

(No Model.)

4 Sheets—Sheet 1.

S. W. WARDWELL, Jr.
MECHANISM FOR WINDING THREAD.

No. 598,587.

Patented Feb. 8, 1898.

Fig. 1.

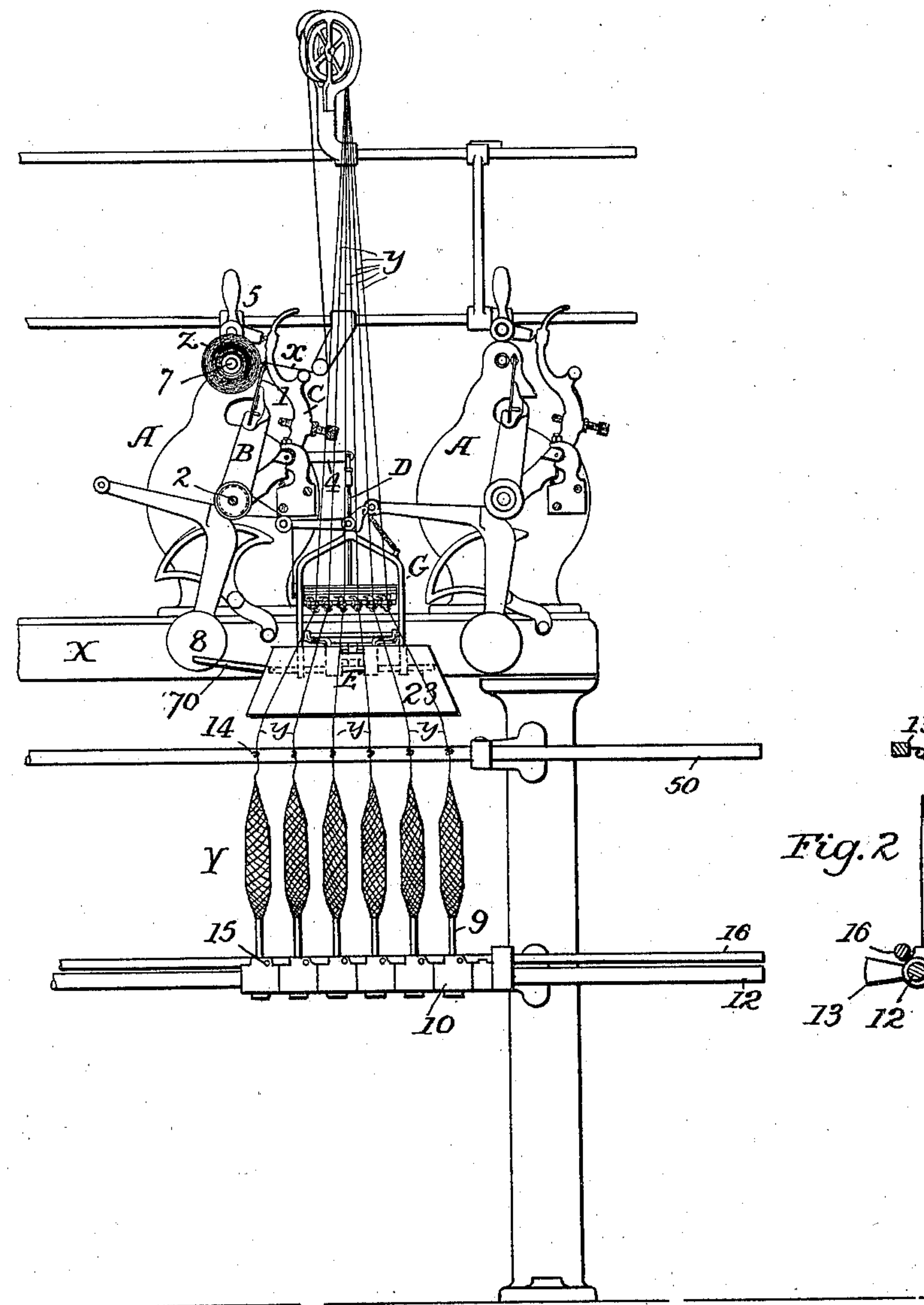
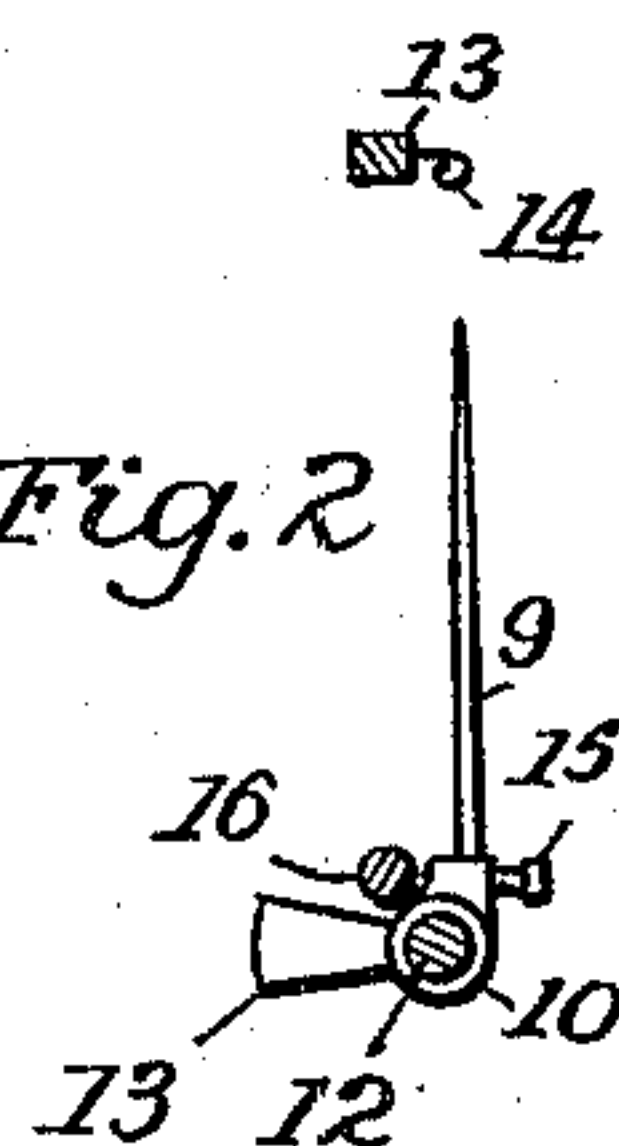


