

No. 652,476.

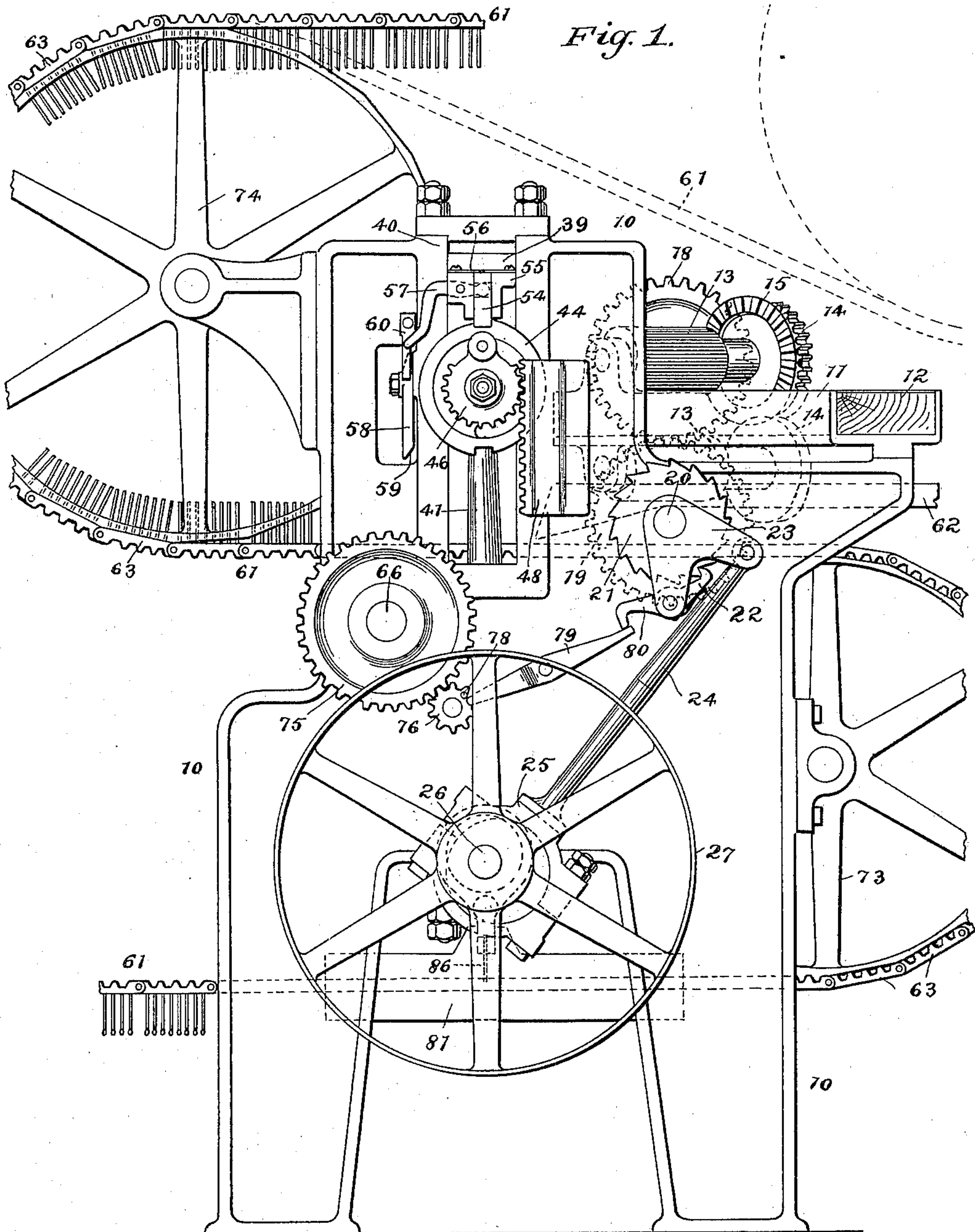
Patented June 26, 1900.

J. A. E. CRISWELL.
MACHINE FOR MAKING MATCHES.

(Application filed Feb. 27, 1900.)

(No Model.)

5 Sheets—Sheet 1.



WITNESSES:

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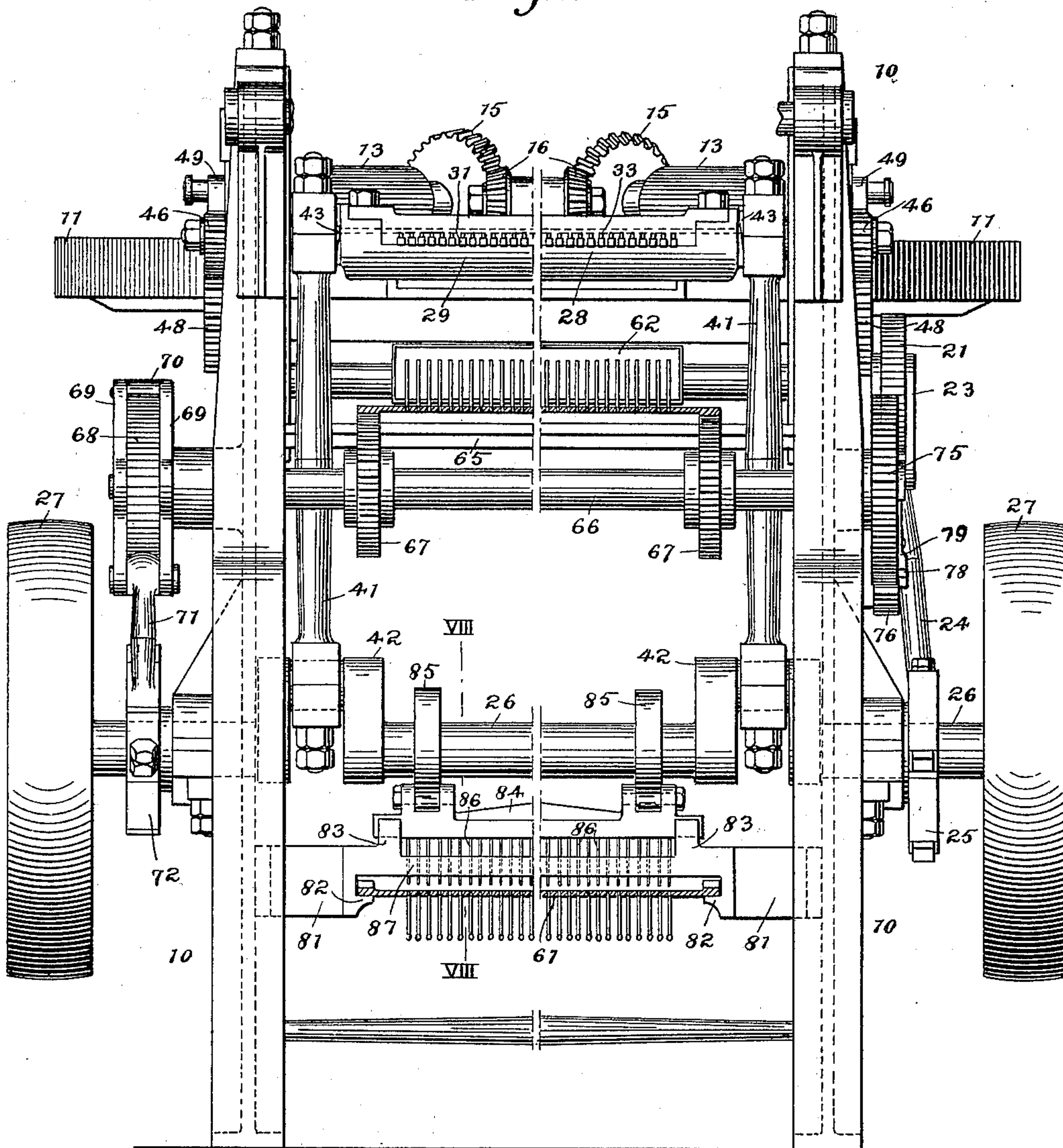
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5 Sheets—Sheet 2.

Fig. 2.



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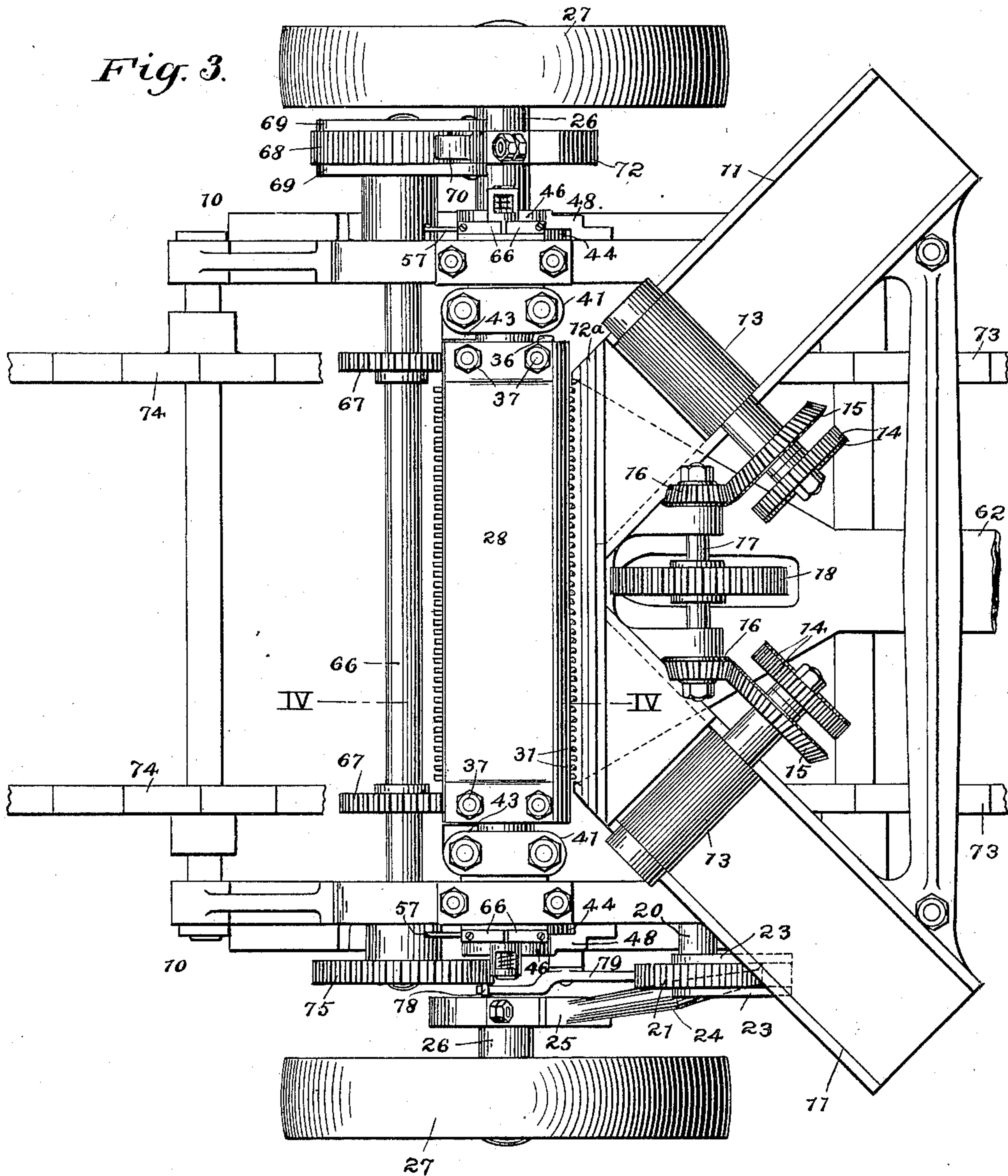
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5 Sheets—Sheet 3.



