

H. A. HOUSEMAN.
YARN SPLICING DEVICE FOR KNITTING MACHINES.
APPLICATION FILED JAN. 21, 1910.

967,019.

Patented Aug. 9, 1910.

6 SHEETS—SHEET 1.

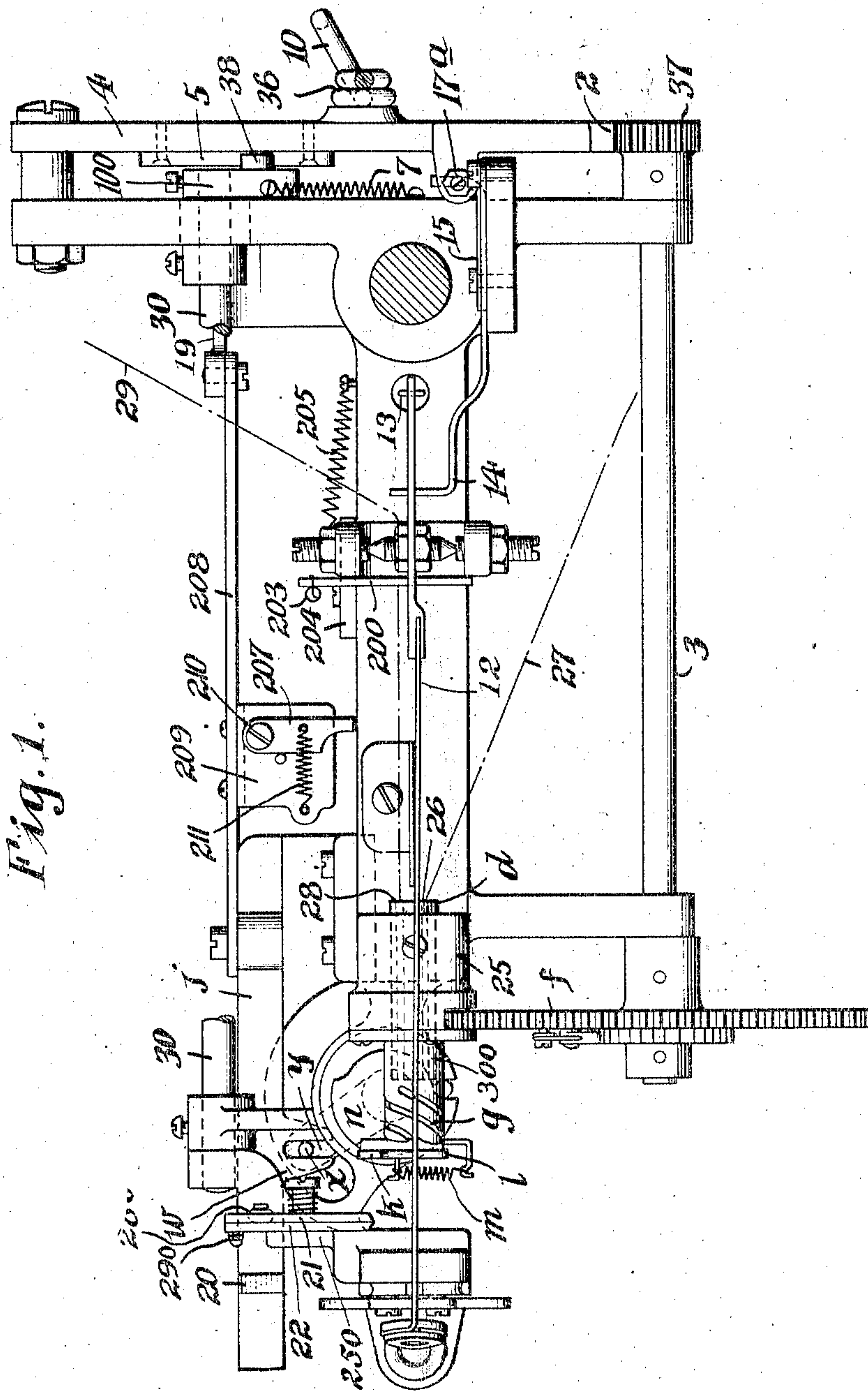


Fig. 1.

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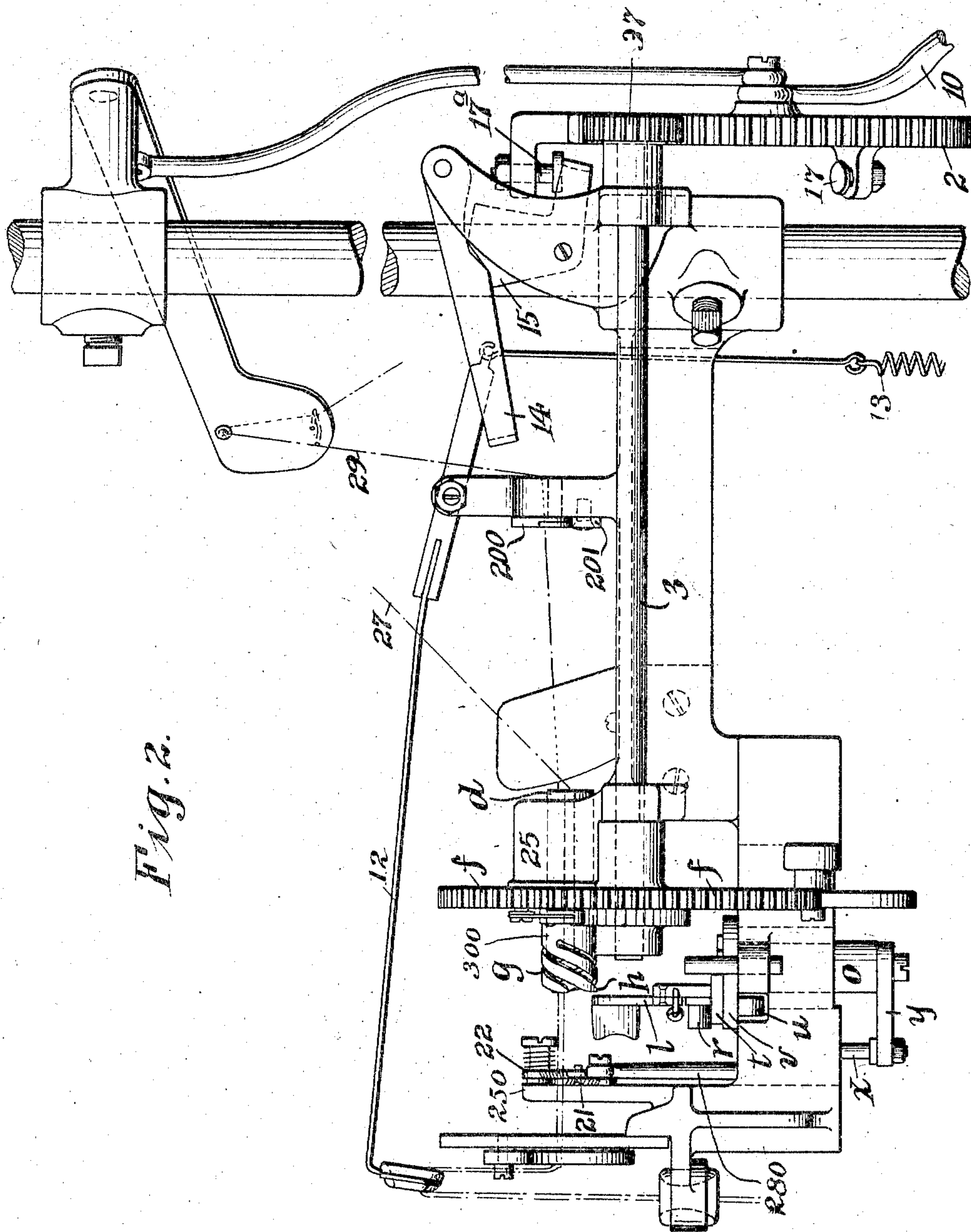


Fig. 2.

