

(No Model.)

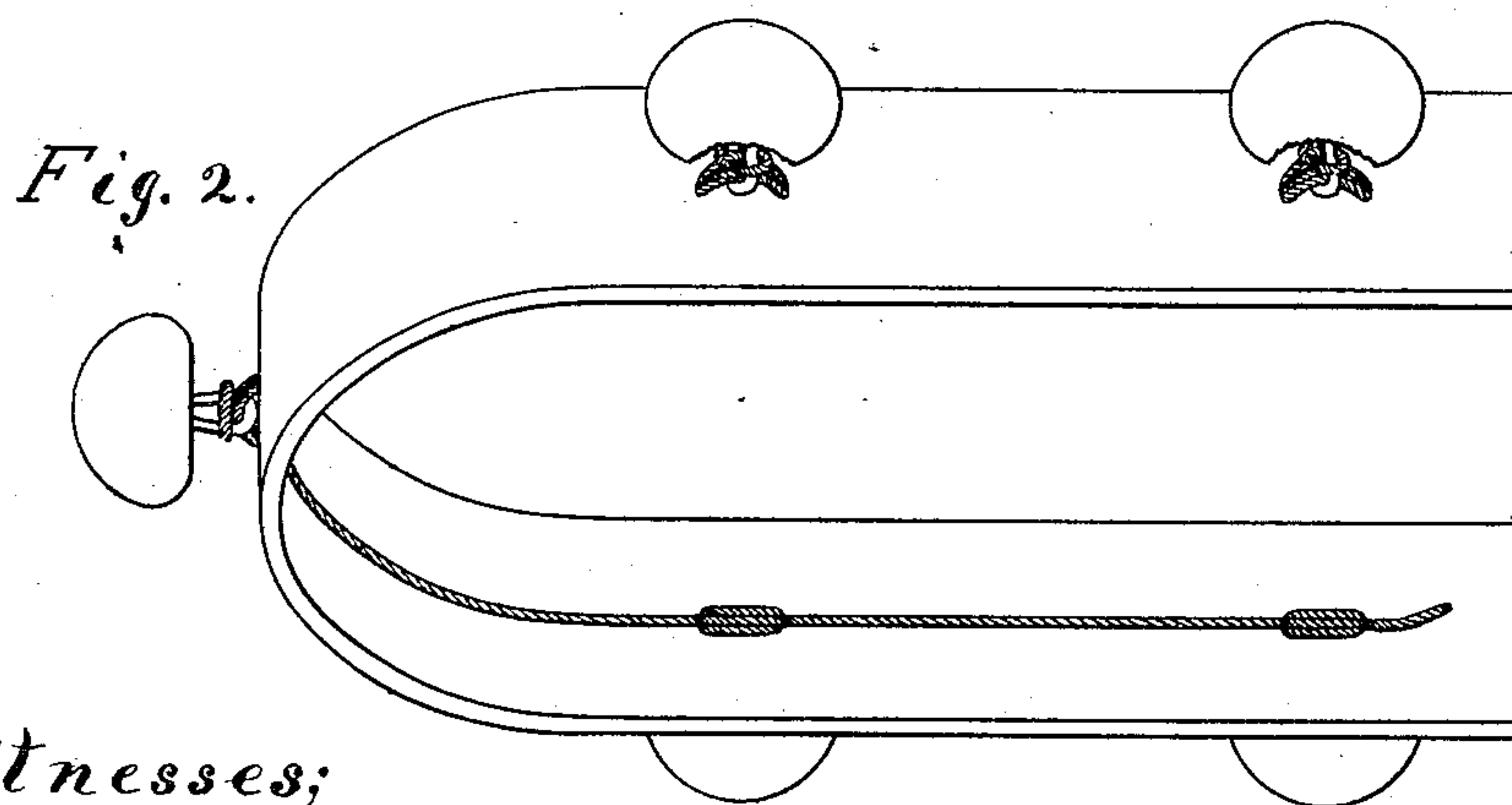
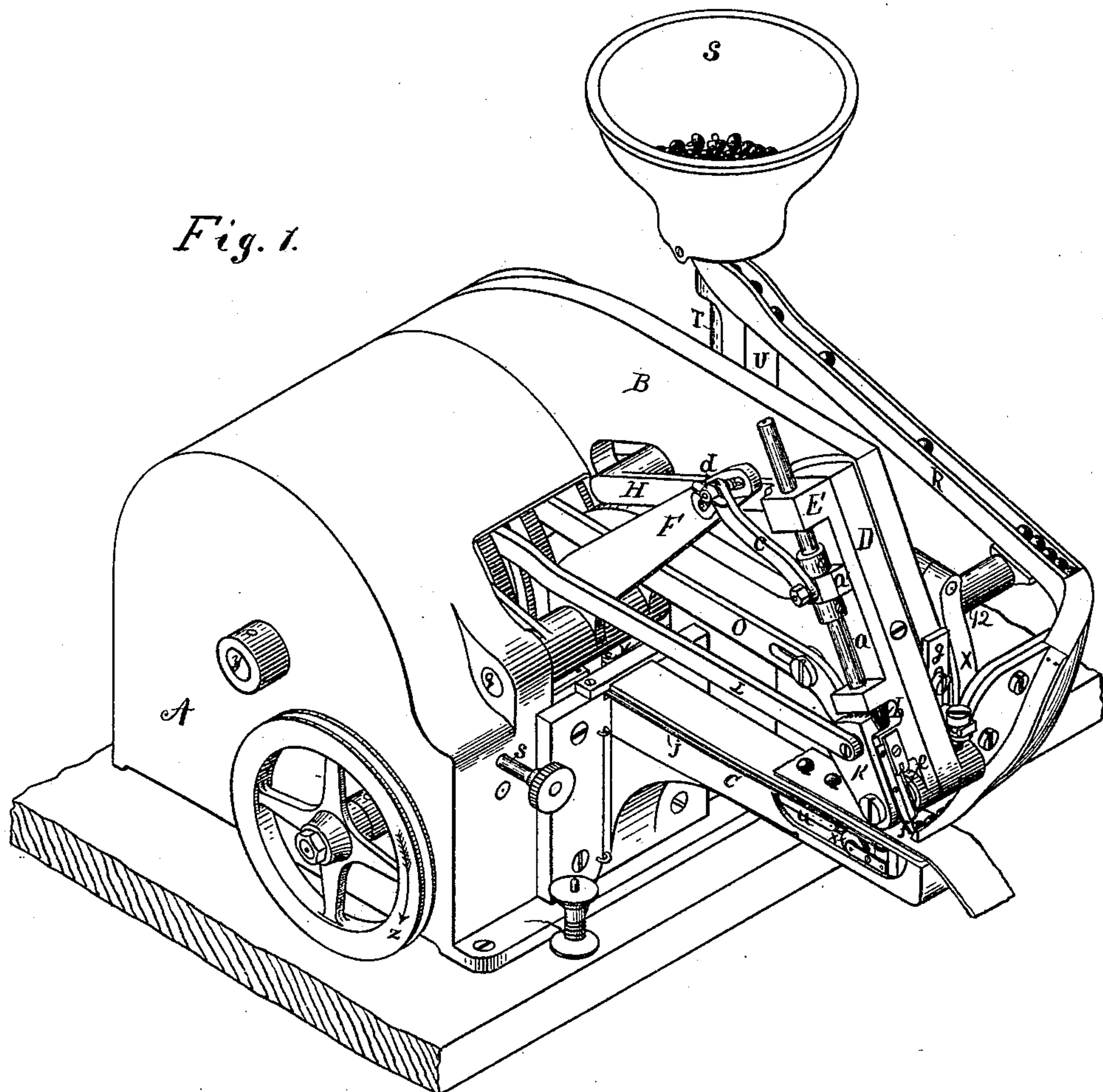
7 Sheets—Sheet 1.

