

J. P. WEIS.  
PULL-OFF MECHANISM FOR SEWING MACHINES.  
APPLICATION FILED AUG. 24, 1905.

990,412.

Patented Apr. 25, 1911.

5 SHEETS—SHEET 1.

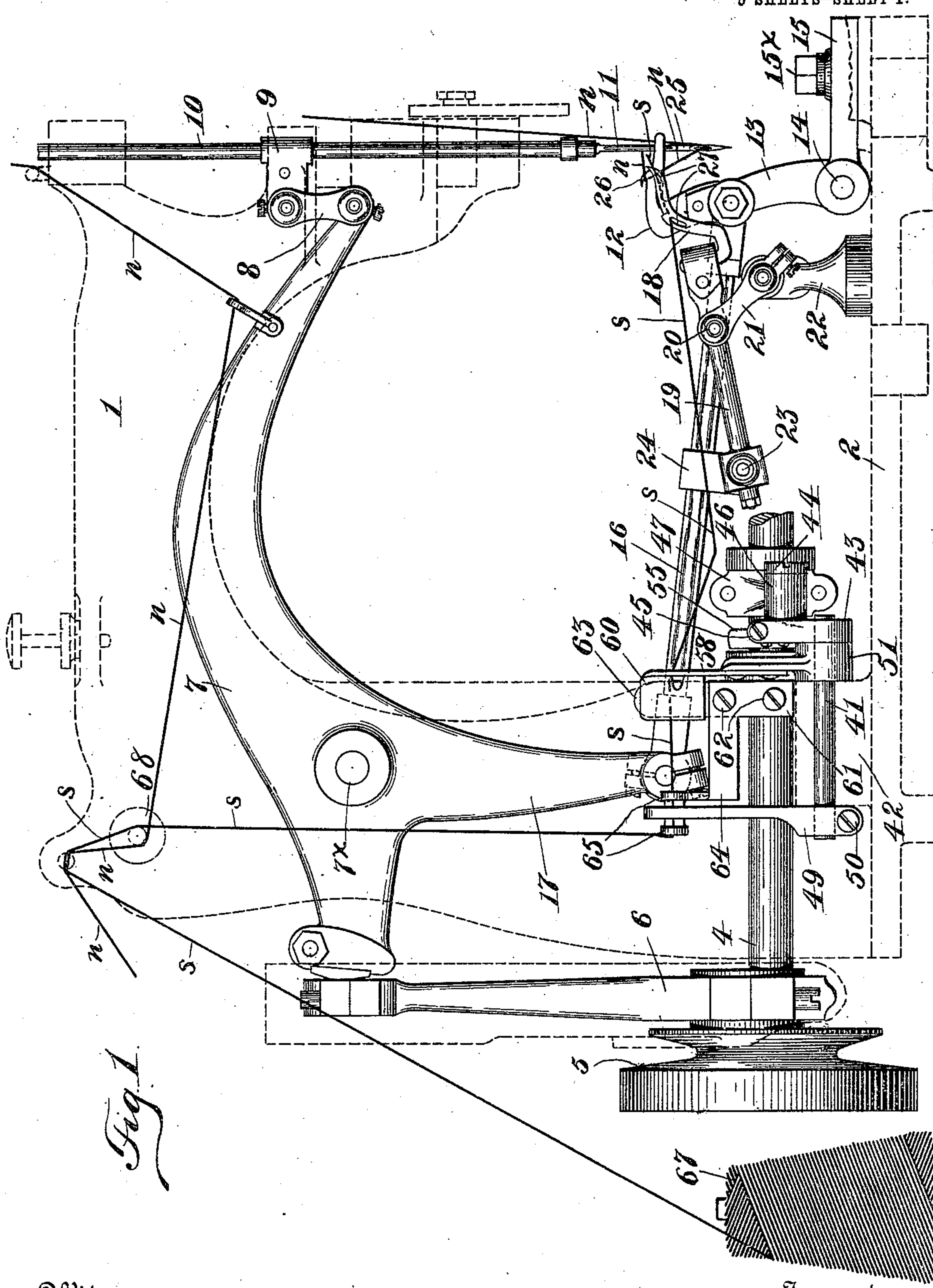


Fig. 1.