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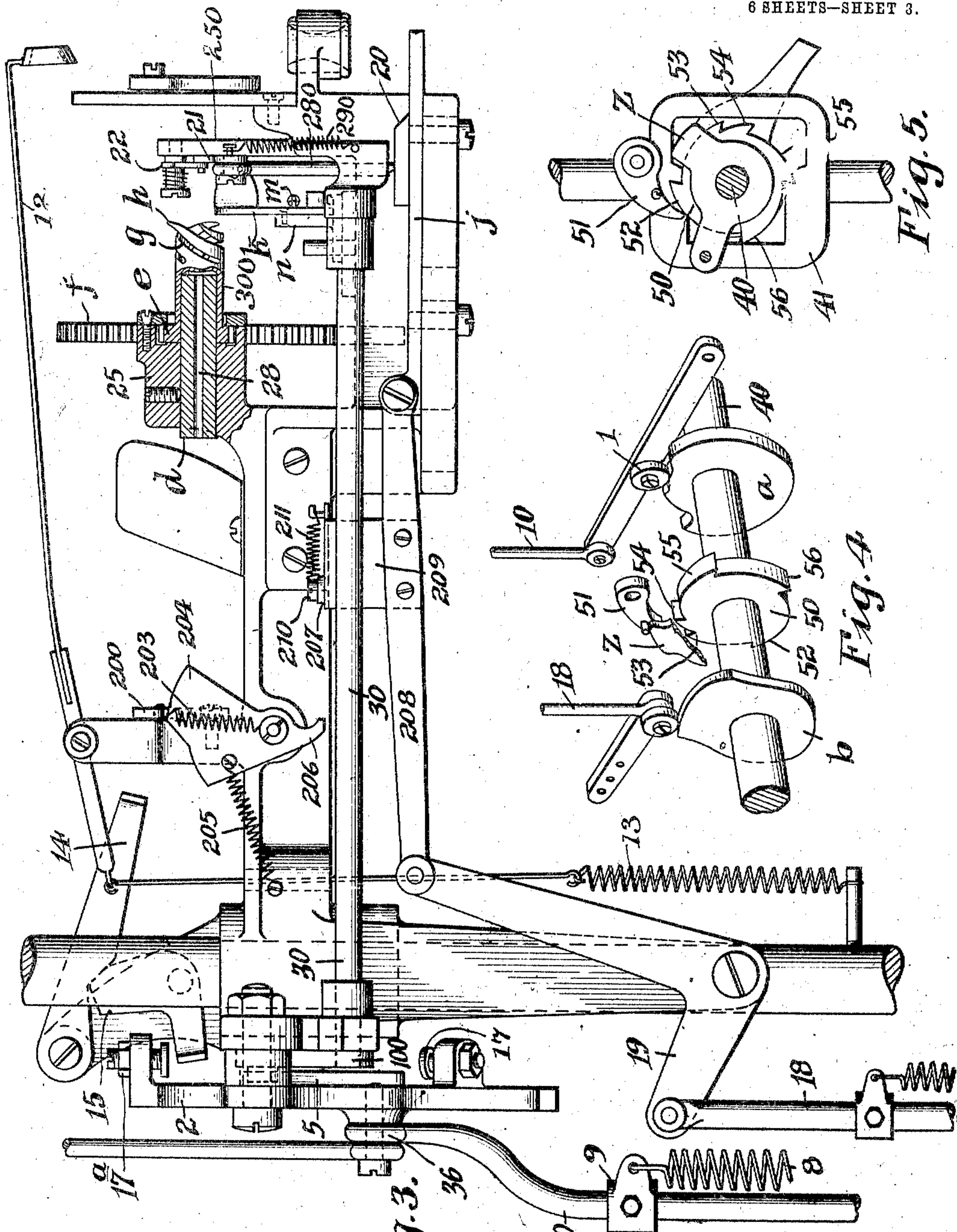
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Fig. 3.

Fig. 4.

Fig. 5.

