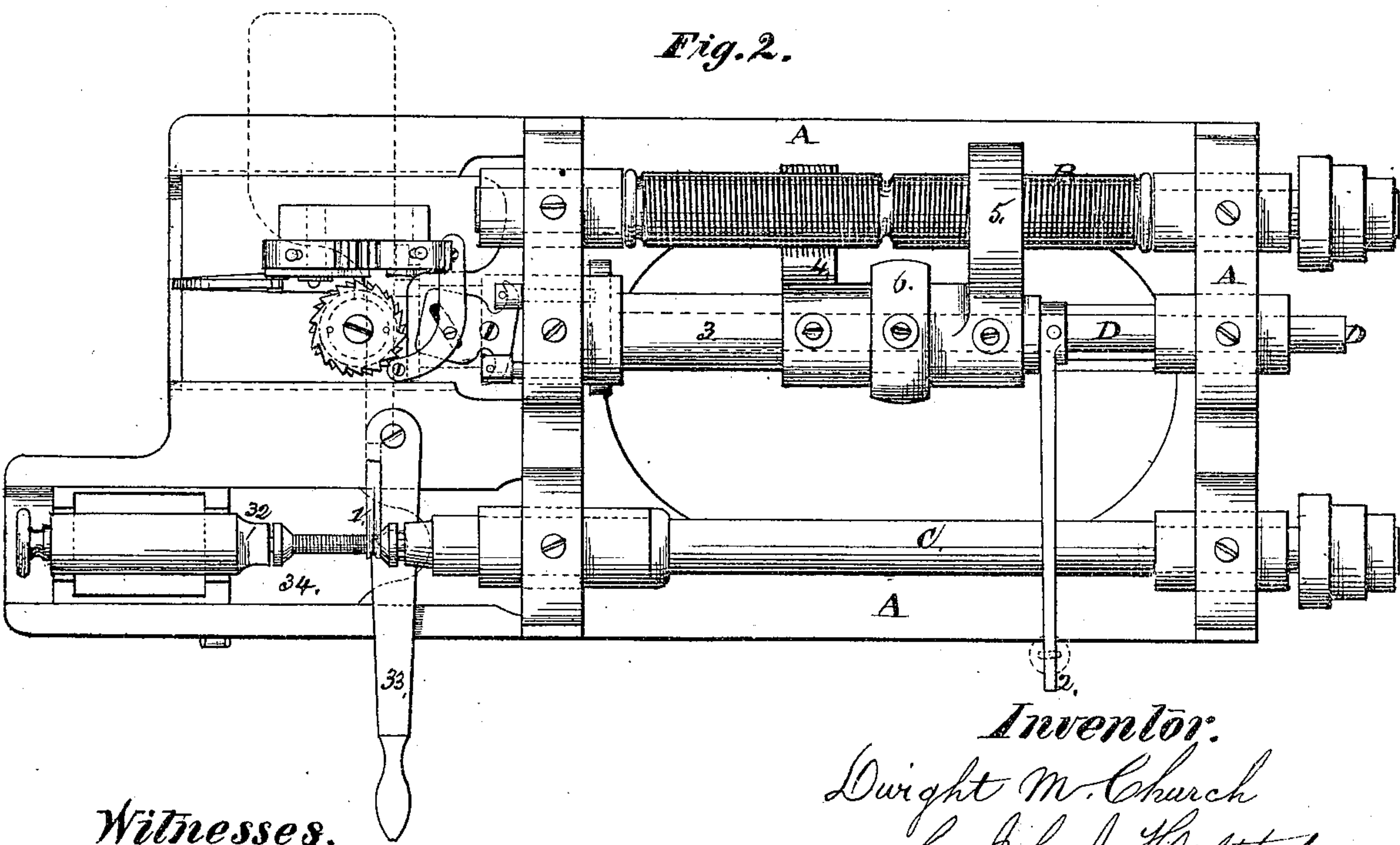
