, *f'*, of this spring H is arranged to come outside of the exterior face of the plate B, as shown in Fig. 5, and its upper end is provided with a turned-out end or point, *i*, to enter openings *i'* in the plate or head B, as shown in Fig. 5. The coil or spring portion of this spring is located around a stud or sleeve, *h*, one end of which is screw-threaded and enters a screw-threaded opening in a boss or projection, H'', on the plate B, as shown in Fig. 6, the other or free end of this stud or sleeve extending into the plate B, so that its end face will be flush, or nearly so, with the face of the plate. This stud or sleeve *h* is provided with a central circular opening, through which passes a pin, *g*, on the outer end of which is a head or thumb piece, *h''*, and the inner end of which is provided with a screw-threaded opening to receive a screw, *h'*, by means of which the pin *g* is held in place, the head of which screw *h'* comes in contact with the head of the pin or journal *b* when the parts are together, the pins *b* and *g* being in line with each other for this purpose. The spring or coiled portion of the spring H is held in place around the stud or sleeve *h* between the inner face of the boss or projection H and the face of a flange, *g'*, formed on the end of the stud or sleeve *g*. The spring H acts to give the presser-foot bar a greater or less downward pressure through the action of the arm or side piece *f*, which bears downward on the bar, and the amount of downward pressure exerted by this arm or side piece *f* can be increased or diminished, as required, by means of the arm or side piece *f''*, which can be raised or lowered to adjust the pressure, and this arm or side piece being outside of the head, no difficulty is presented in changing the pressure, all that is necessary to be done being simply to disengage the end *i* from the opening *i'* and move it up or down, as required, and again insert it in an opening, *i'*. By means of the tubular stud or sleeve *h* the tension of the disks *a a'* on the thread can be released at any time by simply pushing on the thumb-piece or head *h''* and forcing the head of the screw *h'* against the head of the pin or journal *b*, carrying such pin forward or outward and relieving the pressure of the disks *a a'*, and when the pressure is removed from the head or thumb piece *h''* the spring *c* will act and throw the pin *b* back and bring the tension-disks again in contact to produce the tension, and at the same time return the pin *g* to its normal position, where it is non-acting. This arrangement of a sleeve or stud having a circular central opening furnishes a support for the spring H, and at the same time provides a bearing in which the pin *g* can slide, thereby enabling the tension to be released through the action of the pin, and have such tension-releasing device in position to be easily operated and out of the way of the other devices.

In use the needle-bar is liable to be worn to a greater or less extent by the constant motion to which it is subjected, and this wear in time decreases the size of the needle-bar, so as to give it more or less side play, which interferes with the perfect operation of the machine. To obviate this wear the needle-bar is made triangular or V-shaped, and on its back face is made to bear the plate *j*, two plates being used, one at the top and the other at the bottom of the head or plate B. These plates *j* are located in suitable openings, *j'*, formed in the plate B, and are made to bear against the face of the needle-bar by means of a set-screw, *j''*, the end of which comes in contact with the plate, so that by turning the screw the plate will be projected or advanced to bear against the needle-bar. By this arrangement it will be seen that the wear of the needle-bar will be taken up, and that such bar will have a steady movement vertically, and side play will be prevented, thereby insuring a correct operation in this respect.

The crank wheel or disk I' is attached to the end of the shaft J by a hub, I'', as usual, and around the exterior face of this hub I'' is formed a cam-groove, *k*, to receive an anti-friction roller, *l*, and the portion *k'* of this groove, in which the roller travels, as the eye of the needle reaches and passes through the material, is enlarged or widened, so as to increase the width of the groove at this point and allow the roller to travel outside of its regular path. The anti-friction roller *l* is located on the outer end of an arm, *l'*, on the upper end of which is a head or socket, *l''*, through which