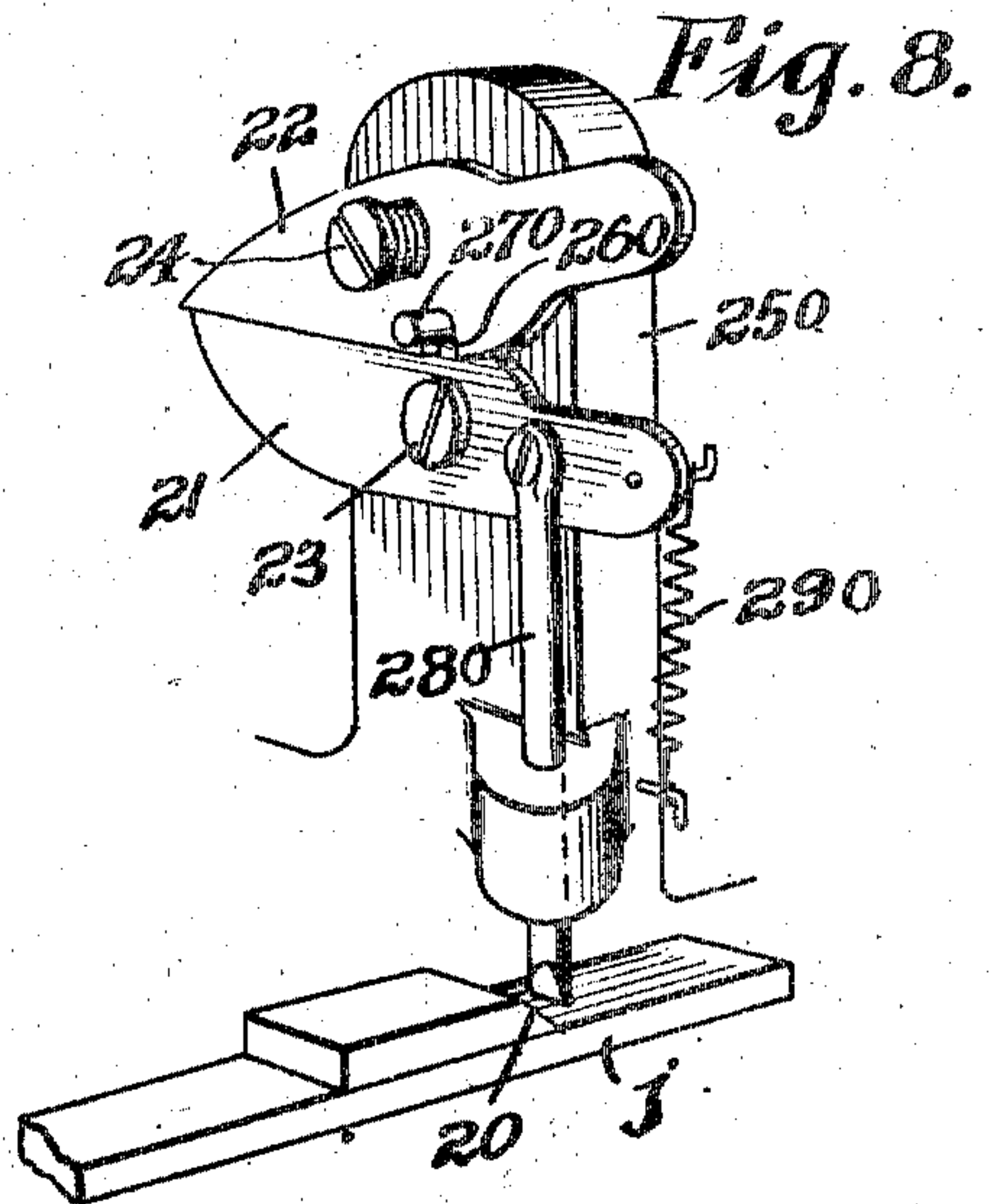
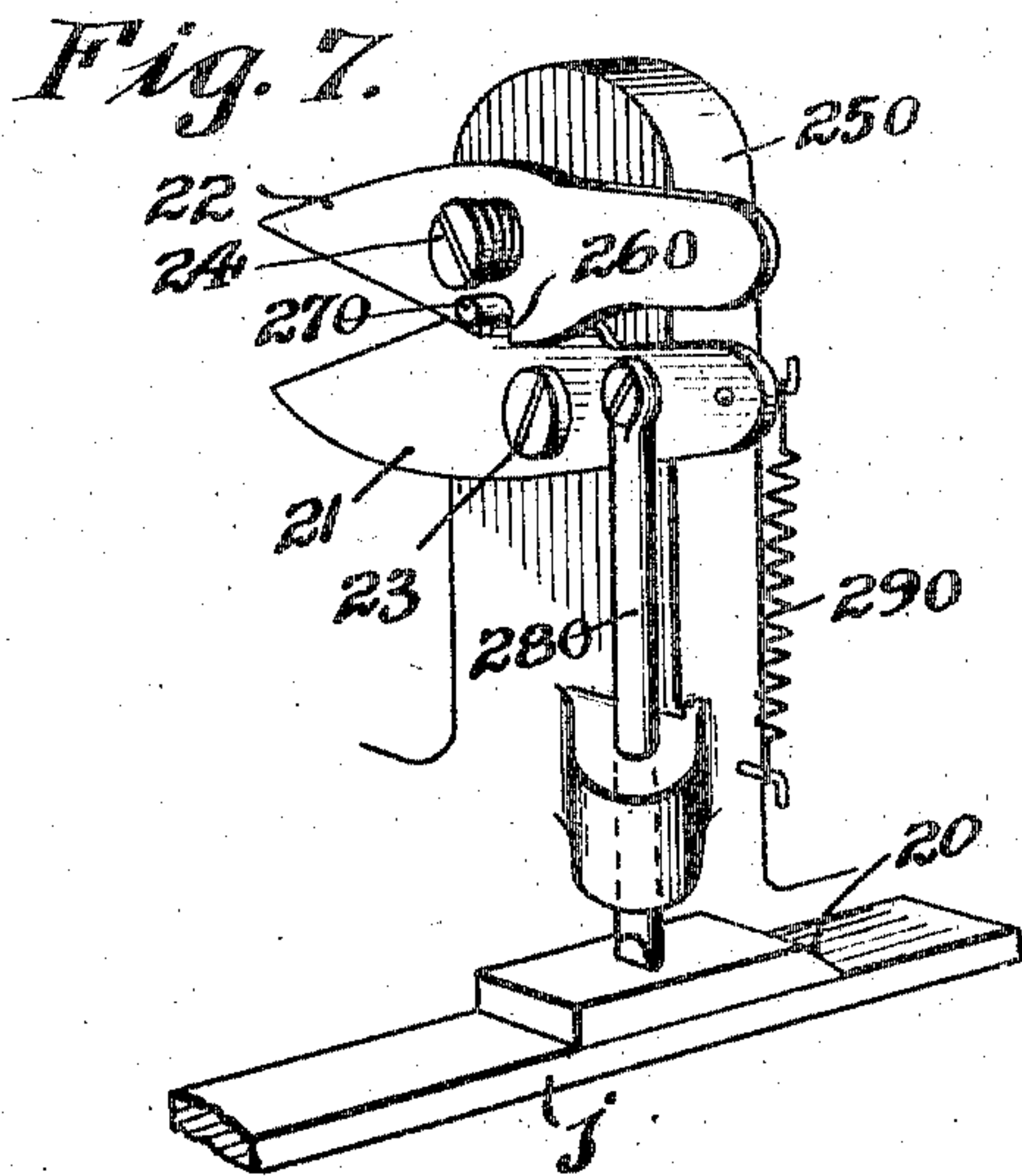
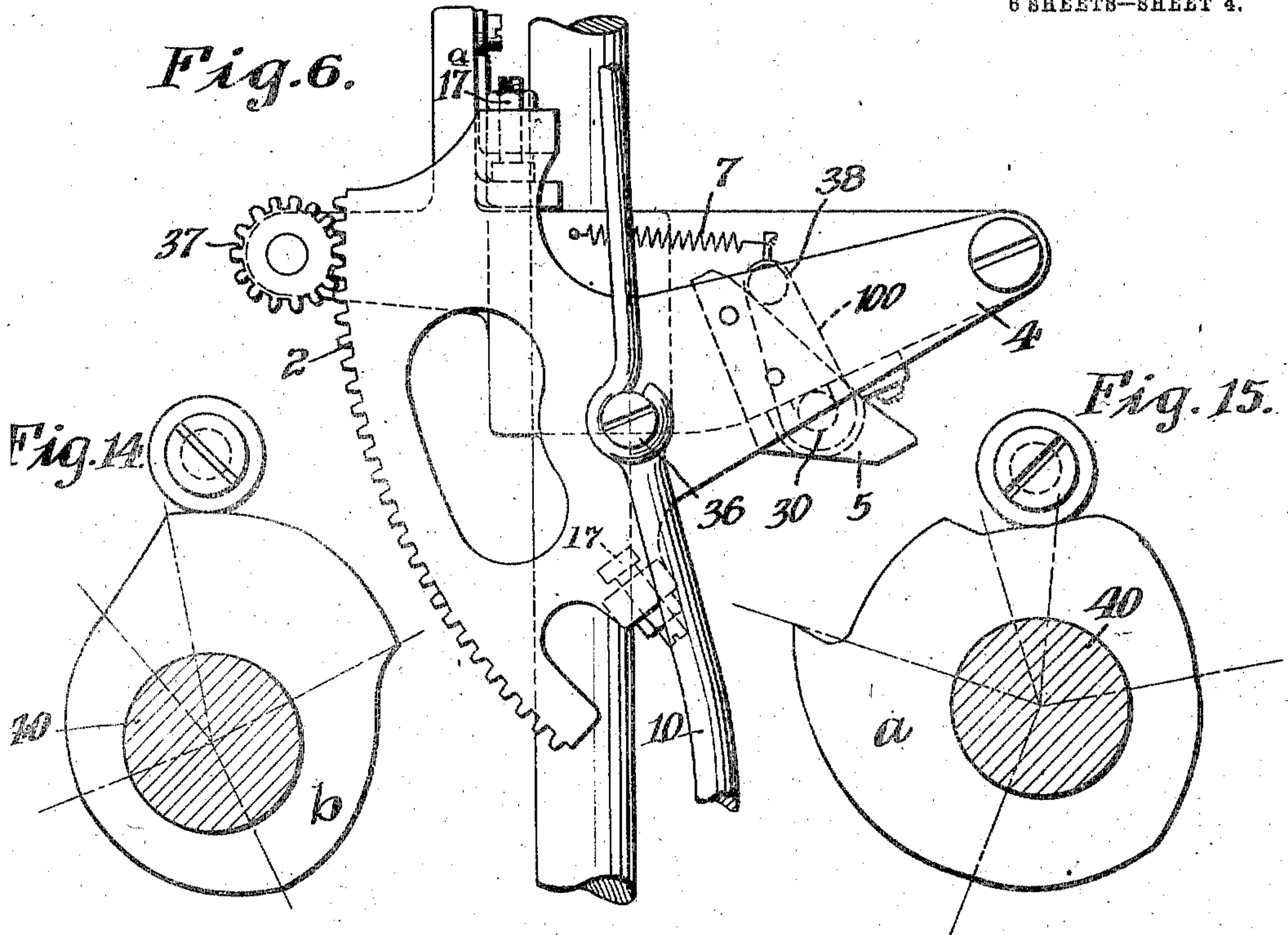
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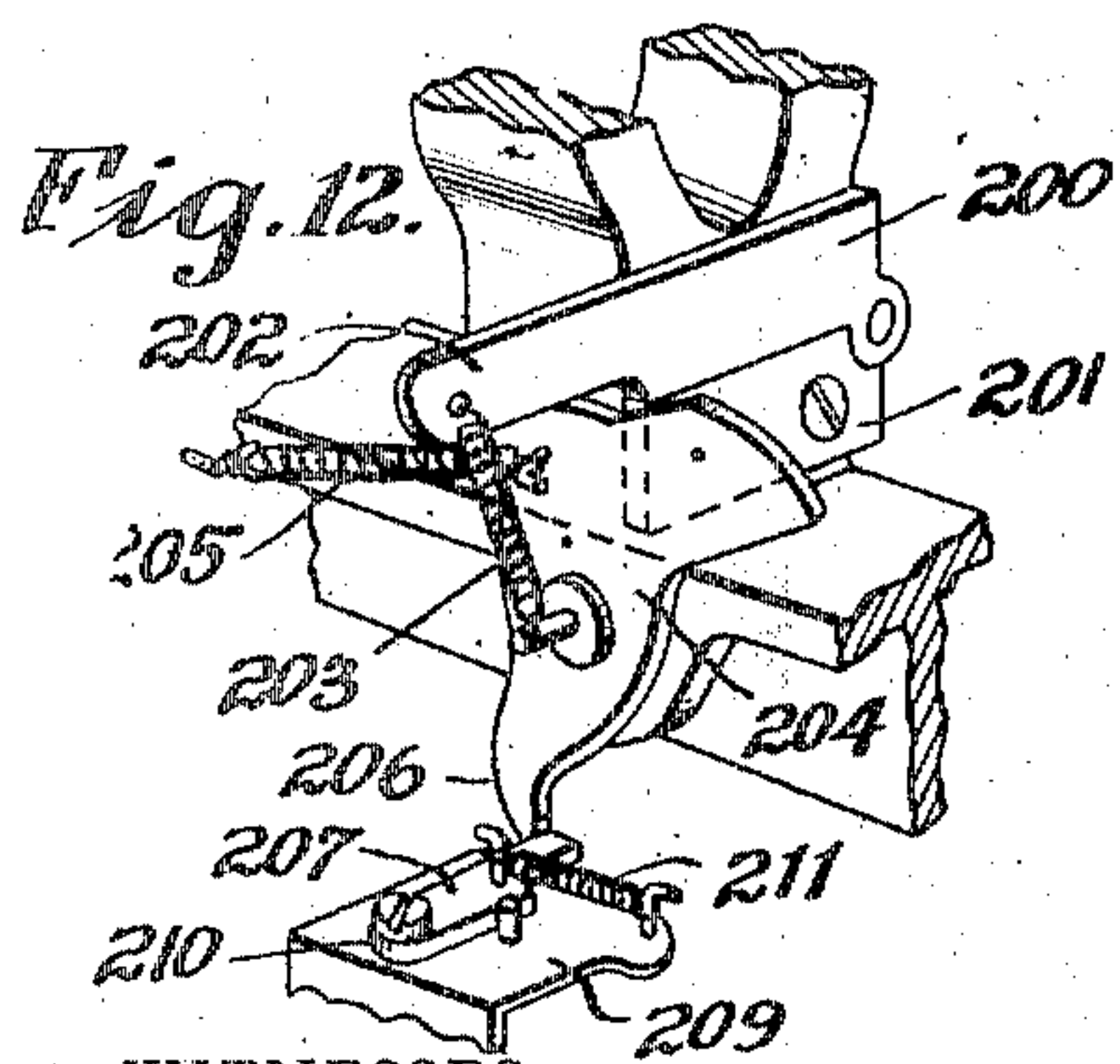
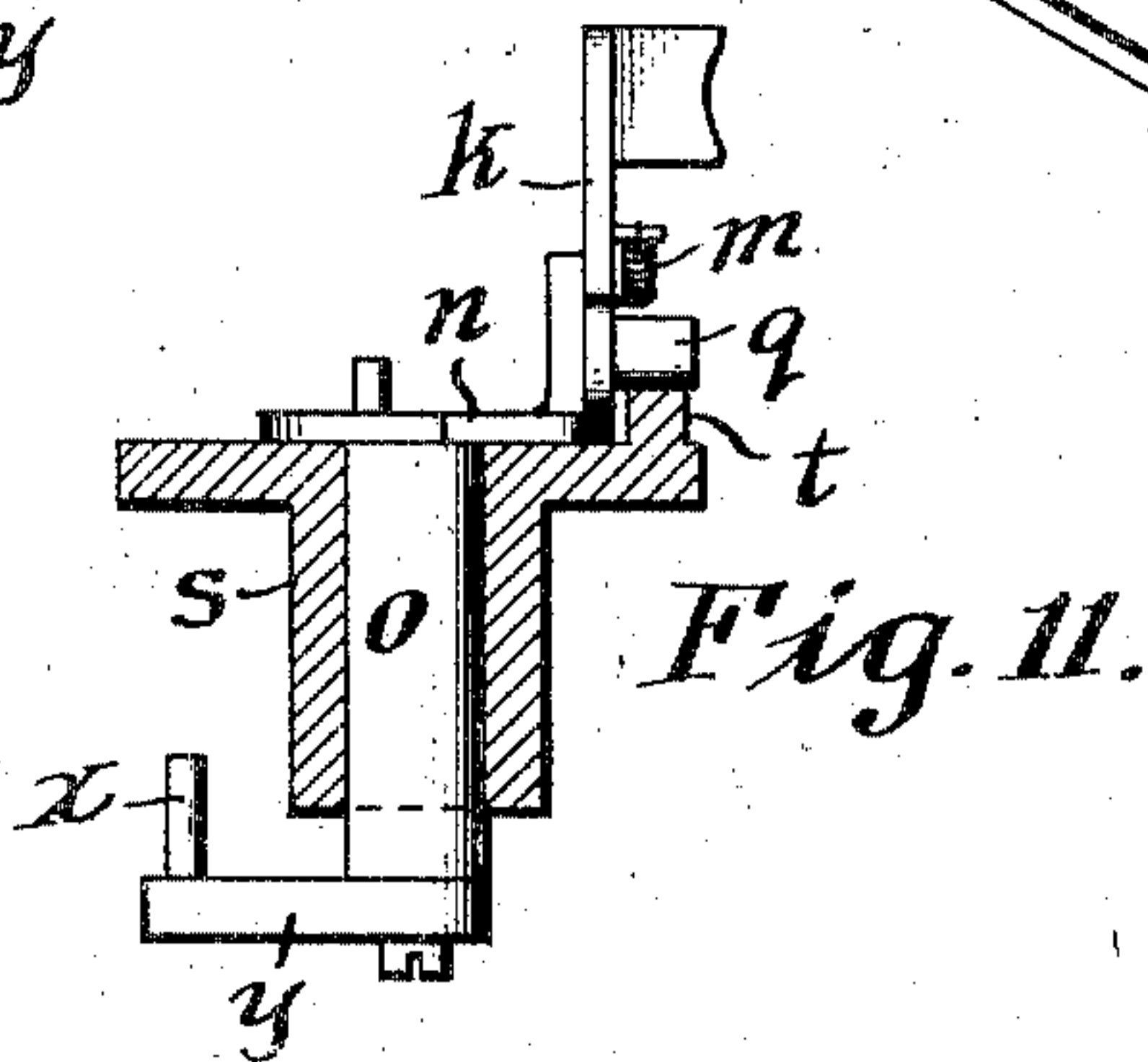