Witnesses  
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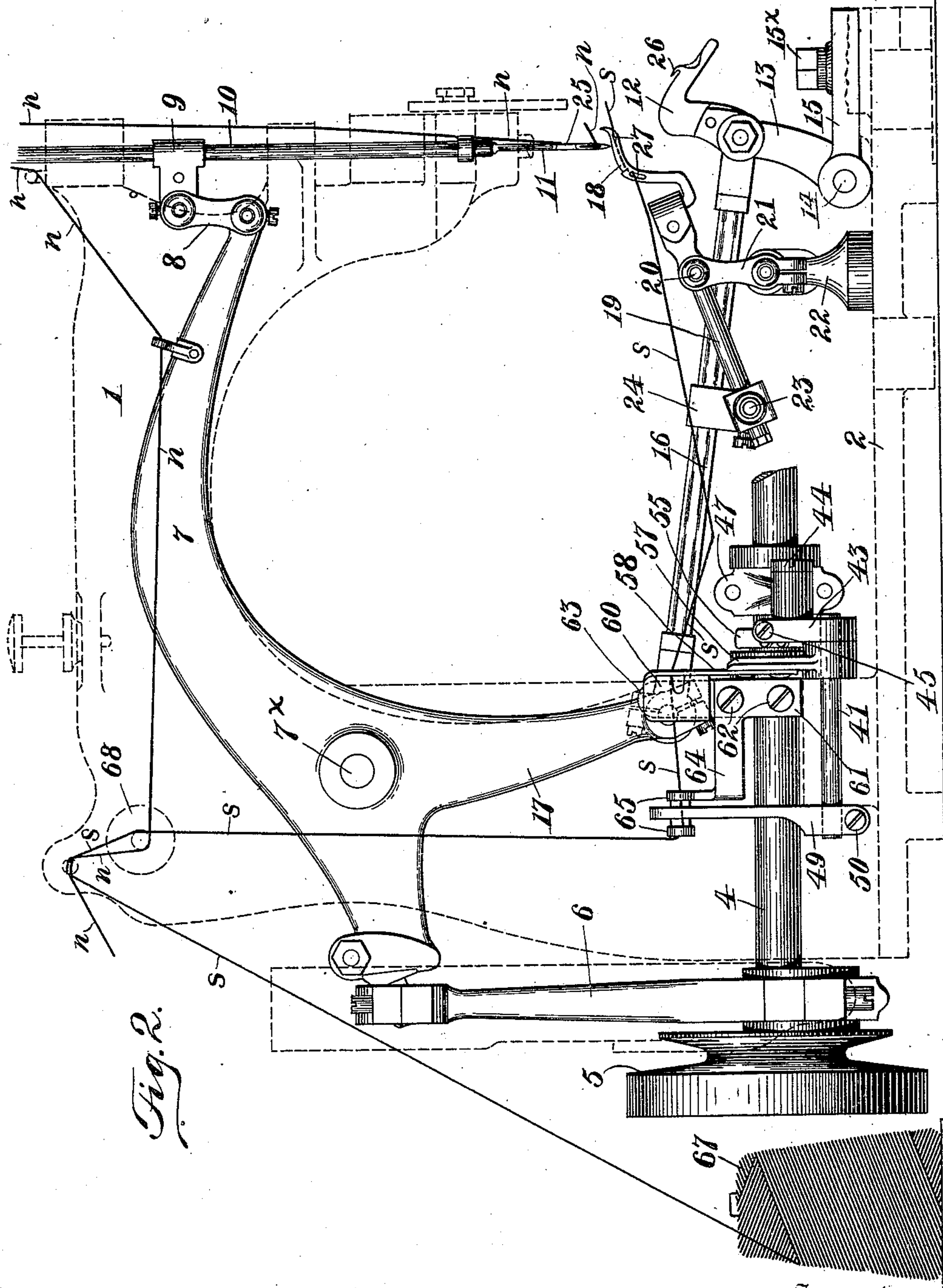


Fig. 2.

