No. 640,417. Patented Jan. 2, 1900.

F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 1.

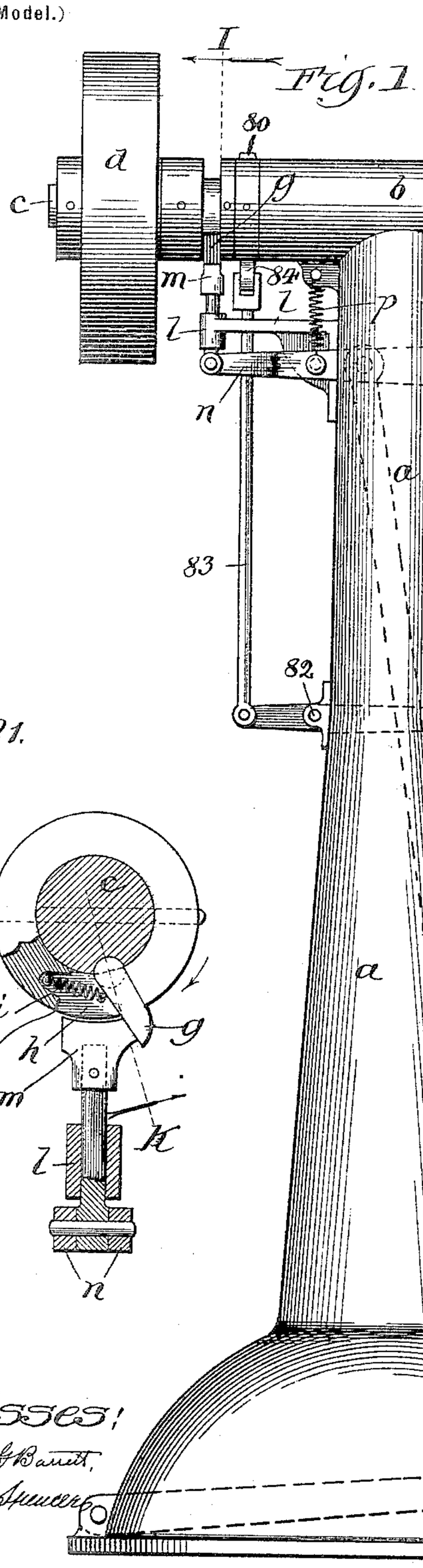


Fig. 1.

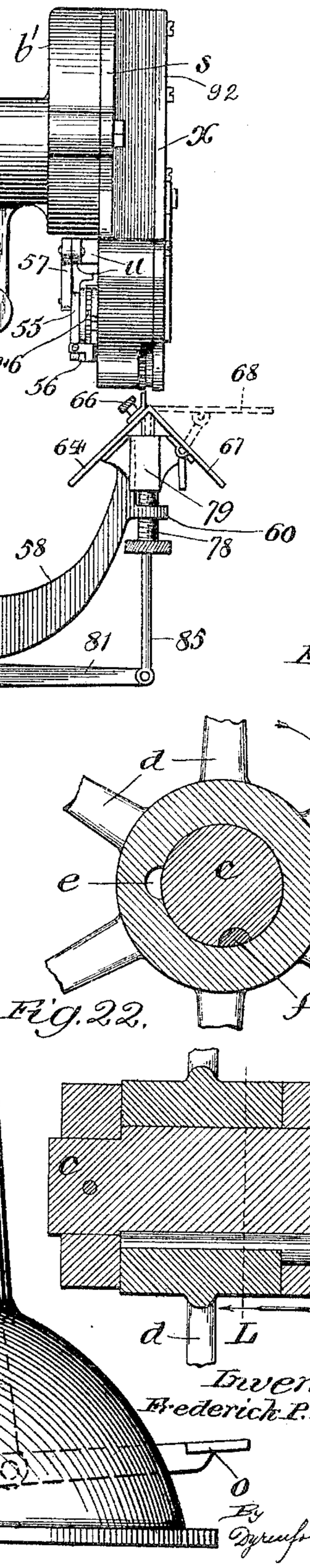


Fig. 21.

Fig. 23.

Fig. 22.

Witnesses:
Harold S. Barnett,
Richard D. Spencer.

Inventor:
Frederick P. Rosback,
By Dyrenforth & Dyrenforth,
Attys.

No. 640,417. Patented Jan. 2, 1900.

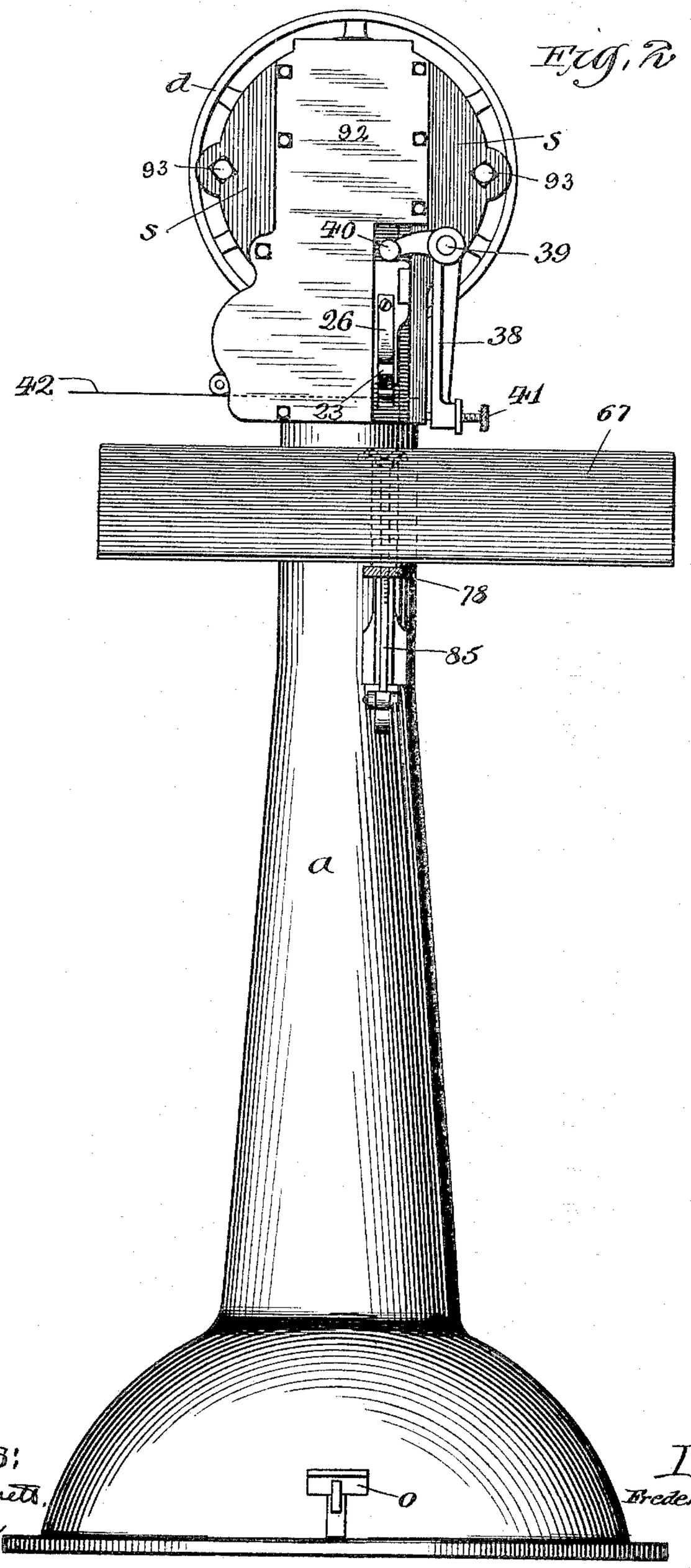
F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 2.

Fig. 2.



Witnesses:
Harold S. Barnett.
Richard J. Stevens.

Inventor:
Frederick P. Rosback,
By. Dyrenforth & Dyrenforth Atty's

No. 640,417. Patented Jan. 2, 1900.