Fig. 2.



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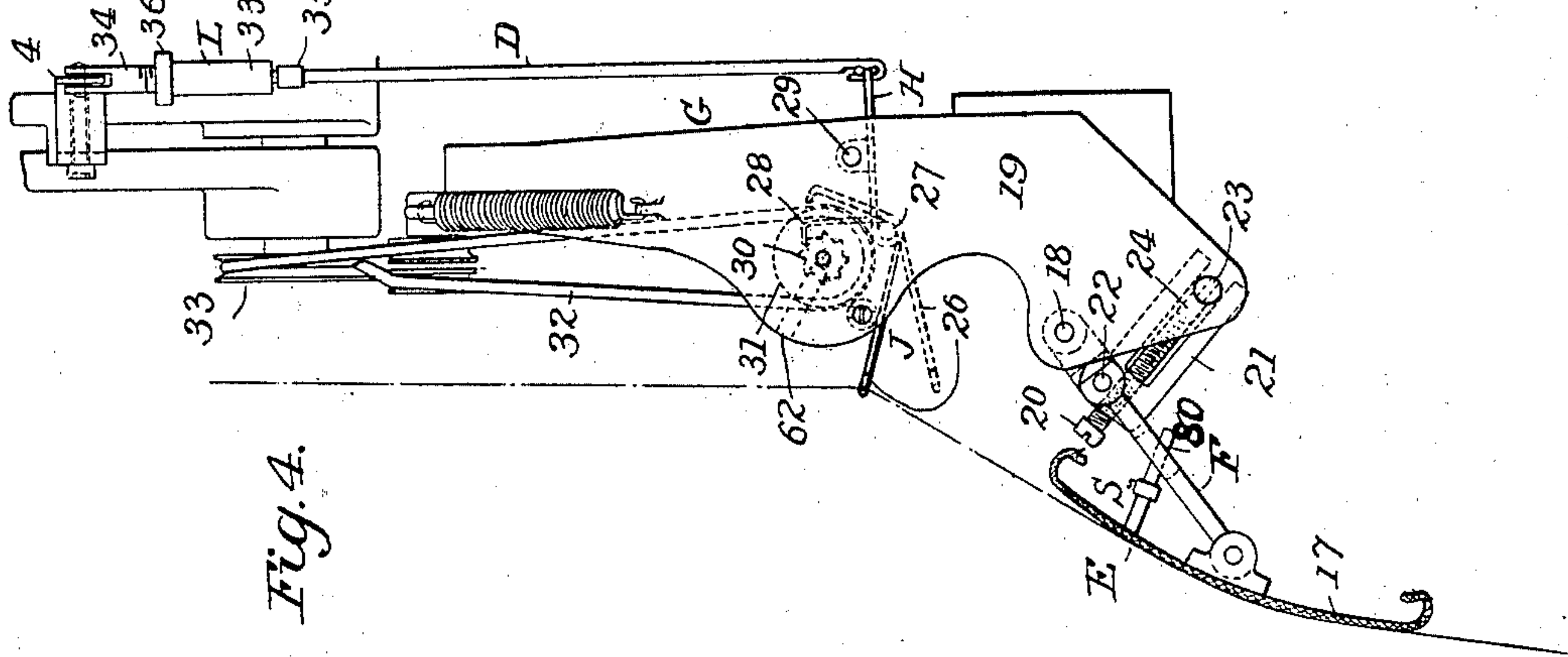


Fig. 4.