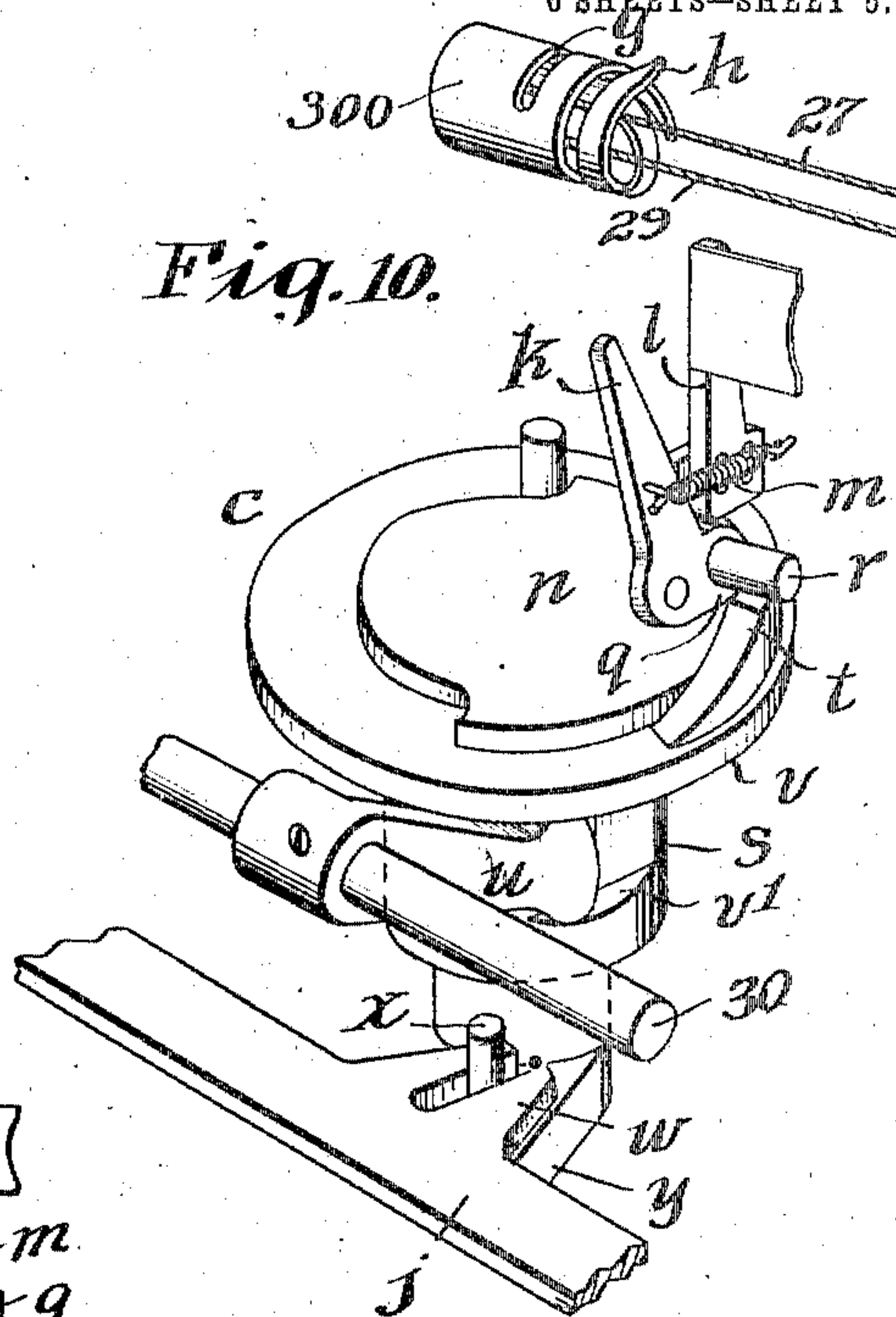
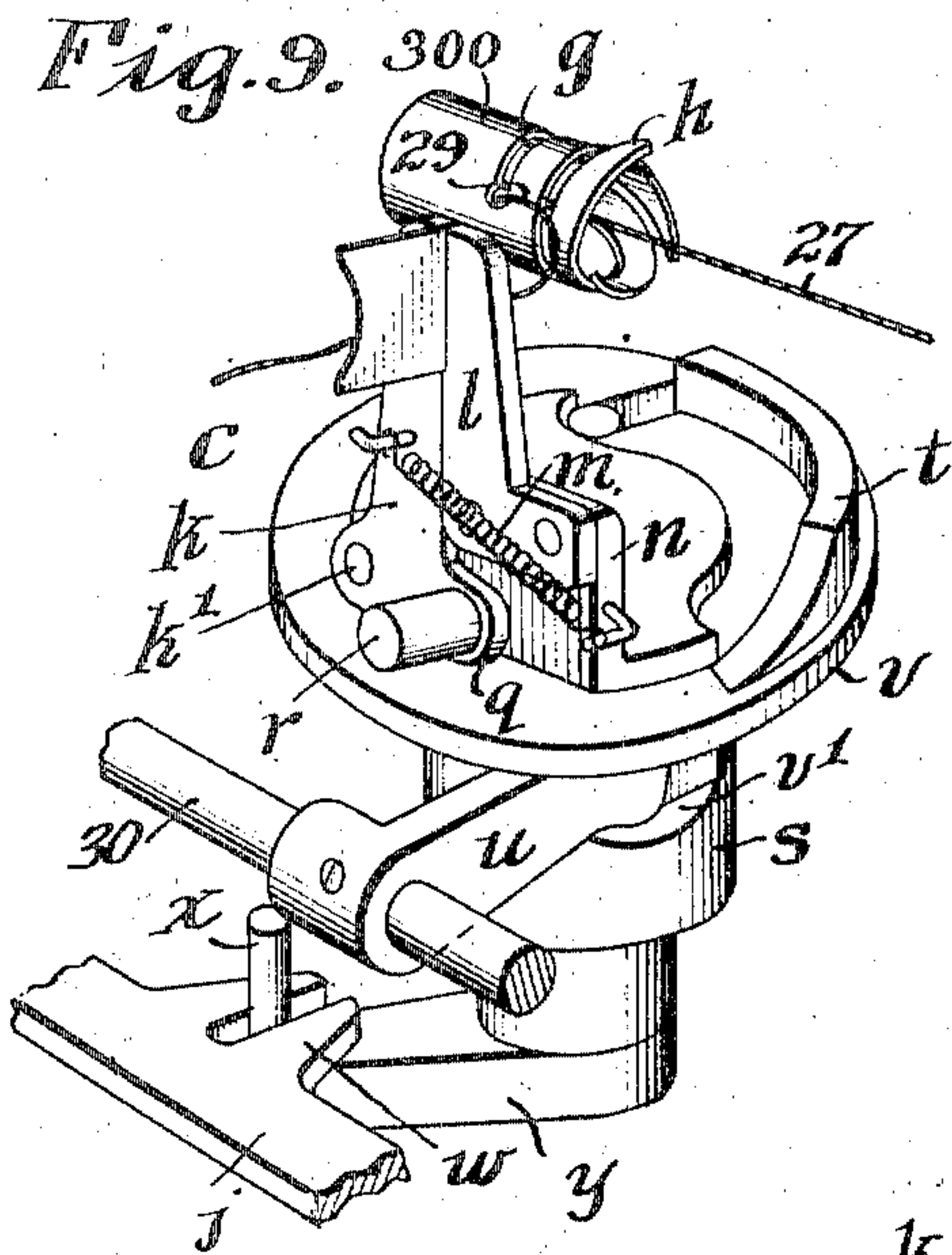
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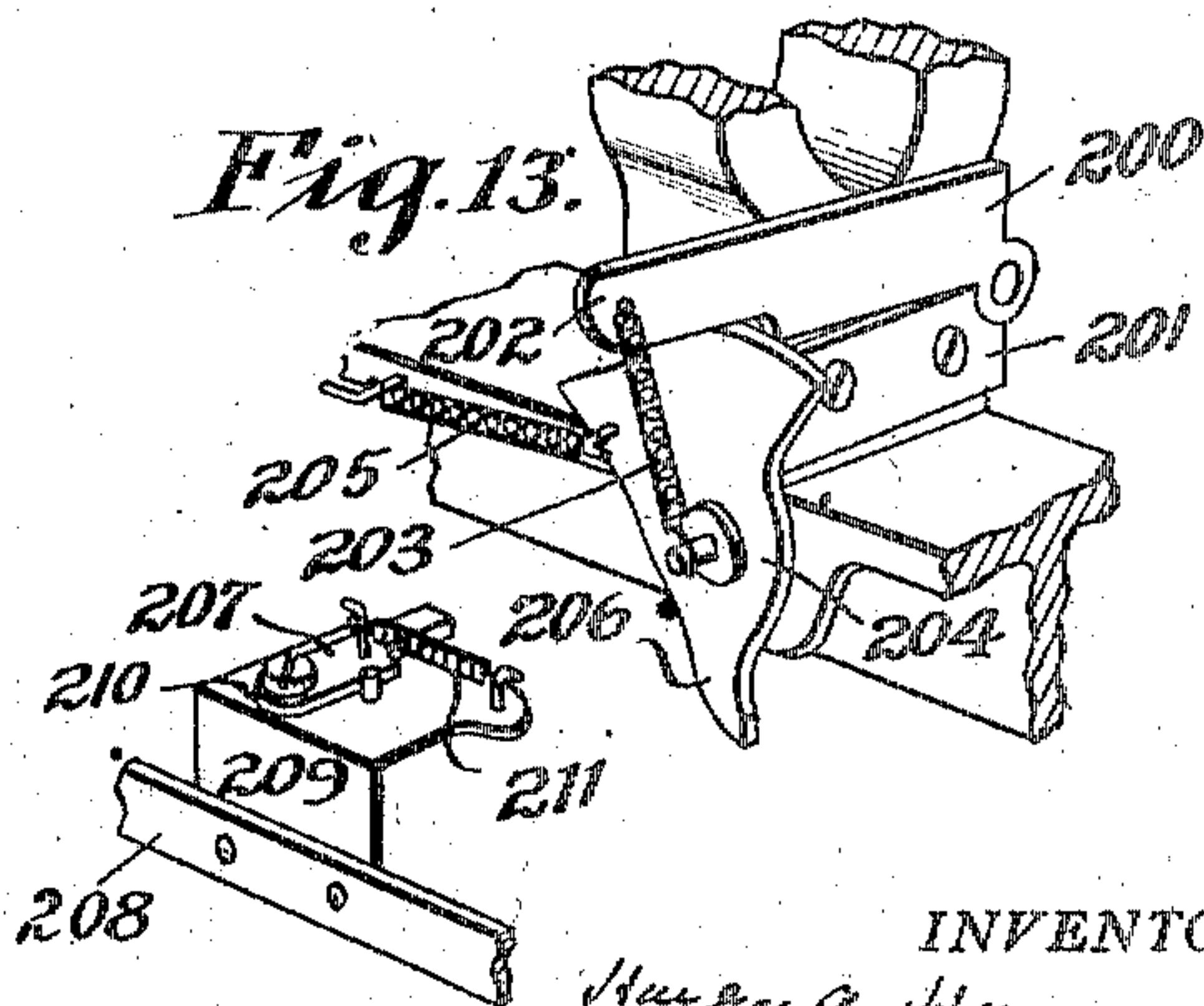
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6 SHEETS—SHEET 6.