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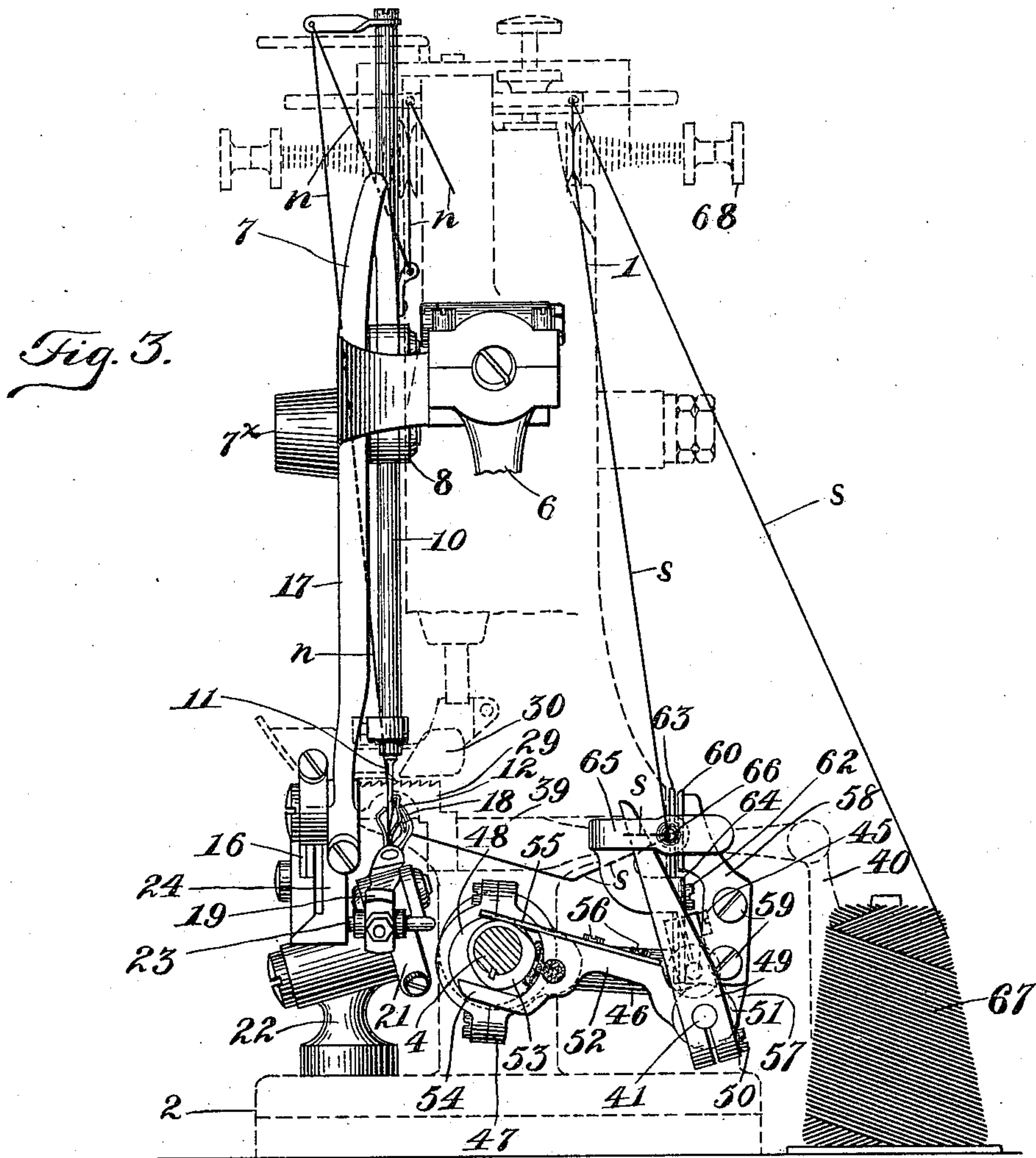