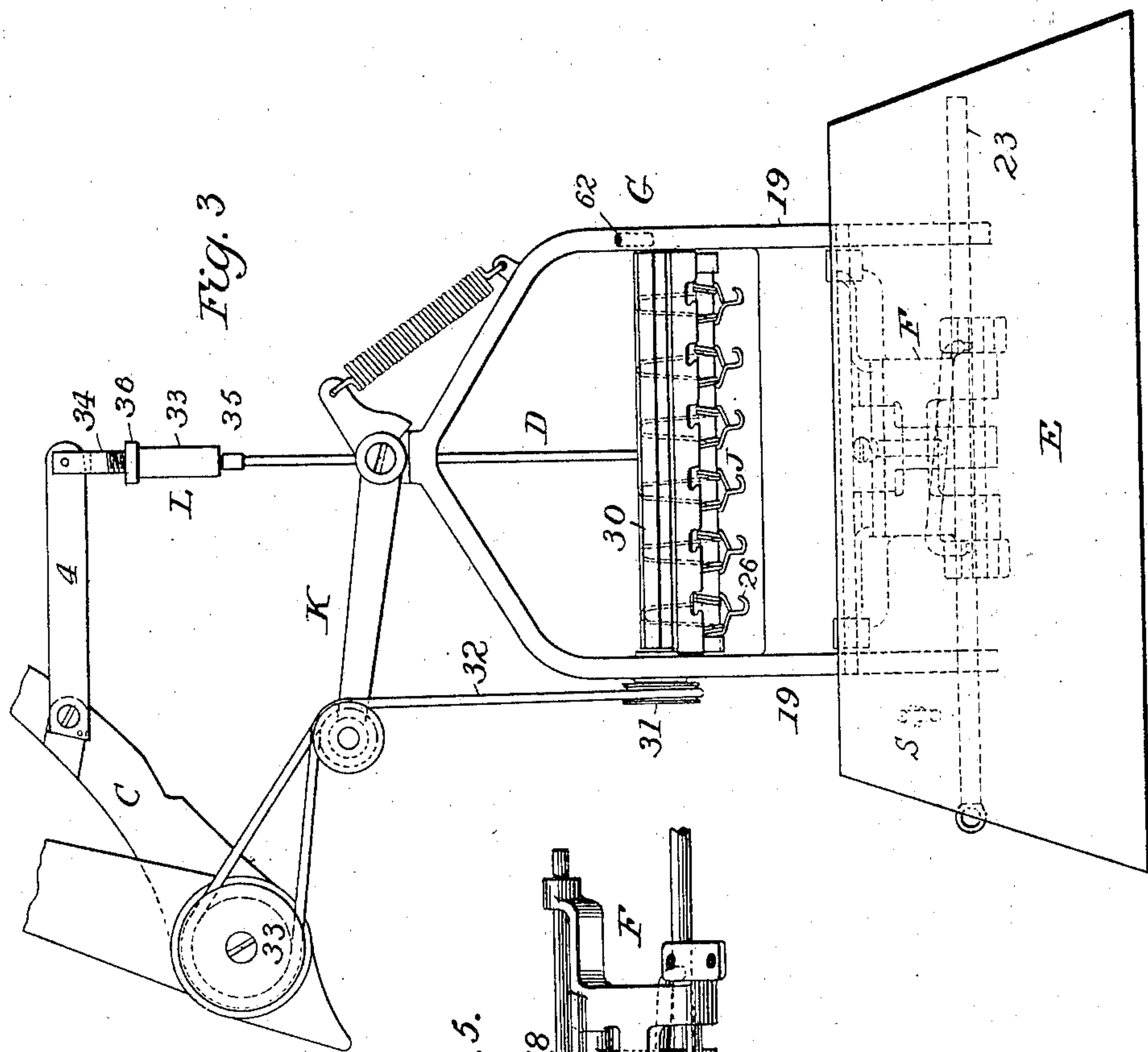
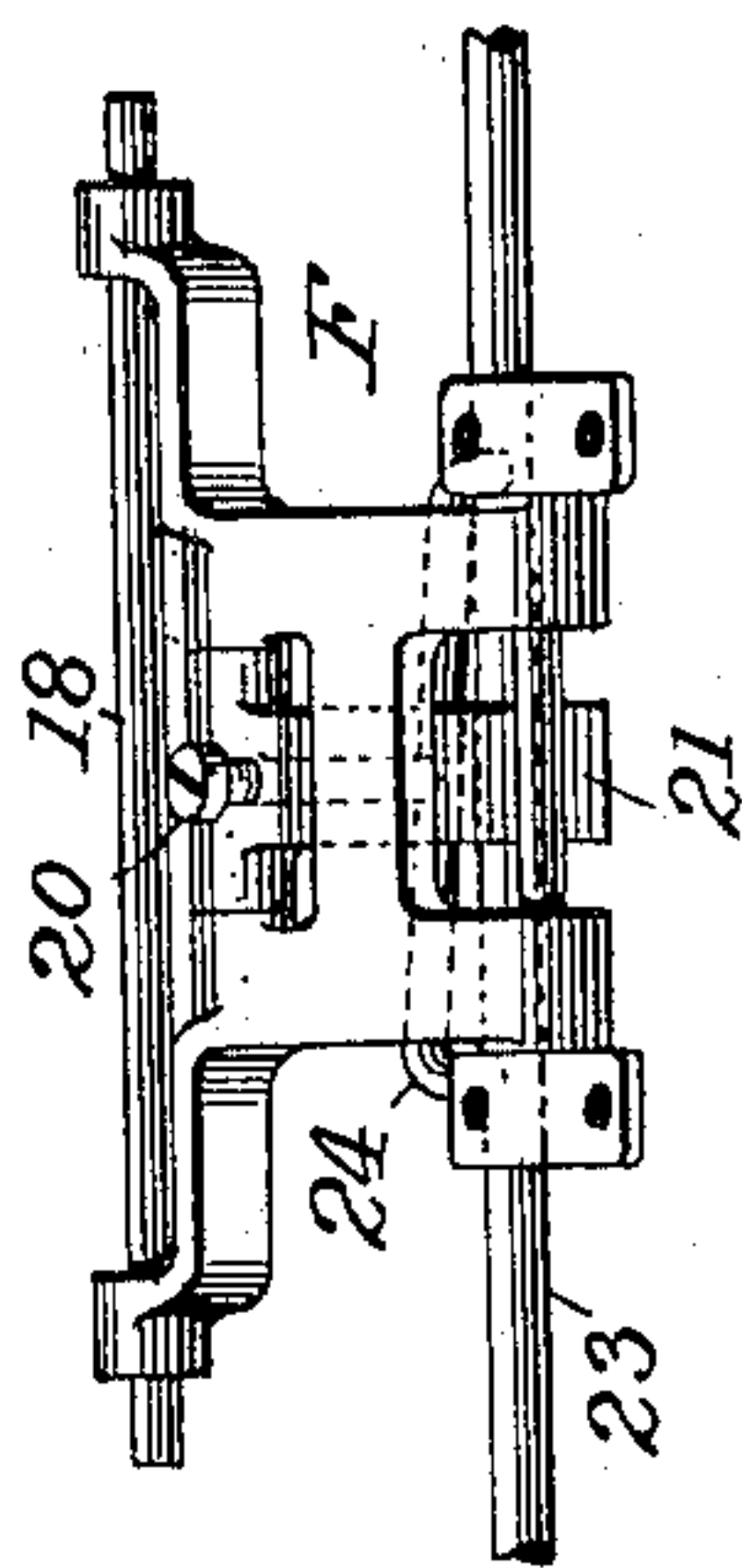


Fig. 3.

