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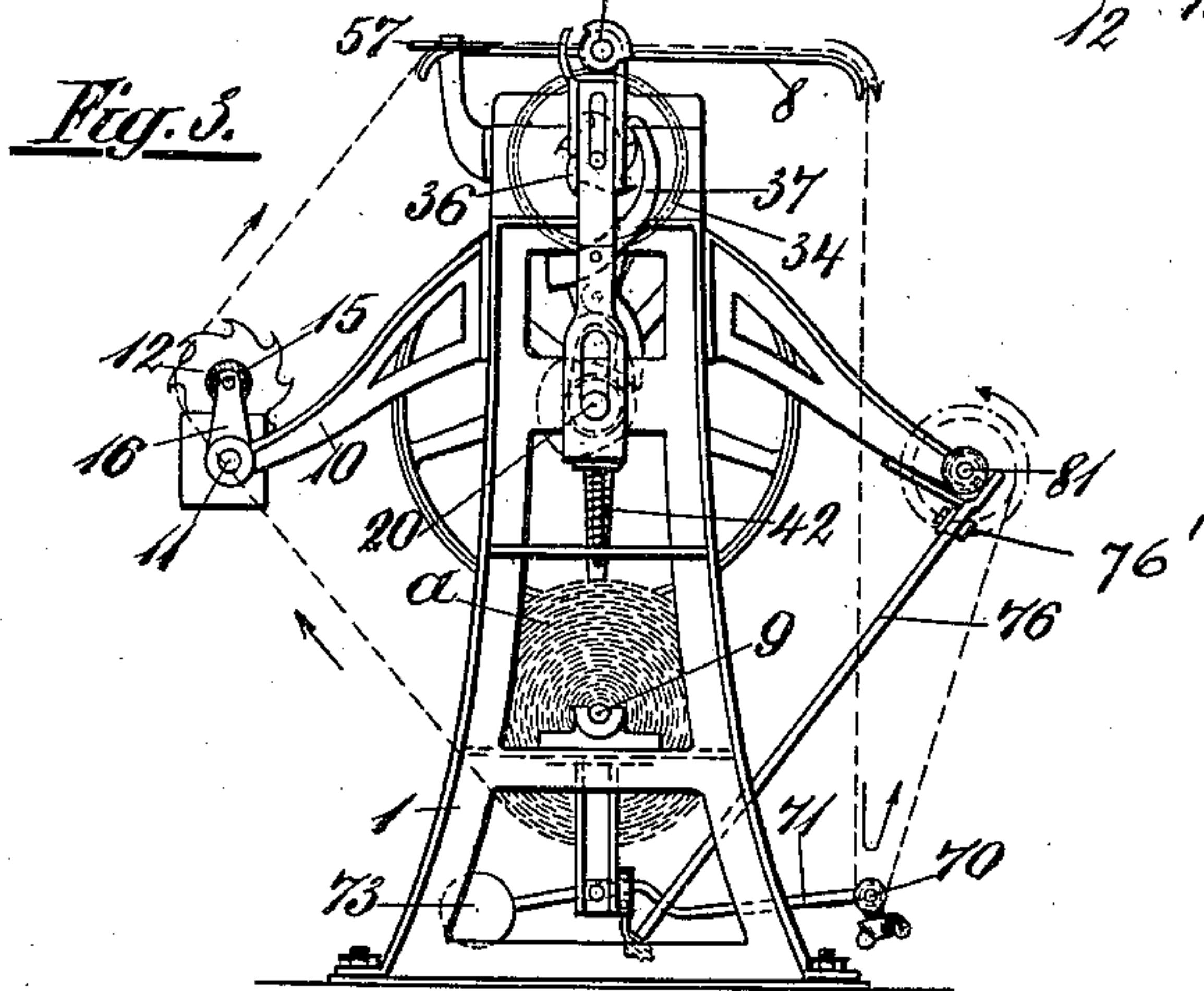