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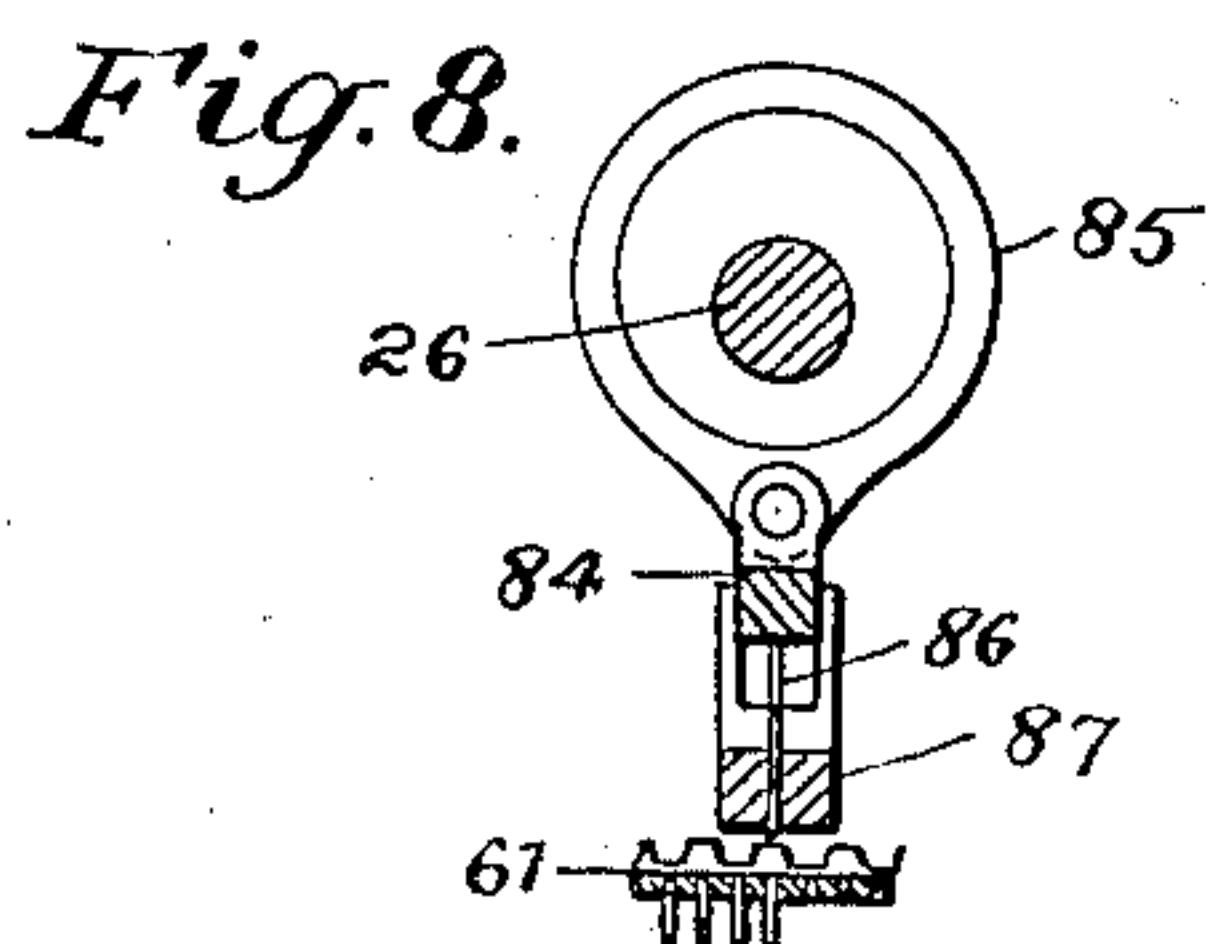
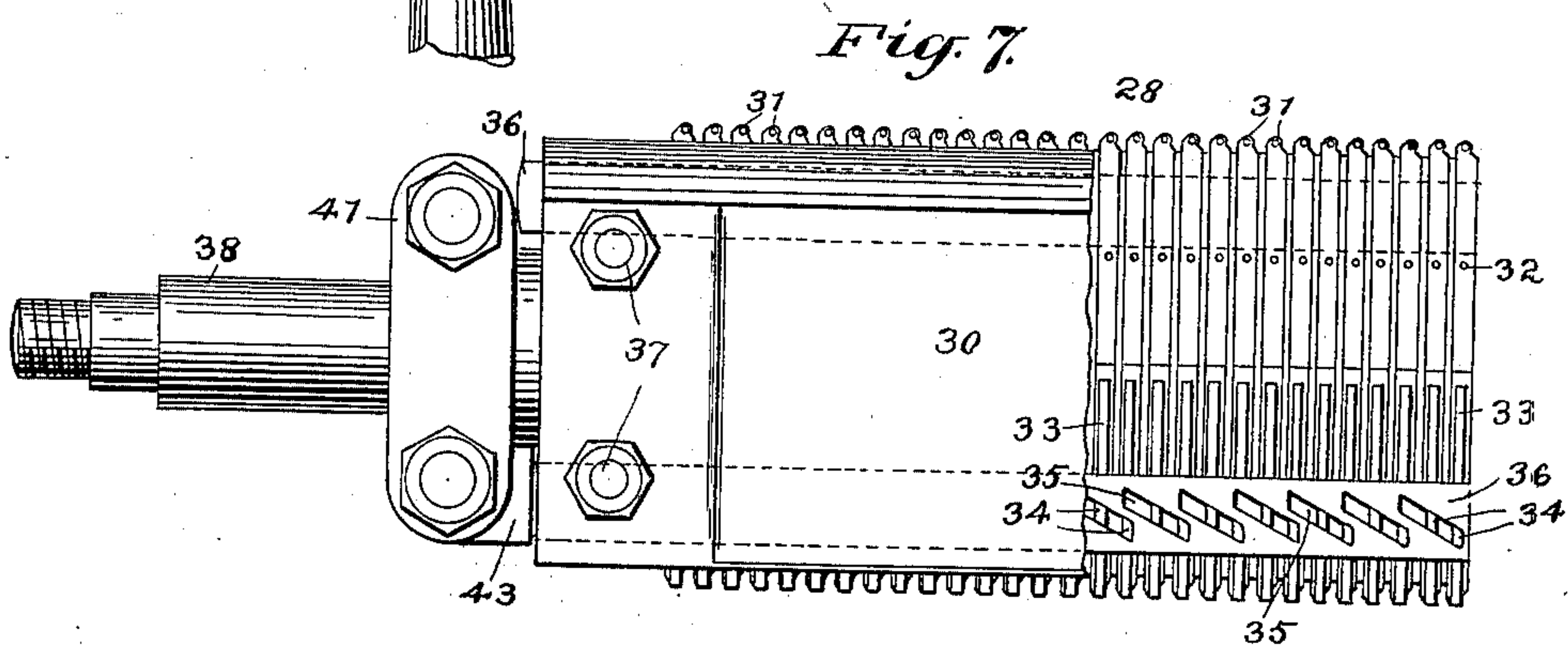
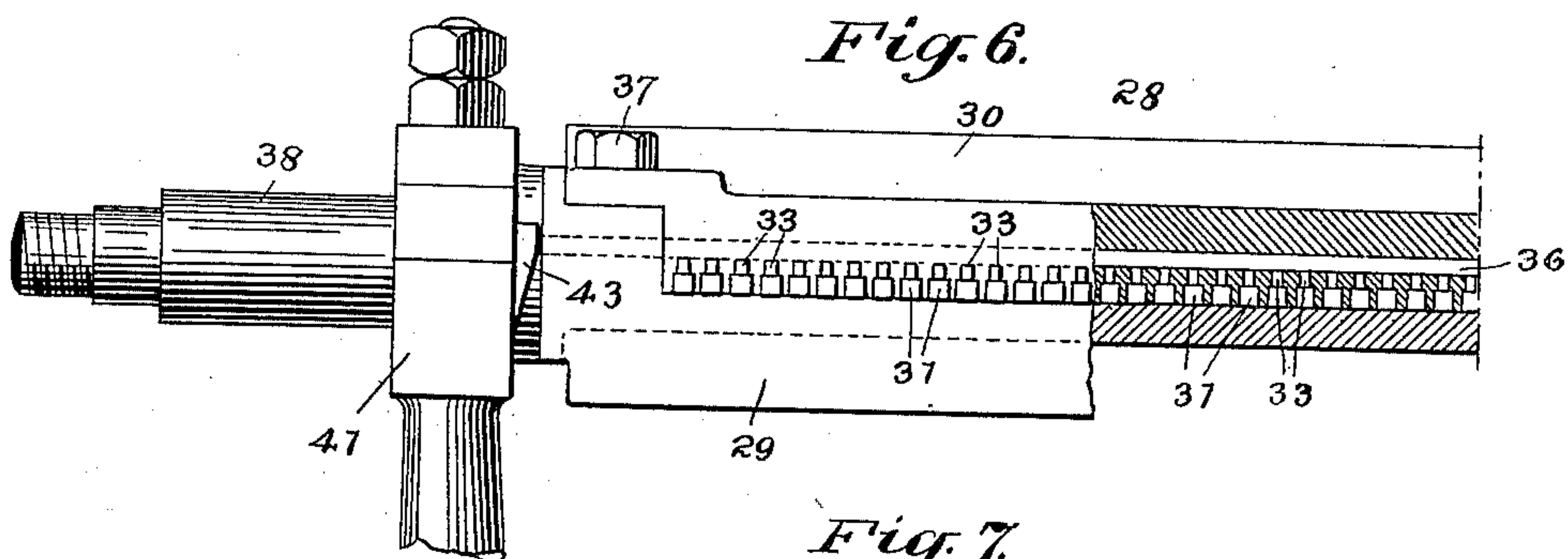