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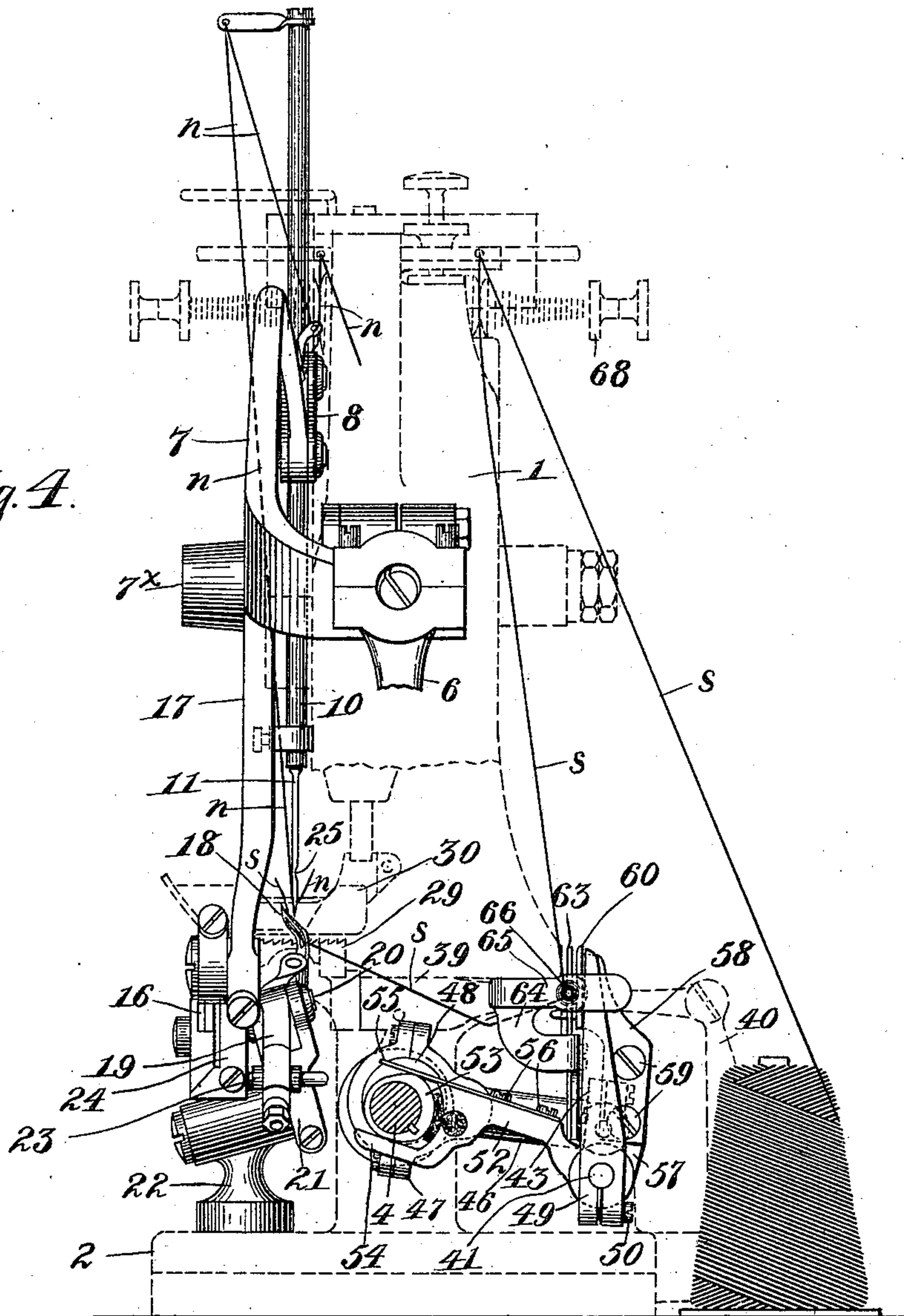
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5 SHEETS—SHEET 4.

Fig. 4.



Witnesses  
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M. Herskowitz

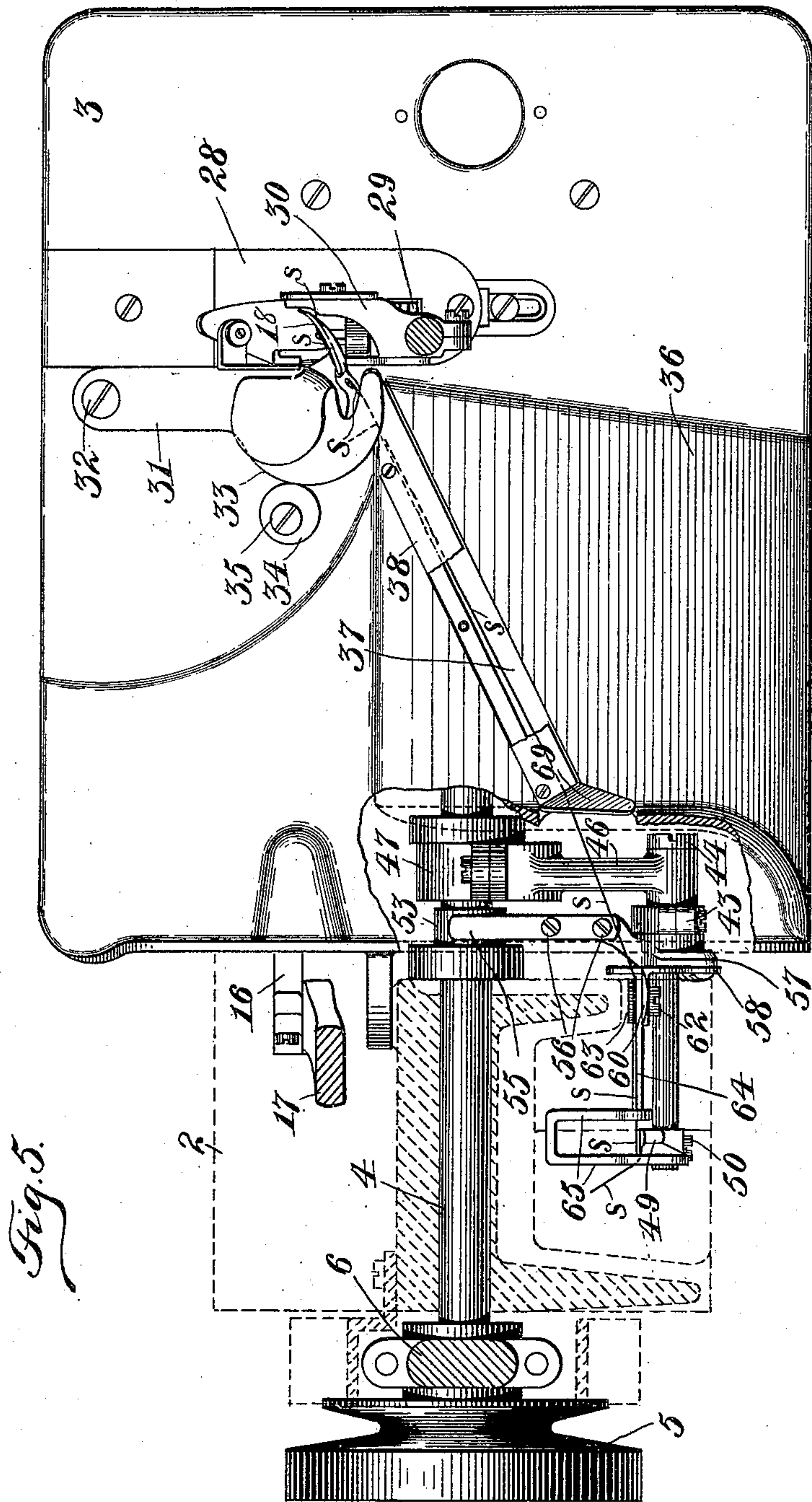
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5 SHEETS—SHEET 5.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN P. WEIS, OF NYACK, NEW YORK, ASSIGNOR TO METROPOLITAN SEWING MACHINE COMPANY, OF NYACK, NEW YORK, A CORPORATION OF NEW YORK.