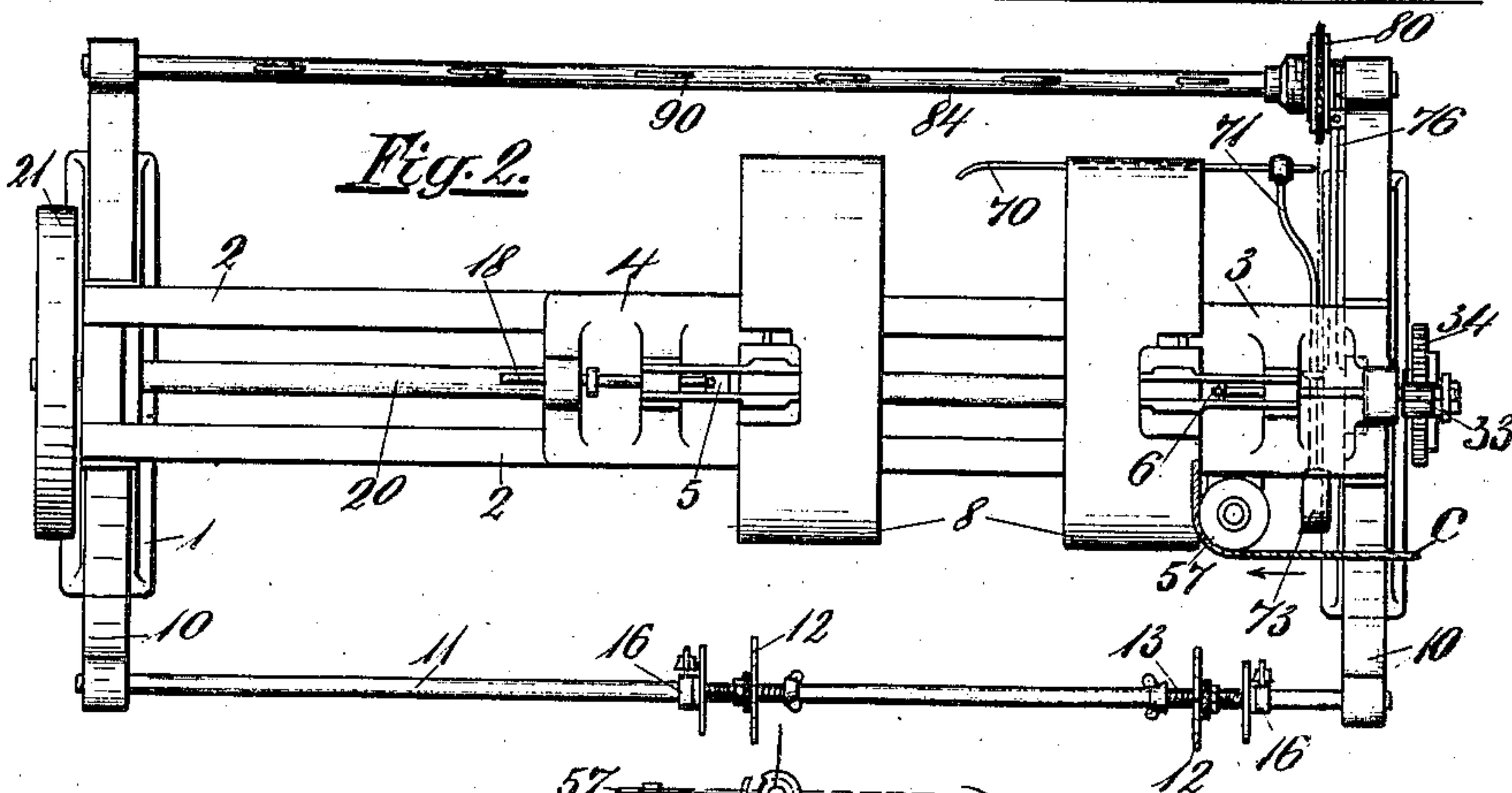
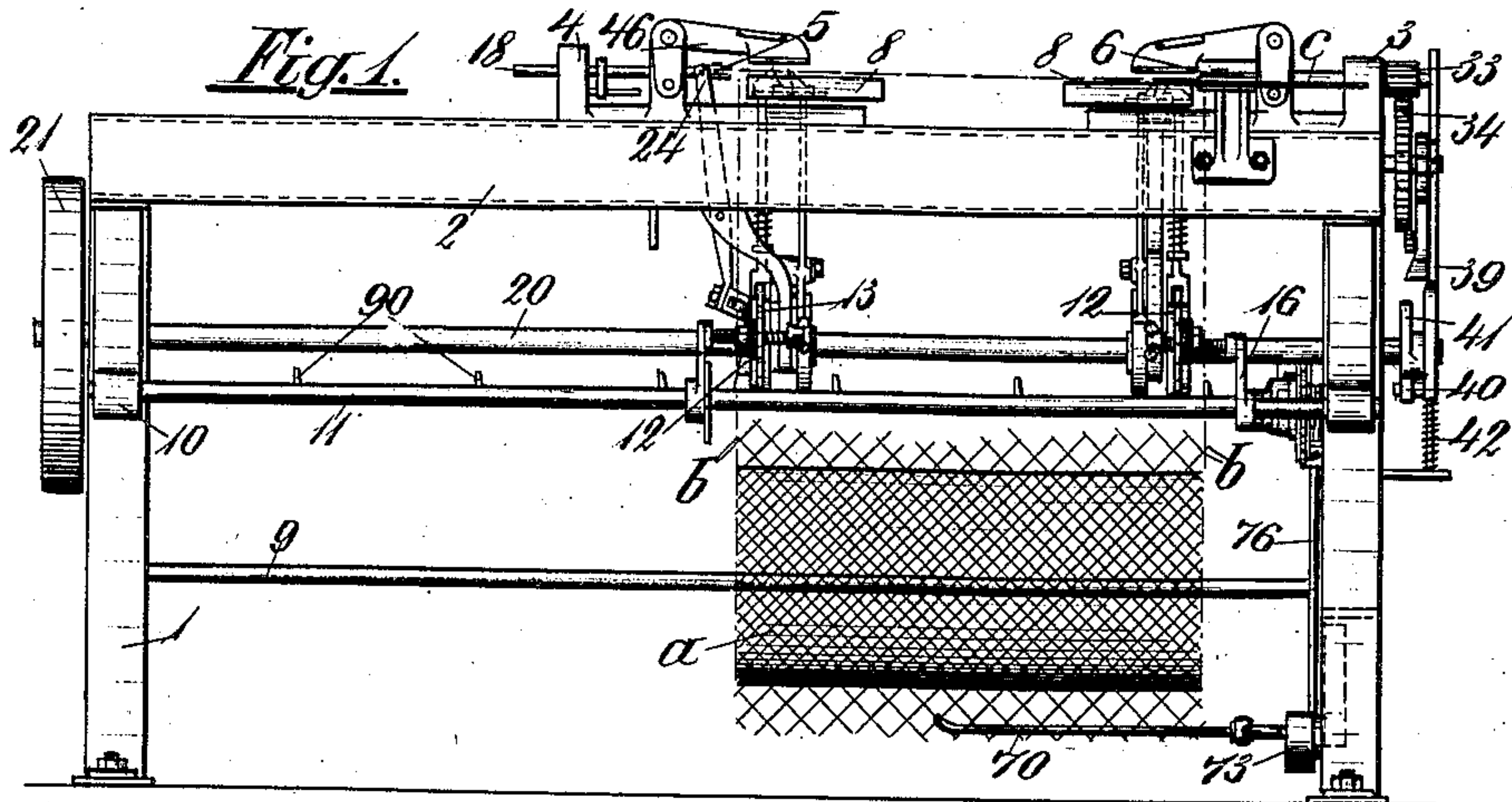
PATENTED JUNE 2, 1908.