Fig. 5.



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4 Sheets—Sheet 4

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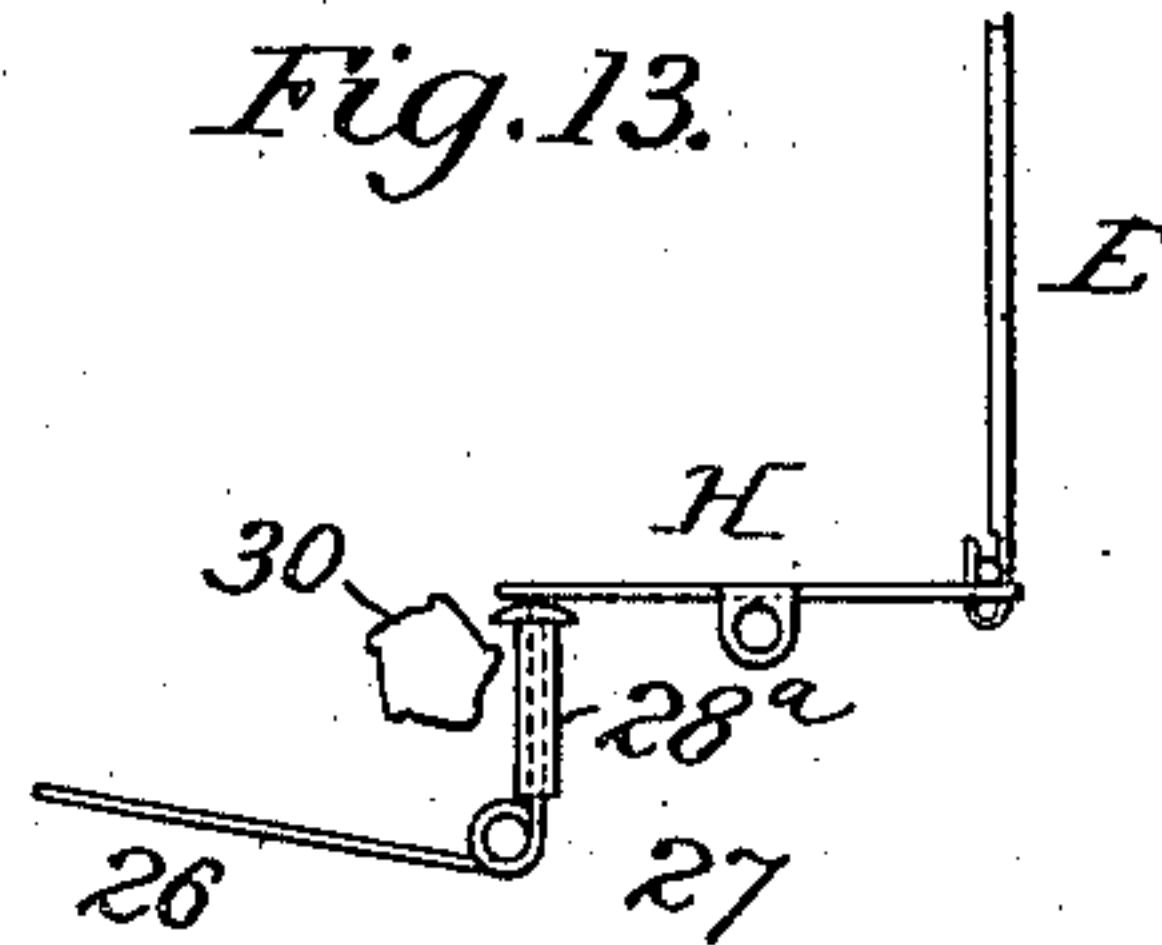
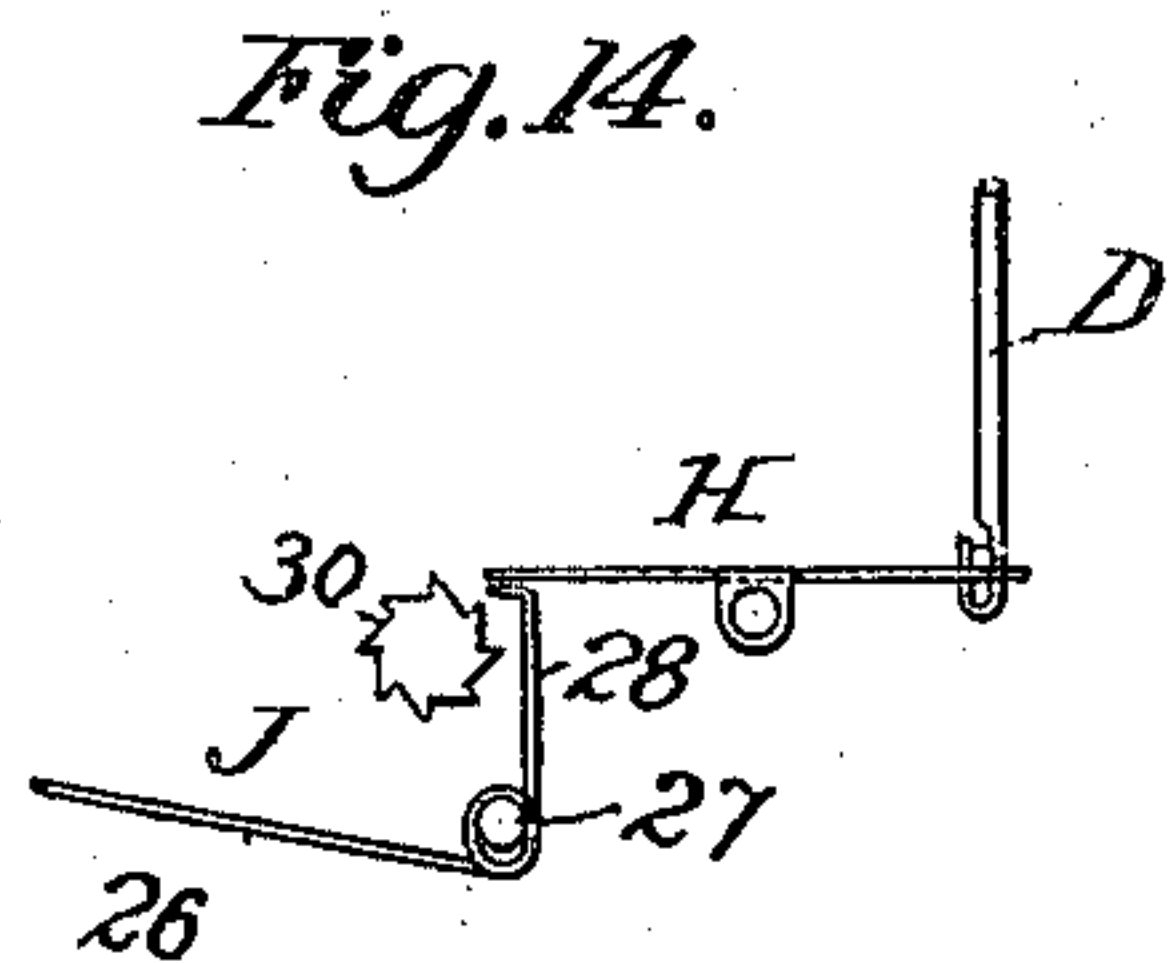