R. THOMPSON.

MACHINE FOR SEWING SHANK BUTTONS TO BOOTS, &c.

No. 353,609.

Patented Nov. 30, 1886.



Witnesses;

William H. Orcutt,
Charles E. Thompson,

Inventor;

Rosewell Thompson,

(No Model.)

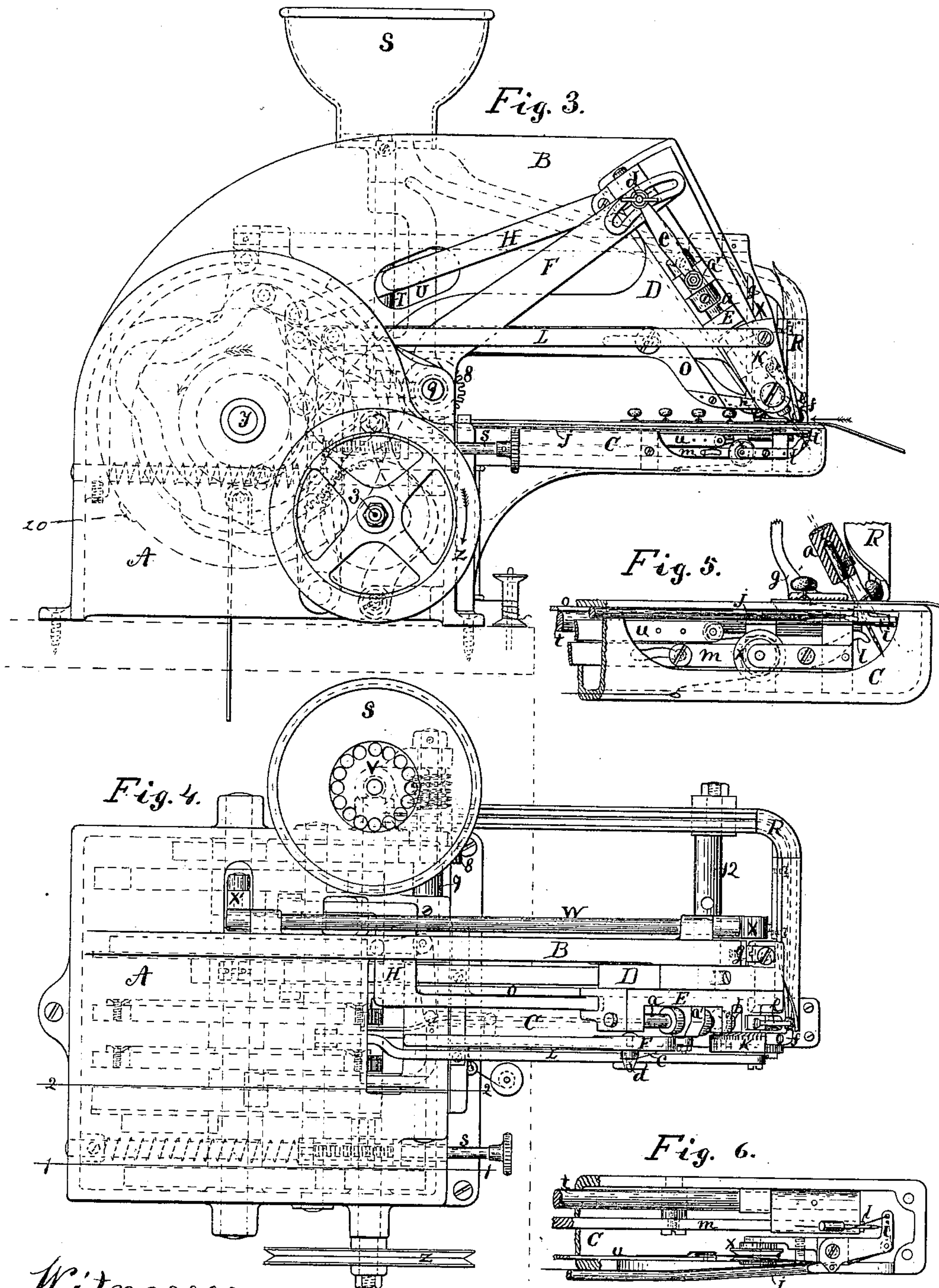