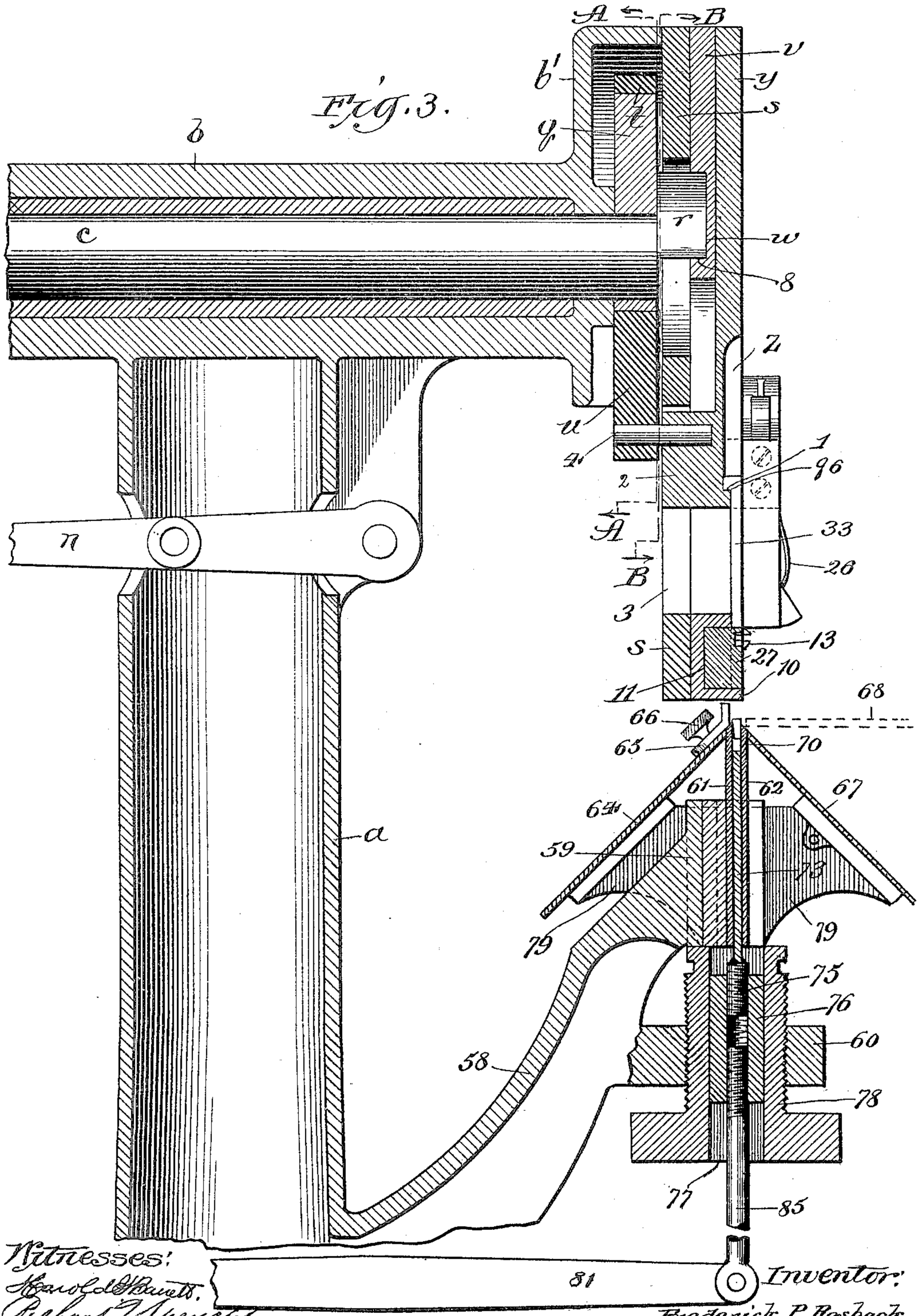
F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 3.

Fig. 3.



Witnesses:
Harold Hamett.
Richard J. Spencer.

Inventor:
Frederick P. Rosback,
By Dyrenforth & Dyrenforth,
Atty's

No. 640,417. Patented Jan. 2, 1900.

F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 4.

Fig. 4.

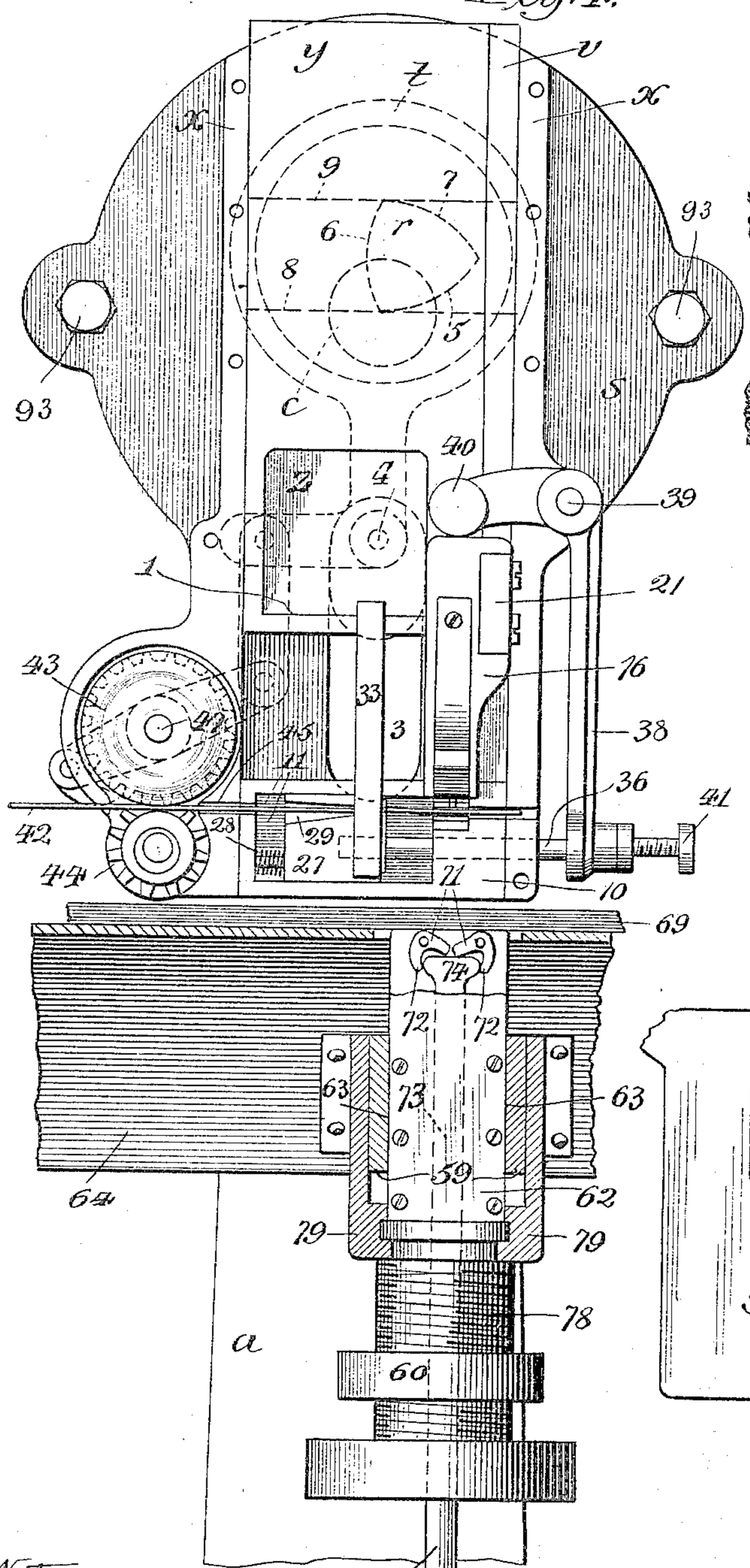


Fig. 6.