O. SCHMID.

MACHINE FOR FINISHING AND SELVAGING WIRE FABRICS.

APPLICATION FILED MAY 24, 1907.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

Fig. 4.

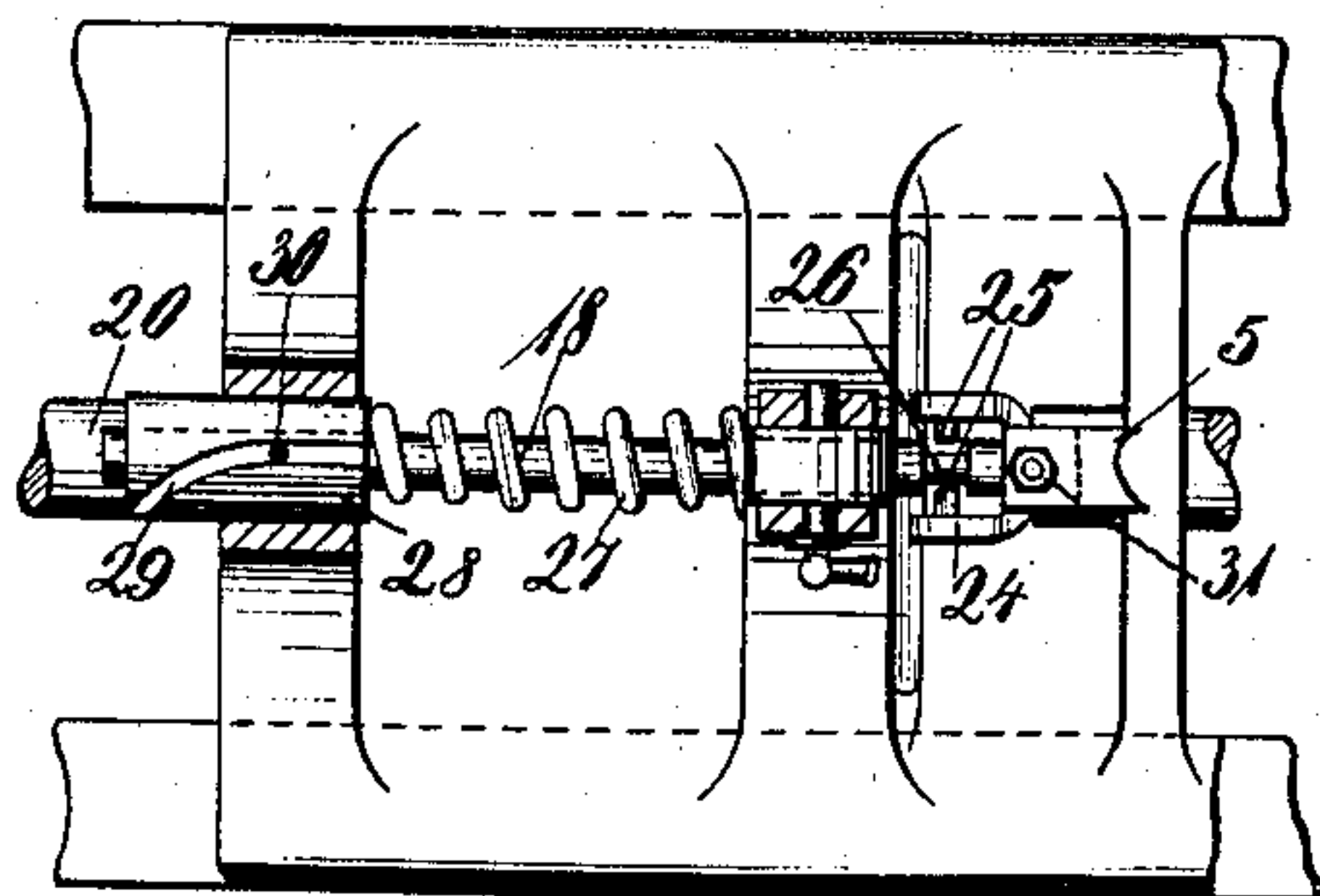


Fig. 6.