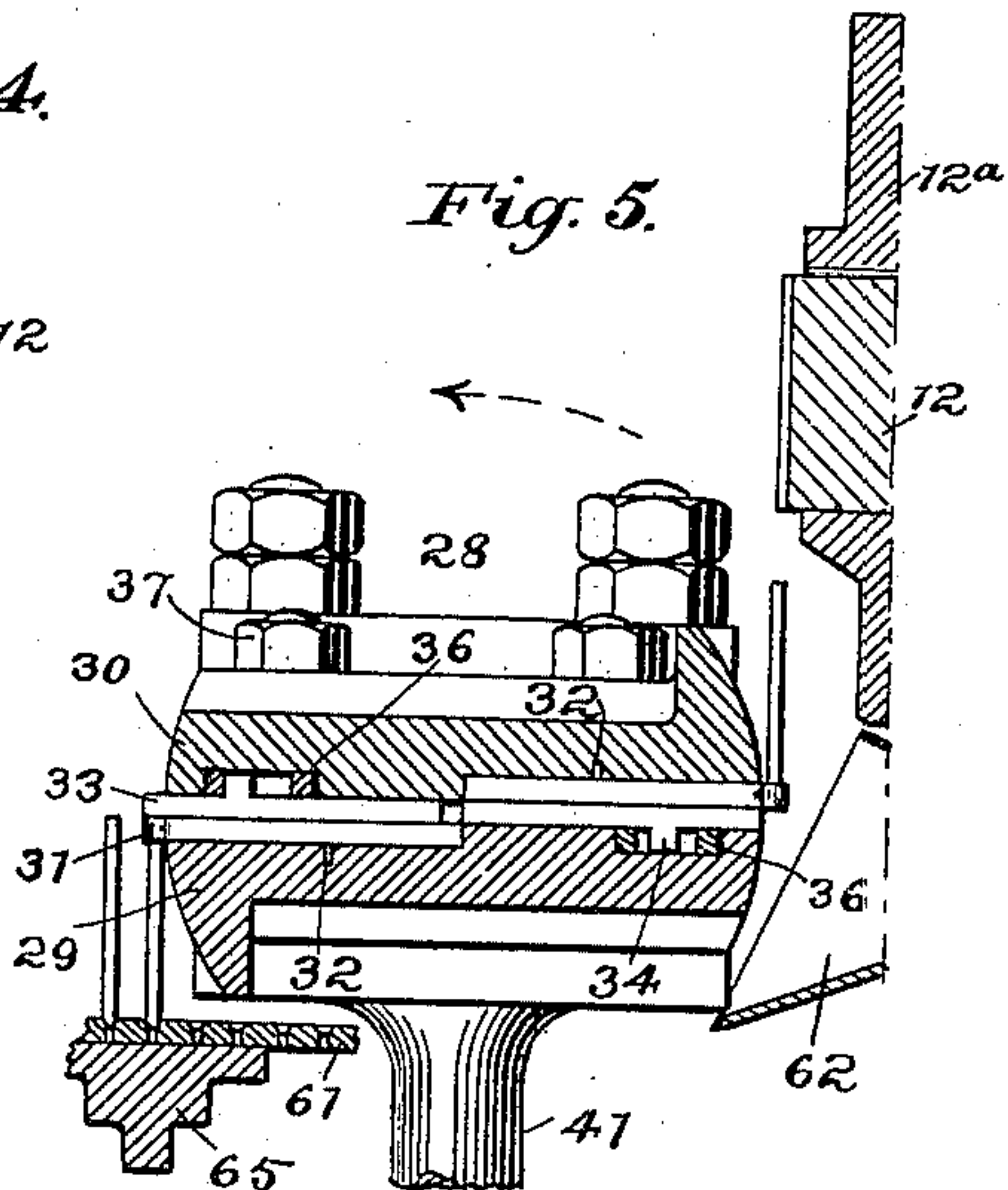
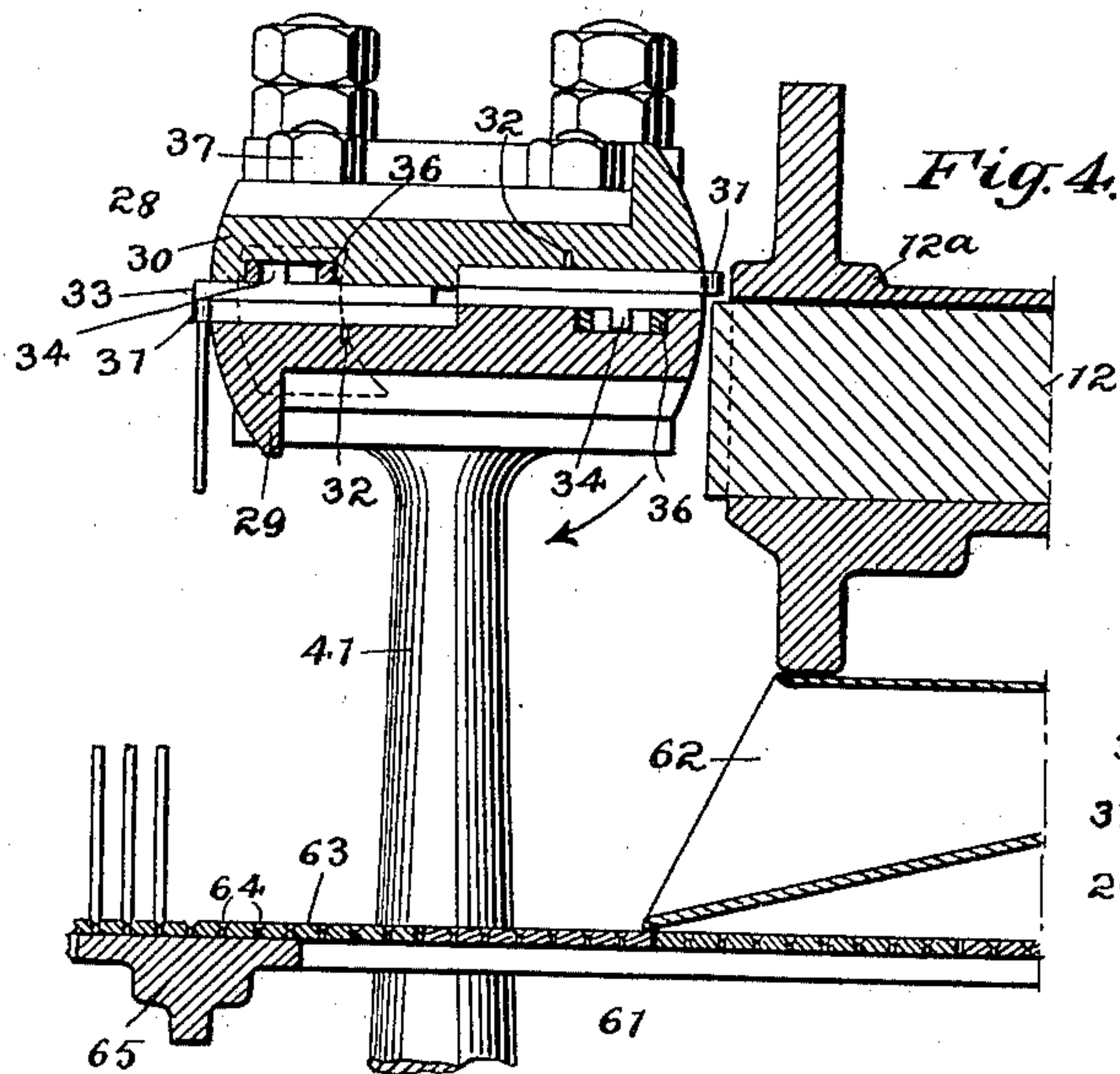
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(Application filed Feb. 27, 1900.)