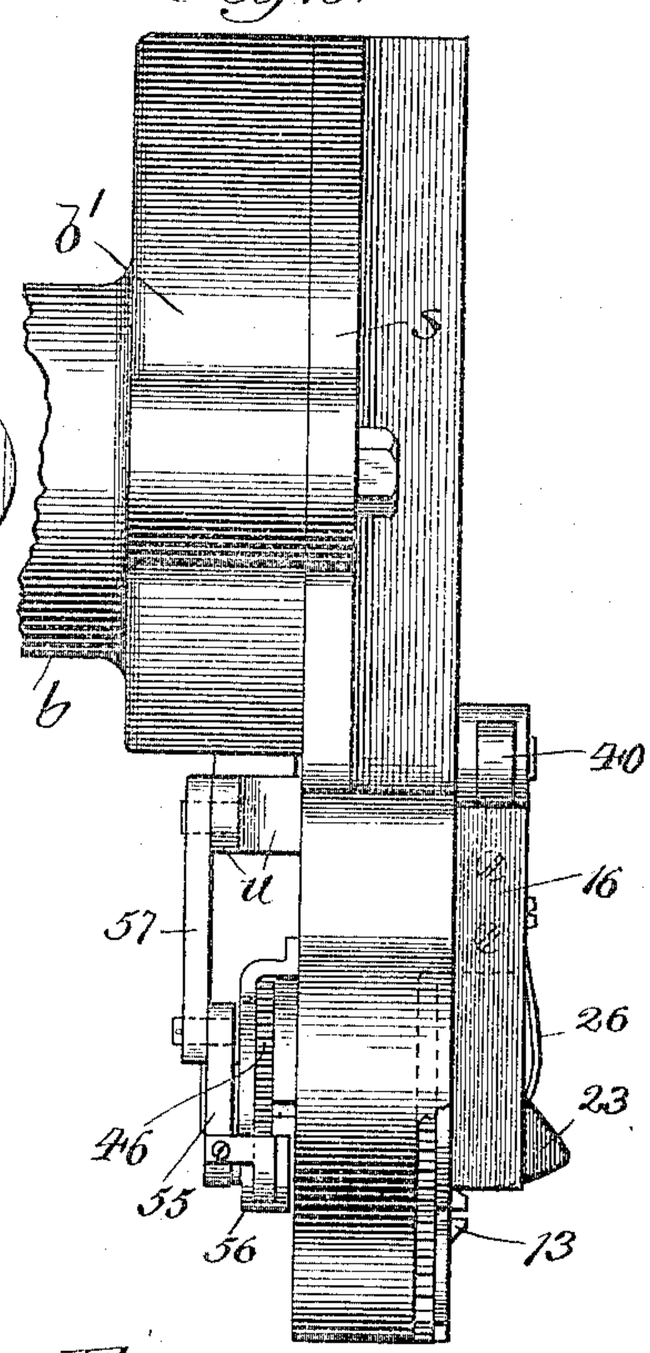
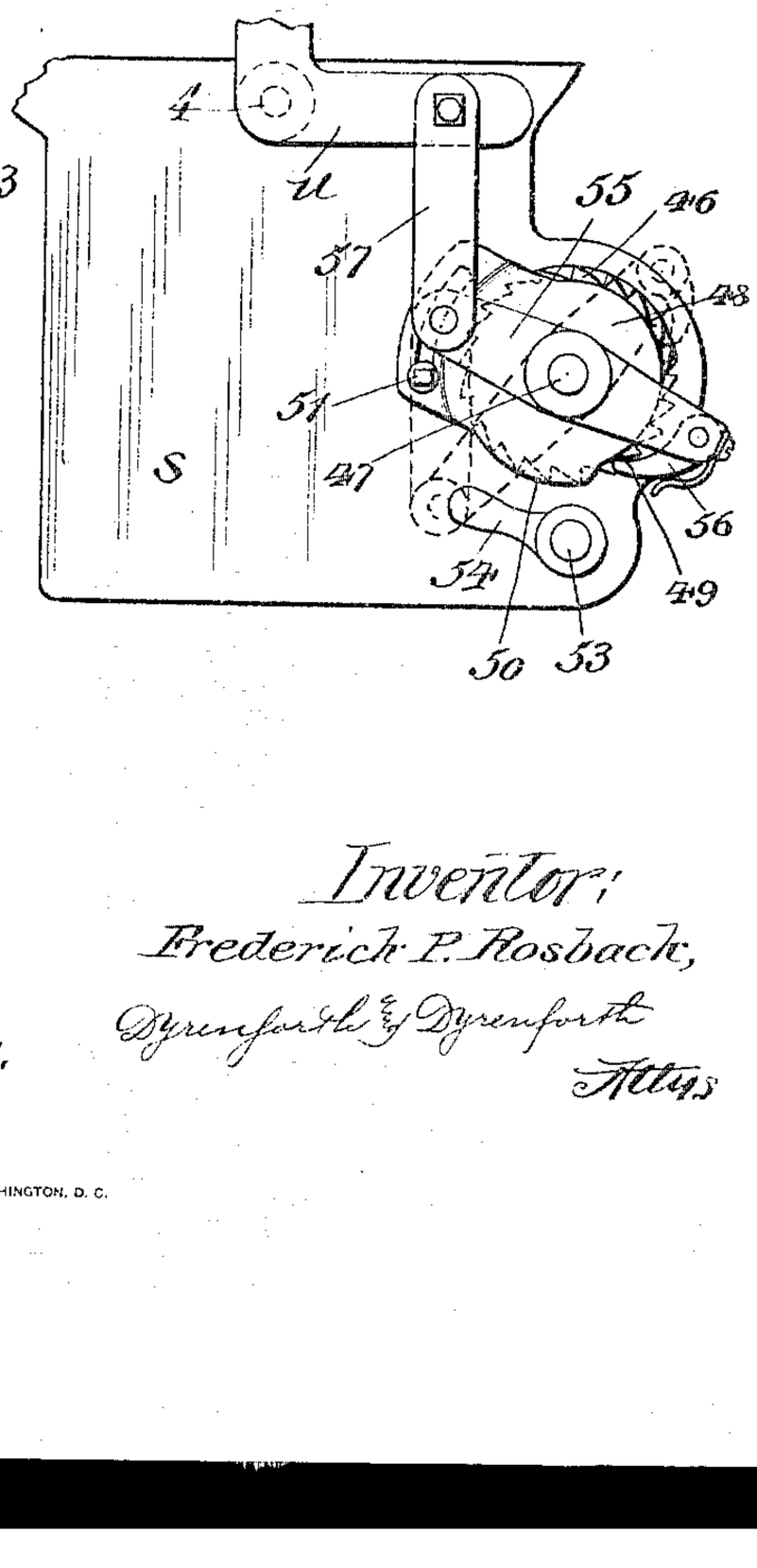


Fig. 7.



Witnesses
Harold B. Bynett
Richard J. Spencely

Inventor:
Frederick P. Rosback,
By Dyrenforth & Dyrenforth
Attys

No. 640,417. Patented Jan. 2, 1900.

F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 5.

Fig. 5

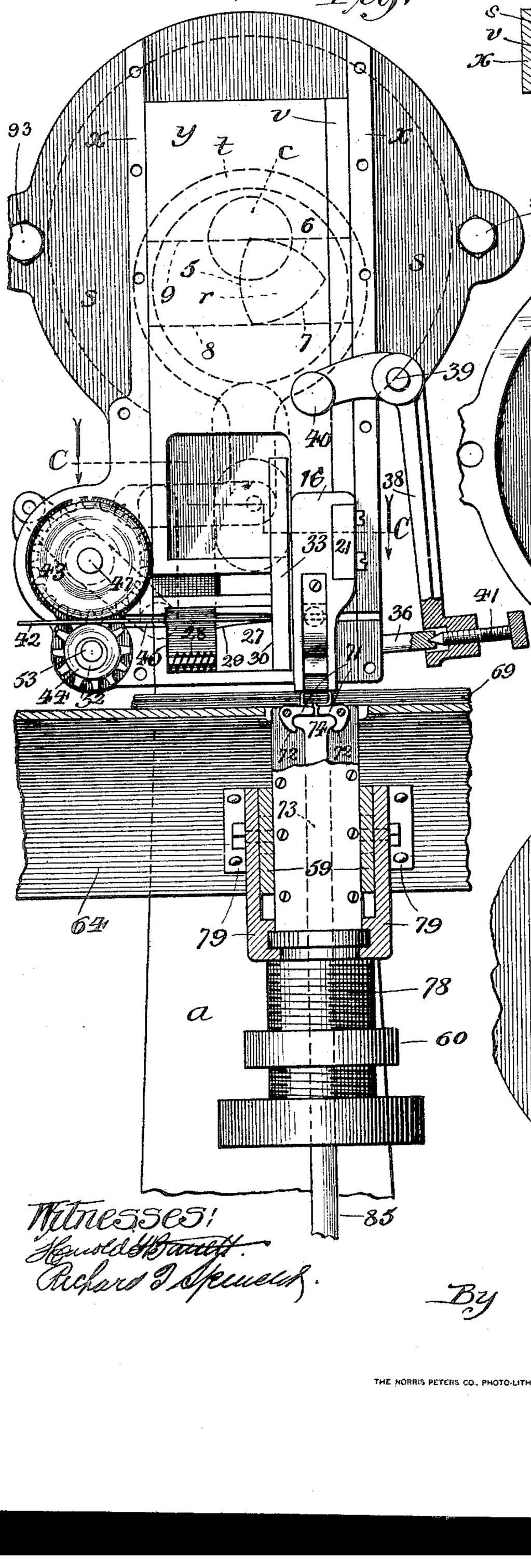


Fig. 10.