Fig. 16.

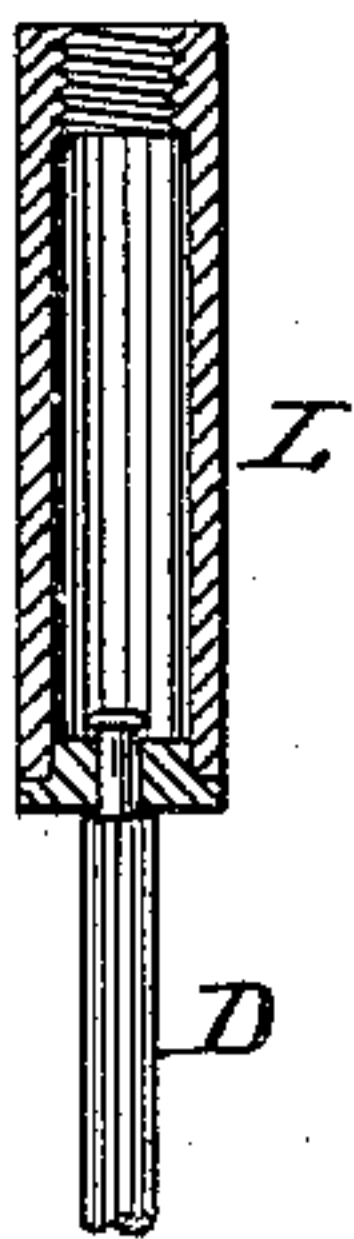


Fig. 17.

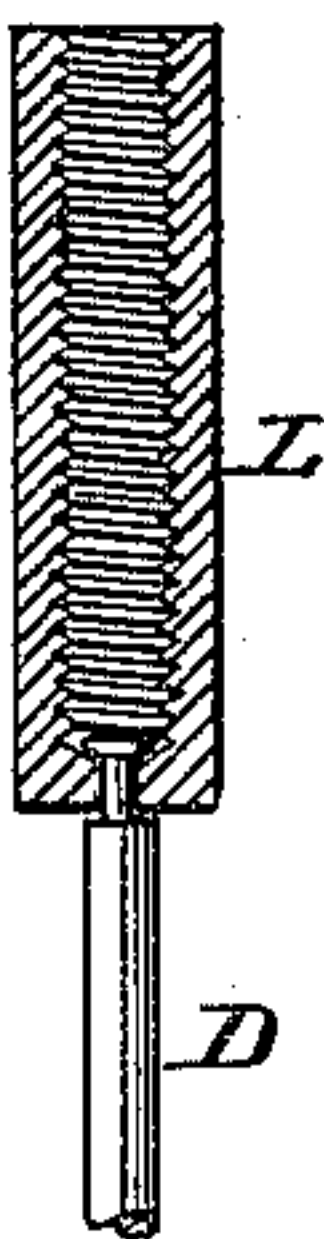


Fig. 18.