## PULL-OFF MECHANISM FOR SEWING-MACHINES.

990,412.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed August 24, 1905. Serial No. 275,525.

*To all whom it may concern:*

Be it known that I, JOHN P. WEIS, a citizen of the United States, residing in Nyack, county of Rockland, and State of New York, have invented a new and useful Improvement in Pull-Off Mechanism for Sewing-Machines, of which the following is a description.

This invention relates to pull-off mechanism for sewing machines and has special reference to mechanisms of the character stated for operating upon or manipulating the lower thread of a stitch-forming organization.

Among the objects of this invention may be noted the following: to provide a pull-off mechanism which will control the lower thread during the movement of the element below the cloth-plate which carries the same; to provide a mechanism by means of which a grip may be applied to the lower thread periodically for coöperation with the pull-off in pulling thread from the supply; to provide a mechanism by means of which the requisite amount of thread may be pulled from the supply without affecting that portion of the thread extending from the pull-off to the stitching point; to provide a mechanism by means of which a definite supply of thread may be measured off and delivered for entering into the stitch to be formed; to provide an automatic means by which a lower thread may be controlled in its supply during the stitch-forming operation; and to provide a mechanism which will prevent the formation of any slack in the stitch beyond what is required for the exigencies of the latter.

With the above objects in view, and others which will be set forth during this description, this invention consists in the parts, features, combinations of elements and co-operating mechanisms hereinafter described and claimed.

In the drawings forming part of this description: Figure 1 is a side elevation of so much of a sewing machine as is deemed necessary to illustrate the invention, the frame of the machine being shown in dotted lines, the feed eliminated and the stitch-forming elements being shown in one extreme position, viz., that marked by the extreme descent of the needle; Fig. 2 is a view similar to Fig. 1, but showing the parts in another extreme position, viz., that marked by the

extreme rise of the needle; Fig. 3 is a rear end elevation showing the parts in the position of Fig. 1, this view also showing portions of the feed and presser-foot mechanisms in dotted lines; Fig. 4 is a view similar end elevation showing the parts in the position of Fig. 2; and Fig. 5 is a top plan view showing the cloth-plate of the machine, but with the parts above the cloth-plate removed and said cloth-plate being broken away in order to show in top plan the pull-off mechanism.