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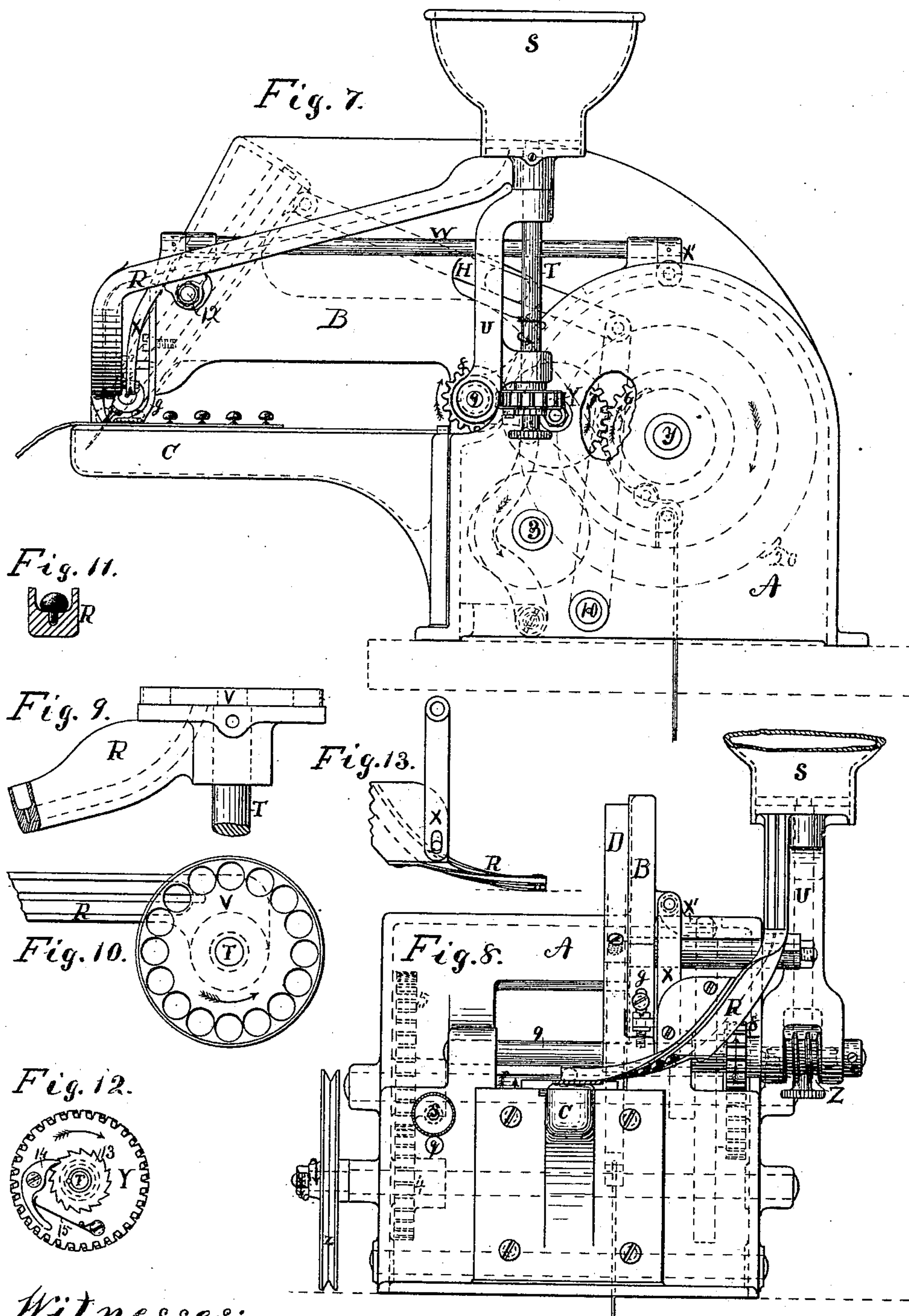
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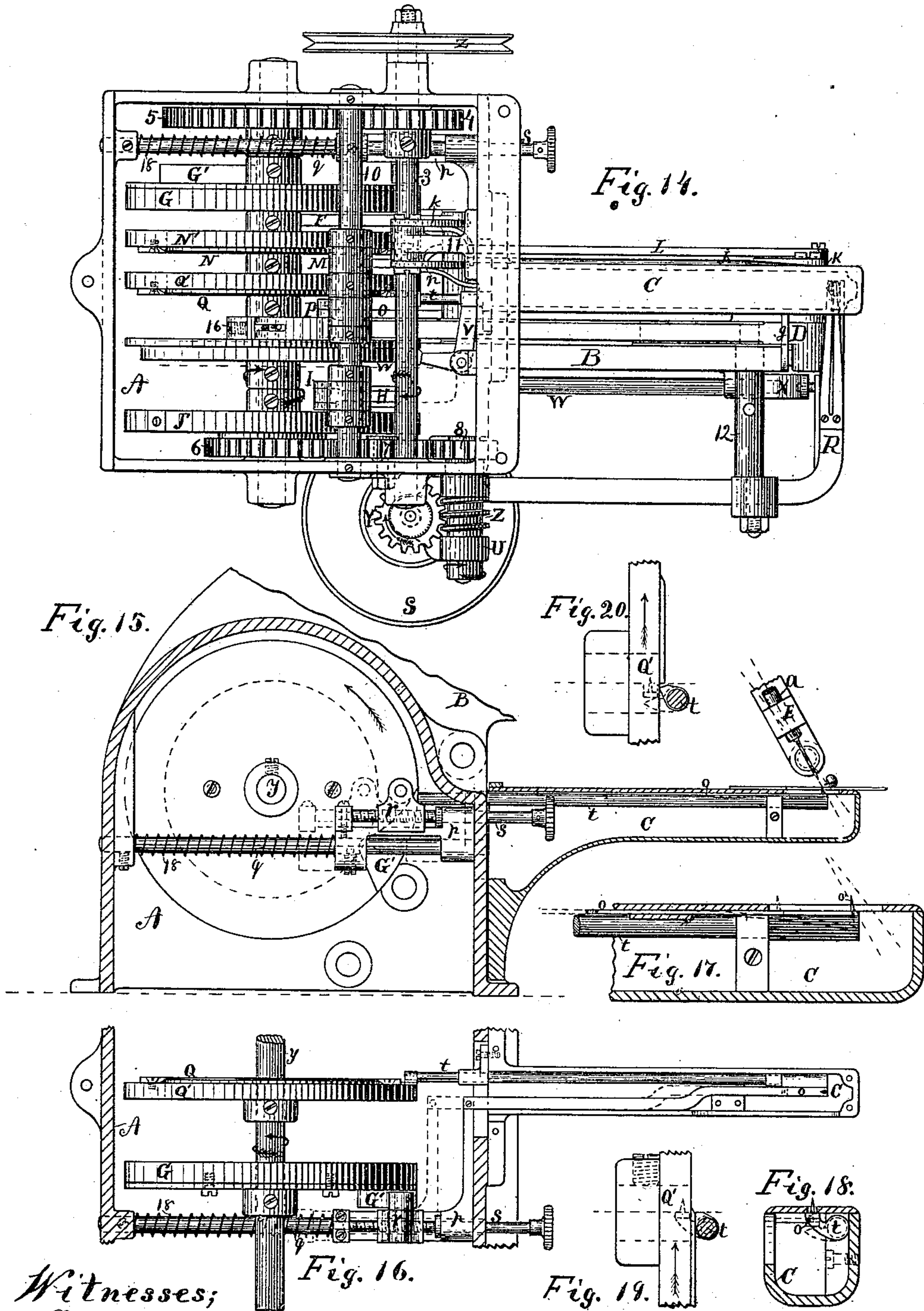
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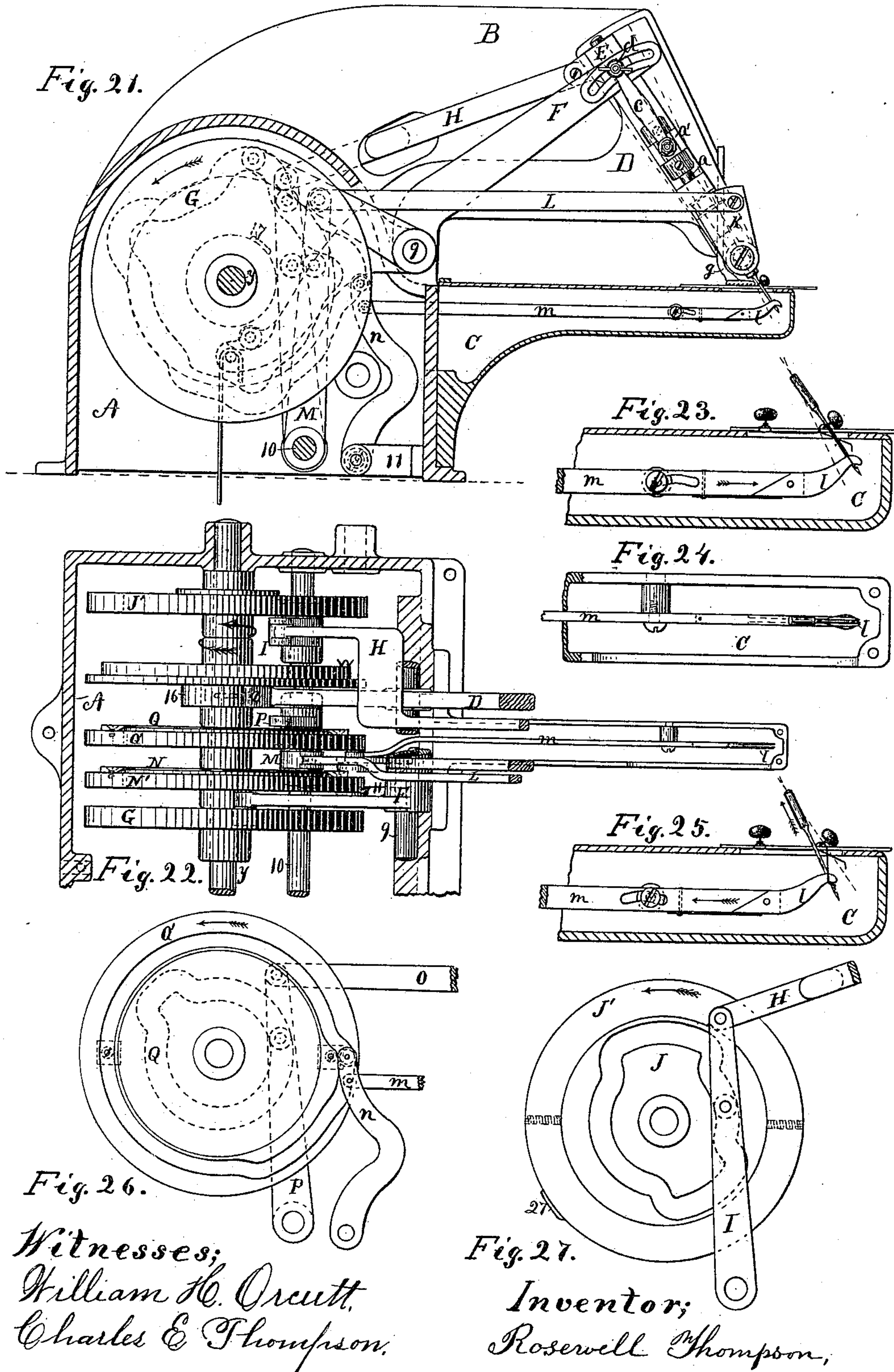