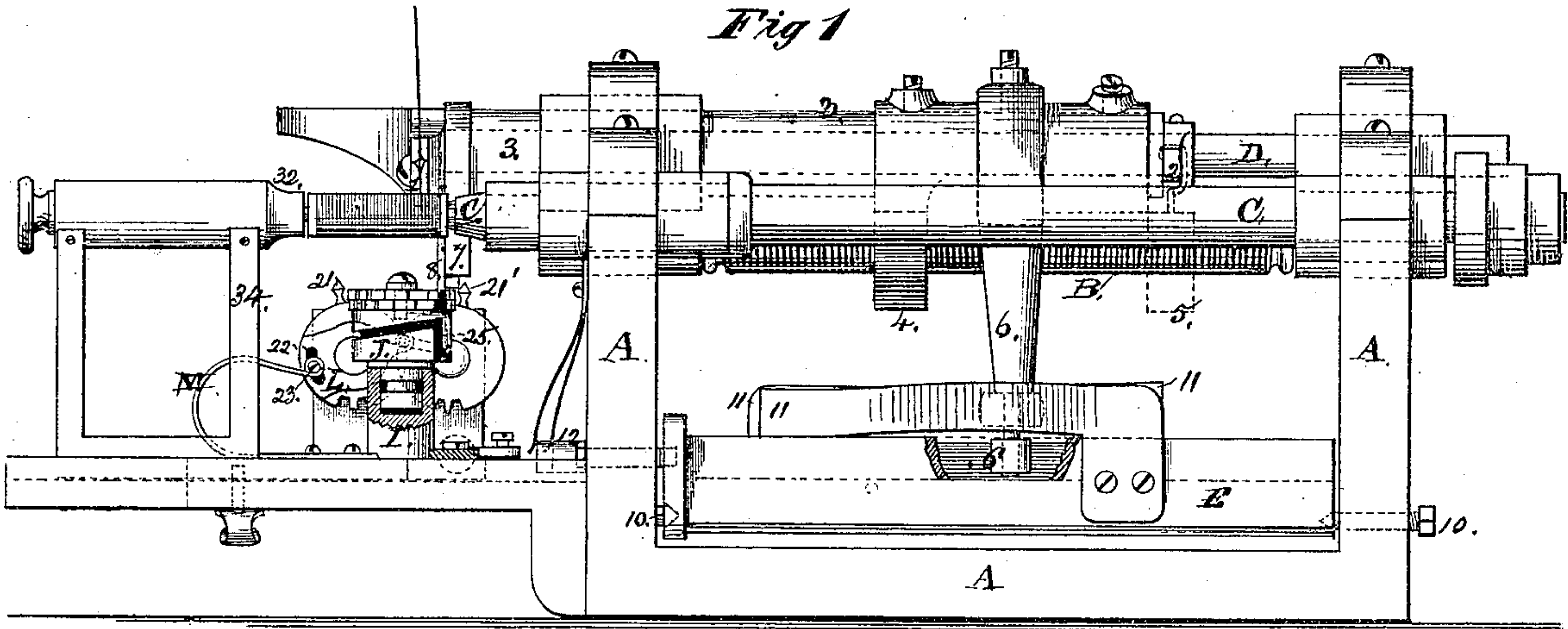