(No Model.)

5 Sheets—Sheet 4.



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Fig. 9.

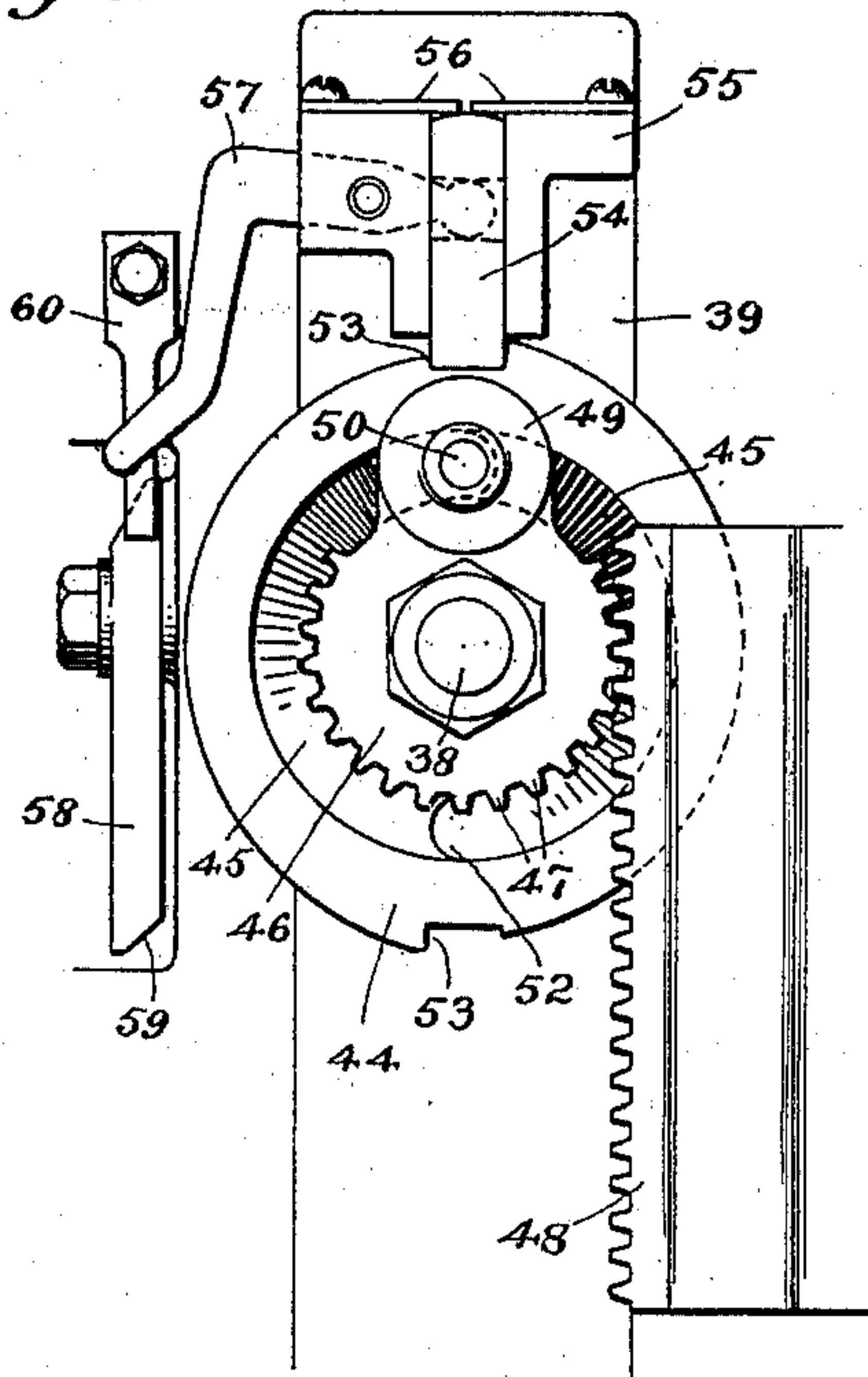


Fig. 10.

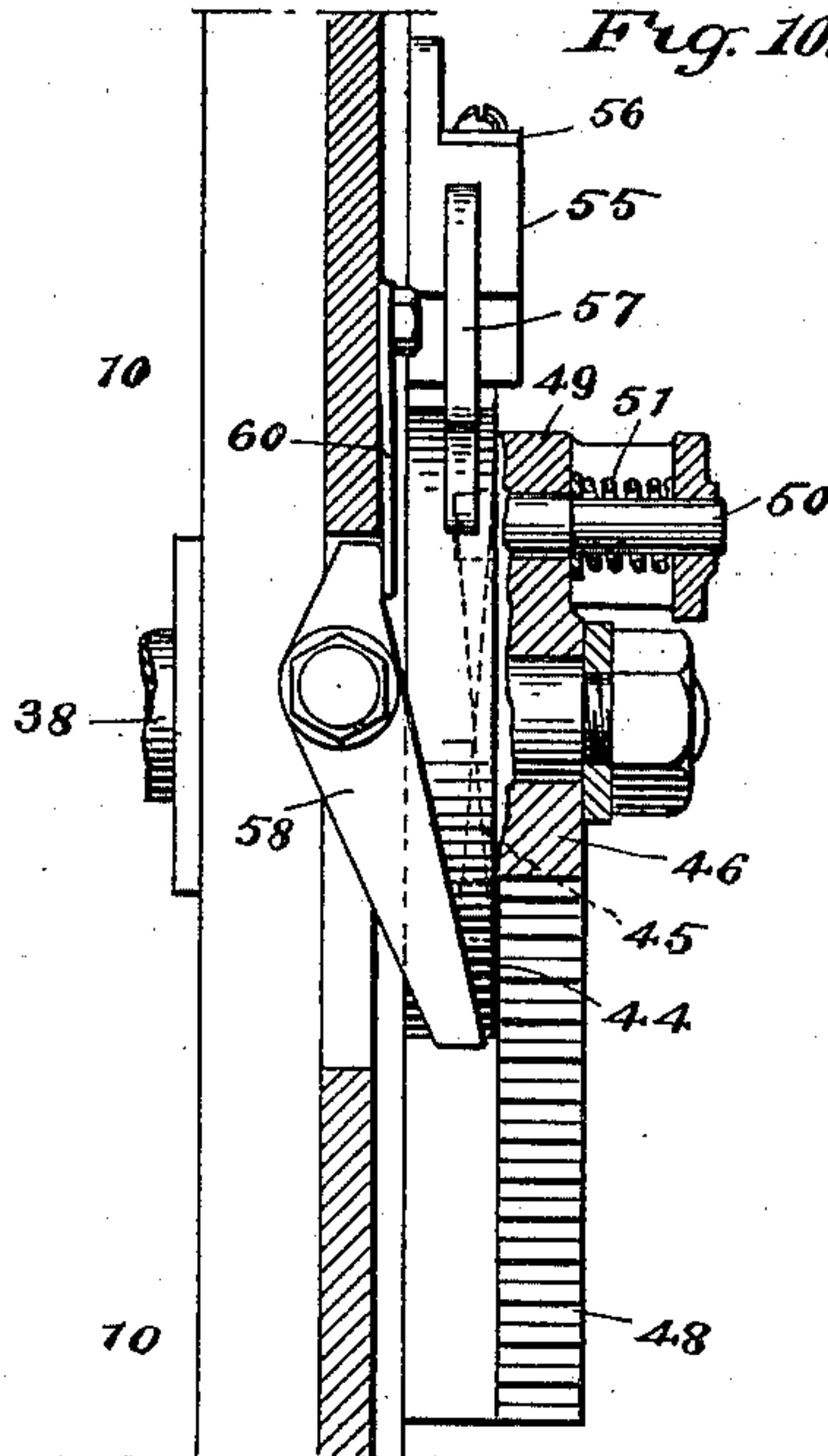


Fig. 11.