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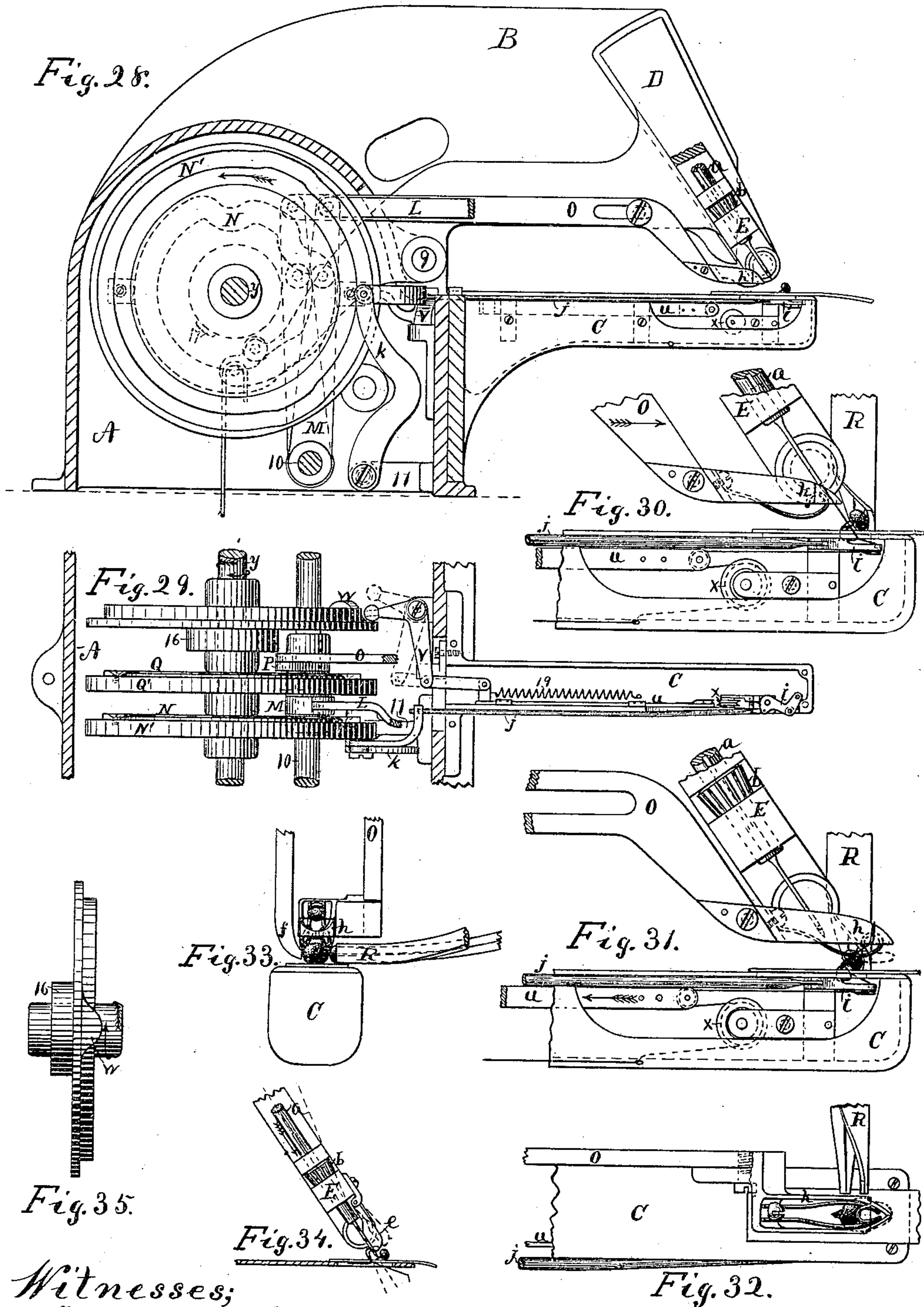
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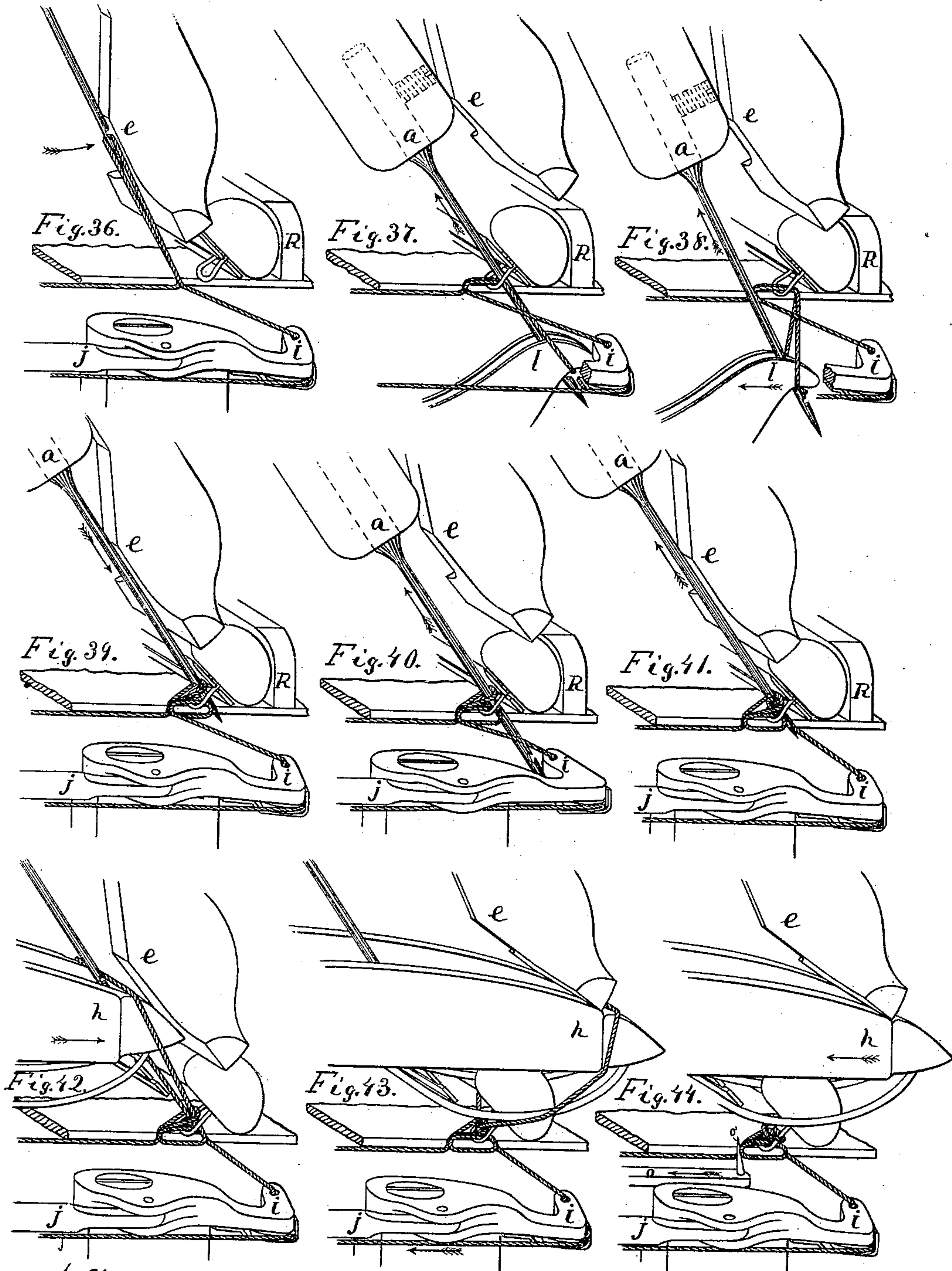
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Rosewell Thompson,