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Improvement in Machines for Automatically Winding-Bobbins.

No. 129,394.

Patented July 16, 1872.



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*by John J. Halsted*  
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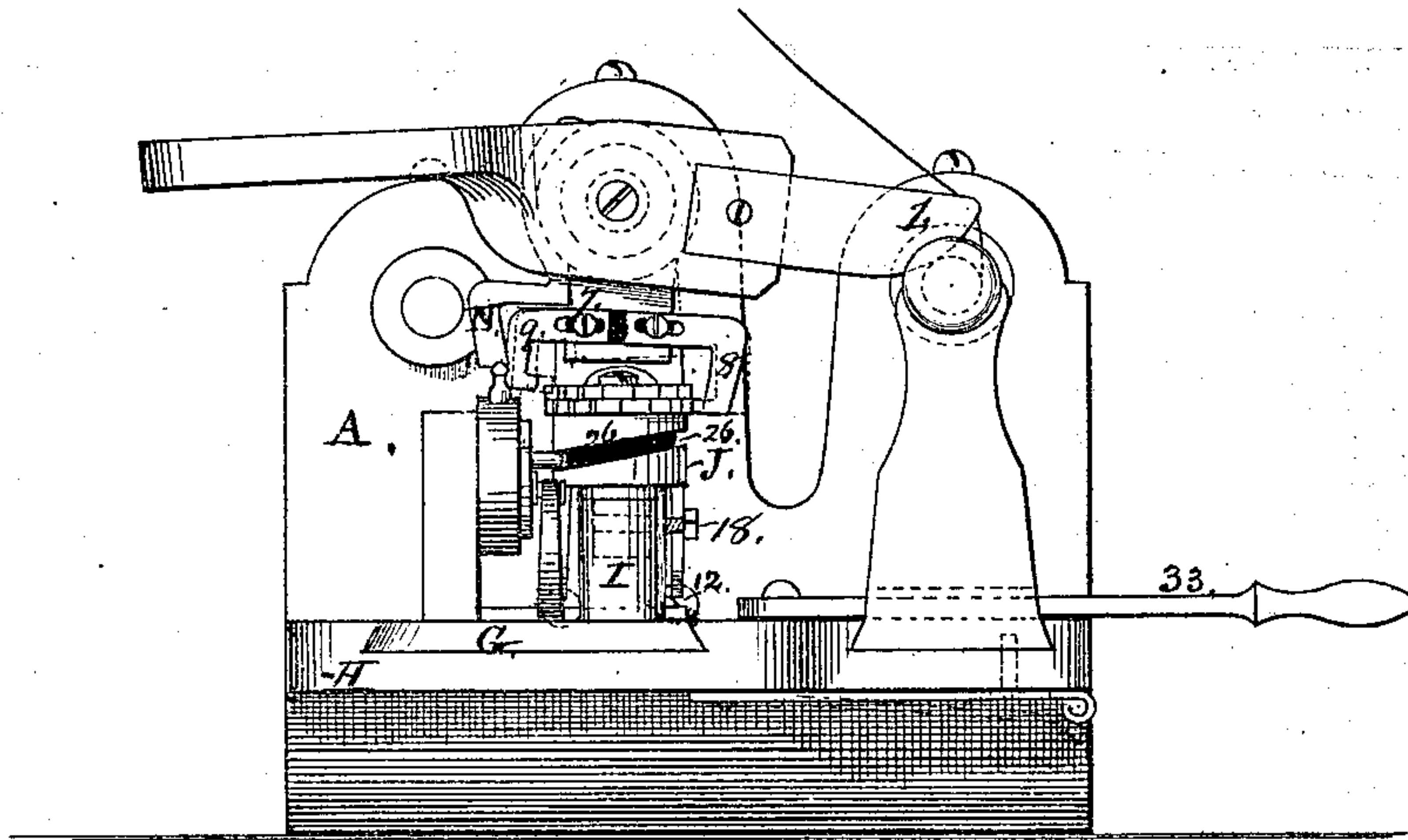
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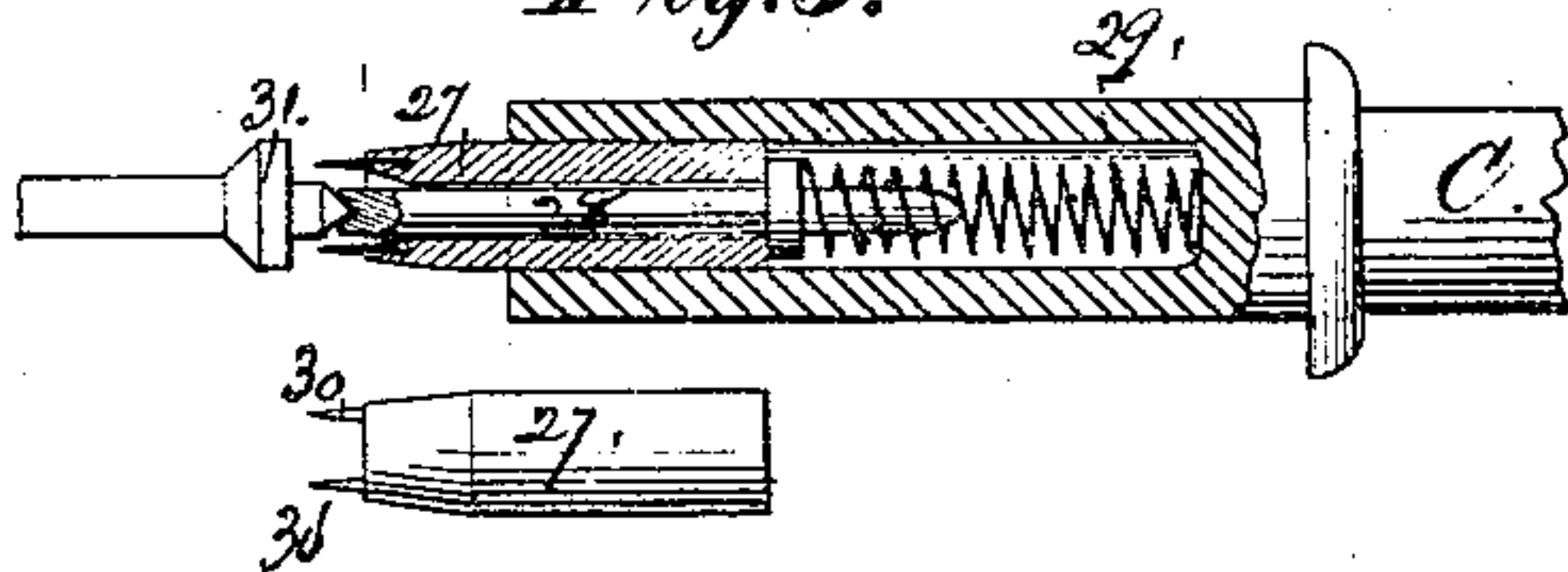
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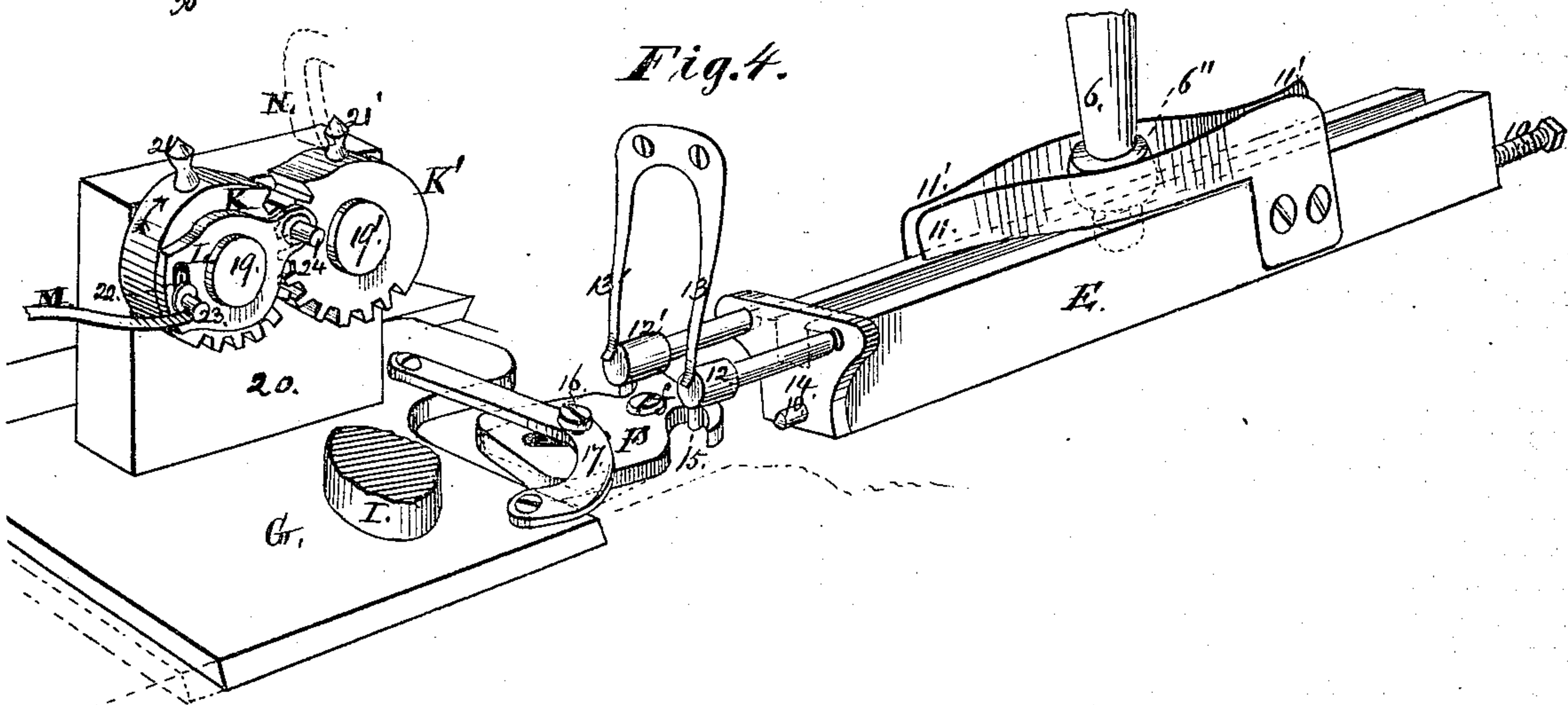
*Fig. 3.*