Primarily, it should be understood that the pull-off mechanism comprehends a device for positively gripping the thread, a device for positively acting upon the thread while gripped to pull the same from the supply in measured quantity for the succeeding stitch, and suitable guides for leading and directing the thread so that the clamp and the pull-off may properly act thereon. It should also be understood that this pull-off mechanism may operate upon a lower looper-thread or a thread for a spreader which usually operates below the cloth-plate and that, irrespective of which implement manipulates the thread, the function of the pull-off mechanism will be substantially or identically the same. Furthermore, it is to be understood that although, in this application, the pull-off mechanism is shown in coöperation with an overedge stitching mechanism, it is not restricted thereto, being, on the contrary, operative for all its purposes and functions, and substantially without modification, in connection with a "straight-away" stitching mechanism.

Referring to the drawings, the numeral 1 indicates generally the frame of the machine above the bed-plate 2, the cloth-plate 3 being shown only in Fig. 5 in order that confusion may not result in comprehending the operation of the machine. The driving-shaft is indicated by 4, and is driven in usual manner by a belt coöperating with the pulley 5. An eccentric on the driving-shaft actuates the strap 6, which in turn drives the needle-lever 7, fulcrumed at 7<sup>x</sup> to the frame 1, the forward end of said lever being connected by a link 8 and clamp 9 with the needle-bar 10, the latter reciprocating in bearings in the head of the frame, as usual, and carrying at its lower end the eye-pointed needle 11. In this instance of



an overedge stitching machine, the looper 12 is actuated by the carrier 13, fulcrumed at 14 to the adjustable bracket 15 secured to the bed-plate 2, by screw-bolt 15\*, the carrier 13 being actuated by the rod 16, pivoted at its forward end to said carrier and at its rear end to the depending-arm 17 of the lever 7. The spreader 18, which co-operates with both the looper and the needle, is held by the forward end of the carrier 19, pivoted at 20 to the link 21, in turn pivoted to the bracket 22 also adjustable on the bed-plate 2, in any approved manner, the carrier 19 being connected by a sliding-pin 23 and clamp 24 with the looper-rod 16. The two brackets 15 and 22 have not been shown in detail, as to their adjustment upon the bed-plate 2, for the reason that the invention comprehended in this application has no reference to such construction. In this instance of the stitch-forming mechanism the needle is provided with a scarf or slight depression 25, over which the thread extends to its eye, while the looper is provided with a rearwardly pointing hook 26, vertically off-set from the body of the looper, the latter carrying no thread. The spreader is eyed at 27 for carrying a thread and it is upon such thread that the pull-off mechanism is specially designed to operate in this particular instance or illustration of the invention.

Viewing Fig. 5, the cloth-plate is shown as provided with a throat-plate 28, through which operates the feed-dog 29 and with which latter the presser-foot 30 coöperates. The cloth-plate is provided with an opening covered by the guard-plate 31, pivoted at 32, and provided with the head 33 held in operative position by the rotatable cam 34, pivoted to the cloth-plate at 35. The head 33, extends over the opening in the cloth-plate through which the spreader projects in carrying the needle-thread from the looper across the edge of the work, and the movement of the spreader is such as to require but a small opening in either the cloth-plate or guard-plate 31 for its free passage. The cloth-plate is provided with the rear chute-portion or incline 36 down which the edge of the work travels after being trimmed preparatory to overstitching, and the chute-portion of the cloth-plate is provided with the slot or opening 37 covered by the thread-guard 38, the edge of the guard terminating slightly short of the slot 37 along its length. In Figs. 3 and 4 the feed-bar 39 is shown in dotted lines, carrying the dog 29, and only the upper end of the rocker 40, which actuates said bar, is illustrated.

The pull-off mechanism consists of the rock-shaft 41, journaled in the extensive bearing 42, connected to the bed-plate 2, and having at its front end the crank-arm 43, which may be keyed, splined or sweated on