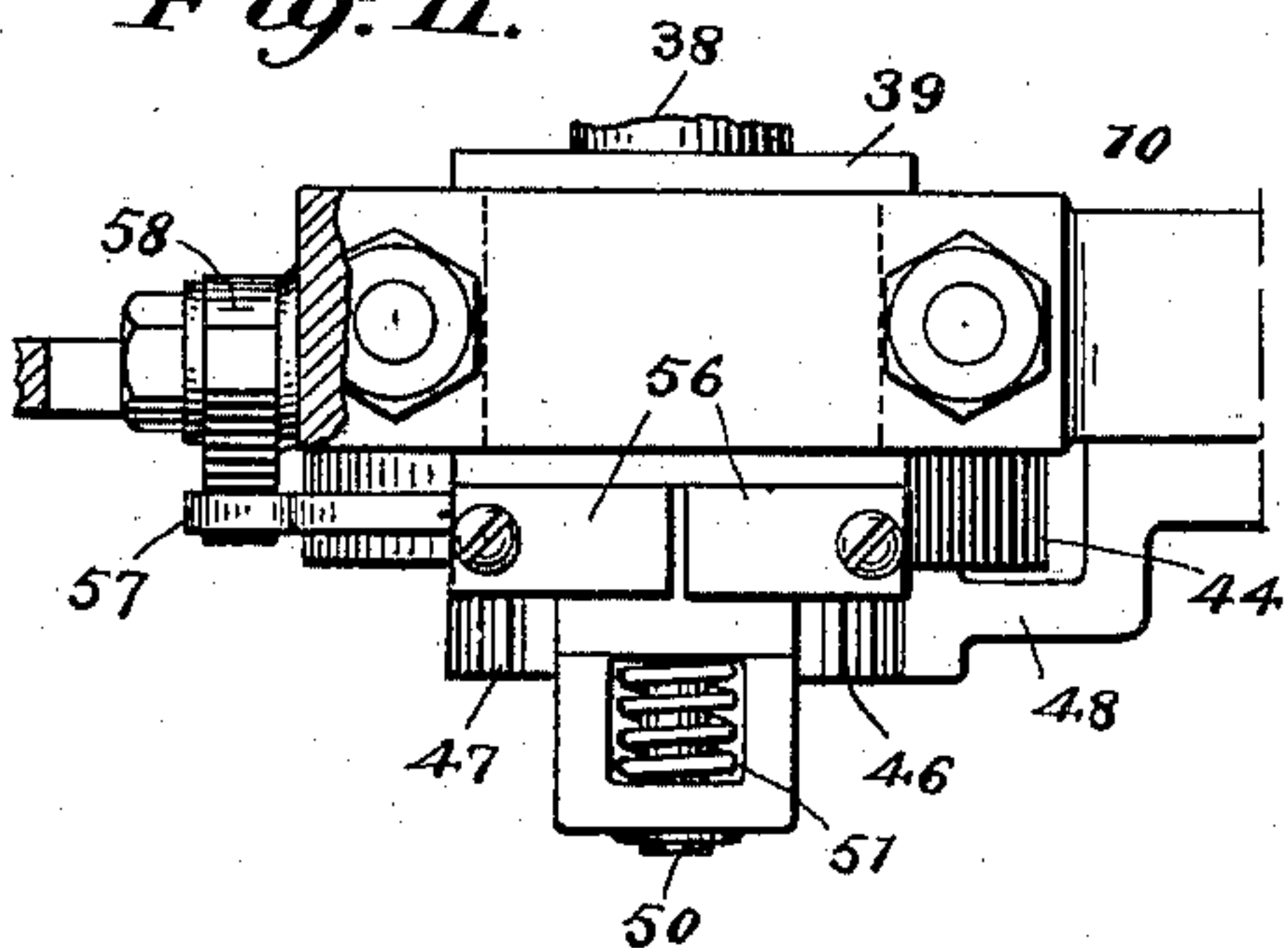


Fig. 12. XIV

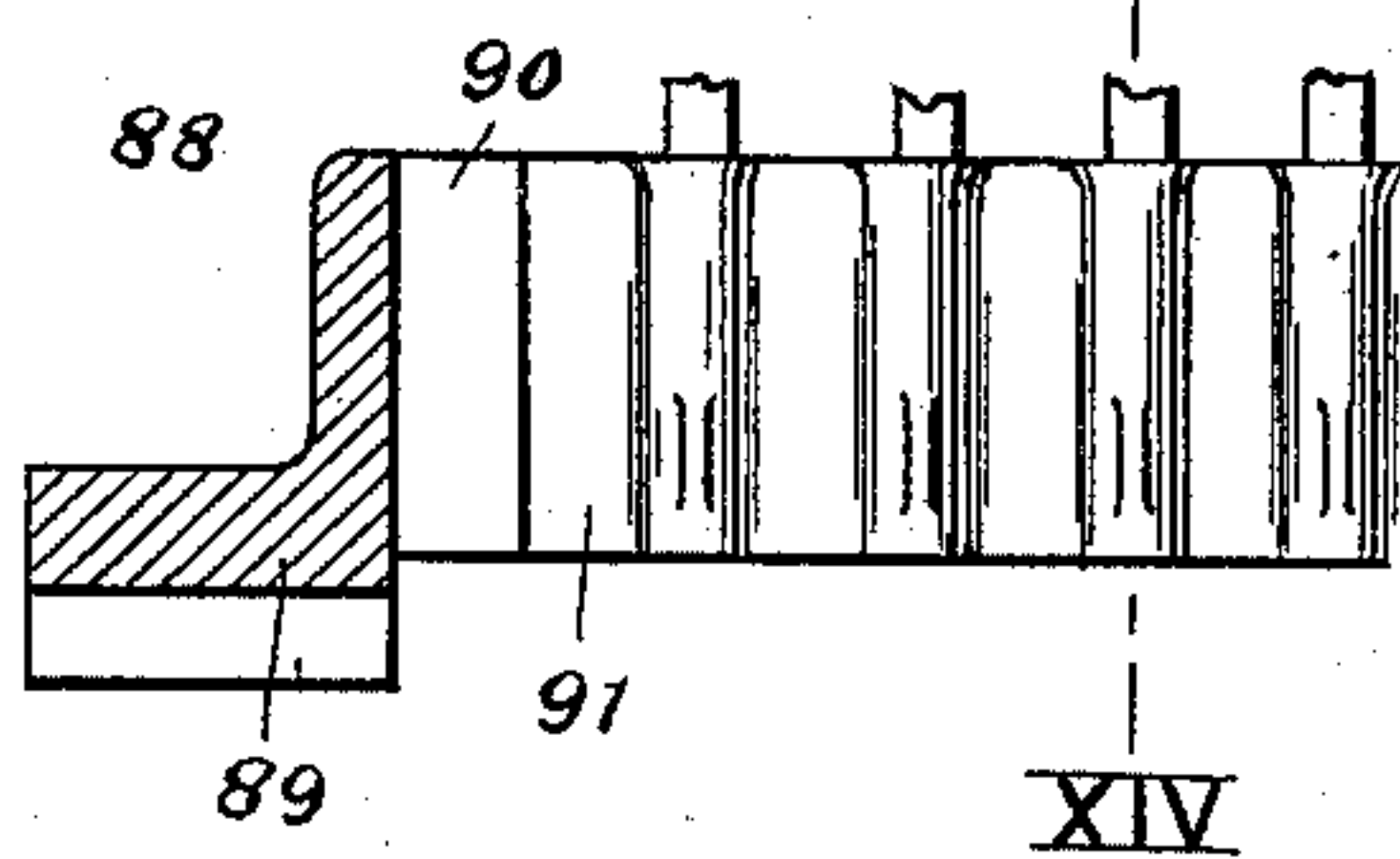


Fig. 13

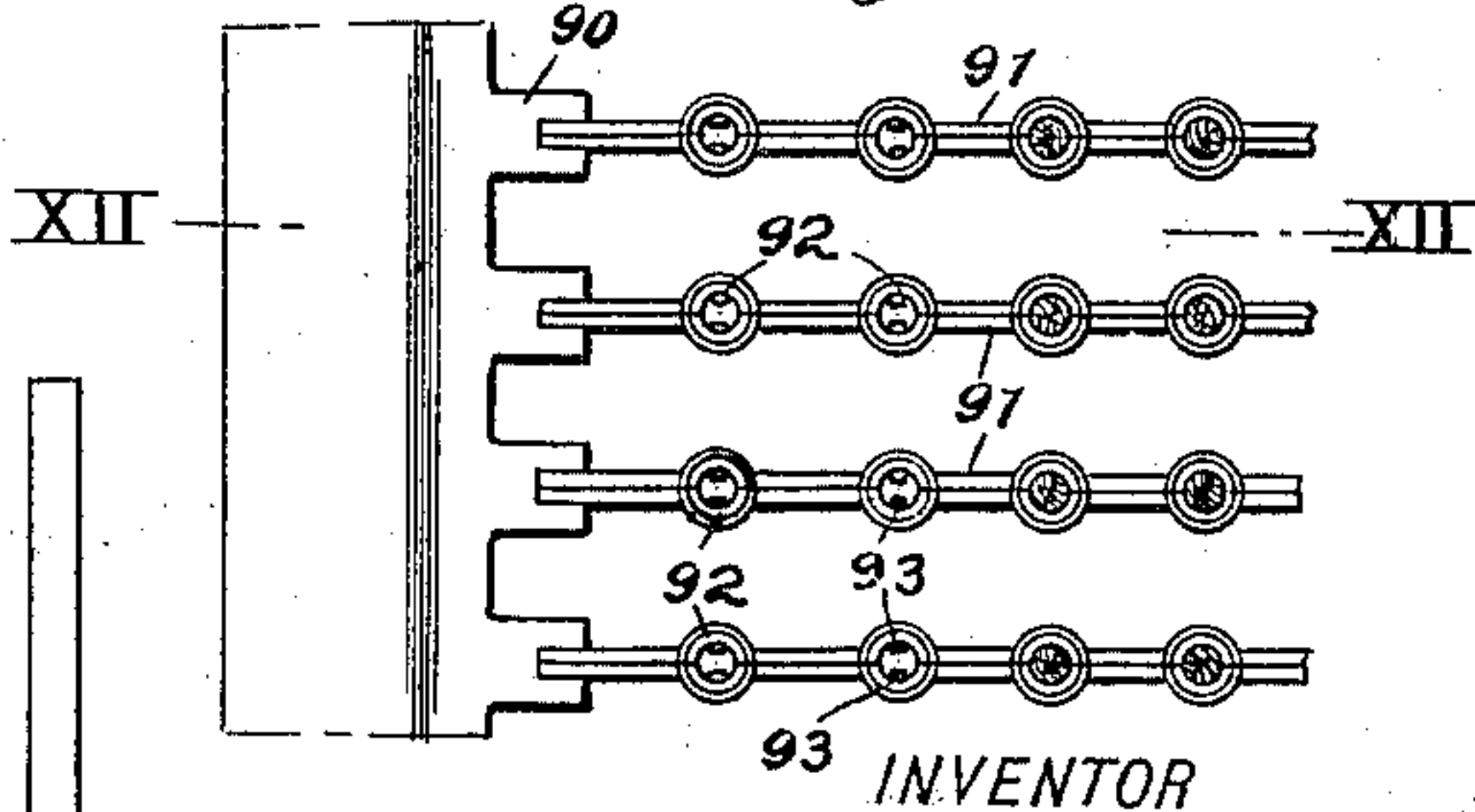
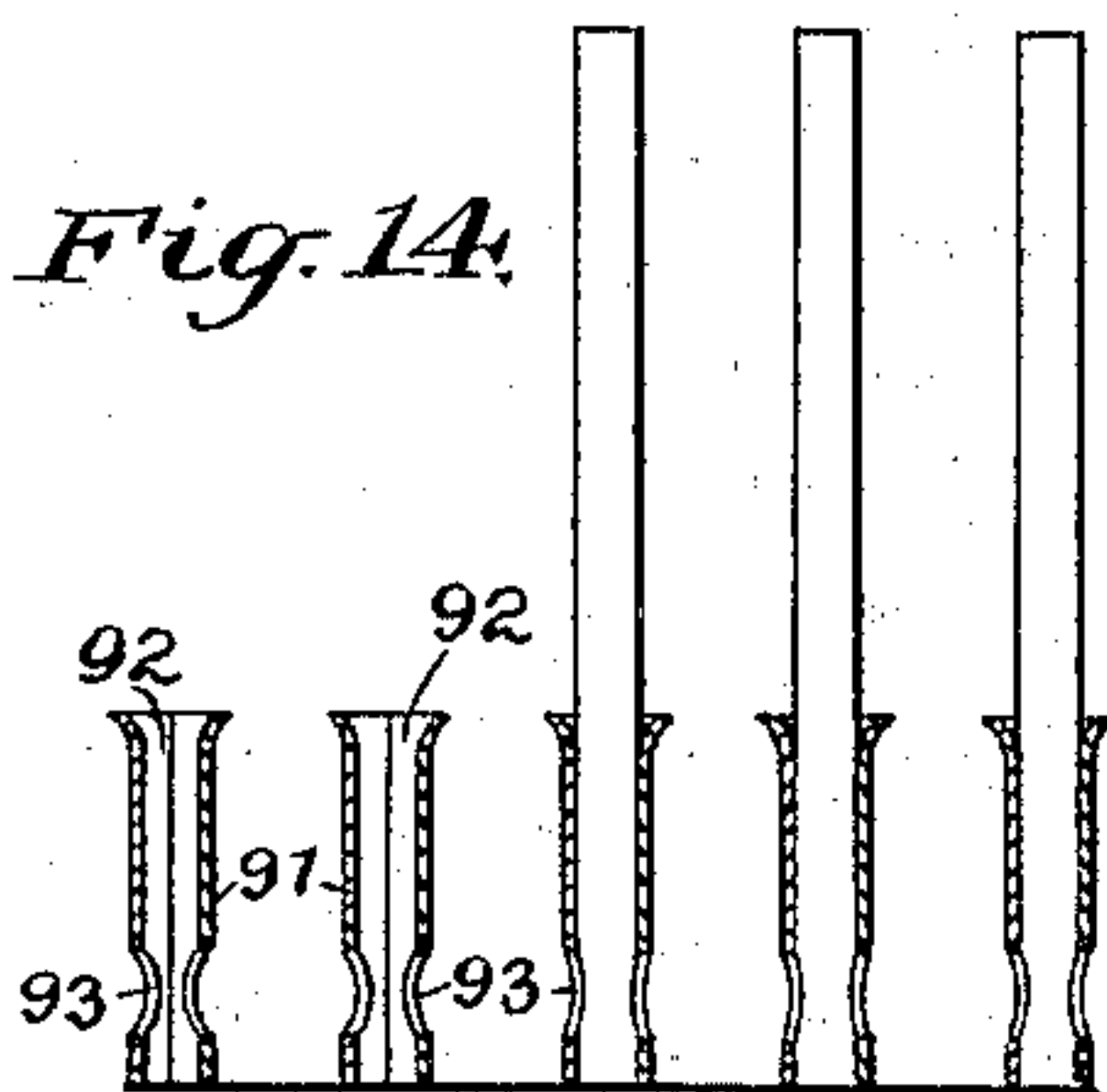