a pin or journal, *m*, passes, which pin or journal extends through a suitable opening in the neck B′ of the head, which neck is slotted or has an opening to receive the head or socket *l″* and allow the arm to depend or hang down, so that the roller will enter the cam-groove *k k′*. Around the pin or journal *m* is located a coil-spring, *m′*, one end of which enters the end of the head or socket *l″* and the other end is made to engage with the face of the opening in the neck B′, in which the spring is located, which spring acts to give the required tension to the take-up arm *n*. The arm *n* is attached at its rear or inner end to the head or socket *l″* by means of a set-screw, *n″*, or in any other suitable manner, so that its position can be changed horizontally when desired, and the body of this arm extends forward from the head or socket *l″* through a suitable slot formed in the head A B, and its outer or free end is provided with an opening, *n′*, through which the thread passes, as usual. This arm *n*, with the socket *l″* and pendant or arm *l′* and spring *m′*, form the take-up devices, the necessary movements of which are produced by the action of the roller *l* in the cam-groove *k k′*; and in order to prevent the thread from being broken as the needle enters the material, the enlarged portion *k′* of the groove is provided, this portion of the groove allowing the roller to have extra play as it enters therein, which play drops the arm *n* and produces an increased length of thread to be taken up by the folding of the thread back onto the needle as the eye of the needle strikes and enters the material, by which arrangement it will be seen that the thread will not be broken at this point, as the dropping of the arm allows a sufficient increase in the length for doubling up, so that no strain will occur on the thread at this point, as is the case in the construction of these devices, in which the cam-groove for the roller is of the same width the entire circumference of the head or hub I″.

As before stated, the devices represented by the letters I, I′, I″, J, K, K′, K″, L, M, M′, and M″ are of the ordinary and usual forms of construction and arrangement, and need not be here specifically described, as they form no part of this invention, except in the relation which they have to the other parts of the machine.

The feed-dog O is made from a bar of steel or other suitable material of the form shown in Fig. 10, the head or raised portion O′ being provided on its upper face with serrations or teeth for the feed, and this head or raised portion O′ entering the feed-opening in the throat-plate Q, as usual, the body of the dog being suitably arranged for this purpose; and the form of the body of this feed-dog O, with its head O′, may be changed or varied somewhat from the precise form shown in Fig. 10, so long as it has a head or raised portion for the feed and a body or elongated portion which can be connected with the operating device. The rear end of the body of this feed-dog O is provided with a circular opening, *o″*, to receive a ball or rounded pivot, *o′*, located on the end of an arm or bar, N, so as to form a ball or socket connection between the feed-dog and the bar N. The bar N is made from a piece of steel or other suitable material, and at its inner end is provided with a pin or stud, *o*, to form a pivot for the attachment of feed arm or lever M, the end of which is provided with a circular opening (see Fig. 8ª) to slip over the pivot *o*. The upper face of the forward end of the bar N is provided with a groove, *p*, to receive a flange on the under face of the incline or wedge P, and through the body of the arm N, in line with the groove *p*, is formed a slot, *p′*, for the passage of a set-screw, *p″*, the shank of which enters a screw-threaded opening in the wedge or incline P. The wedge or incline P has straight side and bottom faces, as shown, and its upper face is formed inclined or sloping, and this face engages a face which has a corresponding slope in the opposite direction on the forward end of the feed-dog (see Fig. 12) to maintain the dog in a horizontal plane, no matter at what height this forward end may be adjusted. The end of the bar or lever M enters the slot or opening *r* formed on the under side of the feed-dog, and the feed-dog is pressed or held down by means of a spring, *q*, one end of which is attached to the face of the feed-dog, and the other engages with the face of the bed-plate of the machine. This feed-dog is located in a suitable slot formed in the under face of the bed-plate, and has a straight reciprocating movement in such slot, and the plate or bar N is also located in a slot formed by suitable side pieces on the under side of the bed-plate, which slot is wider than the slot for the feed-dog, and of sufficient width to allow the bar to swing horizontally or have a vibrating movement, and when in place the dog and the vibrating bar are held in position by a plate or cover, R, secured to the side pieces forming the slot for the arm by means of screws or otherwise, so as to hold the parts in place and allow them to have perfect freedom of movement. In use the feed-dog is adjusted so that its head or raised portion O′ will occupy a higher or lower plane, as required, for use by sliding the wedge or incline P in or out, the sliding of the wedge in raising the end of the dog and sliding it out lowering it, and when adjusted the wedge is held in the position in which it is adjusted by tightening the screw *p″*. As the arm or lever M is reciprocated by the action of the crank disk or wheel K the forward end of the vibrating arm N will be oscillated or carried back and forth horizontally, and this movement of the vibrating arm will, through the inclined faces of the wedge on the end of the feed-dog, raise and lower the dog, the socket-connection of the feed-dog with the vibrating bar permitting this movement, thus producing the required vertical movement of the head O′ for the feed, the feed-dog being stationary, so that the wedge will raise or lower it vertically by the