UNITED STATES PATENT OFFICE.

ROSEWELL THOMPSON, OF BRIDGEPORT, CONN., ASSIGNOR TO THE MORLEY
BUTTON SEWING MACHINE COMPANY, OF BOSTON, MASS.

MACHINE FOR SEWING SHANK-BUTTONS TO BOOTS, &c.

SPECIFICATION forming part of Letters Patent No. 353,609, dated November 30, 1886.

Application filed April 12, 1886. Serial No. 198,617. (No model.)

To all whom it may concern:

Be it known that I, ROSEWELL THOMPSON, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented an Improved Machine for Sewing Shank-Buttons to Boots, Shoes, and other Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification.

The object of my invention is to more closely and snugly secure shank-buttons to boots, shoes, and other fabrics than has heretofore been done by the use of a cord or thread, and at the same time produce a form of stitch which insures strength, durability, and neatness; and my improvement consists in causing a straight needle-bar to oscillate alternately between the angles of fifty-five degrees and sixty-two degrees (more or less) during the operation of sewing the button to the fabric, so that a straight needle secured to the lower end of said bar may pierce the goods at such an angle with respect to the face of the material to be sewed as to allow both the shank and body of a button to rest upon the fabric when presented to said needle during the entire process of forming a stitch through the eye of the same; also, in the manner of operating the devices for controlling the main and locking loops which compose the stitch, and in the arrangement of certain mechanism for feeding the goods after the stitch is completed, as will hereinafter appear.

In the accompanying drawings, Figure 1 is a perspective view of my improved machine, showing the top, left side, and front as it appears when secured to a bench for practical use. Fig. 2 is a perspective view of a strip of material on which a series of shank-buttons have been sewed and then bent C-shaped, so as to clearly show the appearance of the stitch made by this machine upon both sides of the fabric. Fig. 3 is a left-side elevation of the machine. Fig. 4 is a top view of the same. Fig. 5 is an enlarged left-side view of the front end of the projecting horn, showing some of the mechanism contained therein, together with presser-foot, needle, and extreme end of

button trough. Fig. 6 is an enlarged top view of front end of projecting horn with top plate and feed bar removed, so as to expose the internal mechanism. Fig. 7 is a right-side elevation of the machine, showing the construction and arrangement of the button-feeding mechanism. Fig. 8 is a front view of the machine, also showing button-feeding mechanism, but with needle-bar bearing certain levers and other operating devices removed. Figs. 9 and 10 are enlarged side and top views of a portion of the button-trough and all of the revolving button-table with hopper-bowl removed. Fig. 11 is an enlarged cross-section of the button-trough with shank-button in feeding position. Fig. 12 is an enlarged bottom view of the worm gear-wheel with ratchet and pawl, which revolve the button-shaft and table. Fig. 13 is a back view of the extreme end of the button trough, together with the lever which causes said trough to swing away from the button after the latter is secured in position by the thread. Fig. 14 is a bottom view of the machine, showing the positions of cams, driving-gears, levers, and other mechanism contained therein, and also the button-trough and other devices which operate in connection with the projecting horn. Fig. 15 is a cross-section of the body of the machine on line 1 1, Fig. 4, and a longitudinal section of the horn through the center, showing feeding mechanism and cam which operates the same. Fig. 16 is a top view of horn with top plate removed, and a sectional view of a portion of the lower half of the body of the machine, also showing feeding mechanism and operating-cams. Fig. 17 is an enlarged longitudinal section of front end of horn, showing feed-pin and some other devices more clearly than in Fig. 15. Fig. 18 is an enlarged cross section of horn just in front of the feed-pin and lifting rock-shaft, showing the manner of lifting said pin by the device on the end of the rock shaft. Figs. 19 and 20 are enlarged views of the device on the opposite end of the feed-pin lifting-shaft and portion of the cam which operates the same. Fig. 21 is a cross-section of the body of the machine on line 2 2, Fig. 4, and longitudinal section of horn through the center, showing the cam and lever which operate the needle-bar, lever, bar, and vibrating seg-