Fig. 14.



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UNITED STATES PATENT OFFICE.

JAMES A. EKin CRISWELL, OF NEW YORK, N. Y.

MACHINE FOR MAKING MATCHES.

SPECIFICATION forming part of Letters Patent No. 652,476, dated June 26, 1900.

Application filed February 27, 1900. Serial No. 6,693. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. EKin CRISWELL, of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Machines for Making Matches, of which the following is a full, clear, and exact description.

This invention relates to match-making machines, but more particularly to machines in which the splints are cut from blocks of wood.

The primary object of the invention is to provide simple and efficient means by which the splints may be cut from the block and then swung or moved clear of the splint material in position to be forced into holding devices in a suitable carrier.

Another object of the invention is to provide a simple and efficient reciprocatory and intermittently - rotary cutter - head having more than one set or row of cutters by which sets or rows of splints spaced apart are cut in succession and by which a set or row of splints is cut during the same reciprocatory movement of the cutter-head that previously-cut splints are forced into position to be held by the carrier.

A further object of the invention is to provide simple and efficient means by which the feeding of the splint material may be stopped at stated intervals and the other parts of the machine operated independently of the feeding mechanism to permit the carrier to be moved without receiving splints at predetermined intervals, thus allowing the carrier to comprise a series of linked members.

With these and other objects in view the invention consists in the construction and combination of the several parts, substantially as hereinafter described and then pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a side elevation, partly broken away, of one form of machine embodying my invention. Fig. 2 is a front elevation, the machine being broken centrally and the sections of the frame brought closer together. Fig. 3 is a plan view, partly broken away. Fig. 4 is a fragmentary vertical section through the cutter-head, on a larger scale, taken on the line IV IV of Fig. 3. Fig. 5 is a view similar to Fig. 4 except that the cutter-head is in a different position. Fig. 6 is

a fragmentary front elevation of the cutter-head, partly broken away to show one of the cam-bars. Fig. 7 is a fragmentary plan view of the cutter-head, partly broken away to show the arrangement of the cutters, slides, and one of the cam-bars. Fig. 8 is a vertical section taken on the line VIII VIII of Fig. 2, showing the punches for ejecting the splints from the carrier. Fig. 9 is an enlarged detail of the mechanism for giving an intermittent rotary movement to the cutter-head. Fig. 10 is a vertical section, partly is elevation, of the mechanism shown in Fig. 9. Fig. 11 is a plan view of Figs. 9 and 10. Fig. 12 is a transverse section of a modified form of carrier or holding device, taken on the line XII XII of Fig. 13. Fig. 13 is a fragmentary plan view of the carrier shown in Fig. 12, and Fig. 14 is a vertical section taken on the line XIV XIV of Fig. 12.

The frame 10 may be of any suitable form and construction and may comprise two or more sections properly held together. On the frame are one or more troughs or hoppers 11 for the blocks 12, from which the splints are to be cut. As shown, there are two converging feed-troughs by which the cutters may cut a single row or set of splints in a straight line from both sets of blocks, though the troughs may be arranged in any suitable manner. The feed-troughs 11 have a cover-plate 12^a at their inner ends, and each trough is provided with feed-rolls 13, which engage the upper and lower surfaces of the blocks of splint material to force the latter inward. The shafts of the feed-rolls are journaled in brackets or lugs on the troughs, and the shafts of said rolls of each trough are geared together by the gears 14. Each shaft of the upper feed-roll is provided with a bevel-gear 15, which meshes with a smaller bevel-gear 16 on a transverse shaft 17. A gear 18 on the shaft 17 meshes with a similar gear 19 on transverse shaft 20, as shown in Fig. 1. The shaft 20 has at one end a ratchet-wheel 21, the teeth of which are engaged by a pawl 22. The pawl is carried between one end of two bell-crank levers or arms 23, the other end of said levers or arms being connected to a rod 24 of the eccentric-strap 25. The strap 25 has its eccentric secured to the main drive-shaft 26, on each end of which is a pul-

ley 27, the rotation of which through the ratchet-and-pawl mechanism and train of gearing described will cause the blocks of wood to be fed into the path of movement of the splint-cutting devices.

As a means for cutting the splints I provide a suitable reciprocatory and intermittently-rotary cutter-head, as at 28. The cutter-head has the main member 29 and the second member or clamping-plate 30, between which are the cutters 31. These cutters may be of the usual or of any preferred form and are held in grooves in the clamping or cap plate 30, between said plate and the member 29. As shown, there are two sets or rows of cutters 31, Figs. 4 to 7, the cutting ends of which project from opposite sides of the head, and one set is in a plane somewhat above the other set. The cutters 31 have pins 32 entering holes in the head, and on one side of each cutter is a slide 33. These slides have each a projection 34, which enters cam-grooves 35 in the cam-bars 36. There are two bars 36, and each groove 35 is of sufficient length to have the projections or pins 34 of two slides to enter said grooves. The two members of the head are clamped together by the bolts 37, and the main member 29 has the studs or shafts 38 formed thereon, which are journaled in the bearings 39, that move vertically in the guides 40 of the frame. Connecting-rods 41 span the shafts or studs 38 at one of their ends, while the other ends of said rods are operatively connected to the cranks 42 on the main drive-shaft 26. The upper ends of the rods 41 are each provided with a cam 43, one of which operates the cam-bars 34 in one direction, while the cam on the other connecting-rod operates the bars 34 in the opposite direction when the cutter-head is given a rotary movement in the manner and for the purpose to be hereinafter described. The construction and arrangement of the head may be varied, and the cutter-bars may be made longer and provided with cutting devices at each end to provide the two independent sets or rows of cutters instead of using two sets of short cutter-bars, as shown in the drawings.

The rotary movement of the cutter-head may be secured by various means. As shown, Figs. 1, 9, 10, and 11, the shafts or studs 38 have each a cam-disk 44 secured thereto. Each cam-disk has two facial teeth or cam-surfaces 45, similar to that of long ratchet-teeth, and loosely held on the outer ends of the shafts 38 are toothed disks or segmental gears 46, the teeth 47 of which mesh with the stationary racks 48 on the frame 10. Each gear 46 has an arm 49, in which is held a bolt or pawl 50, which is normally pressed inward by a spring 51. As the cutter-head is reciprocated and during the downward stroke the toothed disk or gear 46 on each side will be rotated independently of the head. The spring-pressed bolts 50 will each ride up one of the teeth or cam-surfaces 45 of the cam-

disk adjacent thereto and will drop into the recess 52 in front of the tooth, so that on the upward stroke of the head each gear 46 will rotate in the opposite direction and will carry the disks 44 with them, so as to give one-half of a revolution to the cutter-head.

To lock the cutter-head against rotary movement and to release the locking mechanism at the proper time, I provide recesses 53 in the disks 44, which are adapted to be engaged in succession by sliding bolts 54. These bolts, one for each cam-disk 44, are held in the brackets 55, which are secured to and move with the guides 39, in which the cutter-head shafts 38 are journaled. The bolts 54 are normally forced downward by springs 56, and pivoted to the brackets 55 are arms 57, one end of which engages the bolts 54, and their other ends extend downward in the path of levers 58. The levers 58 are pivoted to the frame and have their lower ends beveled, as at 59, and said ends are forced outward by springs 60 to permit the lower ends of the arms 57 to pass by said levers on the downward stroke of the cutter-head, but which will cause the bolts 54 to be released from the recesses 53 of the cam-disks 44 on the upward strokes of the cutter-head just prior to the bolts 50 engaging the teeth of said disks to impart rotary movement to the cutter-head. The bolts as they are released will ride upon the peripheral cam-surface of the disks 45 during their rotary movement and will be forced into the next recess 53 by the springs 56, the side of the recesses 53 which receives the thrust during the cutting operation being of a greater length than the other side.

It will be seen that the splints after being cut are swung or moved away from the splint material, and during the same movement downward of the cutter-head one row or set of splints will be cut and the other set previously cut will be placed in position to be engaged by the splint carrying and holding means.

The carrier or holding means may be of any suitable form or construction. The carrier 61 may consist of independent plates linked together, as in the drawings, and between the carrier and the troughs or hoppers 11 may be arranged the open end of a funnel-shaped pipe or tube 62, which has its other end connected to an exhaust-fan, (not shown,) by which the waste and defective splints may be withdrawn from the machine. The carrier 61 is of the usual form and consists of a series of sections 63, linked together, each section being provided with a series of holes 64 or splint-engaging devices, which hold the splints when forced therein by the cutter-head, the holes 64 being smaller than the diameter of the splints to compress and hold the latter in the usual manner. The holes 64 are arranged in rows and correspond in number to the cutters and are made to register with the sets of cutters as they are suc-

cessively brought in position to stick the splints into the holes, the thrust being taken up by the plate 65, located directly beneath the carrier.