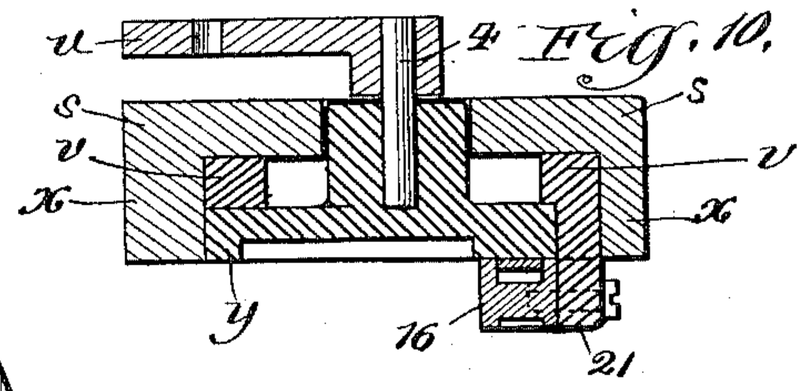


Fig. 8

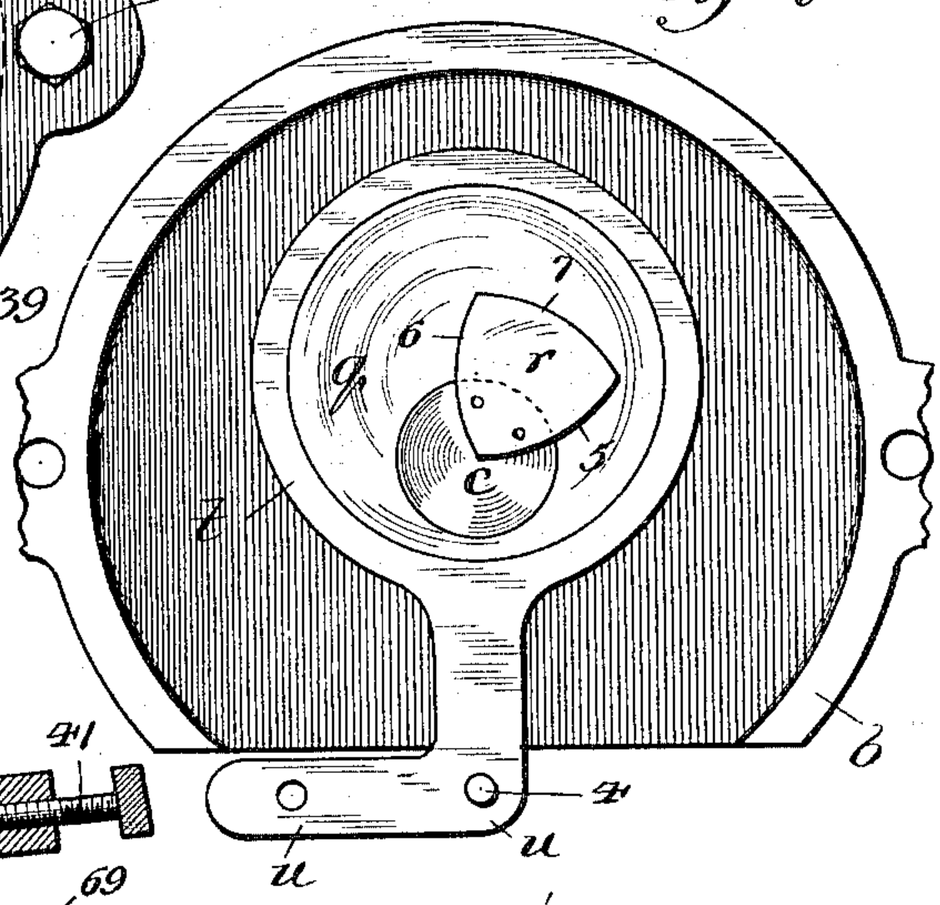
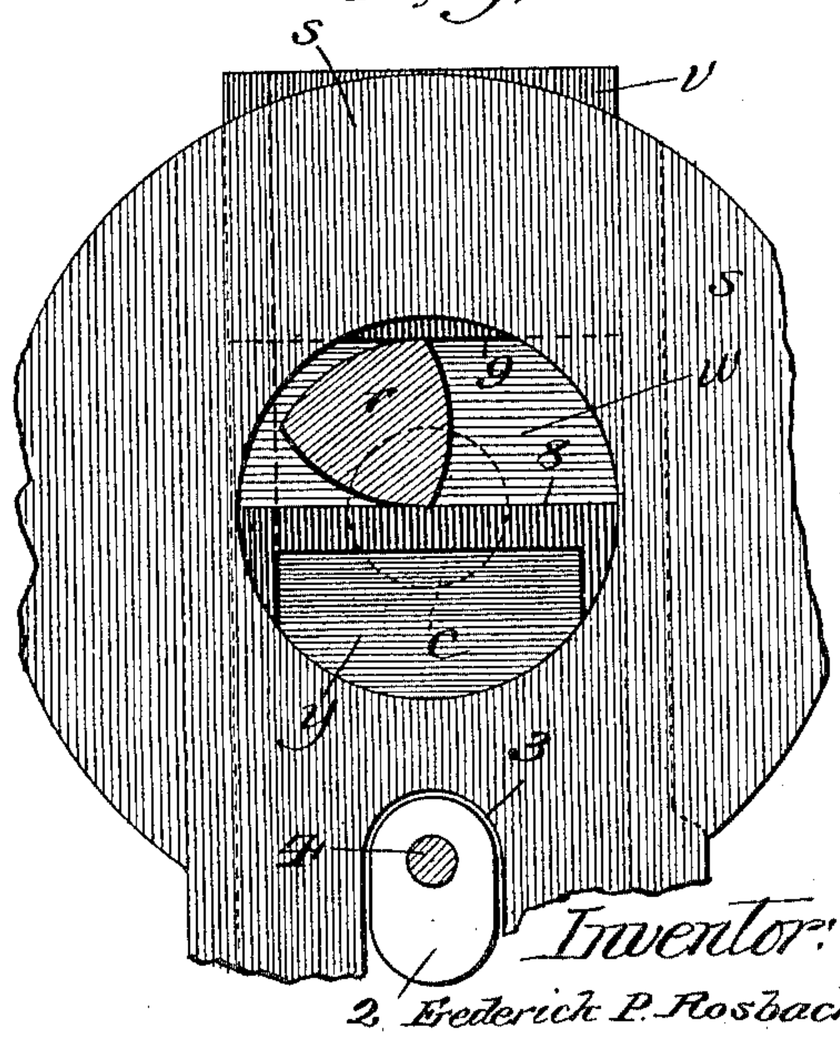


Fig. 9



Witnesses:
Harold [illegible].
Richard D Spencer.

Inventor:
F. Frederick P. Rosback,
By Dyrenforth & Dyrenforth,
Attys.

No. 640,417. Patented Jan. 2, 1900.

F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 6.

Fig. 12.

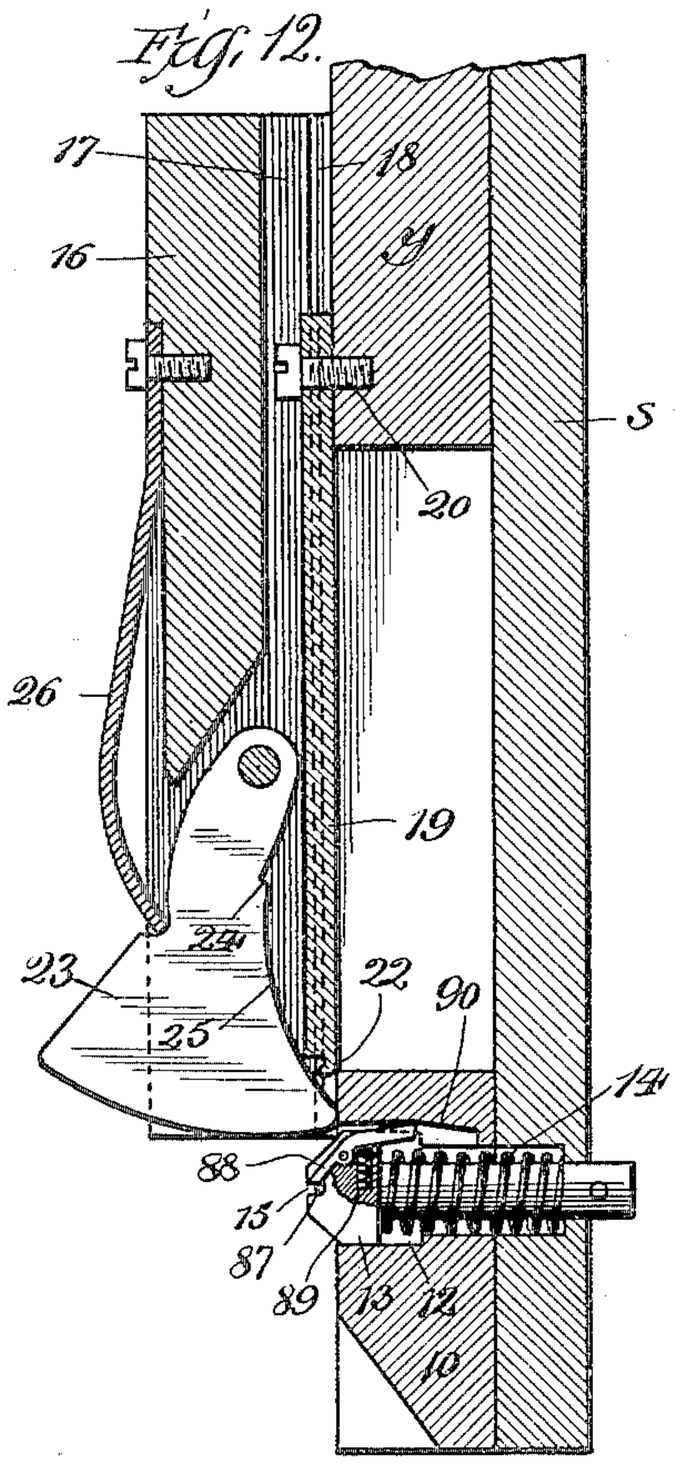


Fig. 11.