said shaft 41. The arm 43 is formed at its upper end into a clamp which holds a crank-pin 44, clamped therein by means of the screw 45, said crank-pin having sleeved thereon one end of the pitman 46, the strap-end 47 of which surrounds the eccentric 48, suitably secured to the driving-shaft 4. These devices result in rocking the shaft 41, on the outer end of which is adjustably clamped the pull-off arm 49, by means of the split-end and screw 50, said arm extending vertically into position to engage the thread, guided as presently described. Also suitably secured to the rock-shaft 41, between the crank-arm 43 and the bearing 42, is the bell-crank 51, one arm 52 of which is extended beside the strap 46 and formed so as to embrace the cam 53 on the driving-shaft 4, the preferred construction being an integral arm 54 having an opposing and co-operating flexible plate or arm 55 secured by screws 56 to the arm 52. The other arm 57 of the bell-crank is extended vertically from the rock-shaft 41 and has secured thereto a plate 58, by means of screws 59, see Figs. 3 and 4, said plate being formed at its upper end into the broad, flat clamping-member 60. Secured to the frame of the machine, just above the rock-shaft 41, is the angular plate 61, the same being secured in place by means of the clamping-screws 62, said plate having the vertical extension 63 which lies substantially flat against the frame of the machine and constitutes the opposing clamping-member, of the thread-clamp or grip, complementary to the clamping-member 60. The plate 61 is also provided with the horizontal arm 64, extended vertically at its end and formed into the guide-bars 65, between which operates the pull-off arm 49. The guide-bars 65 are provided with thread-guiding apertures 66, through which the thread runs so as to extend between the two guide-bars 65. The form of the cam 53 is such as to carry the clamp-plate 60 either into actual contact with the opposing clamp-plate 63, or so close thereto as to put upon the thread the required amount of grip for the purpose of preventing the pull-off arm 49 drawing thread from the stitching point, and maintaining such position of the clamping-plate 60 positively for a definite period and then to abruptly move said clamping-plate away from the plate 63 to quickly and wholly release the thread for free passage between the plates. No stress is here laid upon the particular form of the cam shown, as the same may be varied to a considerable extent within the scope of this invention, it being only necessary to bear in mind that the cam should be of such form as to produce a positive grip of the clamping-plates 60-63 upon the thread quickly and continuously for a definite period and then quickly and wholly



release the same, as will be readily understood.

The cop of thread 67 may be disposed at any suitable point on the table, bench, or  
5 other support for the machine, and the thread *s*, therefrom is led through guides, subjected to tension, for example, at 68 and then is led down to and through the guide-eyes 66 of the pull-off mechanism, and thence  
10 between the clamping-plates 60—63, and then under the tongue 69 of the plate 38, and slid along under said plate to the spreader, which latter is then threaded by passing the thread through the eyes 27 in  
15 the heel and toe thereof. It will thus be seen that the machine is easily threaded and without inconvenience, or removing the parts of the machine. Viewing the several figures it will be seen that the thread *s* passes  
20 behind the pull-off arm 49 across the space between the guide-bars 65. The needle-thread is indicated by *n* and is carried through the usual guides and tension to the needle, as shown in the several figures.

25 Having thus described the details of my invention, the operation thereof will be understood as follows: The machine being threaded as just described and power being applied to the driving-shaft 4, the needle  
30 descends, and while descending the hook 26 takes the thread from said needle by engaging it at the scarf 25, the needle, looper and spreader then assuming the extreme positions of Figs. 1 and 3, the looper and spreader be-  
35 ing at their extreme of backward movement and the needle at its extreme of downward movement. During this operation the cam 53 has actuated the bell-crank by depressing the arm 52 thereof and moving the arm 58  
40 so as to bring the clamping-plate 60 close to, or into engagement with, the clamping-plate 63, so as to firmly grip the thread passing between the two plates. As this is accomplished, the pull-off arm 49 engages the  
45 thread *s*, extending between the two guide-bars 65 and draws the same in loop form,—see Fig. 3,—pulling a supply from the cop 67 sufficient for the overedge stitch about to be formed. As the spreader rises to lift  
50 the needle-loop from the hook 26 of the looper and carry said loop forward and across the edge of the work, the cam 53 actuates the bell-crank by lifting the arm 52 and moving the arm 58, with its clamping-  
55 plate 60, away from the clamping-plate 63, thus releasing the thread and permitting it to be supplied to the spreader, or permitting the spreader to have freedom of action for drawing its thread forward for entering into  
60 the stitch to be formed. It will thus be understood that, as the spreader moves rearwardly, the thread is gripped and a supply is pulled from the cop, and as the spreader moves forward the thread is released by the  
65 grip so that the supply pulled off may be

utilized by the spreader and incorporated in the stitch being made. It will also be understood that, by providing means for adjusting the arm 49 on its rock-shaft 41, and by changing the character of the cam 53  
70 which actuates the clamping-arm 58, the amount of thread drawn by the arm 49 can be regulated, as well as the duration of the grip or clamping action of the arm 58. Thus, a regulated amount of supply can be drawn  
75 during a regulated period, hence controlling the amount of lower or spreader thread which will enter into the stitch about to be formed and also regulating and controlling the character and disposition of the over-  
80 seam stitch.