5 The carrier may be operated by any suitable mechanism. A transverse shaft 66 is journaled in the frame, and on said shaft are gears 67, which mesh with teeth on the carrier-links. At one end of the shaft 66 is a
10 ratchet-wheel 68, Figs. 2 and 3, on each side of which is an arm 69. One end of these arms carries a pawl 70, which engages the ratchet-wheel, while the other end of the arms is operated from the main drive-shaft 26 by
15 the rod 71 and eccentric 72, thus giving a continuous step-by-step movement to the carrier. The endless carrier 61 enters the machine at the front and passes around idlers 73, then under the cutter-head, and around
20 the idlers 74, from which the splints may move in any suitable direction to have the matches completed in the usual or in any preferred manner.

For the purpose of allowing for the space
25 between the different sections of the carrier to permit them to be linked together or to have them immediately follow each other when separate plates or holding means are employed suitable means is provided by
30 which the feeding of the splint material is stopped at predetermined intervals. On the shaft 66 is a gear 75, which meshes with a smaller gear 76, and on this latter gear is a pin or projection 78. This pin in its rotary move-
35 ment strikes one end of a lever 79. The lever 79 is pivoted to the frame and has its other end in the path of movement of the end 80 of the pawl 22. As the lever 79 is tilted by the pin 78 the pawl 22 will be disengaged from the
40 ratchet-wheel 21, thus permitting the arms 23 and eccentric-rod 24 to operate without operating said ratchet-wheel so long as the pin 78 engages the lever 79. This through
45 the train of gearing already described temporarily stops the feeding of the blocks 12, and thus permits the carrier 61 to be given one or more additional throws without receiving splints, as the cutters do not act on the blocks when the feeding stops.

50 The carrier 61 when it returns to the machine with completed matches passes under and has its edges supported by a guide-plate 81. This plate, Figs. 1, 2, and 8, is secured to the frame and has supporting-ribs 82 for
55 the edges of the carrier. The plate has guides 83, in which the cross-head 84 is vertically movable. The cross-head is pivoted to straps 85, which are operated by eccentrics on the drive-shaft 26. A series of punches 86, ar-
60 ranged in a row and corresponding in number to the holes 64 in the carrier, are carried by the cross-head 84 and have their ends guided in a cross-bar 87 of the plate 81. The rows of holes with the matches are caused to
65 register with the punches 86, and when the latter are forced downward a row of matches will be ejected from the carrier.

The invention will be readily understood from the foregoing description when taken in connection with the accompanying drawings. 70

The troughs or hoppers 11 being filled with blocks of a size equal to the length of the splints and the machine operated, the blocks will be fed with a step-by-step movement to the cutter-head 28. The cutter-head will now
75 have a downward movement and will cut a set or row of splints from the blocks 12. The segmental gears or toothed disks 46 will be rotated on the studs 38, so as to carry the bolts 50 around and into the lower recesses
80 52. Shortly after the upward stroke of the cutter-head begins the levers 58 cause the arms 57 to release the locking-bolts 54 from engagement with the disks 44, and as said stroke continues the racks 48 through the
85 gears 46 and bolts 50 will rotate said disks and cutter-head one-half a revolution in the direction indicated by the arrow in Fig. 4. This rotary movement carries the splints away from the splint material and inverts the
90 latter, so that their free ends are lowermost. During the rotary movement of the cutter-head one of the cam-bars 36 will be operated by one of the cams 43 on the connecting-rods
95 41 to cause one set of slides to cover the openings of the set of cutters filled with splints and act as an abutment, while the other cam-bar moves the other set of slides free of the ends of the other set of cutters. This lat-
100 ter set of cutters is now in position to cut another set of splints, and through the locking mechanism previously described the cutter-head, cam-disks 44, and locking mechanism are in position for another downward move-
105 ment. During this downward reciprocatory movement another set or row of splints is cut from the blocks, and the previously-cut splints are forced or stuck into the holes 64 of the carrier, as shown in Fig. 5. This operation
110 continues, and when one of the links is filled with splints the feeding of the splint material is stopped by the mechanism hereinbefore described until the first row of splints of the next succeeding link registers with the proper set of cutters in the cutter-head. The
115 carrier as it is filled with splints has the matches completed in the usual or in any preferred way, and as the completed matches return to the machine they are ejected by the
120 punches 86; but when small sections of plates or other holding means are employed instead of an endless carrier they may be taken and the matches completed by hand or otherwise.

From the foregoing it will be seen that a simple and efficient machine is provided in
125 which there is a reciprocatory and intermittently-rotary cutter-head which cuts rows or sets of splints in succession and which cuts one row or set of splints during the same reciprocatory movement of the cutter-head that
130 another set is forced into position to be held by a carrier, and, further, simple and efficient means is provided by which the carrier may be moved without receiving splints at stated

intervals, thus compensating for the space between two adjacent members of the carrier.

In Figs. 12 to 14 there is shown a form of carrier which may be made in independent sections, or the sections may be linked together to form an endless carrier. Here the carrier 88 has side pieces 89, provided with lugs 90. These lugs are slotted, and fitting said slots are two opposed metallic plates 91. The plates 91 are depressed at intervals and when placed together form recesses or openings 92 for the splints. At or near the lower end of the openings 92 are spring fingers or tongues 93, past which the ends of the splints are forced and by which the splints are rigidly held spaced apart.

Various changes in the construction and arrangement of the machine may be made, as, for example, the cutter-head may be made to rotate in the direction indicated by the dotted arrow in Fig. 5. In this case substantially the same mechanism may be used, the parts being transposed and changed to permit this and the proper action of the cutters and slides, or the cutter-head might have a single row of cutting devices and be given a partial rotation and then returned instead of completing the rotation to return to its former position. The cutting devices may be variously arranged, and means may be employed to lock the carrier during the sticking of the splints.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a match-making machine, the combination with a cutter-head provided with two independent rows or sets of cutting devices each adapted to cut a row of splints, of means for reciprocating the cutter-head, mechanism for giving a partial rotation to said head during one reciprocatory movement, and a carrier receiving in succession the rows of splints from the cutters, whereby after each row of splints is cut its position is changed and during the same movement of the head that cuts one row of splints the other row is placed in the carrier.

2. A match-making machine, comprising a reciprocatory and intermittently-rotary cutter-head having two rows or sets of cutters each adapted to cut a row of splints, and holding means receiving in succession the rows of cut splints from the cutters.

3. A match-making machine, comprising a carrier having independent rows of openings for the splints, and a reciprocatory and intermittently-rotary cutter-head having independent rows of cutters each cutting in succession a row of splints and forcing them into the openings in the carrier.

4. In a match-making machine, the combination with a cutter-head provided with a series of cutting devices, of means for reciprocating the cutter-head, means for giving a partial rotation to said head during one re-

ciprocatory movement, and a carrier receiving the splints from the cutters.

5. A match-making machine, comprising a reciprocatory and intermittently-rotary cutter-head provided with a series of cutters, a carrier receiving the splints from the cutters, and means for carrying off the waste material and bad splints from the cutters.

6. A match-making machine, comprising a reciprocatory and intermittently-rotary cutter-head having two independent rows or sets of cutters each adapted to cut a row of splints, holding means receiving in succession the rows of splints from the cutters, and exhausting means for carrying off the waste material and bad splints.

7. In a match-making machine, the combination with a carrier provided with independent rows of openings, of a reciprocatory and intermittently-rotary cutter-head provided with cutters which cut the splints in rows and stick them into the openings of the carrier.

8. In a match-making machine, the combination with a carrier provided with independent rows of openings, of a cutter-head having two independent rows or sets of cutters, means for giving a partial rotation to the cutter-head, and means for reciprocating the cutter-head, whereby after each row of splints is cut its position is changed and during the same movement of the head that cuts one row of splints the other row is forced into a row of openings in the carrier.

9. In a match-making machine, the combination with a carrier, of a vertically-movable cutter-head provided with two independent sets or rows of cutters, and arranged above the carrier, means for feeding the splint material to the cutters, means for giving a reciprocatory movement to the cutter-head to cut one row of splints and place the previously-cut row in the carrier, and means for giving a partial rotation to the cutter-head to place one set of cutters in position to cut the splints and the other set in position to place them in the carrier, substantially as described.

10. In a machine for making matches, the combination with a carrier having independent rows of openings for the splints, of a reciprocatory and intermittently-rotary cutter-head having more than one row or set of cutting devices each cutting in succession a row of splints and forcing them into the openings in the carrier, and punches for ejecting the splints from the carrier.

11. In a machine for making matches, the combination with a reciprocatory and intermittently-rotary cutter-head having two sets or rows of cutters each adapted to cut a row of splints, holding means receiving in succession the rows of cut splints, and punches for ejecting the splints from the carrier.

12. In a machine for making matches, the combination with a carrier, of a movable cutter-head provided with more than one set of

cutting devices which cut one set of splints and place another set in the carrier during the same movement of the head.

13. A match-making machine, comprising a reciprocatory and intermittently-rotary cutter-head having cutting devices which cut the splints and give them a partial rotation, and holding means receiving the splints from the cutter-head.

14. In a match-making machine, the combination with a carrier, of a reciprocatory and intermittently-rotary cutter-head having more than one set or row of cutting devices which cut one set of splints and place another set in the carrier during the same movement of the head.

15. In a match-making machine, the combination with a carrier, of a cutter-head having cutters for cutting splints, means for reciprocating the head, means for locking the head against rotary movement, means for releasing the locking means, and means for imparting a rotary movement to said head.

16. In a match-making machine, the combination with a carrier, of a cutter-head having cutting devices for cutting splints, means for reciprocating the head, devices locking the head against rotation at each end, means for releasing the locking devices, and means for imparting a rotary movement to said head.

17. In a match-making machine, the combination with a carrier, of a cutter-head having cutting devices for cutting splints, a device locking the head against rotary movement, means for releasing the locking device, and means for imparting a rotary movement to said head.