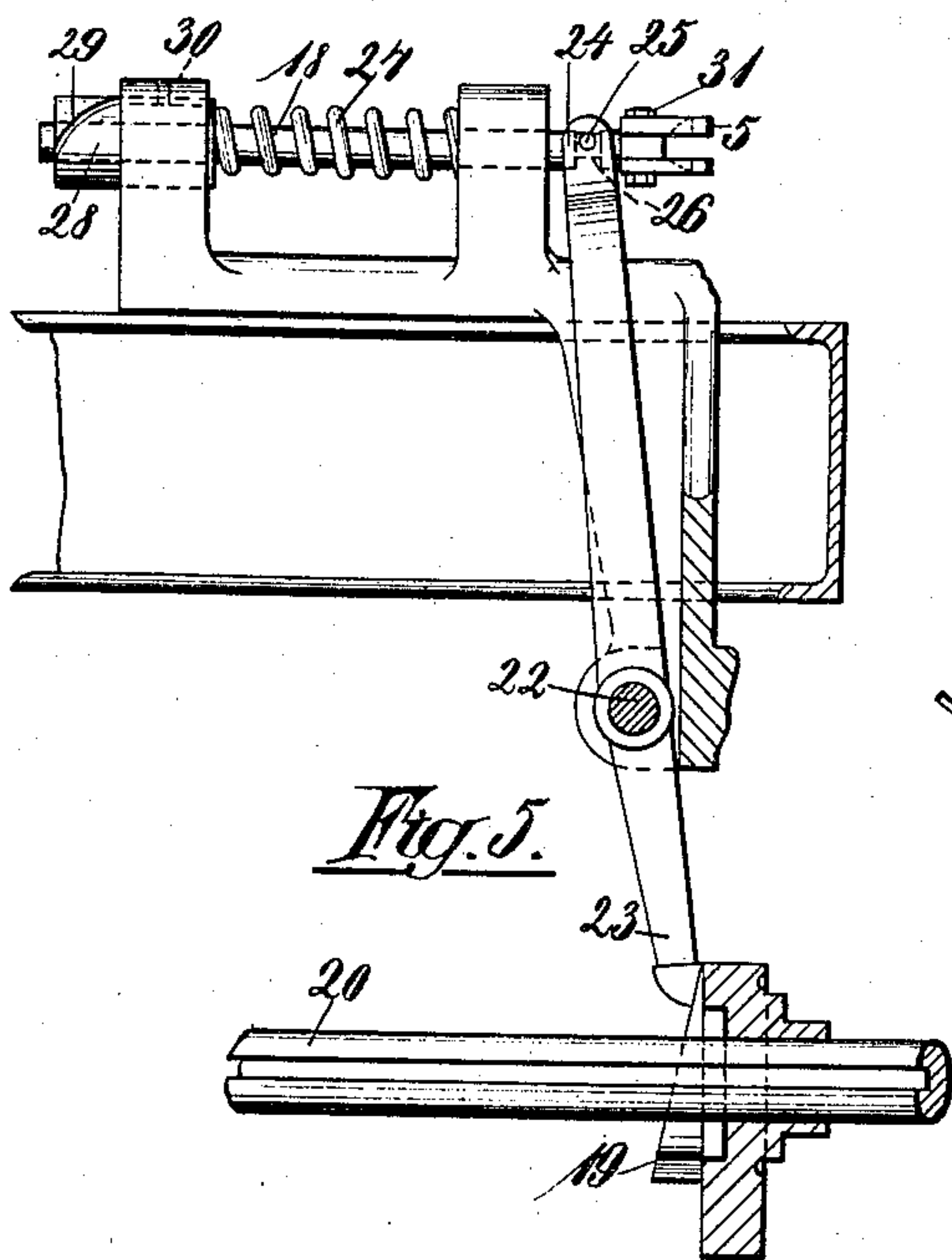