Among the advantages of this invention may be noted the following: A positive grip is applied to the lower thread to hold the  
85 same while a measured quantity is being drawn from the supply for the next stitch; the lower thread is positively and firmly gripped to prevent supply to the lower thread-manipulating device during the back-  
90 ward movement of the latter, thus preventing entanglement of the thread and an excess of the latter at the stitching point; the mechanism for actuating the grip is easy and steady in operation and positive and certain  
95 in its function; the thread is pulled from the supply and allowed to run to the stitching point at the proper time in the stitch formation; the pull-off is adjustable on its rock-shaft so as to regulate and time the action of  
100 the same according to the stitch-forming mechanism with which it is coöperating, or other requirements; the pull-off arm is adjustable upon its rock-shaft for the purpose of regulating the amount of thread which  
105 may be drawn from the supply and which may be necessary to a given character of stitch and in accordance with the character of the stitch-forming mechanism with which the pull-off mechanism is combined; the  
110 clamp is so constructed as to impose upon the thread a positive and firm grip along quite a length of the thread instead of imposing thereon a pinching or gripping action at a single point in the length of the thread. By  
115 regulating the gripping and drawing action of the pull-off mechanism upon the thread, perfect control of the lower, or spreader, thread is had, thus enabling the character and disposition of the overedge stitching to be regulated, controlled and determined according  
120 to desire. The time and duration of the gripping and drawing action and the amount of thread drawn, obviously, in great measure control and modify such character and disposition of the overseam stitching. The  
125 parts are so constructed as to require very short movements to accomplish the necessary functions, thus enabling high speed to be attained without vibration or noise; the parts are so located,—at the rear side and  
130



end of the machine,—as to be easy of access for cleaning, repair or adjustment and be out of the way of the actuating mechanism or the stitch-forming elements; and  
 5 the parts are so constructed as to enable the pull-off mechanism to be adjusted for the control of the thread of either a looper, a spreader, or other lower complemental stitch-forming elements.

10 Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A pull-off mechanism for sewing machines comprising a driving-shaft, a rock-  
 15 shaft, a thread-clamping arm and a thread-drawing arm both carried by said rock-shaft, means for fixing one of said arms to said shaft at one end thereof, means for loosely supporting the other arm on said  
 20 shaft, devices coöperating with said clamping arm and with said drawing arm for enabling the two to perform their respective functions, and means for actuating the rock-shaft and the loosely supported arm from  
 25 the driving-shaft.

2. A pull-off mechanism for sewing machines comprising a driving-shaft, a rock-  
 shaft, a thread-clamping arm supported by said rock-shaft, a thread-drawing arm fixed  
 30 to said rock-shaft, devices coöperating with said two arms for enabling them to perform their respective functions, means whereby the thread-drawing arm may be adjusted upon the rock-shaft for the pur-  
 35 pose of regulating the amount of thread drawn from the supply, means for actuating the rock-shaft from the driving-shaft, and means for actuating the thread-clamping arm.

40 3. A pull-off mechanism for sewing machines comprising a driving-shaft, a rock-shaft, a thread-clamping arm loosely supported by said rock-shaft, a thread-drawing arm fixed to said rock-shaft, an eccentric  
 45 on the driving-shaft, a pitman connecting said eccentric with the rock-shaft for actuating the latter, means for actuating the said thread-clamping arm, independently of the thread-drawing arm and devices co-

operating respectively with the thread- 50 clamping-arm and the drawing-arm for enabling the latter to secure their functions.

4. A pull-off mechanism for sewing machines comprising a driving-shaft and a 55 rock-shaft disposed in parallelism, an eccentric on the driving-shaft, a crank-arm on the rock-shaft, an eccentric strap connecting the eccentric with the crank-arm, a thread-clamping arm supported by said 60 rock-shaft, a thread-drawing arm fixed to said rock-shaft, means for actuating the thread-clamping arm, and devices coöperating with the two said arms for enabling them to secure their respective functions. 65

5. A pull-off mechanism for sewing machines comprising a driving-shaft, a rock-  
 shaft, a thread-drawing arm secured to the rock-shaft at one end of the latter, a thread-  
 clamping arm journaled upon the rock-shaft 70 at the other end of the latter, means for actuating the rock-shaft to give motion to the thread-drawing arm, means for actuating the thread-clamping arm to give motion to the latter, and devices coöperating with the 75 clamping-arm and the drawing-arm for enabling said two arms to perform their functions.

6. A pull-off mechanism comprising a driving-shaft, a rock-shaft, means connect- 80 ing the rock-shaft with the driving-shaft for actuating the former, an arm carried by the rock-shaft for drawing thread from the supply, a thread-clamping arm journaled upon the rock-shaft, means connecting the 85 driving-shaft with the clamping-arm for actuating the latter, and devices coöperating with the clamping-arm and the drawing-arm for enabling said two arms to perform their functions. 90

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN P. WEIS.

Witnesses:

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 W. J. REED.