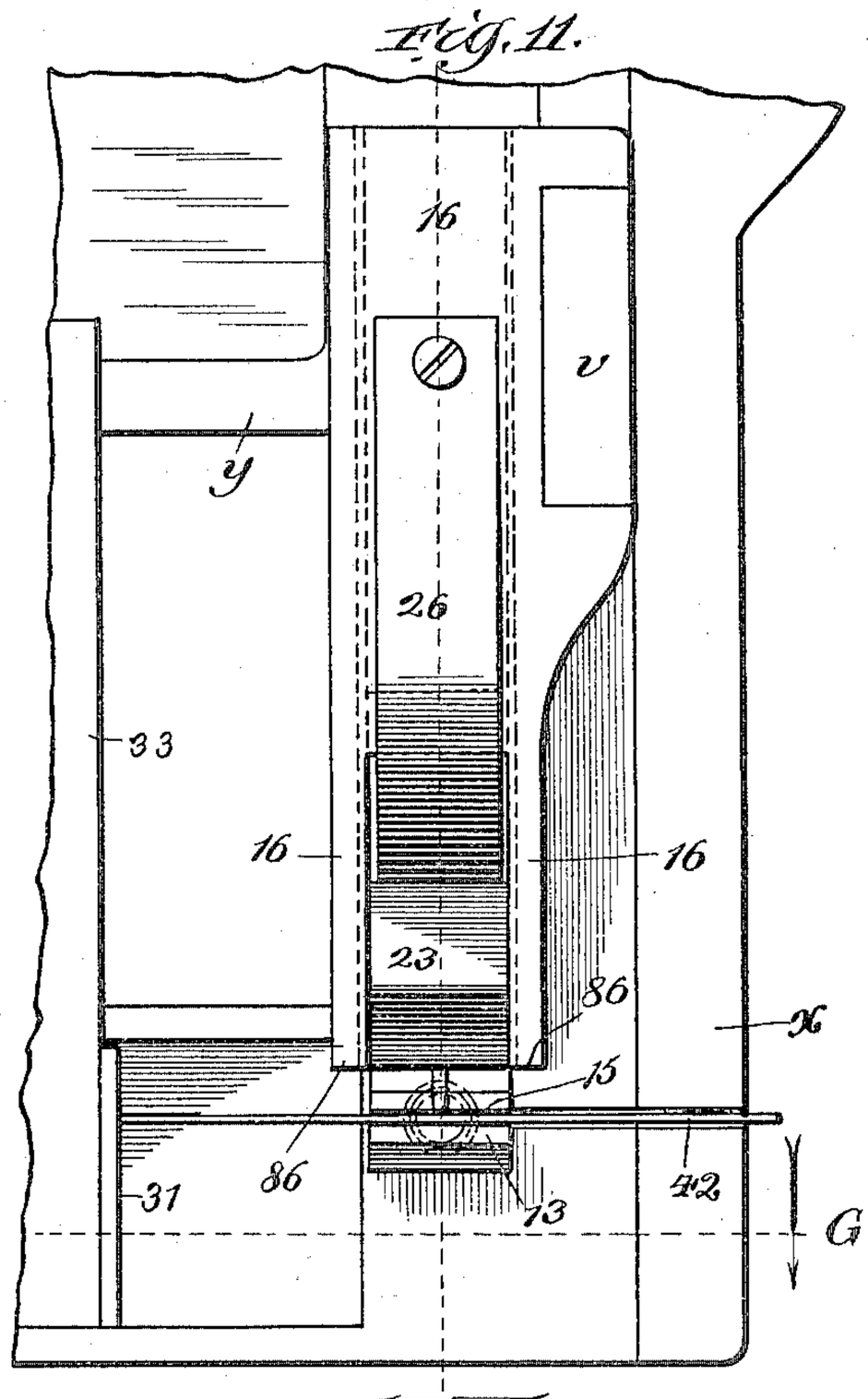


Fig. 13.

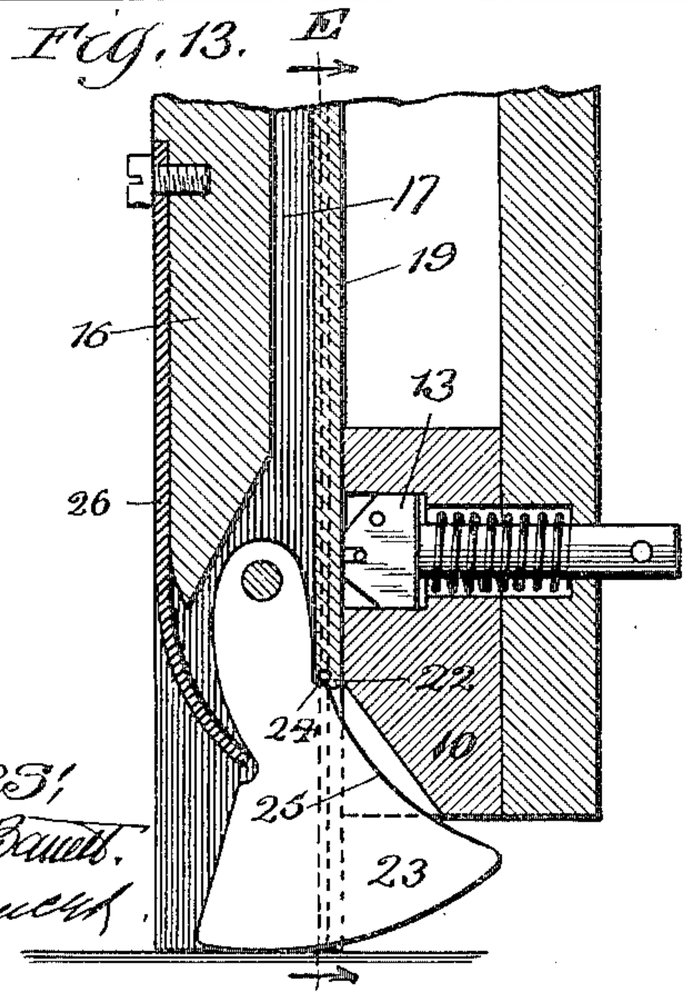
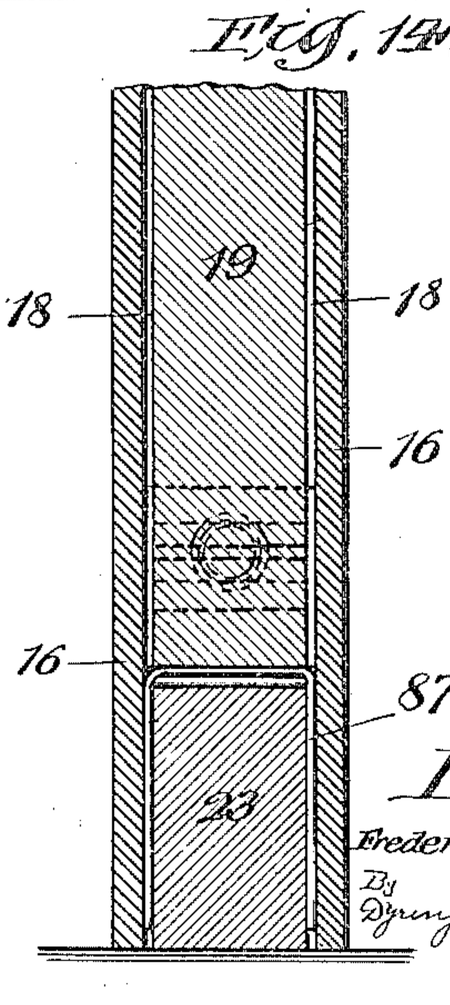


Fig. 14.



Witnesses;
Harold Howell.
Archibald Spencer.

Inventor.
Frederick P. Rosback,
By Dyrenforth & Dyrenforth
Attys.

No. 640,417. Patented Jan. 2, 1900.

F. P. ROSBACK.

BOOK STITCHING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 7 Sheets—Sheet 7.

Fig. 15.

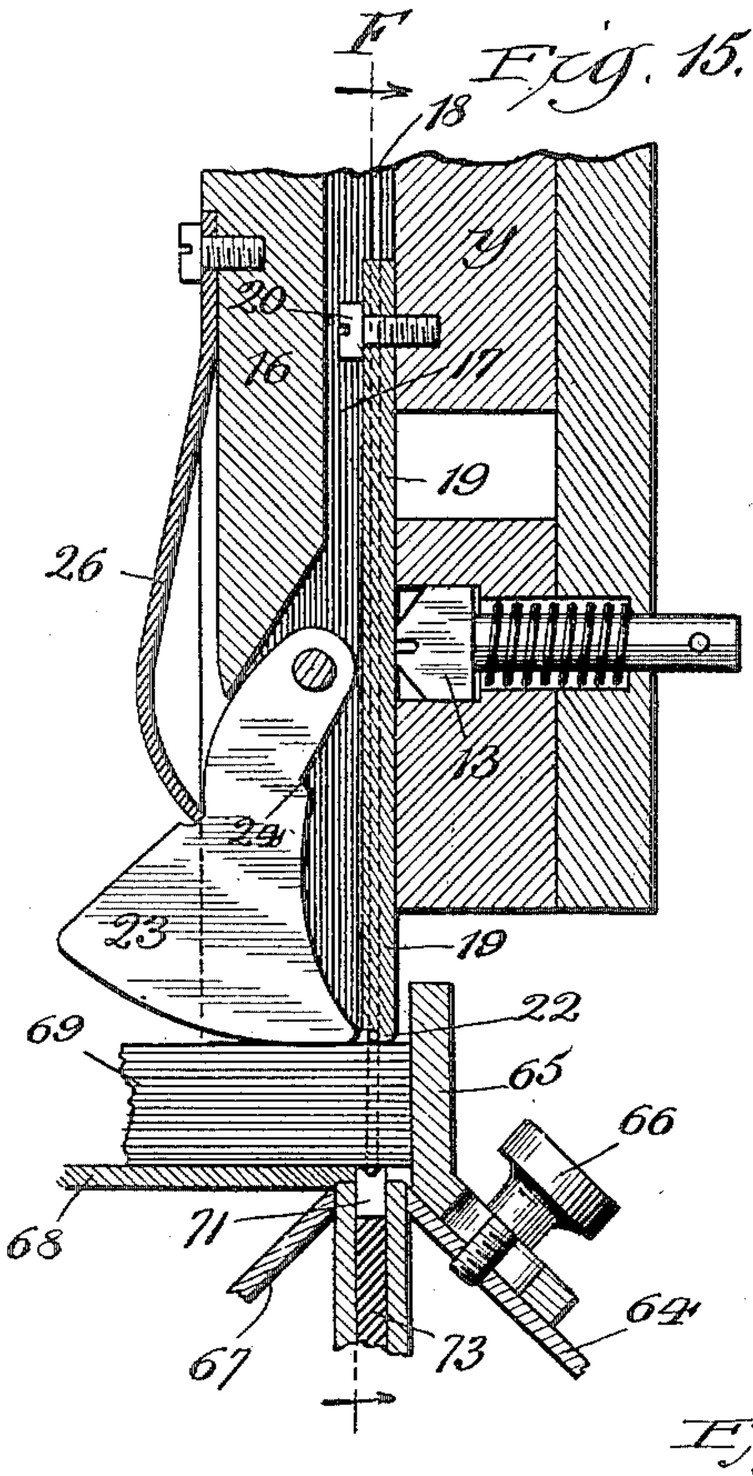


Fig. 16.