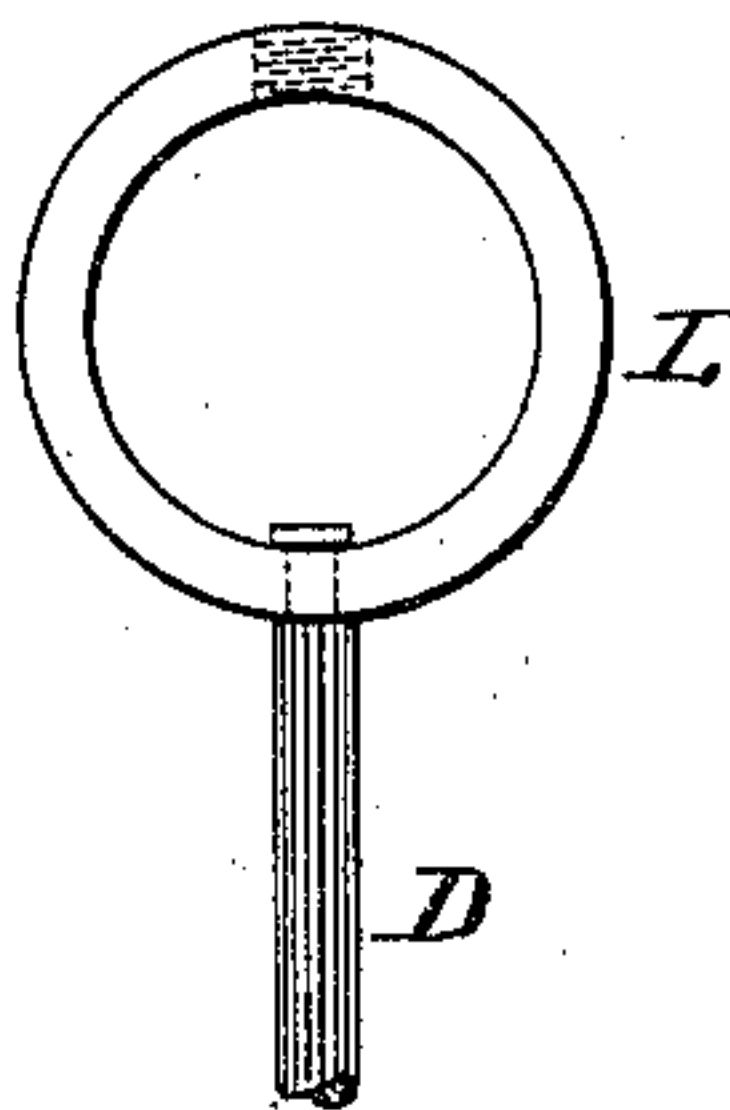
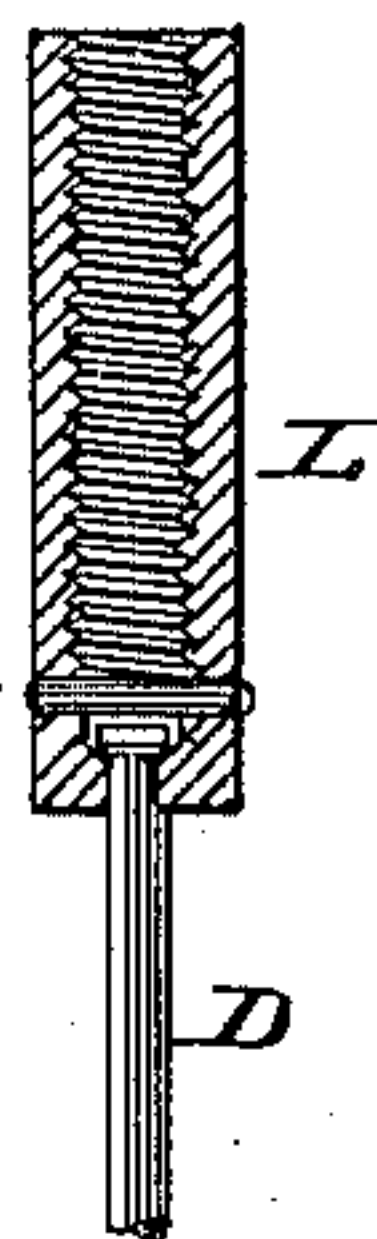


Fig. 15.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR WINDING THREAD.

SPECIFICATION forming part of Letters Patent No. 598,587, dated February 8, 1898.

Application filed May 29, 1897. Serial No. 638,810. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Mechanism for Winding Threads, of which the following is a specification.

My invention relates to winding-machines for winding threads to form cops, and has for its object to secure proper varying tension or drag upon the thread, as is requisite at different times in the winding, and to arrest the movement of the winding-machine in case of the breaking of any one of the threads; and to these ends I combine with a winding-machine of any suitable construction the parts hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation showing two winding-machines with the tension and stop devices connected with one of the same. Fig. 2 is a transverse section through one of the bobbin-supports. Fig. 3 is an elevation, enlarged, of the friction-pad and stop devices connected therewith. Fig. 4 is a side elevation of the parts shown in Fig. 3, but in different positions. Fig. 5 is a detached perspective view of part of the supports for the friction-pad. Fig. 6 is an enlarged side view of part of the stopping devices. Fig. 7 is a plan view of the parts shown in Fig. 6. Fig. 8 is a side view of the ratchet-cylinder constituting part of the stopping device. Fig. 9 is an end view of the cylinder. Fig. 10 is an end view of one of the bearings. Fig. 11 is an edge view of one of the bearings. Fig. 12 is an enlarged sectional elevation of the connecting-rod and turnbuckle of the stopping device. Figs. 13 and 14 are views illustrating modified forms of parts of the stopping device. Figs. 15 to 18 are modified forms of the extension or turnbuckle part of the stopping device.