Fig. 16.

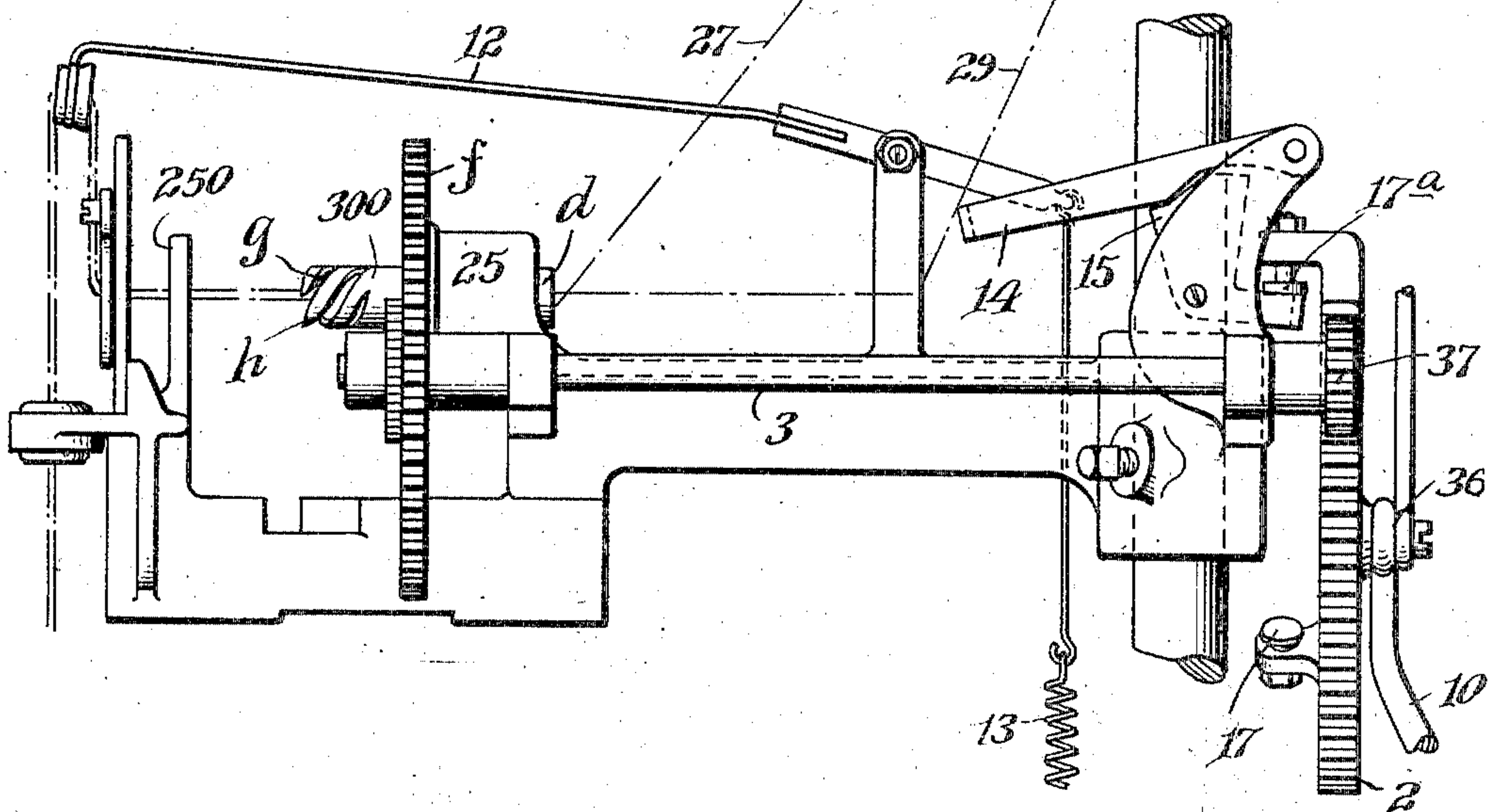
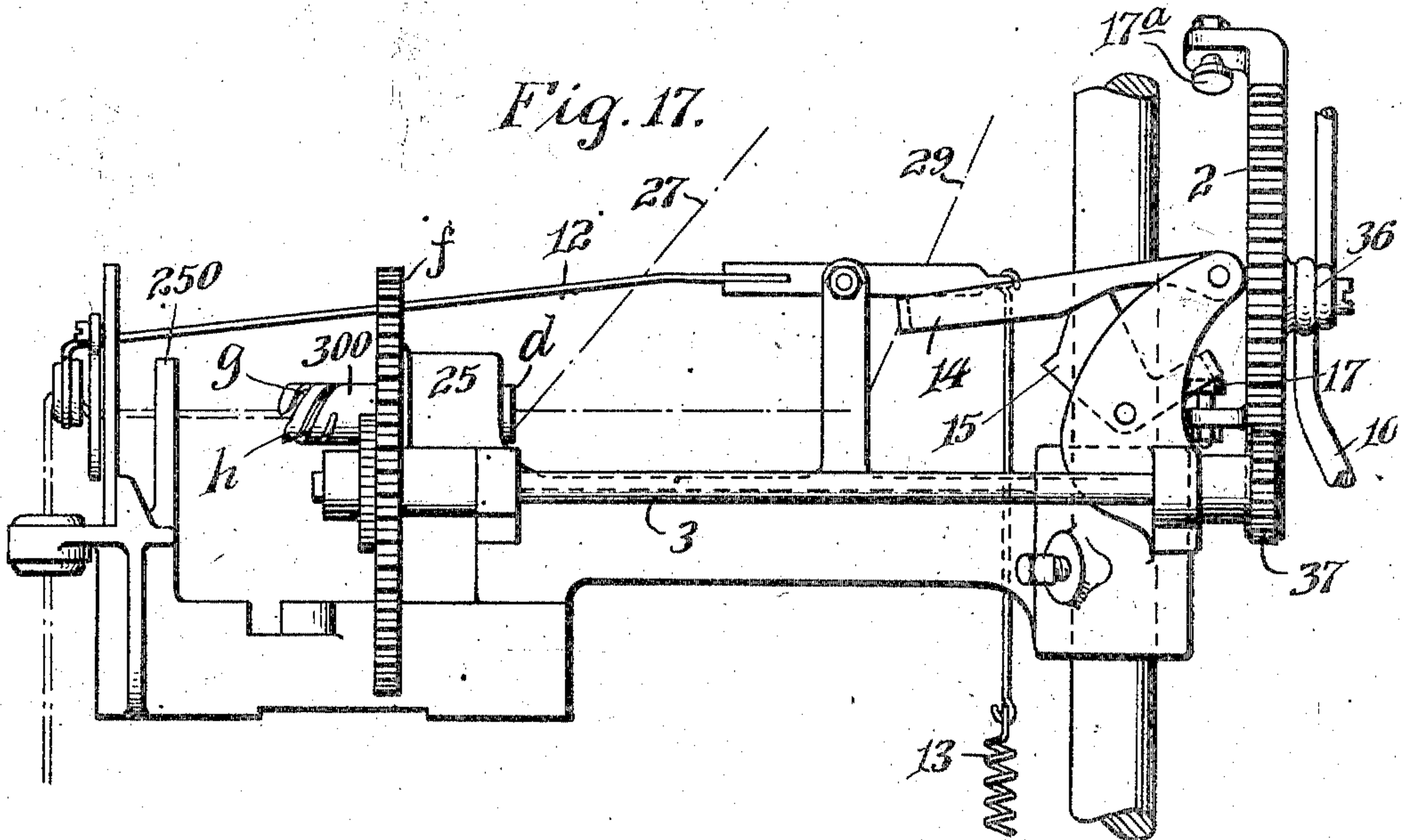