*Fig. 5.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

DWIGHT M. CHURCH, OF HOLYOKE, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR AUTOMATICALLY WINDING BOBBINS.

Specification forming part of Letters Patent No. 129,394, dated July 16, 1872.

### SPECIFICATION.

*To all whom it may concern:*

Be it known that I, DWIGHT M. CHURCH, of Holyoke, in the State of Massachusetts, have invented certain Improvements in Machines for Automatically Winding Bobbins; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The main object of my invention is to render the thread-winding automatic for bobbins of different lengths. Heretofore there has been a failure, so far as I am aware, to devise a machine which could graduate and control the traverse so as to adapt it to different lengths of courses for different lengths of barrels and of spools or bobbins.

Figure 1 is an elevation—a few of the parts being cut away to show the inner construction. Fig. 2 is a plan, Fig. 3 an end view, Fig. 4 a perspective view, of part of the apparatus; and Fig. 5 a detached view, partly in longitudinal section, of the bobbin centering and holding devices.

My improvements are more especially designed and adapted for the automatic winding of the small solid wood-bobbins for sewing-machine shuttles, which, for the different varieties of shuttle-machines, are required of different lengths, and which, for the purpose of rendering out the thread evenly from the shuttle when sewing, must be wound with precision and uniformity, and for the purpose of economy must be wound rapidly and at little cost of labor and time, in order that the wound bobbins may be furnished to the manufacturers and operators of sewing-machines at such slight advance upon the mere cost of the thread that all will find it to their advantage to purchase them ready wound, even though throwing away the bobbin, as common spools of commerce are thrown away when their thread has been consumed.

My improvements consist in novel means for effecting the alternate engagement of the nuts with the right-and-left-hand screw-shafts in a rocking-trough or grooved bar automatically locked to different positions to aid in this; in an automatically-operating switch, to permit the periodic rocking of the trough; in the means

for actuating such switch; in mechanism for varying the traverse for each layer of thread; in means for regulating the machine for different lengths of bobbins; in a method of self-locking the machine whenever it is stopped; in means for varying the period at which the switch shall operate; in a peculiarly-constructed capstan or head for imparting and controlling the traverse motion and for locking the machine; in special means whereby when a bobbin is fully wound the parts automatically resume their proper positions to commence winding; in a special means for centering and holding the bobbins to be and while being wound; and in other details hereinafter stated.