The features of my improved apparatus are adapted to be used in connection with a single winding-machine or with machines arranged in series or gangs. As shown in Fig. 1, there are two winding-machines A upon a single table or frame X, but I have shown my multiple devices in connection with but one of them.

The winding-machines may be of any of the usual characters. As shown, each machine has a cam-shaft 2 and a cop-shaft 7, upon which the cop Z is wound, the thread passing through the eye of a reciprocating guide 1 upon a swinging frame B, which swings concentrically with the cam-shaft 2 and is counterbalanced by a weight 8, so that the frame and the guide may swing back as the cop increases in diameter. The machine is provided with any suitable kind of a stopping device. As shown, there is a stop-lever 5, having a lug engaging with a lug upon a detent-lever C, pivotally attached to the machine and provided with a laterally-projecting arm 4, with which is connected a rod D. When the parts are in the position shown in Fig. 3, the machine will operate to wind the cop; but when the rod is drawn downward, swinging out the lever C, the lever 5 will be released and the operation of the winding-machine will be arrested. It is not necessary to describe in greater detail these parts, as they may be of any ordinary or suitable constructions and as my present invention has no connection with any special features of construction of such parts, it simply being necessary to have the parts so constructed that a thread x , consisting of two, three, four, or more strands y of separate threads brought together, shall be properly conducted to the guide 1, together laid as a single thread, and wound to form a cop.

The bobbins or cops Y, whatever may be their form, containing the strands which are to be brought and wound together, are preferably supported in a vertical position, as shown in Fig. 1. When in the form of cops, as shown, each may be supported by a spindle 9, Figs. 1 and 2, projecting upward from a sleeve 10, rocking upon a stationary rod 12, supported by the frame X, the sleeve having a counterweight 13, which tends to maintain the spindle 9 in an upright position, the sleeve 10, however, rocking outward on the rod 12 when a cop has to be placed upon and removed from the spindle 9.

Upon a rod 50 above the cop-holders is a series of guide-eyes 14, and in order to bring the spindles 9 of the cop-holders directly in line with these guide-eyes a screw 15 extends through each sleeve 10 and bears with its end

against a rod or bar 16, so that by turning the said screw each sleeve 10 may be adjusted until the spindle 9 is directly below one of the eyes.

5 Each strand of thread γ passes over a tension-pad E of any suitable construction. As shown it consists of a metallic plate 17, having a somewhat curved form and externally covered with a sheet of felt or cloth of such a
10 character as to cause a certain amount of frictional adhesion as the strand is carried over the pad. The pad is pivoted about centrally at the back of the plate 17 to a frame F, which is hung to a cross-rod 18, extending between
15 the sides 19 of a frame G.

The frame F may be raised and lowered in any suitable manner—as, for instance, by means of a screw 20, passing through a forked piece 21, pivoted between arms of the frame
20 F and embracing a transverse rod 23, the end of the screw 20 bearing upon an inclined projection 24 upon said rod.

The mean tension must be varied to suit the size and character of the material wound.
25 To adapt it to these conditions, I raise or lower the pad by means of the screw 20, so that a greater or less tension-surface shall be presented to the thread and the angle at which the thread leaves the pad be increased
30 or diminished, as the case may require. The higher the pad is raised the sharper the bend the thread must make to reach the guide 14, and it is obvious that the sharper the bend the more tension there is on the thread. Having
35 adjusted the pad for the mean tension by the screw 20, the tension may be still further varied, between certain limits, to adjust it to the varying size of the package being wound. The greater the lineal speed of the thread the
40 less the tension required. Therefore as the cop increases in size the rod 23 is moved to the left, and the end of the screw 20 moves down the incline, allowing the pad to drop. The pad is delicately counterbalanced by a
45 weight S, adjustable on a rod 80, so that it may adjust itself to the strands as they are drawn over it. If not counterbalanced, the pad would assume a nearly horizontal position, so that the thread would draw only over
50 the edge. The pad may be moved from any part of the machine which is properly actuated to impart the proper movement to the pad in respect to the increasing size of the cop. As the counterweight 8 swings to one
55 side as the cop increases in size, its connection with the rod 23 by a connecting-rod 70 serves to gradually draw out the rod and alter the position of the pad.

The tension-pad may be of any suitable
60 shape and may be supported in any suitable manner, so as to present an increased frictional surface from time to time, as required.

With each strand I combine a stop-motion arm or finger of any suitable character, which
65 is held in position so long as the strand is taut, but which changes its position if the strand breaks or becomes slack, and is the

means through other mechanism of shifting the stop device of the machine and thereby arresting the movement of the latter. As
70 shown, the finger 26 is pivoted to a cross-bar 27 upon one edge of a plate H, pivoted midway between the front and rear edges at 29 to the sides 19 19 of the frame G, and to the rear edge of the plate H is connected the
75 rod D.