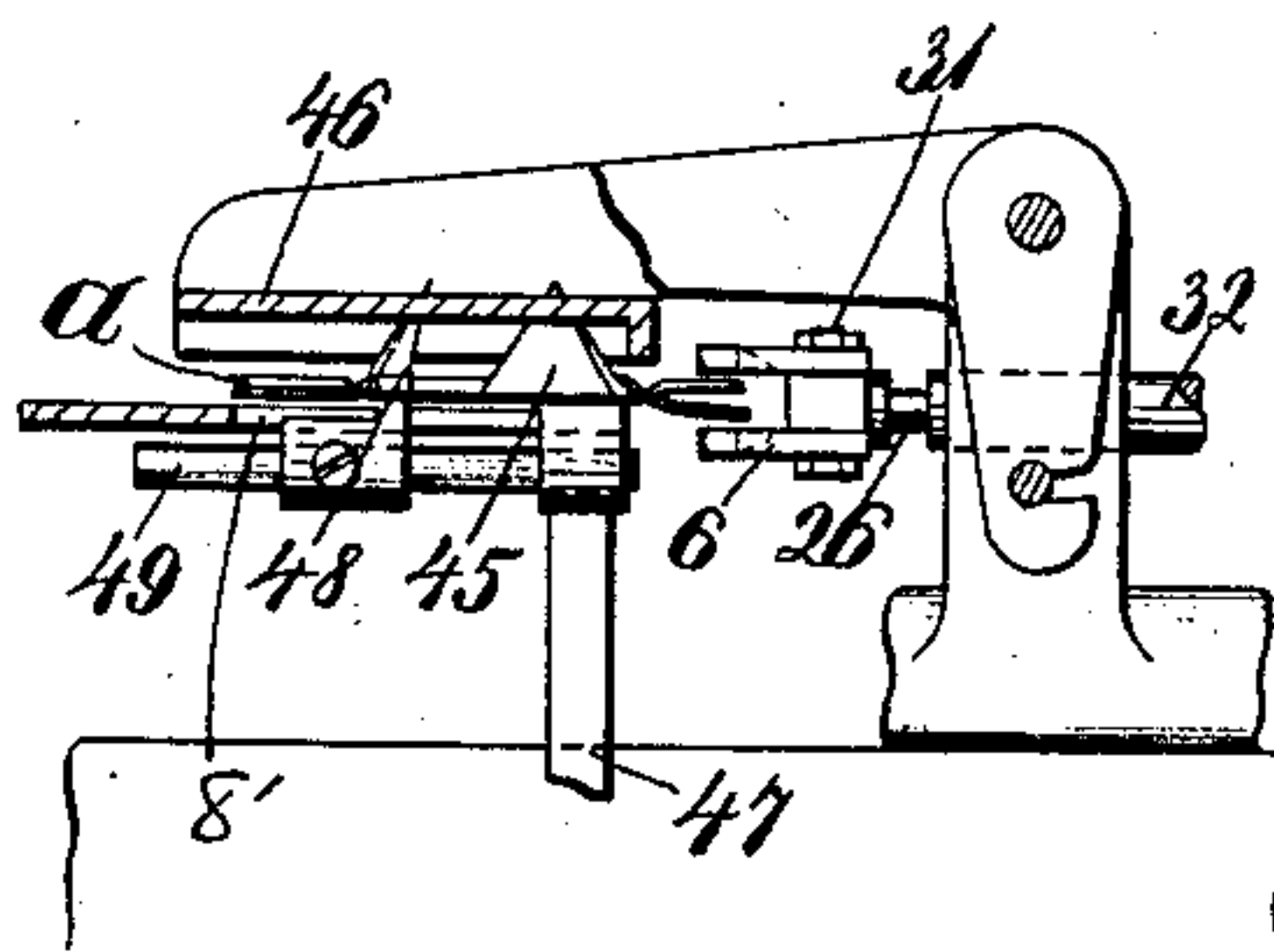


Fig. 7.