A is the frame of the machine, having a proper bed and uprights to support the mechanism and the several shafts and their journal-boxes. B is the revolving shaft, having the customary right-and-left-hand screw-threads thereon for giving to the thread-guide its traverse movement. C is the shaft for imparting to the spool or bobbin its revolving motion in winding. D, the slide-rod or shaft carrying the thread-guide or yarn-deliverer 1, the adjustable weighted arm 2, and the sleeve 3 on which are the adjustable half-nuts 4, 5, and an arm, 6, for rocking the sleeve and nuts, and the pendent arm 7, and its adjustable dogs 8 9. E is a rocking piece, grooved or troughed on its upper side to admit the lower end of arm 6, on which is a friction-roller, 6', this rocking piece or bar swinging upon pins or journals 10 10 near its bottom, and being provided with two springs, 11 11, bent, as shown, against the inner side of one or the other of which a swell or boss, 6'', on the arm 6, when traversing, presses, that it may be rocked at the proper period by each spring alternately, when, as hereinafter stated, the trough is automatically unlocked from one position and rocked and locked in its other position, this locking and unlocking being effected by two bolts, 12 12', each of which has a pressure-spring, 13 13', to force its bolt into a hole provided for it in the end of the head 14 of the trough—the head of each bolt having a downwardly-projecting pin, 15, whereby it may be pulled out of engagement with the trough to permit it to be rocked from one position to the other, such pulling action being effected by the



two-armed slotted switch F, pivoted at *f* on an extension of the bed of the frame. The inclined slot 15 of this switch receives a pin, 16, on the cross-piece or bar 17, secured on the slide-frame G, which frame is dovetailed in the bed-piece or extension H, and has mounted upon it the larger portion of my novel devices, and which I will now proceed to describe:

I is a post or capstan, within which is sunk the stock of the spirally-grooved head J, having a single spiral, the upper and lower ends of the groove being connected by a vertical groove, as seen. Surmounting this head are located, one above the other, two toothed disks or circular racks, each of the same diameter, and having the same number of teeth, the teeth of both pointing in the same direction, but those of one overlapping the spaces between the teeth of the other, thus permitting one at a time of the dogs 8 or 9 on the rocking sleeve 3, at each traverse of the sleeve and thread-deliverer, to give a slight partial revolution to the spirally-grooved head J, but compelling both dogs, as they engage, respectively, with the teeth of either the upper or lower rack, always to revolve the head in one direction only; one dog, acting as the guide, traverses in one direction, and the other being brought into position for engagement with the teeth (by the rocking of the sleeve) and acting when the traverse is reversed. The two racks, of small diameter, thus occupy but small space, while admitting of teeth of sufficient size to insure positive action of each tooth without risk of missing its hold on the dog. One dog projects lower than the other, so that each shall act only upon its corresponding ratchet. The two ratchets are firmly united together, so as to move as one piece. They are so held or secured to the head J as to cause the latter to revolve from time to time, step by step, with them, and yet be capable of being adjusted in position thereon. The head is held to place and yet allowed to revolve by a pin or screw, 18, whose inner end enters an annular groove in the stock of the head. (See Figs. 1 and 3.) K K' are two circular plates or wheels, geared together by teeth on a portion only of their peripheries, and both hung on center bearings 19 19' in the upright support 20. Each of these wheels has a pin, 21 21', projecting from its periphery, and K has upon its axis a two-armed plate, L, on the inner end or arm of which is a pin which enters the groove in head J, and which pin may be so arranged as to be set nearer to or further from the center of said plate in order to regulate it to the different lengths of the bevels on the heads of the spools or bobbins; and in the outer end of plate L is a short concentric slot, 22, through which passes a pin, 23, into the plate K, such pin serving to hold the plates K and L firmly together to any desired position to which they may be adjusted relatively to each other. A spring, M, exerts a constant tendency to turn plate K in the direction of the arrow thereon, and thus to suddenly force down the pin 24

whenever in the action of the machine this pin reaches the vertical part 25 of the spiral groove 26. Such action, which takes place after a spool has been filled, brings back pins 21 21' to the original positions which they had at the commencement of the winding of the conical-headed bobbin. N is a pendent arm or downward projection, which, at the end of each traverse—that is, at the completion of the winding of each tier or layer upon the bobbin—strikes one or the other of the pins 21 21', and thus causes the slide-frame G to move, and thus, through the medium of the pin 16 and switch F, to loosen the bolt which, for the time being, is locking the rocking trough, and to lock it in its other position with the other bolt. The slot in the switch is made somewhat wider than the diameter of its pin, that the latter may play loosely enough therein to permit the locking bolt to fly into its place at the proper time under the action of its own spring, without having such free action at all retarded by the force of the spring which bears upon the other locking bolt.