Fig. 17.



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UNITED STATES PATENT OFFICE.

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YARN-SPICING DEVICE FOR KNITTING-MACHINES.

967,019.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed January 21, 1910. Serial No. 539,390.

To all whom it may concern:

Be it known that I, HARRY A. HOUSEMAN, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Yarn-Splicing Devices for Knitting-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention particularly relates to circular knitting machines and to mechanism for introducing to and withdrawing from the needles, with certainty, a supplemental thread, and holding the tension device out of action until said thread is introduced into the needles.

It specifically further relates to novel mechanism for causing the supplemental thread to be wound upon the main thread to be carried by the main thread into the needles, separating the supplemental thread from the main thread by one member of a clamping device, which at that time is open, drawing it by said member into a cutting mechanism and closing the clamp to retain the loose end of the supplemental thread and operating the cutting mechanism.

My mechanism for winding the supplemental thread upon the main thread is also simple and efficient. I use a tube through which both the main thread and the supplemental threads pass. The forward end of this tube has one or a plurality of open-ended spiral slots, the walls of which, at their outer ends, are slightly turned up. The supplemental thread is held by the clamp in line with the outer ends of the slots and simultaneously with the initial rotation of the tube the clamp is given a rearward longitudinal movement carrying the thread rearward in these slots as the tube rotates, thus holding and guiding the supplemental thread as it is carried rearward in the slot by the initial rotation of the tube. When the rearward movement of the clamp is stopped, the further rotation of the tube pulls the thread out of the clamp and twists the supplemental thread on the main thread and the main thread draws the supplemental thread into the needles. As is well known, the main thread is continuously in opera-

tion, while the supplemental thread is intermittently brought into action, as, for instance, for reinforcing the heel and toe. Further, the tension device acting on the threads is held out of action until the supplemental thread is entered with certainty, into the needles, thus preventing any resistance to the supplemental thread being carried freely into the needles. This latter I accomplish by maintaining the tension out of action until at or near the end of the final twisting rotation of the winder. Finally, the mechanism for rotating the winding cylinder is such as to rotate it rapidly and readily.

I will now describe the embodiment of my invention illustrated in the accompanying drawings in which—

Figure 1 is a plan view of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an elevation of the opposite side of Fig. 2, and is shown partially in broken section. Fig. 4 is a perspective view of the operating cams and ratchet and pawl, the pawl being in inoperative position with respect to the ratchet. Fig. 5 is a detail showing the shield for lifting the pawl to render it inoperative with respect to the ratchet. Fig. 6 is a partial elevation of my invention illustrating several of the operating parts. Figs. 7 and 8 are perspective views showing the operation of the cutters. Figs. 9 and 10 are perspective views showing the movement and operation of the clamp. Fig. 11 is a vertical section through the clamp. Figs. 12 and 13 are perspective views of a tension device and its operation. Figs. 14 and 15 are enlarged views showing more clearly the operating cams. Figs. 16 and 17 are views similar to a portion of Fig. 2 showing the tension device 12 respectively out of and in action.

25 is a boss holding the rod *d* having the passage 26 in which the main thread 27 passes and the passage 28 through which passes the supplemental thread 29. 300 is a winder rotatably mounted in line with said rod and through which both threads pass. The main thread then passes from the winder to the thread carrier. The winder has the gear *e* on it which meshes with the gear *f*. The forward end of the winder has a series of open ended spiral grooves *g*,

the walls of which at the ends have the projections *h*.

30 is a rock-shaft and *j* a sliding plate.

c is a clamp formed of the two members *k* and *l* connected by spring *m*. The member *l* is mounted on a plate *n* on shaft *o*. The part *k* is pivotally connected at *k'* to the plate *n*. Projecting from the tail piece *q* of clamp member *k* is the roller *r*. The plate *n* rests on a sleeve *s*. The upper surface of the sleeve *s* has the cam surface *t* upon which the roller *r* rests. When the sleeve *s* is elevated both clamping members *k* and *l* are elevated. When the shaft *o* is rotated the clamp as a whole is rotated, and, in one direction, the cam *t*, acting on roller *r*, opens the movable jaw against the action of spring *m* and, in the other direction, the cam allows the spring *m* to close the jaws.

From the rock shaft 30 projects the finger *u* resting between the flanges *v* and *v'* of sleeve *s* and when the shaft is rocked in one direction the sleeve *s* is elevated and with it the clamp, and, when the shaft is returned, the sleeve and clamp are returned to their initial position.

The sliding plate *j* has the forked projection *w* between which a pin *x*, projecting from a lever *y* mounted on shaft *o* rests. When this sliding plate *j* is moved in one direction the lever *y* is moved, rotating the shaft and with it the clamp, the cam surface of the sleeve allowing the spring to close the clamp, and in the other direction reverses the rotation of the shaft and the clamp, the cam surface causing the clamp to open against the action of the spring.

40 is the shaft for shifting the clutch to change the movement of the cam cylinder 41 from rotation to reciprocation and vice versa, as described and illustrated in Letters Patent issued to me April 30, 1895, No. 538,518. Upon this shaft are the cams *a* and *b*. *a* is the cam for operating gear *e*, and *b* is the cam for operating the sliding plate *j*.