ment which turn the needle-bar and needle during the sewing operation, and main loop-controlling mechanism. Fig. 22 is a top view of horn with top plate removed and a portion of lower half of the body of the machine, showing certain cams and levers and main loop-controlling bar and hooks in center of horn. Fig. 23 is an enlarged longitudinal section of front end of horn, showing the main loop-controlling hooks just entering the loops each side of the needle. Fig. 24 is an enlarged top view of front end of horn with top plate removed, also showing main loop-controlling hooks just entering the loops each side of the needle. Fig. 25 is an enlarged longitudinal section of horn, showing main loop-controlling hooks drawing the main loop back against the needle just before the latter is raised. Fig. 26 is a view of the cams, levers, and portions of bars which operate the main loop-controlling hooks and locking-loop spreader. Fig. 27 is a view of the cam, lever, and portion of connecting-bar which oscillate the needle-bar bearings, and cam on periphery which swings button-trough away from button after the latter is secured in position by the thread. Fig. 28 is a sectional view of body of the machine on line 2 2, Fig. 4, showing the thread-controller cam, lever, and rod; cam, lever, and portion of bar which turn needle-bar and needle, locking-loop spreader and bar, needle-bar bearing-support, and portion of treadle-rod for lifting the latter. Fig. 29 is a top view of horn with top plate removed and a portion of lower half of body of machine, showing edge of cam for operating thread-controlling device, also rod and thread-controller, together with edge of take-up cam, take-up lever, and sliding bar, and cams and portions of bars for operating needle-turning segment and locking-loop spreader. Fig. 30 is an enlarged side view of the front end of horn, with tension-disks, take-up bar, and thread-controller inside, and with portion of needle-bar bearing, extreme end of button-trough, and point of locking-loop spreader just entering loop below the needle-eye above. Fig. 31 is a view of same mechanism as represented in Fig. 30, with the addition of the bevel-pinion on needle-bar and the locking-loop spreader passed through the loop and over the button. Fig. 32 is an enlarged top view of front end of horn, showing locking-loop spreader carried over the button and with the extreme end of button-trough away from button. Fig. 33 is an enlarged view of front end of horn, with locking-loop spreader passed over the button and button-stop in position, with extreme end of horn carried away from secured button. Fig. 34 is a side view of needle-bar bearings, showing thread-guard resting upon the needle to retain the thread in barb of same during its downward movement. Fig. 35 is an edge view of take-up cam and small cam for lifting needle-bearing support and presser-foot during the feeding of the fabric between the stitches. Figs. 36, 37, 38, 39, 40, 41, 42, 43, and 44 are enlarged perspective

views designed to illustrate and explain the relative positions of the needle, button, thread, loops, and certain working devices during the process of securing the button to the fabric. The sewing is represented as being done quite upon the edge of the material, in order to expose the under as well as the upper side of the side of the stitch.

Similar letters of reference indicate corresponding parts.

A is the body, B is the arm, and C is the horn, of the machine. D is the needle-bar bearing-support. E is the needle-bar bearing, pivoted to lower side of support. F is the needle-bar driving-lever. G is the needle-bar lever-cam. H is the needle-bar-bearing oscillating connecting-bar. I is the needle-bar-bearing oscillating lever, and J is the cam for operating the same. K is the needle-bar turning-segment. L is the connecting-bar. M is the lever, and N is the cam for operating the same. O is the locking-loop spreader-bar. P is the lever, and Q is the cam for operating the same. R is the button-trough. S is the bowl or hopper. T is the button-shaft. U is the button-shaft support or bearings. V is the button-table. W is the button-trough rock-shaft. X is the long button-trough swinging lever, and X' is the short or cam button-trough swinging lever. Y is the button-shaft worm-gear, and Z is the driving-worm.

a is the needle-bar, having a spline-groove near its lower end.

b is a bevel-pinion, supported between needle-bar bearings, and having a spline at its center to allow needle bar spline-groove and needle-bar to slide freely through the same.

a' is the needle-bar carrier, having a hole through it to allow the needle-bar to turn freely in the same, and retained in its proper position upon the needle-bar by means of collars each side, which are secured to said needle-bar.

c is the needle-bar connecting-rod.

d is an adjustable stud, which secures connecting-rod in such a position on the end of the needle-bar driving-lever as to give the required motion to the needle-bar.

e is the thread-guard, pivoted to the lower needle-bar bearing.

f is the button-stop, secured to lower needle-bar bearing.

g is the presser-foot, fitted to slide freely on the end of the arm of the machine, a slot being made through it where the fastening-screw passes, and is caused to rise and fall in unison with needle-bar bearing-support by means of a screw in the hub of the latter passing through a stud which extends from the sliding portion of said presser-foot, as shown in Figs 1 and 4.

h is the locking-loop spreader.

i is the thread-controlling device.

j is the thread-controlling rod. *k* and *N'* are the lever and cam for operating the same.

l is the double main-loop-controlling hook, the space between being about the amount of the diameter of the needle-blade.

m is the bar, and *n* and *Q'* are the lever and cam for operating the same.

o is the feed-bar, fitted to slide in a bearing on the lower surface of the horn-cover plate, the portion extending in front of said bearing being bent sufficiently to cause the point of the feed-pin *o'*, which is at the extreme end of the same, to remain below the top surface of said horn-cover plate when not in practical operation, as shown in Figs. 5 and 17 by broken lines, but so as to be raised to pierce the goods by means of certain devices, hereinafter shown and explained, as shown in Fig. 44, just before the feed motion takes place.

p is the feed-bar carrier.

q is the feed-carrier-supporting rod, on which said feed-carrier is fitted to slide.

r is the adjustable roller-block, fitted to slide on the top of the feed-carrier. *s* is the adjusting screw, for changing the relative position of said roller-block with respect to the carrier and driving cam *G'*, so as to make such distance between each stitch as is required.

t is the feed-point-lifting rock-shaft, upon the front end of which is a short lever for lifting the feed-pin. (Shown in Figs. 6, 17, and 18.) Upon the opposite end of said shaft is also a short lever, operated by the cam *Q'*, as shown in Figs. 19 and 20.

u is the take-up sliding bar.

v is the take-up lever, and *w* is the operating-cam.

x is the tension-disk.

y is the main driving-shaft, in body of machine, and *z* is the driving-pulley. The latter is secured to shaft 3, which extends quite through the body of the machine, and upon which is secured gear 4, which drives gear 5 upon the main shaft *y*, both gears being fitted to revolve just inside of the left wall of the body of the machine, as shown in Figs. 8 and 14.

Near the opposite or right-hand wall of the body of the machine is a train of gears, 6, 7, and 8, which drive the button-shaft worm *Z*. (Shown in Figs. 7 and 14.) Said worm is fitted to a hub extending from gear 8, the hub being fitted to revolve freely upon the right end of pivot-shaft 9. The lower or cross bearings of the button-shaft support are also fitted to said hub, but so as to allow the latter to turn freely in the same. Shaft 9 is the pivot for needle-bar bearing-support and needle-bar driving-lever. Shaft 10 is the pivot for levers *M*, *P*, and *I*, and is supported by right and left sides of body of machine.

11 is a bracket, upon which levers *k* and *n* are pivoted.

12 is a stud passing through an opening in the arm of the machine and entering and secured to the needle-bar bearing-support, so as to be in motion with the latter, the opposite end of said stud extending under the button-trough in such a manner as to allow the button-trough to rest upon it, and thus rise and fall with stud, needle-bar bearing-support, and other mechanism attached thereto.

At the bottom of the worm-gear *Y*, as shown in Fig. 12, is a ratchet, 13, pawl 14, and spring 15. The worm-gear is fitted to turn freely on the vertical button shaft; but the ratchet is secured rigidly to the same, so that by means of the pawl as an intermediate device said vertical shaft may be connected or disconnected with the worm-gear, as desired.

Upon the left-side hub of take-up cam *w* is an adjustable ring, 16, (shown in Figs. 22, 29, and 35,) which has upon it a small cam, 17, (shown in Figs. 21 and 28,) for the purpose of lifting the needle-bar bearing-support, presser-foot, and other devices attached to said support during the feeding of the goods.