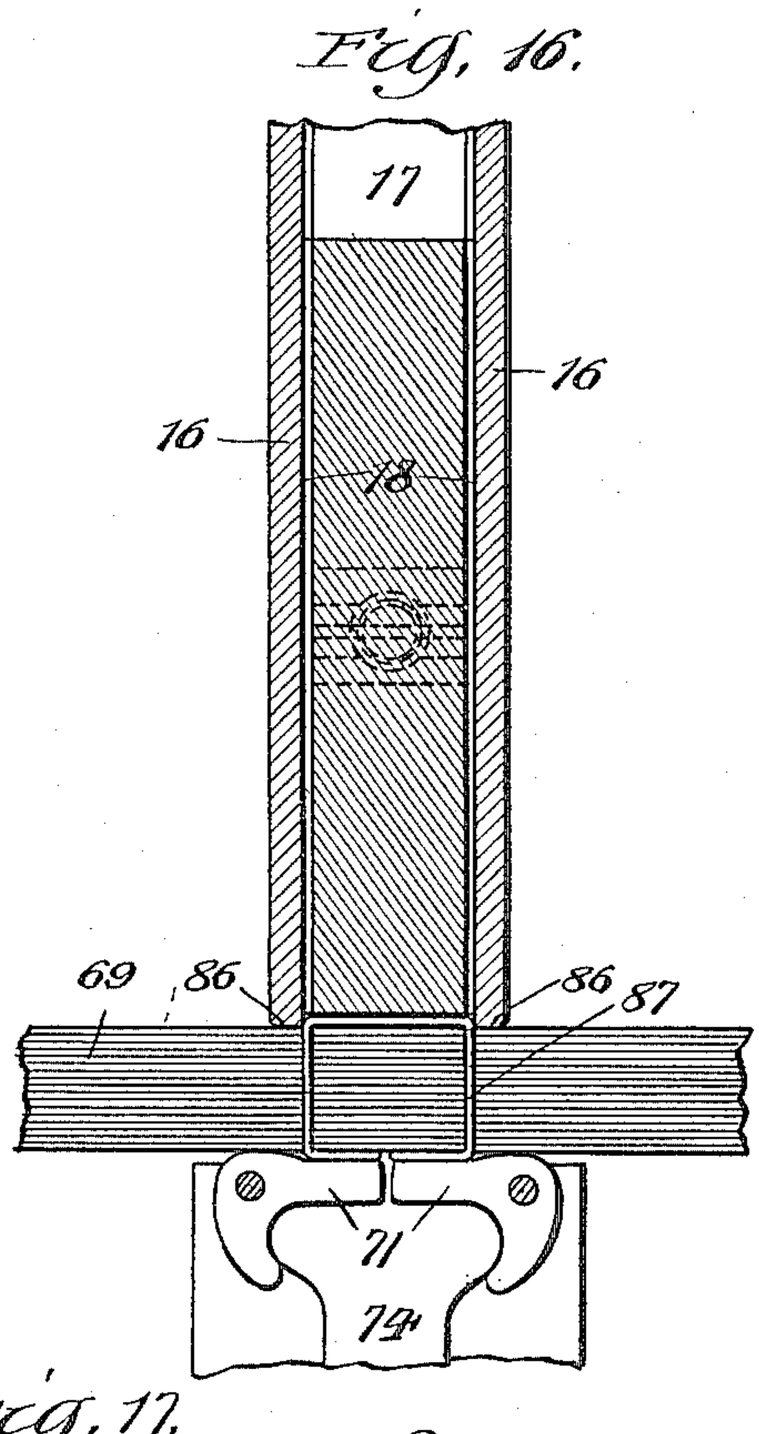


Fig. 17.

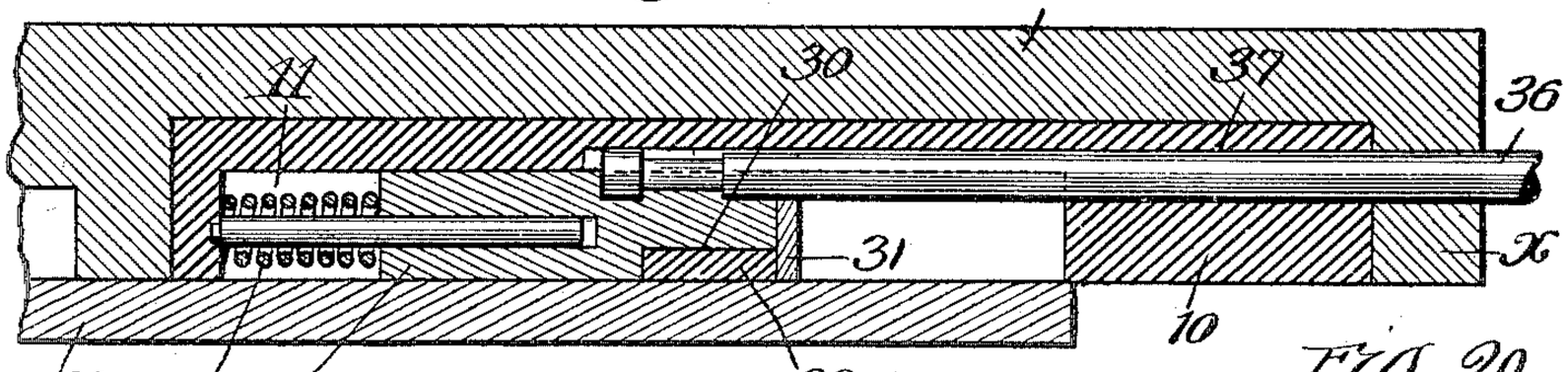


Fig. 18.

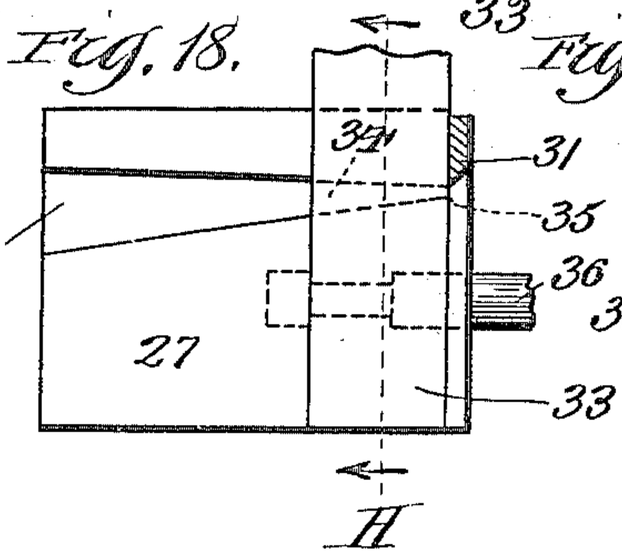


Fig. 19.

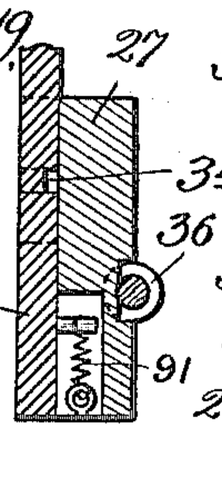
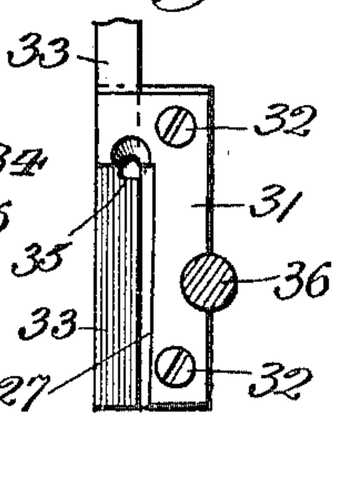


Fig. 20.



Witnesses;
Harold S. Bantle.
Richard P. Ahearn.

Inventor;
Frederick P. Rosback,
By Dyrenforth & Dyrenforth,
Atty's.

UNITED STATES PATENT OFFICE.

FREDERICK P. ROSBACK, OF CHICAGO, ILLINOIS.

BOOK-STITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,417, dated January 2, 1900.

Application filed June 5, 1899. Serial No. 719,413. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK P. ROSBACK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Book-Stitching Machines, of which the following is a specification.

This invention relates to an improved book-stitching machine in which wire staples are formed, driven, and clenched to fasten together the leaves of books or pamphlets or, in fact, sheets or pieces of suitable materials generally. In operation the leaves or the like which are to be stitched or fastened together are assembled together and placed in their assembled condition upon a platform upon the machine to extend at the parts where the stitching is to take place between the staple forming and driving mechanism and the clencher. The operator then starts the machine by pressing upon a treadle and causes the drive-shaft to be given one complete revolution. In this revolution the staple is cut and formed from a length of wire, driven downward through the assembled leaves, and clenched on the under side by the operation of the clencher, when the machine stops ready for another operation.