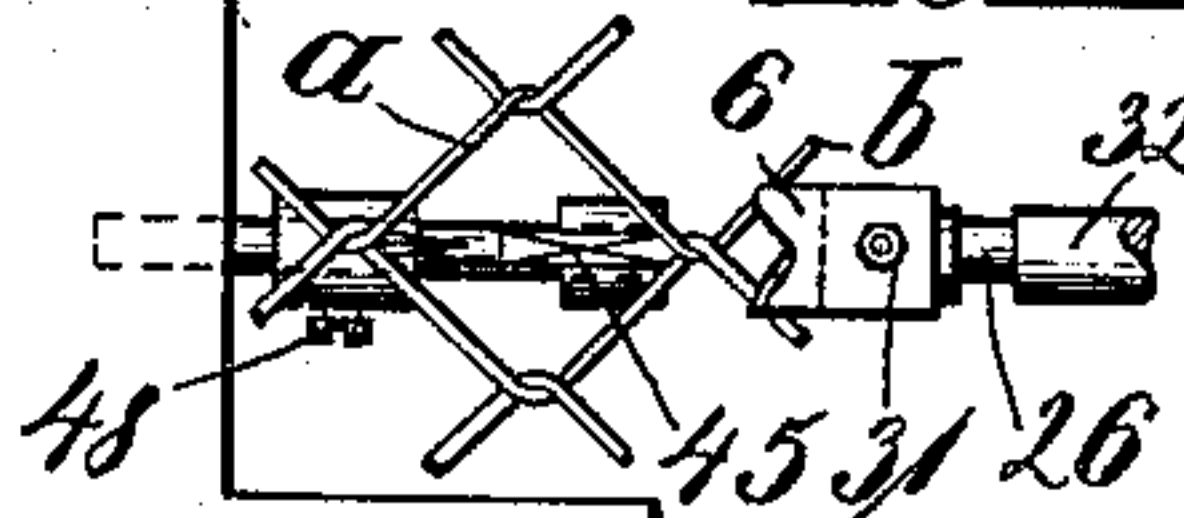


Fig. 9.