The spiral spring 18 upon the feed-carrier supporting-rod, *q*, (shown in Figs. 14, 15, and 16,) is for the purpose of forcing the carrier and feed-bar back to starting position after the feed is completed, and spiral spring 19 (shown in Fig. 29) is for the purpose of drawing back the take-up mechanism after the operation of the same. The small cam 20 on periphery of ring *J'* (shown in Figs. 3, 7, and 27) is for the purpose of lifting the short lever *X'*, and consequently swinging the extreme end of button-trough away from button during the throwing of the locking-loop over the latter.

I will now describe the practical operation of this machine with reference to the accompanying drawings.

A quantity of shank-buttons is placed in the hopper-bowl, as shown in Fig. 1. Then a ball or spool of thread is placed in some convenient position near the machine and the end of the thread passed through the small wire staples near the base of the horn, and then through the small hole in the lower side of the horn near the center, as shown in Figs. 1 and 3. Then said thread is passed around the tension-disk and small roll at the extreme end of the take-up bar, and then around the small roll under the thread-controlling device and through the eye in the end of the same, as shown in Figs. 5, 6, 30, 31, and perspective figures, Sheet 7, a sufficient amount of thread being drawn through said eye to form the main loop, the needle and bar during this time being raised to their highest point and most vertical position, as shown in Figs. 1 and 15. Then the needle-bar bearing-support and presser-foot are raised by means of a treadle connected with the wire rod which hangs from the back end of said needle-bar bearing support, and a boot, shoe, or other fabric on which buttons are to be sewed is placed in a proper position under said presser-foot, power being now applied to the machine by causing the driving-pulley to revolve in the direction indicated by the arrow drawn upon the same. The needle will first pierce the goods outside and just back of the button-eye, as shown in Fig. 5, the buttons in the meantime passing down the inclined hopper-trough, as shown in Fig. 1, the first one reaching the extreme end of said trough and placed and retained in its proper position by means of the button-stop and spi-

ral form of the end of the trough, as shown in
 Figs. 1, 4, 5, 8, 13, and 33. The thread-con-
 troller will now cause the surplus thread to be
 thrown against the blade of the needle, as
 shown in Fig. 6, after which the needle will
 have an upward movement, causing the thread
 to fall into the barb of the same, which at this
 time is in a position to take it, said needle
 continuing its upward motion and drawing
 the main loop through the fabric until it
 reaches its highest point, as shown in Fig. 36,
 the eye of the thread-controller being in the
 meantime thrown back, as shown in Figs. 29
 and 36. While the needle is at its highest
 point, the upper end of the needle-bar bearing
 will be thrown back by the operating mech-
 anism, after which a downward movement of
 the needle-bar and needle takes place, the
 loop of thread being retained in the barb of
 the needle by means of the guard in the man-
 ner shown in Fig. 34. The needle now passes
 through the eye of the button and then through
 the fabric, carrying with it the loop of thread
 until it reaches its lowest point, as shown in
 Fig. 23, after which the main loop-controller
 hooks enter said loop by passing each side of
 the needle, as shown in Fig. 23, and are car-
 ried slightly forward, so as to remove the loop
 from the barb, as shown in Fig. 37. The nee-
 dle is now again raised to its highest point,
 without a thread in the barb of the same, when
 the upper end of the needle-bar bearing will
 be thrown forward by the operating mech-
 anism and the needle again forced through the
 fabric in its first place outside of the button-
 eye. The main loop-controller, which has re-
 tained the loop during the upward and down-
 ward motion of the needle, now draws said
 loop back against the needle-blade in the man-
 ner shown in Figs. 25 and 38, after which the
 needle is again raised, causing the loop to fall
 into the barb during its upward movement,
 the hooks in the meantime having a backward
 motion, as shown in Figs. 25 and 38 by ar-
 rows drawn upon the same. The upward move-
 ment of the needle carries the loop through
 the fabric, but only a sufficient distance above
 to allow the point of the needle to pass over
 the button-eye, after which another backward
 movement of the top end of the needle-bar
 bearing takes place, causing the needle to again
 swing over the eye of the button, carrying
 with it the short loop of thread it still retains
 in the barb. Now another downward motion
 is given to the needle, but only a sufficient
 amount to leave the barb and loop just above
 the button-eye, in which position a half-revo-
 lution is given to the needle and bar by means
 of the small pinion, vibrating segment, and
 other operating mechanism, leaving the loop
 and barb of the needle as represented in Fig.
 39, after which the downward motion is con-
 tinued, leaving the short loop around the
 blade of the needle, just above the button-eye.
 After the barb of the needle passes below the
 fabric the needle is turned back about one-
 third of a revolution, and so retained until it

reaches its lowest point, when the thread-con-
 trolling device again throws the thread against
 the needle in the manner shown in Fig. 40,
 after which the needle is again raised, caus-
 ing the thread to fall into the barb of the nee-
 dle during its upward movement, as before.
 This loop of thread is now drawn through the
 fabric; but when the barb is just above the
 material the needle is revolved back to its pre-
 vious position, so as to allow said barb to pass
 through the short loop while carrying the last
 loop of thread, as shown in Fig. 41. The up-
 ward motion of the needle and loop is con-
 tinued until they reach their highest point,
 during which time the needle is revolved back
 to its first position, so as to place the barb of
 the same directly in front and loop of thread
 crosswise the needle. In this position the
 point of the loop-spreader is forced into the
 loop by means of the operating mechanism in
 the manner shown in Fig. 30, and as the mo-
 tion is continued the loop is spread and car-
 ried out of the barb of the needle in the man-
 ner shown in Fig. 42, the needle during this
 time remaining at rest, and the extreme end
 of the button-trough moving away from the
 button sufficiently to allow the right curved
 wire under the spreader to pass between the
 secured and succeeding button, and by the end
 of the trough, as shown in Figs. 32, 33, and
 43, the motion of the spreader and wires being
 continued until they pass over the body of the
 button about in the position shown in Figs. 31,
 32, and 43, after which the take-up mech-
 anism draws the loop from the spreader until it
 closes around the shank of the button in the
 manner shown in Fig. 44, when the stitch is
 completed. At this stage the feed-pin is
 raised by the operating mechanism and enters
 the first hole made by the needle back of the
 button-eye in the manner shown in Fig. 44,
 after which the fabric and sewed button are
 moved back by the feed mechanism at such a
 distance as is required to place the succeeding
 button in its proper position upon the mate-
 rial, the end of the button-trough, loop-
 spreader, top end of needle-bar bearing, and all
 devices connected with the forming of the
 stitch being in the meantime brought into their
 proper positions for commencing work, when
 the sewing operation is repeated, as above
 described, until the required number of but-
 tons are secured to the boot, shoe, or other
 fabric.

In consequence of the inclination of the but-
 ton-shank while it is presented to the needle,
 the final or locking loop slides down said shank,
 when it is drawn by the take-up mechanism
 until it is limited in its progress by the main
 threads, thus presenting a snug and neat ap-
 pearance to the upper as well as the under
 side of the stitch. After the fabric is removed
 from the machine, the buttons may be raised to
 a vertical position by the fingers, or otherwise,
 as represented in Fig. 2.