In the drawings, Figure 1 is a side elevation of the machine; Fig. 2, a front view; Fig. 3, a broken and enlarged vertical section of the upper forward part of the machine with the face-plate removed, the section being in the plane of the drive-shaft; Figs. 4 and 5, broken front elevations, partly in section, with the face-plate removed and showing the same working parts in two positions; Fig. 6, a broken side view of the head portion of the machine with the face-plate 92 removed; Fig. 7, a broken elevation illustrating the staple-wire-feed-operating mechanism; Fig. 8, a broken view taken on line A A in Fig. 3 with the cam *r* in elevation and looking in the direction of the arrows; Fig. 9, a broken partly-sectional view taken on line B B in Fig. 3 looking in the direction of the arrows; Fig. 10, a plan section taken on the irregular line C C in Fig. 5; Fig. 11, an enlarged broken front view of the staple forming and driving mechanisms; Fig. 12, a section on the line D in Fig. 11 with the swinging staple-guide, however, in elevation; Figs. 13 and 15, views substantially like Fig. 12 with the moving parts in other positions; Fig. 14, a section on line E in Fig. 13; Fig. 16, a section on line F in Fig. 15; Fig. 17, a plan section taken through the staple-wire guiding and cutting mechanism in the plane of line G in Fig. 11; Fig. 18, a broken face view of the wire guiding and cutting block; Fig. 19, a section on line H in Fig. 18; Fig. 20, an end view of the wire guiding and cutting block; Fig. 21, an enlarged section taken on line I in Fig. 1 and showing the starting and stopping clutch; Fig. 22, a section taken on line K in Fig. 21, and Fig. 23 a section taken on line L in Fig. 22.

On the stand *a* is a sleeve *b*, forming a bearing for a shaft *c*. One end of the sleeve *b* is enlarged into a hollow head *b'*. Loose upon the shaft *c* is a constantly-rotating drive-pulley *d*, which in practice may be belted to a line-shaft. In the hub of the pulley *d* (see Fig. 23) is a half-round notch *e*, and set into a notch in the shaft *c* is a rocking clutch-pin *f*, which is half-round where it extends along the hub of the pulley and has a projecting arm *g*. The arm *g* projects through a radial slot *h* in a collar *h'*, fastened to the shaft *c*, and a spring *i* tends normally to draw the arm *g* in the direction of a stop *k* in the collar. Working up and down in a bracket *l* on the stand *a* is a clutch-releasing head *m* on the end of a pivoted lever *n*, connected with a treadle *o*. When the parts are in the positions shown in Figs. 1 and 21, for example, the head *m* is in the path of the arm *g* and has swung the latter to the position wherein the pin *f* has released the pulley *d*, and the said pulley is rotating constantly without turning the shaft *c*. To cause the shaft *c* to rotate, the operator presses down the treadle *o* and then releases it. The pressing down of the treadle causes the arm *g* to be released by the head *m* and to be drawn toward the stop *k* by the spring *i*, whereby as the notch *e* in the turning of the pulley registers with the pin *f* the latter is turned axially into the notch, causing the shaft to be clutched to the pulley. The operator instantly releases the treadle *o*, so that the parts are raised again by the spring *p*, and as the shaft *c* nearly completes a revolution the arm *g* contacts with the head *m*, which is again in its path, and is swung axially to the

position shown in Fig. 21 to release the shaft from the pulley, whereby the shaft stops in its rotation.

Fastened upon the end portion of the shaft *c* in the head *b'* is an eccentric disk *q*, and fastened to the end of the shaft beyond the eccentric disk is an eccentric segmental cam-piece *r*. The cam-piece *r* passes through and beyond an opening in a stationary guide-plate *s*, fastened against the head *b'*. Surrounding the eccentric disk *q* is an eccentric ring *t*, having a downward-extending arm *u* in the shape of a right-angle. Sliding upon the guide-plate *s* is a staple-forming-bar carrier or plate *v*, provided in its rear face with the horizontal recess *w*, in which the segmental cam *r* fits, as shown. The sliding plate *v* moves up and down in guides *x x*, forming part of the stationary plate *s*, and sliding upon the plate *v* is a vertically-movable staple-driving-bar carrier or plate *y*, provided in its front face toward its lower end with a horizontal recess *z*, terminating at its lower end in a shoulder 1 and having on its rear side a backward-extending lug 2 projecting through a vertical slot 3 in the plate *s* and connected with the arm *u* by means of a pin 4. Thus it will be understood that in each rotation of the drive-shaft *c* the eccentric ring *t*, with its arm *u*, is raised and lowered and raises and lowers the sliding plate *y*. Also in each revolution of the drive-shaft *c* the plate *v* is moved down and up by the engagement of the cam *r* in the recess *w*. The cam *r* is formed with segmental side faces 5 and 6 and with a segmental end face 7, so that in turning from the position shown in Fig. 4 to that shown in Fig. 5 the segmental face 5 will bear against the shoulder 8 of the recess *w* and press the plate *v* down. In the further turning of the shaft *c* the surface 7 of the cam slides over the surface 8 without moving the plate *v*, and when it reaches the surface or shoulder 9 of the recess *w* it raises the plate *v* to the position shown in Fig. 4. While the surface 7 of the cam is moving across the surface or shoulder 9 the plate *v* remains stationary.

Fastened against the lower end of the plate *s* below the slot 3 is a block 10, provided in its face with a horizontal guide-recess 11. In the block 10 in the position shown is also a socket 12, containing a spring plunger or anvil 13, held normally by its spring 14 in the forward position. (Indicated in Fig. 12.) In the head of the plunger is a horizontal slot 15, which forms the anvil over which the staple-wire is bent to give it the staple shape. On the anvil 13 (see Fig. 12) is a staple-wire gripping-lever or catch 88, operated by a spring 89 to engage the staple-wire in the slot 15 and hold it against displacement. In the movement of the anvil into the socket 12, as hereinafter described, the arm of the catch or gripping-lever 88 slides against a cam-surface 90 in the socket to open the catch and release its hold upon the wire.

Fastened to a lug 21 on a flange of the plate *v* is a staple forming or bending bar 16, which slides upon the face of the sliding plate *y* and is provided on its rear side with a vertical recess 17, flanked by vertical grooves 18 18. Working up and down in the grooves 18 is a staple-driving bar 19, fastened by means of a screw 20 to the plate *y*. The plate *v* is as wide as the distance between guides *x*, and its side flange forms one of the side guides for the sliding plate *y*. The staple-forming bar 16 straddles and moves along opposite sides of the head of the plunger or anvil 13. The driving-bar 19 is provided at its lower edge with a hook 22, as shown. Pivotally mounted in the forming-bar 16 is a swinging staple-supporter 23, provided in its rear face with a shoulder 24 and below said shoulder with a cam edge 25. A spring 26 on the forming-bar tends to press the swinging staple-supporter in the backward direction, as indicated.

In the guide-recess 11 of the block 10 is a horizontally-movable staple-wire guiding and cutting block 27, which is pressed normally to the position shown in Fig. 5 by a spring 28. In the face of the block 27 is a gradually-diminishing wire-guiding groove 29, terminating at a vertical recess 30 in said block. On the end of the block in line with the groove 29 is the cutting edge of a cutter-plate 31. The cutter-plate 31 is fastened in place with screws 32, so that it may be readily removed and replaced when desired. In the recess 30 and overlapped by the cutter-plate 31 is a vertically-movable cutter-bar 33, provided in its rear face with a groove 34, registering with the groove 29 and gradually diminishing to a cutting edge 36. At the top of the bar 33 is an offset or shoulder 96, which extends into the recess *z* of the plate *y* to be engaged by the shoulder 1. Connected with the block 27 is an operating-rod 36, which extends loosely through a guide-opening 37 in the block 10 and similar opening in the flange *x* of the plate *s*. A bell-crank lever 38, pivoted upon the flange *x* at 39, has an arm 40, which extends over the path of the top of the forming-bar 16. The end of the rod 36 extends into a socket in the lower part of the lever 38 and there contacts with the end of an adjusting-screw 41, as shown in Fig. 5.

The wire 42, from which the staples are formed, passes between feed-wheels 43 44, respectively, and thence through a guide-opening 45 in the adjacent flange *x* and block 10 to the gradually-reducing opening 29 in the block 27. The wheels 43 44 are suitably geared together, and integral with the wheel 43 is a ratchet-wheel 46. Adjacent to the ratchet-wheel and pivotally mounted upon the shaft 47, which carries the wheel 43 and ratchet-wheel, is a cam-plate 48, having the reduced surface 49 and raised surface 50. The cam-plate 48 is provided toward one end with an elongated segmental slot, through which passes a clamp-screw 51 into the adjacent surface of the plate *s*. The feed-wheel 44 is mounted to rotate upon a disk 52, Fig.

5, the disk being eccentric upon a shaft 53, journaled in the plate *s*. On the shaft 53 on the side of the plate *s* opposite the wheel 44 is a handle 54, Fig. 7. By turning the handle 54 the eccentric disk 52 is turned to move the feed-wheel 44 toward or away from the feed-wheel 43. In this way the wheels can be caused to grip the wire as firmly as desired. Pivotally mounted between its ends upon the shaft 47 is a swinging lever 55, provided at one end with a spring-pawl 56 and pivotally connected at its opposite end to a link 57, which in turn is pivoted to the arm *u* of the ring *t*. In the descent of the eccentric ring *t* the lever 55 and pawl 56 are swung to the position indicated by dotted lines in Fig. 7. In the rise of the ring *t* the pawl 56 engages the ratchet-wheel 46 and turns the latter and feed-wheels 43 44 to feed the wire 42 forward. The distance of the feed may be regulated by turning the cam-plate 48 so that in the movement of the pawl 56 it will move from the surface 49 to the surface 50 and release the ratchet-wheel.