In order that the apparatus may be sensitive and to avoid strain and variation of tension upon the threads, it is necessary that the
80 fingers 26 shall be very light and that they shall move under very slight influences; but at the same time it is desirable that there shall be a positive and powerful movement to shift the rod D when it is necessary to arrest
85 the movement of the winding-machine from the slacking or breaking of the threads. I therefore combine with the stop-fingers 26 means for positively actuating the rod D and the stop device connected therewith, which
90 are put into operation by the movement of the fingers 26 of any one of them. The parts of the apparatus may be differently constructed to secure this result; but, as shown,
95 each finger has connected to it at the rear an arm 28, with a terminal hook, which may engage the teeth of a toothed or ratchet cylinder 30, driven from any moving part of
100 the machine. Normally the arm 28 is out of contact with the ratchet-cylinder, as shown in Fig. 4; but should a thread break or become slack the finger 26 will fall to the position shown in Fig. 3 and bring the hook of
105 the arm 28 into engagement with one of the teeth of the ratchet-cylinder, and the rotation of the latter will lift the said arm, and with it the forward edge of the plate H, and draw down the rod D and cause the stop device of the machine to act to arrest the latter. It is not absolutely necessary that the
110 rod 27 shall be carried by the plate H. As shown in Fig. 14, it is intended to be stationary and supported by the sides 19 of the frame G, and there is an elongated eye in the hub, connecting each finger 28 and arm 26 to
115 permit the arm 28 to move upward when its hook engages the teeth of the ratchet-cylinder, or the finger and its arm may swing about the stationary rod 27 without other movement, as shown in Fig. 13, but with a
120 movable sleeve 28^a upon the arm 28, having a head which engages with the teeth of the ratchet-cylinder and is raised thereby and by its contact with the edge of the plate H vibrates the latter. It will, however, be evident that other connections may be made to
125 secure the positive movement of the stop device upon the movement of any finger 26, provided the parts be thrown into operation by the movement of the said finger, the said parts being operated from some positively-
130 operating part of the device.

As shown, the ratchet-cylinder 30 turns in bearings of the frame G and has at one end a pulley 31, over which a band 32 passes to

a pulley 33 on the end of the cam-shaft 2 of the winding-machine. In order to take up any slack, a belt-tightener K is arranged as shown and provided with pulleys over which the band 32 passes.

To secure the proper adjustment of the parts, so that they will operate with nicety and precision and instantly upon the slightest slacking of a thread, it is desirable to put a take-up or extension device at some point of the connections. When there is a rod D, as described, a turnbuckle L may be arranged in the line of the rod and constructed in any suitable way, as shown in Figs. 12 and 15 to 18. As shown in Figs. 3, 4, and 12, the turnbuckle consists of a sleeve 33, threaded at one end to receive a screw-rod 34 and having a perforation at the other end for the passage of the rod D, which has a head inside of the sleeve and a collar 35 below the sleeve, and a nut 36, Fig. 4, on the rod 34 serves as a binding-nut to hold the parts in place after adjustment. The rod 34 is pivoted to the end of the arm 4, as shown.

In order to facilitate inserting the ratchet-cylinder 30 in place, I bore in one side 19 of the frame G an opening large enough to receive a bushing or bearing-block 37, somewhat larger in diameter than the ratchet part of the cylinder and having a recess to admit laterally the journal 38 of the cylinder, the said recess being open at the bottom and provided with a pad of felt or other like material 38, which will absorb oil and maintain the journal lubricated. An inclined orifice 62 in the other side piece receives absorbent material which is saturated with a metallic lubricant.

While the fingers 26, with their arms 28, may be made in any suitable manner, I prefer to construct the same so that each finger and arm will consist of a single piece of wire, portions of which are coiled to constitute the hub, through which the rod 27 passes, as best shown in Fig. 7. In this case the edge of the plate H is cut away to leave intervening lugs 49, which serve to separate the fingers.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim as my invention—

1. The combination with cop-winding mechanism, of a spindle and a counterbalanced tension-pad intermediate the spindle and winding mechanism over which the thread passes, said pad being adapted to swing upon its pivot to vary the angle at which the thread leaves it to increase or diminish the tension upon the thread, substantially as described.

2. The combination with cop-winding mechanism, of a pivoted counterbalanced tension-pad having a curved face over which the thread to be wound passes, and devices for guiding the thread around the face of the tension-pad, substantially as described.

3. The combination with thread-winding mechanism, of a thread-guide, a pivoted ten-

sion-pad adapted to freely swing upon its pivot and an adjustable frame upon which the tension-pad is pivoted whereby the position of the said pad may be varied relative to the thread-guide, substantially as described.

4. The combination with cop-winding mechanism, of a thread-guide, a tension-pad, and automatic means for varying the relative positions of the thread-guide and tension-pad as the cop increases in diameter to decrease the tension upon the thread, substantially as described.

5. The combination with cop-winding mechanism, of a counterbalanced tension-pad, a swinging frame upon which the pad is carried, and automatic means for swinging the frame and pad to vary the tension upon the thread as the cop increases in diameter, substantially as described.

6. The combination with the stop device of a multiple winding-machine, of a pivoted plate, an extensible connection connected to the stop device and the plate to be moved positively with the latter, a series of fingers adapted to be engaged by the threads being wound, said fingers being pivoted to the plate and provided with hooks, and a rotating toothed cylinder common to all of the pivoted fingers and adapted to be engaged by the hooks thereof upon exhaustion or breaking of any one of the threads, substantially as described.

7. The combination with the winding-machine and bobbin-supports, of a friction-pad E arranged to be traversed by the threads and connected with a swinging frame F, and means for shifting the position of the frame as the cop increases in size, substantially as described.

8. The combination of the winding-machine, bobbin-supports, swinging frame F and screw 20, pad E pivoted to said frame, sliding bar having an inclined bearing for the screw, and means for shifting the bar as the cop increases in size, substantially as described.

9. The combination with a thread-guide, of a rocking supply-spindle, a counterweight connected thereto to maintain the spindle in its normal position, and means for adjusting the spindle relative to the thread-guide, substantially as described.

10. The combination with a thread-guide, of a supply-spindle, a rocking support therefor, a counterweight connected to said support to maintain the spindle in its normal position, a rod adjacent the spindle-support, and an adjusting-screw carried by said support, adapted to bear upon the rod, substantially as described.

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

SIMON W. WARDWELL, JR.

Witnesses:

CHAS. W. PEIRCE,
E. C. SMITH.