My novel devices for holding properly to place the delicate heads of these small wood bobbins are as follows, differing essentially from those in my patent No. 108,758: Within the hollow end of shaft C (see Fig. 5) is placed a hollow head, 27, firmly secured, through which plays freely a spring-plug, 28, a spiral spring, 29, within the cavity serving to press the plug 28 outward a little beyond the head, but only far enough to permit the conical end of the bobbin to be truly and centrally lodged in the conical cavity in the end of the plug before the pins 30 30 in the head commence to enter the head 31 of the bobbin. This perfect centering being thus first accomplished, the bobbin at its other end is then lodged in the central conical cavity in the head 32, and by means of the hand-lever 33 the slide-frame 34 is moved up, forcing the other end of the bobbin against the plug and pushing it in until the driving-pins 30 30 enter the bobbin-head. By this means the axial line of the bobbin must positively coincide with the axial line of the shaft and plug, and the winding be strictly concentric, it being well known that if the bobbin be placed at all eccentric the winding is so defective as to be worse than useless.

Another very essential function of the spring-plug is as follows: If it were not used the points of the pins or spurs would enter the bobbin-head before the centering had been fully effected, and then, upon pushing them further into place, (in case the centering chanced to be eccentric,) the pins would be strained or bent, the bobbin would be liable to be split and broken by such strain, the pins would be sprung from place on receiving the next bobbin, and the winding would be imperfect. My improvements avoid all these difficulties, as the true centering is complete before the pins enter, and they both enter in perfectly straight and parallel lines.

Instead of pins 30 30 spurs may be used.



Instead of a conical center-hole in the plug and in the head 32 the holes may be cylindrical, or nearly so, when bobbins having that form of journal are to be wound.

By my machine thirty-six yards of No. 50 cotton can be wound upon one of my wood bobbins made true by my late improvements, and so on up to one hundred and fifteen yards of No. 130 cotton. One girl, at low wages, can supply the bobbins to three machines; and each machine will turn off twice and one-half as much, or one hundred and fifty per cent. more work than could be effected when guiding the thread by hand, which has always been the practice heretofore in filling the ordinary metal bobbins, my present machine being, so far as I know and believe, the only one upon which the small sewing-machine bobbins could be wound automatically and perfectly.

I claim—

1. The rocking trough E and its springs 11 11' combined with the pendent rocking arm 6 as a means for effecting the alternate engagement of the half nuts with the right-and-left-hand screw-shaft to produce the traverse movement of the thread-guide.

2. Also, the trough and its springs, hung as shown and described, combined with the two spring-bolts for locking the trough to its desired position.

3. Also, the combination, with the trough and its spring-bolts, of the two-armed switch for alternating the trough from one or the other of the bolts.

4. Also, in combination with the switch and its inclined slot, the slide-plate G, actuated by the projection N, moving with sliding or traverse rod and thread-guide.

5. Also, in combination with the rocking sleeve 3, the pendent arm 7 and its adjustable

dogs 8 9, for automatically increasing the traverse at each course or layer of thread.

6. Also, the adjustable plate L and its pin 24, as a means for regulating the machine for different lengths of spools, and for locking the machine whenever it is stopped.

7. Also, the two geared plates or wheels K K' and their respective projections 21 21', combined with the revolving grooved head J and arm N, as a means for varying the period for operating the switch at each successive traverse.

8. Also, the head J, grooved as described, and having an intermittent rotary movement upon its supporting-post, substantially as and for the purpose set forth.

9. Also, the combination, with the toothed circular racks or their equivalent, of the head J, provided with its single spiral and locking groove, terminating in and continuous with the vertical groove.

10. Also, the combination, with the plate L and the geared plates K K', of the spring M for restoring the parts to their positions to commence winding a new bobbin.

11. Also, in a machine for automatically winding small bobbins, I claim the movable centering device, constructed and operating substantially as described.

12. Also, in combination with the movable centering device, constructed and operating substantially as described, I claim a mechanism for holding the bobbin after it is centered.

13. Also, a machine constructed and adapted for automatically winding small bobbins, substantially as set forth.

DWIGHT MADISON CHURCH.

Witnesses:

TIMOTHY MINICK,  
E. A. STILL.