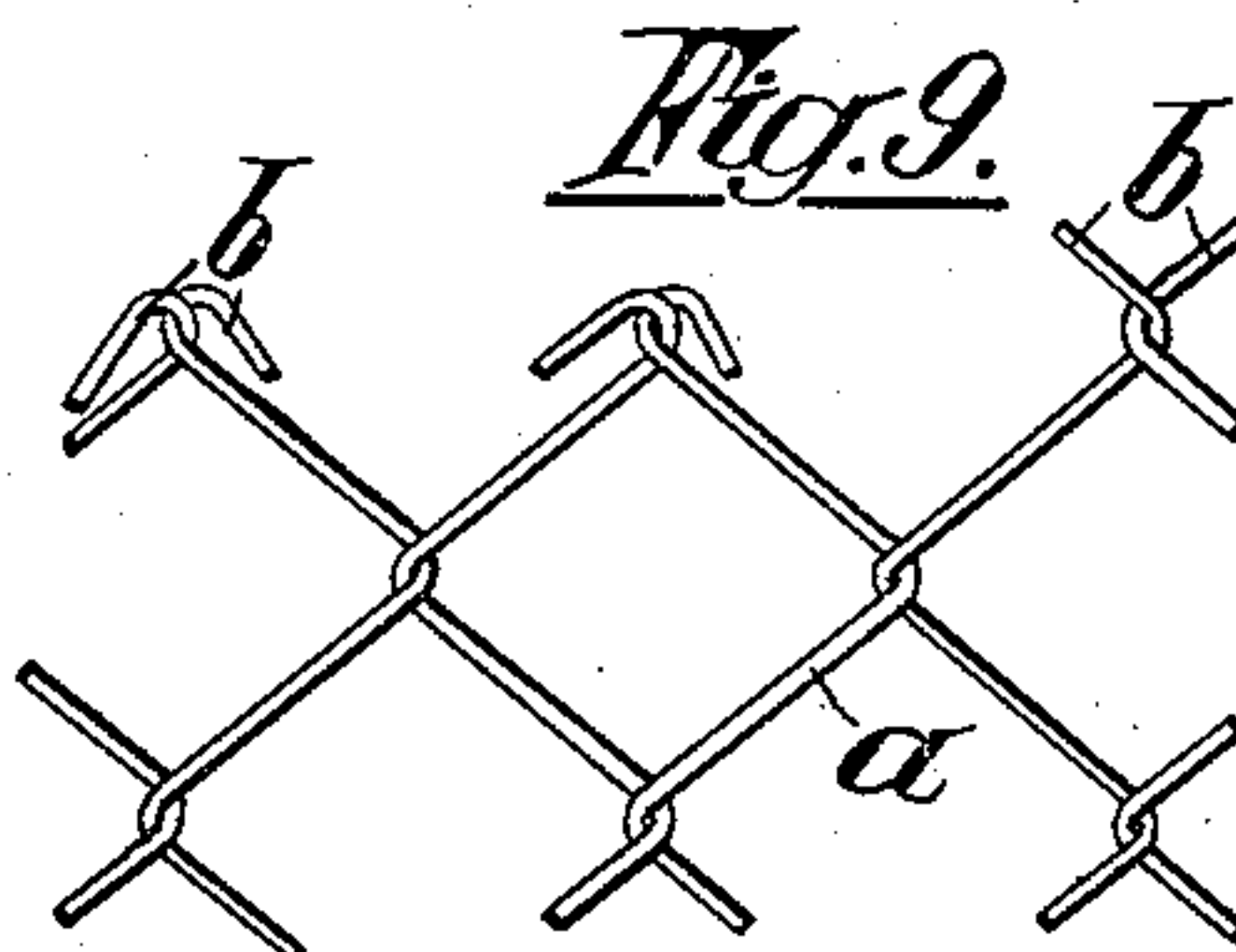


Fig. 5.