18. In a machine for making matches, the combination with a reciprocatory carrier, of a cutter-head having cutting devices for cutting splints, means locking the head against rotation and comprising a cam-disk, a movable bolt or block, and means for releasing the block, and means for imparting a partial rotation to the cutter-head.

19. In a machine for making matches, the combination with a reciprocatory carrier, of a cutter-head having cutting devices for cutting splints, means for locking the head against rotation, means for releasing the locking means, a cam-disk secured to the cutter-head and having two facial teeth or cams, a toothed disk carrying a pawl adapted to engage the teeth of the cam-disk, and a rack engaging the toothed disk.

20. In a match-making machine, the combination with a reciprocatory carrier, of a cutter-head having cutting devices for cutting splints, means for locking the head against rotation, an arm, a spring-pressed lever adapted to operate the arm to release the locking means, and means imparting a partial rotation to the cutter-head.

21. In a match-making machine, the combination with a reciprocatory carrier, of a cutter-head having cutting devices for cutting splints, means for locking the head against

rotation and comprising a disk, and a spring-pressed bolt engaging portions of the disk, means for releasing the locking means, and means for giving a partial rotation to the cutter-head.

22. A match-making machine, comprising a cutter-head having two rows or sets of cutters each adapted to cut a row of splints, means for reciprocating the head, means for locking the head against rotary movement, means for releasing the locking means, means for imparting a rotary movement to said head, and holding means receiving in succession the rows of cut splints from the cutters.

23. In a match-making machine, the combination with a carrier, of a cutter-head provided with more than one set of cutting devices which cut one set of splints and place another set in the carrier during the same movement of the head, means for reciprocating the head, means for locking the head against rotary movement, means for releasing the locking means and means for imparting a rotary movement to said head.

24. In a match-making machine, the combination with a cutter-head provided with a series of cutting devices, of means for reciprocating the head, devices locking the head against rotary movement at each end, means for releasing the locking means, means for imparting a rotary movement during one reciprocatory movement of the head, and holding means for the splints.

25. In a machine for making matches, the combination with a cutter-head provided with a series of cutting devices, of a device locking the head against rotary movement, means for releasing the locking device, means for imparting a rotary movement to said head, and holding means receiving the splints from the cutting devices.

26. In a machine for making matches, the combination with a cutter-head provided with two sets of cutters, of a device locking the head against rotary movement, means for releasing the locking device, means for imparting a rotary movement to said head, and a carrier receiving splints from one set of cutters during the same movement that the other set of cutters is cutting splints.

27. In a match-making machine, the combination with a cutter-head provided with two sets of cutting devices, of means for reciprocating the head, devices locking the head against rotary movement at each end, means for releasing the locking devices, means for imparting a rotary movement to the head, and holding means receiving in succession the splints from the cutting devices.

28. In a match-making machine, the combination with a cutter-head provided with more than one set of cutters spaced apart, of means for reciprocating the head, means locking the head against rotary movement and comprising a cam-disk, a movable bolt or block, and means for releasing the block,

means for imparting a partial revolution to the cutter-head, and holding means receiving the splints in succession from the cutters.

29. In a machine for making matches, the
5 combination with a cutter-head having two independent sets of cutting devices spaced apart for cutting splints, of means for reciprocating the head, means locking the head against rotary movement and comprising a cam-disk, a
10 movable bolt or block, and means for releasing the block, means for imparting a partial revolution to the cutter-head, and a carrier receiving splints from one set of cutters during the same movement that the other set of cutters is cutting splints.

30. In a machine for making matches, the combination with a reciprocatory cutter-head having devices for cutting splints, a cam-disk secured to the cutter-head, means for locking
20 the cam-disk against rotary movement, means for releasing the locking means, means for imparting a partial revolution to said cam-disk and the cutter-head, and a carrier receiving the splints from the cutter-head.

31. In a match-making machine, the combination with a cutter-head having more than one set of devices for cutting splints, a cam-disk secured to the cutter-head, means for locking the head against rotary movement,
30 means for releasing the locking means, means for imparting a partial revolution to said cam-disk and the cutter-head, and a carrier receiving in succession the splints from the cutter-head.

32. In a match-making machine, the combination with a cutter-head having two independent sets of devices for cutting splints, a cam-disk secured to the cutter-head, means for locking the head against rotary movement,
40 means for releasing the locking means, means for imparting a partial revolution to said cam-disk and the cutter-head, and a carrier receiving splints from one set of cutters during the same movement that the other set is cutting
45 splints.

33. In a machine for making matches, the combination with a reciprocatory cutter-head having two sets of cutting devices spaced apart for cutting splints, of means for locking
50 the head against rotary movement, means for releasing the locking means, a cam-disk secured to the cutter-head and having two facial teeth or cams, a toothed disk carrying a pawl adapted to engage the teeth of the cam-disk,
55 a rack engaging the toothed disk, and a carrier receiving in succession the splints from the sets of cutting devices.

34. In a match-making machine, the combination with a rotary and reciprocatory cutter-head having more than one set of cutting devices for cutting splints, of means for locking the head against rotary movement, an arm, a spring-pressed lever adapted to operate the arm to release the locking means, and
65 a carrier receiving in succession the splints from the different sets of cutting devices.

35. In a match-making machine, the com-

bination with a reciprocatory cutter-head having more than one set of devices spaced apart for cutting splints, of means for locking the head against rotary movement and comprising a disk, and a spring-pressed bolt engaging portions of the disk, means for releasing the locking means, means for giving a partial revolution to the cutter-head, and
75 a carrier receiving in succession the splints from the sets of cutting devices.

36. In a match-making machine, the combination with a reciprocatory cutter-head having means for cutting splints, means for
80 giving a partial revolution to the cutter-head, and a carrier receiving the splints from the cutter-head.

37. In a match-making machine, the combination with a reciprocatory and intermittently-rotary cutter-head provided with a series of cutters, means movable over the openings in the cutters to form an abutment for the splints, and a carrier receiving the splints
90 from the cutters.

38. In a machine for making matches, the combination with a reciprocatory and intermittently-rotary cutter-head having two independent rows or sets of cutters each adapted to cut a row of splints, slides movable
95 over the openings in each set of cutters to form an abutment for the splints, and a carrier receiving in succession the rows of splints from the cutters.

39. In a match-making machine, the combination with a cutter-head provided with a series of cutting devices, of means for reciprocating the cutter-head, means for giving a partial revolution to said head during one reciprocatory movement, slides movable over
105 the openings in the cutting devices, and a carrier receiving the splints from the cutters.

40. In a match-making machine, the combination with a reciprocatory and rotary cutter-head having means for cutting splints, of
110 two independent rows or sets of cutters, an independent slide for each cutter, and means for moving the slides to cover the openings in the cutters, and to form an abutment for one end of the splints.

41. In a match-making machine, the combination with a reciprocatory and rotary cutter-head having cutters for cutting the splints, of a series of cutters carried by the head, slides for the cutters, and means for moving
120 the slides to cover the openings on one side of the cutters and to form an abutment for the ends of the splints when sticking them in the carrier.

42. In a machine for making matches, the combination with a reciprocatory and rotary cutter-head provided with a series of cutters, of slides movable over one side of the cutters, and a slidable cam-bar engaging the slides and adapted to move them lengthwise
130 of the cutters during the rotary movement of the cutter-head.

43. In a machine for making matches, the combination with a rotary and reciprocating

cutter-head having a series of independent rows of cutters, of an independent slide for each cutter, a cam-bar for each set or row of cutters engaging the slides and means for operating the cam-bars.

44. In a match-making machine, the combination with a cutter-head, of two independent sets or rows of cutters held in said head, an independent slide for each cutter, a cam-bar for each set of slides having cam-grooves into which projections from the slides fit, and means for operating the cam-bars to cause one set of slides at the proper time to cover the openings in the cutters and to form an abutment for the splints and the other set of slides to be moved free of the openings in the other set of cutters.

45. In a match-making machine, the combination with a reciprocatory and rotary cutter-head having means which cut the splints and move them away from and out of the plane of the material after the splints are cut, a carrier for the splints, and automatically-operated mechanism for stopping the feeding of the material to the cutter-head at stated intervals to permit the carrier to be operated without receiving splints.

46. In a match-making machine, the combination with means for cutting the splints, of means for feeding the material to the cutting means, a carrier for the splints, means for giving the carrier a regular intermittent or step-by-step motion, and automatically-actuated mechanism for stopping the feeding of the material to the cutting means at a predetermined point or points, whereby the carrier may move at stated intervals without receiving splints, substantially as and for the purpose specified.

47. In a match-making machine, the combination with means for cutting the splints, of means for feeding the material to the cutting means, a carrier for the splints, means for giving the carrier a regular intermittent or step-by-step motion, and automatically-operated mechanism for stopping the feeding of the material to the cutting means at stated intervals to permit the carrier to be operated without receiving splints.

48. In a match-making machine, the combination with a cutter-head, of mechanism for feeding the splint material to the cutter-head, a carrier for the splints, means for giving the carrier a regular intermittent or step-by-step motion, a lever, and automatically-actuated mechanism for operating the lever for stopping the feeding of the material to the cutter-head at stated intervals to permit the carrier to be operated without receiving splints.

49. In a match-making machine, the combination with a cutter-head having cutters, of ratchet-and-pawl-operated mechanism for feeding the material to the cutters, a carrier for the splints, means for giving the carrier a regular intermittent or step-by-step motion, a lever engaging the pawl and adapted to throw the latter out of engagement with the ratchet-wheel, and automatically-actuated mechanism for operating the lever to stop the feeding of the material at stated intervals to permit the carrier to be operated without receiving splints.

50. In a match-making machine, the combination with a cutter-head having a series of cutters spaced apart, of feed-rolls, ratchet-and-pawl mechanism for operating the rolls to feed the material to the cutters, a carrier for the splints, a lever engaging the pawl and adapted to throw the latter out of engagement with the ratchet-wheel, a gear having a projection for operating the lever, and means for operating the gear, substantially as and for the purpose described.

51. In a match-making machine, the combination with a reciprocatory and rotary cutter-head having means for cutting splints, of means for feeding splint material to the head, a carrier receiving the splints from the cutter-head, and means for stopping the feeding of the material to the cutter-head at stated intervals to permit the carrier to be operated without receiving splints.

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Witnesses:

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