swinging of the vibrating arm. The feed-dog is reciprocated forward and backward by the action of the bar or lever M, the forward end of which is thrown in or out on the pivot therefor in the usual manner. By means of this vibrating bar N and its connection with the feed-dog and with the end of the lever or arm M it will be seen that the feed-dog is given a reciprocating movement forward and back, and at the same time and by the same means the vibrating arm N is given an oscillating movement, which movement of the arm N gives the feed-dog its vertical movement for the feed, and that both these movements of the dog are produced through the movement of the same lever or arm and its operating devices.

The pivot on which the shuttle-carrier arm swings is liable to become worn in use, so that such arm will have too much play and injure the proper operation of the shuttle. To obviate this objection the bearing U of such arm is made conical in shape, and the head or hub which receives such bearing is provided with a correspondingly conical-shaped opening. This bearing U is attached to a screw-threaded pin or stud, U′, which enters a screw-threaded opening in the bearing, which pin or stud, at its inner end, is provided with a ring or flange, *s′*, which enters a recess formed in the bed-plate of the machine, and projecting out from this flange or ring *s′* is a screw-threaded end, *s″*, which enters a screw-threaded opening in the bed-plate and securely holds the stud or pin U′ in position, and in the outer end of this stud or pin U′ is a screw-threaded opening to receive the shank of a set or jam screw, *s*, the head of which is greater in diameter than the end of the stud or pin and enters a recess or opening formed in the conical bearing U, and comes in contact with such bearing and prevents it from working off the stud or pin during the operation of the shuttle-carrier arm.

The parts represented by the letters S S′ T T″ are constructed, arranged, and operated in the usual manner for such parts, and need not therefore be specifically described.

The pivot on which the lever M turns and for connecting such lever with the stitch-regulating bar through the plate or arm M′ is formed in two sections or parts, V W, the part W having a slot or opening, W′, for the feed-regulating bar M, and being provided with a stud or boss, *u*, at its center to form a pivot for the feed-bar, which stud or boss has a screw-threaded end, *u′*, which enters a screw-threaded opening in the section or part V, and secures the two sections together with the arm or plate M′ between them, the end of this plate having a suitable opening for the entrance of the stud *u*, and the other end of this plate M′ being attached to the stitch-regulating bar M″, and the two sections are held in position and prevented from becoming loose in use by means of a set or jam screw, *v*, the shank of which enters the screw-threaded opening in the stud or boss *u′*, by means of which screw *v* the wear of the coupling or joint in use can be taken up and the proper amount of play of the lever M on its pivot be maintained.

The bed-plate Y and vertical portion Z of the bracket or arm are to be formed as usual, and the end of the bracket or arm carries the plate B of the presser-foot and needle-bar head in the usual manner.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the sewing-machine head A B, the sliding pin *b*, the tension-disks *a a′* on the outer end of said pin, and the spring *c*, attached at its upper end and having its lower end connected with the inner end of the pin, of the lever *d*, pivoted in a recess in the machine-head to swing in a vertical plane at one side of the spring, and having its free end projecting laterally through a vertical slot in one edge of the machine-head, substantially as described.