The connections for operating gear *e* are as follows: The follower 1 for cam *a* has a rod 10 which is connected to the frame of a segmental gear 2 pivoted at 36. This segmental gear forms a lever of the third class. The segmental gear meshes with a gear 37 on shaft 3, on which shaft is the gear *f*. The tail piece 4 of the segmental gear 2 carries a cam 5, which in the upper portion of the throw of the segmental gear strikes a pin 38 on the arm 100 fast on rock shaft 30. This lever 100 is provided with a spring 7, one end connected to lever 100 and the other end to the frame of the machine. The purpose of this is to hold the rock shaft (see Fig. 6) in its forward position and with the pin 38 in line with cam 5.

A spring 8, one end connected with the frame of machine and the other end connected to boss 9 on rod 10, normally holds

rod 10 down against action of cam *a* and returns it, and segmental gear when the cam *a* allows rod 10 to drop after being elevated. The threads pass through the tension device 12 acted on by spring 13. A pivoted finger 14 is adapted to rest under this tension device and relieve the action of its spring. This finger is controlled by the pivoted trip 15, the tail piece of which is operated by a pin 17 on the frame of segmental gear, which pin 17 is in such position that when the segmental gear is in its upper position the trip holds the finger 14 to maintain the tension device out of operation, (see Fig. 16) and when the segmental gear is in its lower position, a second pin 17^a releases the trip, allowing the tension device to go into action (see Fig. 17).

The connections from cam *b* for operating the sliding plate *j* are as follows: The rod 18 from cam *b* has a spring normally holding it in its downward position and returning it to that position when cam *b* allows the rod 18 to fall from its elevated position. The rod 18 is connected by a bell crank lever 19 and connecting rod 208 to sliding plate *j* so that in the movement of the rod 18 in one direction the plate *j* is moved forward and in its movement in the other direction returns the slide. On the end of the slide *j* is the incline 20.

21 and 22 are the cutter jaws. The jaw 21 is pivoted at 23 and jaw 22 is pivoted at 24 on stand 250 in front of the winder 300. On the face of the cutter jaw 22 is the groove 260 in which rests the pin 270 connected to cutter jaw 21. An arm 280 is pivoted to jaw 21. This arm, at its lower end, is beveled and rests on slide *j*. A spring 290, having one end connected to tail piece of jaw 21 and the other end to stand 250, normally holds the two jaws together. When the slide moves so that the arm 280 moves up the incline 20 it opens the jaws against the action of the spring 290 and when it moves downward on the incline it allows said spring to close the jaws.

The ratchet 50 and pawl 51 are used, as in my Patent No. 538,518, to operate the clutch shifting shaft to change the movement of the cam cylinder from rotation to reciprocation, and vice versa. This ratchet has five teeth. When the machine is on circular work (cam cylinder rotating) the pawl is prevented from operating tooth 52 as the crown of the tooth is longer than the throw of the pawl. The ratchet is shifted to make this tooth operative in the manner described in my said patent. The pawl then operates teeth 52 and 53 and the shift to reciprocation is made, and after such shift, operates on tooth 54. It is prevented from operating on the next tooth 55 by shield *z* which when released causes pawl to operate teeth 55 and 56. The reshift of the clutch

shifting shaft to return the movement of the cam cylinder to rotation takes place with tooth 56.

The cams *a* and *b* are formed as shown so that with the operation of tooth 52, through the mechanism described, the clamp holding the supplemental thread in line with open forward end of the slots rotates, carrying the thread into and along the groove in the tube at the same time the segmental gear is allowed to drop slightly, to carry the supplemental thread rearward in the slot. On the action of tooth 53 the segmental gear is allowed to drop freely and the supplemental thread is firmly wound on the main thread by the rotation of the tube, and is drawn into the needles by the main thread without any tension resistance, and finally the clamp moves downward. At substantially the end of the drop of the segmental gear the tension trip is released and the tension device goes into action, the supplemental thread at that time being fully entered into the needles. The action of tooth 54 rotates the clamp forward, opens the cutters, and separates or opens the clamp members. The action of tooth 55 partially raises the segmental gear, raising one member *k* of clamping members *k* and *l* of clamp *c* between the supplemental and main threads and rotates clamp outward, drawing the supplemental thread into line with the open end of the spiral slot and toward the cutters. The action of tooth 56 brings segmental gear to its upper position, bringing trip into action to hold tension device out of action, and further rotating the clamp to bring the thread in cutting relation with cutters, closing the cutters on the supplemental thread and clamping the free end of that thread between the clamping members *k* and *l* of clamp *c*. This completes a cycle of operations of cams *a* and *b*, through the mechanism described, upon the clamp, cutters and segmental gear and its connected winder and the tension device, in one rotation of the shifting shaft produced by the action of the pawl 51 upon the teeth 52, 53, 54, 55 and 56 of the ratchet 50. The use of a segmental gear in the form of a lever of the third class, enables it to drop quickly and avoids any complicated mechanism and makes the rotation of the tube to wind rapidly.

When the supplemental thread has been removed out of action, cut, and held by the clamp, the supplemental thread coming from the cop should be locked. For this purpose I use the following device. The supplemental thread passes between the jaws 200 and 201, pivoted together, the tail piece 202 from one of the jaws, is provided with a spring connection 203 which normally holds the jaws closed. The jaws are opened at the proper time by the following mechanism: The tail piece has a cut away

portion, as shown, which when the jaws are closed, rests in the low point of a pivoted cam lever 204, acted upon by the spring 205, which spring tends to pull the cam lever in a direction to elevate the tail piece and release the jaws. The tail piece 206 of this cam lever rests against a spring acted trip 207, which holds the cam lever against the action of its spring. The stand 209 on which this spring acted trip 207 is mounted, is connected to the connecting rod 208, which connecting rod, through mechanism hereinbefore described, operates the sliding plate *j*. The position of this connecting rod during the period in which the supplemental thread is not being used for knitting, is in a rearward position, and in such position that the trip holds the cam lever out of action, as shown in Fig. 12. This is the only position in which the supplemental thread is entirely inactive. In all other positions or conditions it is either being twisted or drawn into the needles, or separated from the main thread and withdrawn from the needles and cut. The initial movement of the sliding plate as before described, is a rearward one to move the clamps longitudinally rearwardly of the groove in the winder. In this rearward movement the trip passes beyond the tail piece of the cam lever, and the cam lever acts through its spring to open the jaws. On the forward movement of the sliding rod, the trip 207 being pivoted at 210, and acted on by the spring 211, will turn on its pivot point without affecting the cam lever. On its return rearward movement, the plate will stop at a point which will hold the trip at a point shown in Fig. 12, when it will have pushed the cam lever into such position as to cause the tail piece acted on by its spring to close the jaws, 200 and 201, and will maintain it locked in that position until the preceding described operation is again resumed.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a knitting machine, the combination of a rotary winder, comprising a tube having an open ended spiral groove, through which tube a plurality of threads pass, a clamp for holding one of said threads in line with the mouth of said groove, means to simultaneously rotate said winder and move said clamp longitudinally of the winder to carry said thread along said groove.

2. In a knitting machine, a thread separator and spreader, comprising a clamp having clamping members, one clamping member of which forms a spreader to separate the running and introduced threads and draw the introduced thread away from the running thread, and means to cause said

clamping member to close on said thread when drawn away from the running thread.

3. In a knitting machine, the combination with a thread separator and spreader, comprising a clamp having clamping members, one clamping member of which forms a spreader to separate the running and introduced threads and draw the introduced thread away from the running thread, of means to cause said clamping member to close on said introduced thread when drawn away from the running thread, cutting mechanism in line with said introduced thread when drawn away from the running thread, and means to operate said cutting mechanism.

4. In a knitting machine, in combination, a rotary winder having an open ended spiral groove, threads passing through said winder, a clamp between the members of which one of said threads is adapted to be held in line with the mouth of said groove, means to successively give the clamp the following movements, a movement longitudinally of the winder, downward and longitudinally in a reverse direction, opening the members, then laterally and vertically to bring one member between the threads, then laterally in a reverse direction to separate the threads to draw one thread away from the other, and finally closing the clamp on the thread.

5. In a knitting machine, in combination, a rotary winder having an open ended spiral groove, threads passing through said winder, a clamp between the members of which one of said threads is adapted to be held in line with the mouth of said groove, means to successively give the clamp the following movements, a movement longitudinally of the winder, downward and longitudinally in reverse direction, opening the members, then laterally and vertically to bring one member between the threads, then laterally in a reverse direction to draw one thread away from the other, cutting mechanism into which the thread is drawn in the last movement, means to close the clamping members on the thread, and means to operate the cutting mechanism in the last mentioned movement.

6. In a knitting machine, a rotary tubular winder through which a plurality of threads pass, said winder having an open ended spiral groove, means to enter the introduced thread into the mouth of the groove, and means to rotate said winder.

7. In a knitting machine, a winder through which a plurality of threads pass, said winder having an open ended spiral groove, means to rotate the winder, means to carry the introduced thread to the mouth of the spiral groove, and means to positively move the introduced thread in the groove longitudinally of the winder.