I am aware that prior to my invention ma-
 chines have been made to attach shank-buttons

to fabrics by the use of a cord or thread, as well as by other means. I therefore do not claim such combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for sewing shank-buttons to fabrics, mechanism for successively presenting the buttons to the needle in such a manner as to cause both the body and shank of each button to rest upon the material during the formation of the stitch through the eye of the same, in combination with a fabric-supporting arm and an angular alternately-vibrating reciprocating needle-bar, all constructed and operating substantially as shown and described, for the object set forth.

2. The angular reciprocating needle-bar *a*, vibrated in such a manner as to cause the needle in the lower end to alternately pierce the fabric outside and inside of the inclined button-shank, in combination with the fabric-supporting arm and mechanism for turning the barb of the needle away from the end of the loops during the sewing operation, all constructed and operating substantially as shown and described, for the object set forth.

3. The double hooks *l*, for retaining and controlling the main loop after it is forced through the fabric by the needle, and mechanism for operating the same, in combination with the fabric-supporting arm and reciprocating and alternately-vibrating needle-bar, all constructed and operating substantially as shown and described, for the object set forth.

4. The oscillating needle-bar bearings *E*, pivoted at the lower end to the rising and falling needle-bar bearing-support, and mechanism for operating the same, in combination with the reciprocating needle-bar, button-feeding trough, and fabric supporting arm, all constructed and operating substantially as shown and described, for the object set forth.

5. The vibrating segmental gear *K*, for turning the needle-barb away from the ends of thread-loops, and mechanism for operating the same, in combination with the oscillating needle-bar bearings, reciprocating needle-bar, pinion, button-trough, and fabric-supporting arm, and pivoted at lower end in line with the fulcrum of the oscillating needle-bar bearings, all constructed and operating substantially as shown and described, for the object set forth.

6. The horizontally-reciprocating locking-loop spreader *h* and mechanism for operating the same, in combination with the angular reciprocating and vibrating needle-bar and needle, needle-bar bearing-support, button-trough, main loop-controlling-hooks, and fabric-supporting arm, constructed and moved in such a manner as to remove the loop of thread from the barb of the needle after it has entered said loop and then carry the loop over the body of the button sufficiently far to cause the loop to pass below the center of the same when drawn off the point of the spreader by the take-up mechanism, substantially as shown and described, for the object set forth.

7. The thread-guard *e*, in combination with the angular alternately vibrating and reciprocating needle-bar and needle, needle-bar bearings, button-feeding mechanism, main loop-controller, and fabric-supporting arm, and constructed in its body and pivoted at its upper end to the lower needle-bar bearing in such a manner as to cause the back edge of the same to rest upon the inclined needle during its vibratory motion by force of gravity, and thus by its own weight retain the loop of thread in the barb of said needle while the latter is changing from an upward to a downward movement, substantially as shown and described, for the object set forth.

8. The feed-pin *o'* and the sliding elastic feed-bar *o*, in combination with the operating mechanism, fabric-supporting arm, and sewing and loop and thread controlling devices, constructed and arranged to operate in such a manner as to cause said pin to enter the first hole made in the material by the needle during the sewing operation after the stitch is completed and then move the fabric back a sufficient distance to place the succeeding button in its proper position to be sewed, as described, for the object set forth.

9. The feed-carrier *p*, adjustable roller-block *r*, feed-carrier supporting-rod *q*, and adjusting-screw *s*, in combination with the feed-cam *G'*, feed-point-lifting rock-shaft *t*, feed-bar *o*, pin *o'*, fabric-supporting arm, and button-sewing mechanism, all constructed and arranged to operate substantially as shown and described, for the object set forth.

10. The rock-shaft *t*, in combination with the elastic feed-bar *o*, pin *o'*, cam *Q'*, fabric-supporting arm, and button-sewing and fabric-feeding mechanism constructed and arranged to lift the extreme front end of the feed-bar and force and retain the feed-pin in the fabric during the feeding operation, as shown and described, for the object set forth.

11. The stud *12*, in combination with the needle-bar bearing-support *D*, button-trough *R*, needle-bar *a*, and other sewing mechanism inserted at one end into the right side of said support, the opposite end extending under the button-trough in such a manner as to allow the latter to rest upon and rise and fall with it, and thus cause the extreme end of the button-trough to move in unison with the presser-foot, and other devices attached to the front end of the needle-bar bearing-support, as shown and described, for the object set forth.

12. The needle-bar lever *F*, in combination with the cam *G*, connecting-bar *c*, oscillating and reciprocating needle-bar *a*, and other sewing mechanism, constructed and arranged to be pivoted on same shaft with the needle-bar bearing-support and having an arm extending back to be operated by the cam *G*, and the front end, which operates the needle-bar, having a curved slot, the center of which is the arc of a circle, the radius of which is equal to the distance of the connecting-rod *c* between

centers, said arc of a circle being described when the needle-bar and connecting-rod are at their lowest point, so that the top end of the connecting-rod may be moved and secured in
 5 such a position on the lever as will give the required upward stroke to the needle-barb and length of loop drawn up by the same, without affecting or changing the relative position of said barb with respect to the thread and loop
 10 controllers when it is at its lowest point in the fabric-supporting arm, and operating as shown and described, for the object set forth.

13. The upright button-shaft and button-trough support U, in combination with the
 15 button-trough R, hopper-bowl S, needle-bar bearing-support D, gearing 6, 7, 8, and Y, and worm Z, constructed and arranged to receive the vertical shaft T, and having horizontal bearings at the lower end to receive the hub of
 20 gear 8, with sufficient space between said bearings to receive the worm Z, which is secured to the hub of gear 8, said hub being pivoted to and revolving concentric with the same shaft on which the needle-bar bearing-support and
 25 needle-bar lever are pivoted, so that the upright support U may act in unison with said devices, and the horizontal bearings be a pivotal point for the hopper-trough, as shown and described, for the object set forth.

30 14. The combination of the loop-controller *i*, connecting-rod *j*, lever *k*, ring-cam N', secured to periphery of the needle-bar turning-lever N, fabric-supporting arm C, and take-up

mechanism, all constructed and arranged to control the thread before it is formed into
 35 loops and stitches, substantially as shown and described, for the object set forth.

15. The combination of the sliding bar *u*, tension-disk *x*, lever *v*, cam *w*, fabric-supporting arm C, and thread-controller *i*, all constructed
 40 and arranged to take up the final or locking loop to complete the stitch before the operation of the fabric-feeding mechanism, substantially as shown and described, for the object set forth.

16. The combination of the button-table V, hopper-bowl S, button-trough R, vertical shaft T, worm-gear Y, ratchet-wheel 13, pawl 14, spring 15, and revolving worm Z, all constructed
 50 and arranged substantially as shown and described, the worm-gear Y being fitted to revolve freely on vertical button-shaft, and the ratchet-wheel 13, secured to said shaft, so that the pawl 14, having a thumb-piece on opposite side of turning center, may be conveniently used as an intermediate device to connect or disconnect the vertical shaft and button-table attached thereto with the revolving worm-gear Y in regulating the supply of buttons to the end of button-trough, for the object
 60 set forth.

ROSEWELL THOMPSON.

Witnesses:

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 T. M. PALMER, Jr.