2. The combination, with the sewing-machine head, the sliding pin *b*, the tension-disks *a a′* on the outer end of the pin, and the spring *c*, having its upper end attached and its lower end connected with the inner end of the pin, of the lever *d*, pivoted at one end to swing in a vertical plane at one side of the spring, and having a bent or curved portion bearing against said spring, said lever having its outer free end projecting through a vertical slot in one edge of the machine-head, substantially as described.

3. The triangular or V-shaped needle-bar, in combination with an oil-receptacle having a triangular or V-shaped interior perforated casing and an exterior casing, with a cavity or receptacle between the exterior and interior casings for the reception of the oil or other lubricant, substantially as described.

4. The combination, with the sewing-machine head having a vertically-arranged series of openings, *i′*, in one side, of a supporting stud or sleeve, *h*, and a spring, H, coiled around the same, and provided with two arms, *f f′*, projecting in the same direction, one of said arms being arranged within the machine-head to bear on the presser-foot bar, and the other arm being arranged without the head, and having its end provided with a catch or projection, *i*, to engage the openings in one side of the head, substantially as described.

5. The sleeve or stud *g* and sliding pin *h*, in combination with the sliding pin or journal *b* and tension-disks *a a′*, for releasing the pressure of the tension-disks at will and forming a support for the pressure-spring H, substantially as described.

6. The combination, with the lever *d*, the spring-plate *c*, the sliding pin *b*, secured to the latter, and the tension-disks *a a′*, carried by the pin, of the sleeve or stud *g* and the sliding pin *h* arranged in line with the sliding pin *b*, and having at its outer end a thumb piece or head, *h″*, substantially as described.

7. The stud or sleeve *g*, provided with an end flange, *g′*, and the pin *h*, provided with a thumb piece or head, *h″*, and a set-screw, *h′*,

in combination with the sliding pin or journal *b* and the tension-disks *a a'*, substantially as described.

8. The head I'', provided with a cam-groove, *k k'*, in combination with the anti-friction roller *l*, arm or pendant *l'*, rocking head *l''*, pin or journal *m*, spring *m'*, and thread-arm *n*, forming a take-up for the thread and preventing breakage thereof, substantially as described.

9. The combination of the feed-dog O, having a serrated head or raised portion, O', with the vibrating and reciprocating lever M, the vibrating bar N, jointed at one end to the feed-dog and pivoted at its other end to the said lever, and the incline P, moving with the vibrating bar, substantially as described.

10. The feed-dog O, having a serrated or raised portion, O', at one end and a socket, *o''*, at the other end, in combination with a vibrating bar, N, having a ball or pivot, *o'*, at one end, fitting the socket in the feed-dog, and carrying an incline or wedge, P, at its opposite end, for allowing the vertical movement of the dog and maintaining the horizontal relation between the dog and vibrating bar, and a vibrating and reciprocating lever, M, attached at one end to the vibrating lever under the feed-dog, substantially as described.

11. The wedge or incline P and set-screw *p''*, in combination with the vibrating bar N, provided with a slot, *p'*, and feed-dog O, connected with the vibrating bar at one end by a ball-and-socket joint, for adjusting the height of the feed-dog and maintaining it in position when adjusted, substantially as described.

12. The joint or coupling consisting of two sections, V W, one of which, W, is provided with a slot or opening, W', for the reception of the feed-lever, and with a stud or boss, *u*, having a screw-threaded end, *u'*, and provided with a screw-threaded opening, *v'*, and the other section, V, having a suitable opening to receive the stud *u u'*, in combination with the arm or link M' and a set or jam screw, *v*, substantially as described.

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