8. In a knitting machine, in combination, a rotatable winder, a clamp adjacent to the winder, said clamp having members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamp member resting on said cam surface, and means to rotate said shaft.

9. In a knitting machine, in combination, a rotatable winder, a clamp adjacent to the winder, said clamp having members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamp member resting on said cam surface, means to rotate said shaft, and a spring connection between said clamping members.

10. In a knitting machine, in combination, a rotatable winder through which the threads pass, a clamp having clamping members, the said clamp being adjacent to the winder, a movable sleeve said threads being guided in alinement with said movable sleeve, said movable sleeve being adapted to move said clamp to cause one clamping member to enter between the threads, and means to move said sleeve.

11. In a knitting machine, in combination, a rotatable winder through which the threads pass, a clamp having clamping members, the said clamp being adjacent to the winder, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamp member resting on said cam surface, a movable sleeve said threads being guided in alinement with said movable sleeve, said movable sleeve being adapted to move said clamp to cause one member to enter between said threads, means to rotate said shaft, and means to move said sleeve.

12. In a knitting machine, in combination, a rotatable winder through which the threads pass, a clamp adjacent to the winder, said clamp having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamp member resting on said cam surface, a sliding plate, and connection between said plate and said shaft whereby, in the movement of the plate in one direction, the shaft is rotated in one direction, and vice versa in the opposite direction of movement of the plate, and means to move said plate in opposite directions.

13. In a knitting machine, in combination, a rotatable winder through which the threads pass, a clamp adjacent to the winder, said clamp having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamp member resting on said cam surface, a sliding plate, and connection between said plate and said shaft whereby, in the movement of the plate

in one direction, the shaft is rotated in one direction and vice versa in the opposite direction of movement of the plate, a clutch shifting shaft, a cam upon said shaft, and connection between said cam and said plate.

14. The combination, comprising a winder for the end of the introduced thread, a movable clamp, said clamp being adjacent to the winder and having clamping members one clamping member of which is adapted to enter between the introduced thread and the running thread, and means to operate said clamp so as to separate the said threads and hold the supplemental thread in preparation for a further operation.

15. The combination, comprising a winder for the end of the introduced thread, a movable clamp, one member of which is adapted to enter between the introduced thread and the running thread, means to operate said clamp so as to separate the said threads and hold the supplemental thread in preparation for a further operation and means to move the clamp longitudinally of the winder during the initial rotation of the winder.

16. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a vertically movable sleeve adapted to elevate said clamp, means to move said plate, a rock shaft for operating said vertically movable sleeve, a clutch shifting shaft, cams upon said shaft, connection between one cam and the plate, connection between the other cam and the rock shaft.

17. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, means to rotate said shaft, cutting mechanism, and means to open said cutting mechanism in the operation of the means to rotate the shaft in one direction and close said cutting mechanism in the operation of the means to rotate the shaft in the other direction.

18. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, means to rotate said shaft, cutting mechanism, and means to render said cutting mechanism receptive and means to operate said cutting means.

19. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a ro-

tatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a sliding plate, connection between said plate and said shaft whereby, in the movement of the plate in one direction the shaft is rotated in one direction and vice versa in the opposite direction of movement of the plate, means to move said plate in opposite directions, cutting mechanism, and connection between said cutting mechanism and said plate, adapted in the movement of the plate in one direction to render said cutting mechanism receptive, and in the other direction to operate said cutting mechanism.

20. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a sliding plate, connection between said plate and said shaft whereby, in the movement of the plate in one direction the shaft is rotated in one direction and vice versa in the opposite direction of movement of the plate, cutting mechanism, connection between said cutting mechanism and said plate, adapted in the movement of the plate in one direction to render said cutting mechanism receptive, and in the other direction to operate said cutting mechanism, a clutch shifting shaft, a cam upon said shaft, and connection between said cam and said plate for operating said plate.

21. In a knitting machine, in combination, a rotatable winder, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a sliding plate, and connection between said plate and said shaft whereby, in the movement of the plate in one direction, the shaft is rotated in one direction and vice versa in the opposite direction of movement of the plate, a rotatable shaft, a cam upon said shaft, and connection between said cam and said plate.

22. In a knitting machine, in combination, a rotatable winder through which a plurality of threads pass, a clamp adjacent thereto and having clamping members, a movable sleeve adapted to move said clamp, means to move said sleeve, a rock shaft for operating said movable sleeve, a rotatable shaft, a cam upon said shaft, and connection between said cam and said shaft for rocking said shaft, the threads passing through the winder being guided in alinement with said sleeve.

23. In a knitting machine, in combination, a rotatable winder through which a plural-

ity of threads pass, a clamp adjacent thereto and having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a movable sleeve adapted to move said clamp, means to move said plate, a rock shaft for operating said movable sleeve, a rotatable shaft, cams upon said shaft, connection between one cam and the plate, connection between the other cam and the rock shaft, said threads passing through the winder being guided in alignment with said sleeve.

24. In a knitting machine, in combination, a rotatable winder through which a plurality of threads pass, a clamp adjacent thereto, said clamp having clamping members, a rotatable shaft upon which said clamp is mounted, a plate having a cam surface, there being a projection from one clamping member resting on said cam surface, a sliding plate, connection between said plate and said shaft whereby, in the movement of the plate in one direction the shaft is rotated in one direction, and vice versa in the opposite direction of movement of the plate, cutting mechanism, connection between said cutting mechanism and said plate, adapted in the movement of the plate in one direction to render said cutting mechanism receptive, and in the other direction to operate said cutting mechanism, a rotatable shaft, a cam upon said shaft, and connection between said cam and said plate for operating said plate.

25. In a knitting machine, in combination, a rotatable winder, through which the supplemental and main thread pass, a gear for operating said winder, means to oscillate said gear, a tension device for the threads, a trip for holding said tension device out of action, and means adapted at the completion of the movement of the gear in one direction to release said trip, and means adapted at the completion of the movement of the gear in the opposite direction to throw said trip into action.

26. In a knitting machine, in combination, a rotatable winder, through which the supplemental and main threads pass, a gear for operating said winder, means to oscillate said gear, a tension device for the threads, a trip for holding said tension device out of action, a device carried by said gear which acts against said trip to throw it out of action at the completion of its movement in one direction and to throw said trip into action at the completion of its movement in the opposite direction.

27. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip cooperating with said cam lever, in the movement in one direction of the trip, and adapted to release

said cam lever and hold it against the action of its spring, means to move said trip in its cooperative direction, and means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring means to guide a thread between the jaws of said clamp.

28. The combination with the pivoted jaws and the spring for closing said jaw of the cam lever and its spring for normally holding said clamp open, a trip cooperating with said cam lever, in the movement in one direction of the trip, and adapted to release said cam lever and hold it against the action of its spring, means to move said trip in its cooperative direction, means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring, and means to cause said trip to continue its movement in the same direction to pass beyond and release said cam lever means to guide a thread between the jaws of said clamp.

29. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip cooperating with said cam lever, in the movement in one direction of the trip, to release said cam lever and hold it against the action of its spring, and in its inactive position against the action of its spring, means to move said trip in its cooperative direction, means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring, means to cause said trip to continue its movement in the same direction to pass beyond and release said cam lever, and means to move said trip in its non-cooperating direction to its initial position means to guide a thread between the jaws of said clamp.

30. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip cooperating with said cam lever, in the movement in one direction of the trip, to release said cam lever, means to move said trip in its cooperative direction to and beyond the cam lever means to guide a thread between the jaws of said clamp.

31. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip cooperating with said cam lever, in the movement in one direction of the trip, to release said cam lever and inactive in the movement in the opposite direction, means to move said trip in its cooperative direction to and beyond the cam lever, and means to move said trip in its non-cooperating direction to its initial position means to guide a thread between the jaws of said clamp.

32. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip pivoted to be active, in the movement in one direction of the trip, and adapted to release said cam lever and hold it against the action of its spring, means to move said trip in its active direction, and means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring means to guide a thread between the jaws of said clamp.

33. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip pivoted to be active, in the movement in one direction of the trip, and adapted to release said cam lever and hold it against the action of its spring, means to move said trip in its active direction, means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring, and means to cause said trip to continue its movement in the same direction to pass beyond and release said cam lever means to guide a thread between the jaws of said clamp.

34. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip pivoted to be active, in the movement in one direction of the

trip, to release said cam lever and hold it against the action of its spring, and inactive in the movement of the trip in the opposite direction, means to move said trip in its active direction, means to stop the movement of the trip to hold the cam lever in its inactive position against the action of its spring, means to cause said trip to continue its movement in the same direction to pass beyond and release said cam lever, and means to move said trip in its non-active direction to its initial position means to guide a thread between the jaws of said clamp.

35. The combination with the pivoted jaws and the spring for closing said jaws, of the cam lever and its spring for normally holding said clamp open, a trip pivoted to be active, in the movement in one direction of the trip, to release said cam lever, and inactive in the movement in the opposite direction, means to move said trip in its active direction to and beyond the cam lever, and means to move said trip in its non-active direction to its initial position means to guide a thread between the jaws of said clamp.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 8th day of January, 1910.

HARRY A. HOUSEMAN.

Witnesses:

M. M. HAMILTON,

E. E. WALL.