On the side of the standard *a* is a bracket 58, carrying a head 59 and below the head an internally-threaded lug 60. Supported in the head 59 are guide-plates 61 62, the plates passing through a guide-opening 63 in the head. 64 is a rearwardly-inclined platform or table extending downward and backward from the top of the guide-plate 61. At the top of the table 64 is a gage-strip 65, removably fastened in place by a thumb-screw 66 in a common manner. 67 is a table or platform extending downward and forward from the top of the guide-plate 62. The table 67 may be hinged to swing upward to the horizontal plane or a removable table 68 may be provided which may be attached when desired by any suitable means to extend in a horizontal plane. It will be obvious that when a pack of leaves 69 are to be stapled at their edges, as indicated in Fig. 15, the table or platform 68 will be placed in position and also the gage 65. On the other hand, when leaves are to be stapled along the line of folding the table or platform 68 and gage 65 will be removed and the leaves caused to rest on the platforms 64 67. In the guide-opening 70 between the plates 61 62 and pivotally mounted upon said plates is a pair of swinging clenchers 71 of the form shown, having the clencher-arms extending toward each other and curved arms 72. Movable up and down in the guide-opening 70 is a clencher-rod 73, having a head 74, which fits into the curved arms 72 when raised, as indicated in Fig. 5. The lower end of the rod 73 is formed into a threaded cylinder 75 and engages an internally-threaded sleeve-piece 76. The sleeve-piece 76 is externally square and fits in the squared opening 77 of a nut 78. The nut 78, which is threaded on its outer surface, passes through the internally-threaded lug 60. The brackets 79, on which the tables 64 67 are mounted, are connected with the plates 61 62, whereby they may all be raised and lowered in the head 59, and in order that this raising and lowering may be accomplished the brackets are connected, as indicated in Figs. 4 and 5, with the upper end of the nut 78 in a manner not to interfere with the turning of said nut.

On the drive-shaft *c* is a cam 80. (See Fig. 1.) A lever 81, pivoted to the standard *a* at 82, is pivotally connected at one end with a rod 83, passing upward through a guide-opening in the bracket *l* and carrying an antifriction-wheel 84, which rides against the cam 80. On the other end of the lever 81 and pivotally connected thereto is a rod 85, threaded at its upper end to fit the thread of the square sleeve 76. It will be noticed in Fig. 3 that the threads of the parts 75 and 85 are right and left hand, respectively, and the internal thread of the sieeve 76 is right and left hand to correspond therewith. Therefore in the turning of the nut 78 to raise or lower the tables, plates 61 62, and clenchers 71 the clencher-operating rod 73 will be raised and lowered to correspond. It will be understood that for this purpose the pitch of the threads on the parts 75, 85, and 78 is made to correspond.

The operation is as follows: Starting with the mechanism in the position shown in Figs. 3 and 4, it will be noticed that the ring *t* and the parts connected therewith, as well as the cam *r* and parts operated by it, are at the extreme upward limits of their rise. The staple-wire 42 has been fed forward and cut to the proper length for a single staple and extends through the slot 15 of the anvil 13. When the operator presses down the treadle *o* and the shaft *c* commences to rotate, the eccentric *q* forces the ring *t* downward with the arm *u* until the wire-feeding pawl and lever are in the position shown by dotted lines in Fig. 7, ready for another feed of the wire. In this descent of the ring *t* the plate *y* is moved downward to the position shown in Fig. 5. In the turning of the cam *r* the plate *v* is forced down to the position indicated in Fig. 5, the descent of the plate, owing to the nature of the cam, being more rapid than the descent of the plate *y*. The downward movement of the plate *v* forces down the forming-bar 16, whereby the lower ends 86 of said bar engage the wire 42 at opposite sides of the anvil and form the staple 87, the legs of the staple resting in the guide-slots 18 18 of the bar 16. In the downward movement of the forming-bar from the position shown in Fig. 12 to that shown in Fig. 13 the swinging supporter 23 slides over the anvil 13 and under the block 10, as shown. The resistance of the spring 14 being greater than the resistance of the spring 26, the anvil will not be moved by the part 23. When the parts are in the position shown in Fig. 13, the staple 87 will straddle the supporter 23. Immediately that the staple is formed the driving-bar 19, being forced down with the plate *y*, will engage the cam-

shaped top of the anvil 13 and force the latter from the position shown in Fig. 12 to the retracted position shown in Fig. 13. At the same time the hook portion 22 of the driving-bar will engage the staple 87 and move it down to the shoulder 24 of the movable supporter 23. Further downward movement of the driver 19 forces the supporter 23 outward against the resistance of the spring 26 and at the same time slides the staple along the surface 25 of the supporter. A pack of sheets 69, placed on the table 68, will be penetrated by the legs of the staple, and as the latter is forced by the driver 19 from the end of the forming-bar 16 the staple-legs will be passed through the pack 69. Just as the driving operation is completed the cam 80, Fig. 1, strikes the wheel 84 and lowers the rod 83 and raises the rod 85, whereby the rod 73 and its head 74 are moved from the position shown in Fig. 4 to the position shown in Fig. 5, causing the clenchers 71 to engage the downward-projecting legs of the staple and turn them up to the position indicated most plainly in Fig. 16. It will be noticed that when the parts are in the initial position (indicated in Fig. 4) the top of the forming-bar 16 has engaged the arm 40 of the lever 38 and swung it so that the wire-guide and cutting-block 27 are moved against the resistance of the spring 28 to the position shown in that figure. As the plate *v* and former move in the downward direction, as described, the upper surface of the forming-bar releases the arm 40 of the lever 38, whereby the spring 28 moves the block 27, rod 36, and lever 38 to the position shown in Fig. 5. The block 27 is thus caused to move with its guide-slot 29 to a point directly adjacent to the opening 15 in the anvil. Owing to the shape of the cam *r* the plate *v* and forming-bar 16 remain at rest in the lowest position during the time that the surface 7 of the cam is sliding over the surface 8 of the plate *v*. Immediately that the driving of the staple has been effected the eccentric *q* starts to raise the plate *y* and driving-bar, and the arm *u* turns the pawl 56 to feed the staple-wire 42 forward. The guide-block 27 remains in the position shown in Fig. 5 close to the path of the anvil while the staple-wire 42 is being fed forward, and the feed movement of the wire is completed when the driver 19 releases the anvil 13. As the anvil springs forward the catch 88 slides away from the cam-surface 90 and closes upon the wire 42 to hold it against displacement. Just as the plate *v* is nearing the limit of its rise the top of the forming-bar 16 engages the arm 40 of the lever 38 and moves the block 27 to the position shown in Fig. 4, and just as the plate *y* is nearing the limit of its rise the shoulder 1 thereon engages the shoulder 96 of the cutter-bar 33 and moves the latter upward against the resistance of the spring 91, Fig. 19, so that the wire is severed by the cutting edges 31 35. At this instant the arm *g* of the clutch-pin, having been engaged by the head *m*, is swung to the position shown in Fig. 21 to release the shaft *c*, whereby the latter stops in its rotation.

The functions performed by the movable wire guiding and cutting block 27 and catch 88 are very important. As soon as one staple has been formed and driven the block 27 is moved (with the wire 42, which then starts to feed) from the cutting position, Fig. 4, to the position shown in Fig. 5, where it remains to hold the wire in position and insure its being engaged by the anvil-socket 15 when the anvil is released by the driver. The catch 88 operates to hold the wire against displacement on the anvil while the block 27 is being moved to the cutting position, Fig. 4, and during the cutting operation.

The cam *r* and eccentric *q* upon the shaft *c*, actuating the plates *v* and *y*, as described, form particularly compact and desirable operating and timing means for the staple forming and driving devices. The sliding wire-guide 27 insures the positioning of the staple-wire in the anvil, while the hook-shoulder 24 insures the proper engagement of the hook 22 with the staple. Thus even when a comparatively fine wire 42 is employed the staples will be formed without danger of a miss. The face-plate 92 is fastened to the flanges *x* with screws and holds the plates *v y* in place. By taking out the bolts 93 the plate *s* and operating mechanisms carried thereby may be removed from the head *b*, which is a great convenience in the event that the mechanism should need repairing.

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

1. The combination with the drive-shaft, staple-forming anvil and the wire-feeder, cutter and staple forming and discharging mechanisms, of a reciprocal staple-wire guide movable to one position to position the wire at the anvil and movable from said position to be out of the way in the staple-bending operation, and operating mechanism for the said guide in the path of the staple-forming mechanism to be actuated in the movement of the latter, substantially as and for the purpose set forth.

2. The combination with the drive-shaft and the staple-wire feeder and staple forming and driving bars actuated from the drive-shaft, of an anvil movable into and out of the path of the staple-wire and driving-bar, a staple-wire-engaging catch on the anvil and a sliding wire-guide between the said feeder and anvil movable to one position to hold the wire in position to be engaged by the catch and movable from said position to be out of the way in the staple-bending operation, substantially as and for the purpose set forth.

3. The combination with the drive-shaft, staple-forming anvil and the wire-feeder, cutter and staple forming and discharging mechanisms, of a reciprocal staple-wire guide movable to one position to position the wire at the anvil and movable from said position to be out of the way in the staple-bending operation, a lever actuated from the drive-shaft to

move the said guide in one direction, a spring operating to move said guide in the other direction, and means for varying the distance of movement of said guide, substantially as and for the purpose set forth.

4. In a book-stitching machine, the combination with the hollow stationary head b' and drive-shaft c, of the removable guide-plate s fastened to the head b', eccentric q and cam r on the end portion of the shaft, sliding forming-bar carrier v on the guide-plate operatively connected with the cam r, sliding driving-bar carrier y on the guide-plate operatively connected with the eccentric q, and the removable face-plate 92, all constructed and arranged to operate substantially as and for the purpose set forth.

FREDERICK P. ROSBACK.

In presence of—
R. T. SPENCER,
D. W. LEE.