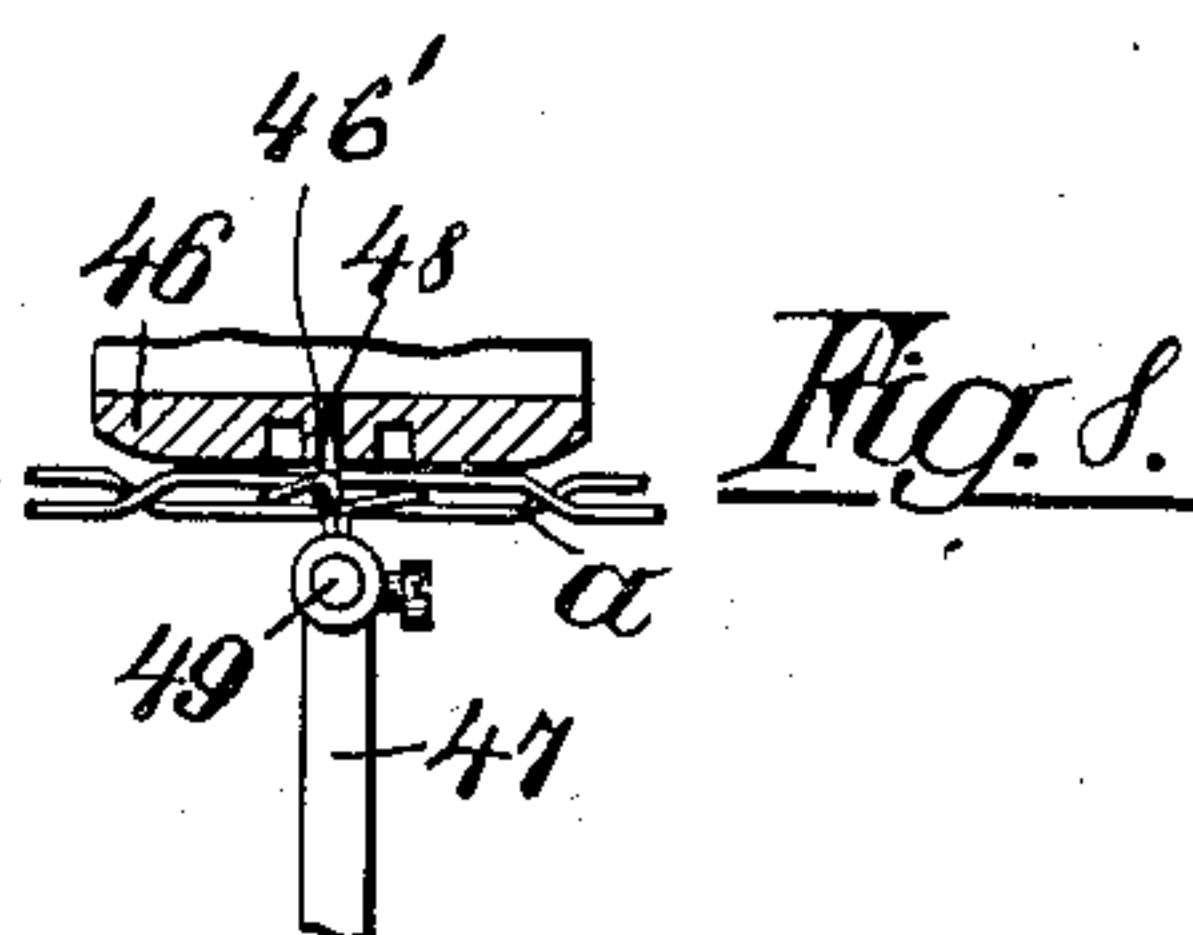


Fig. 8.

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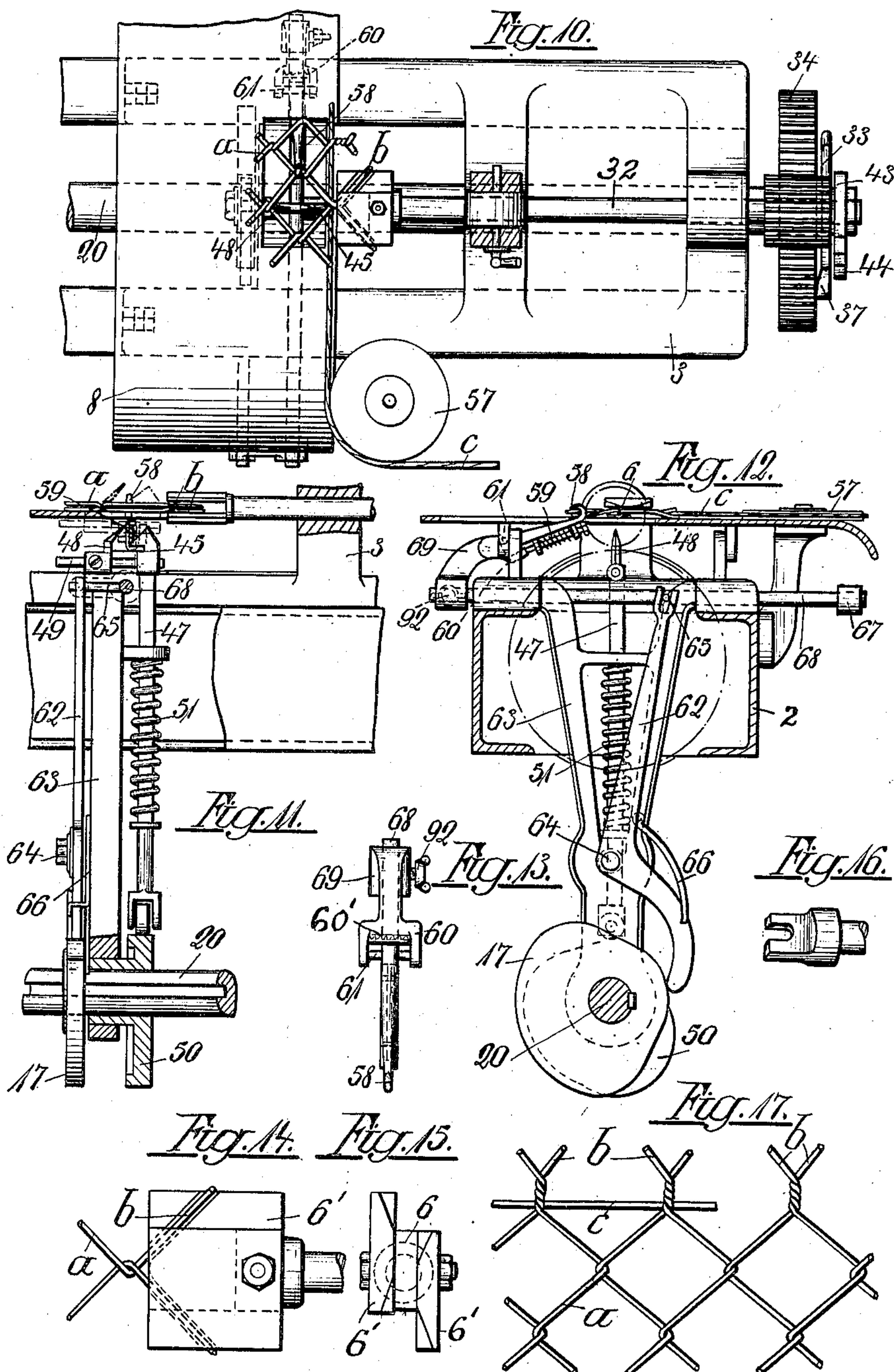
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

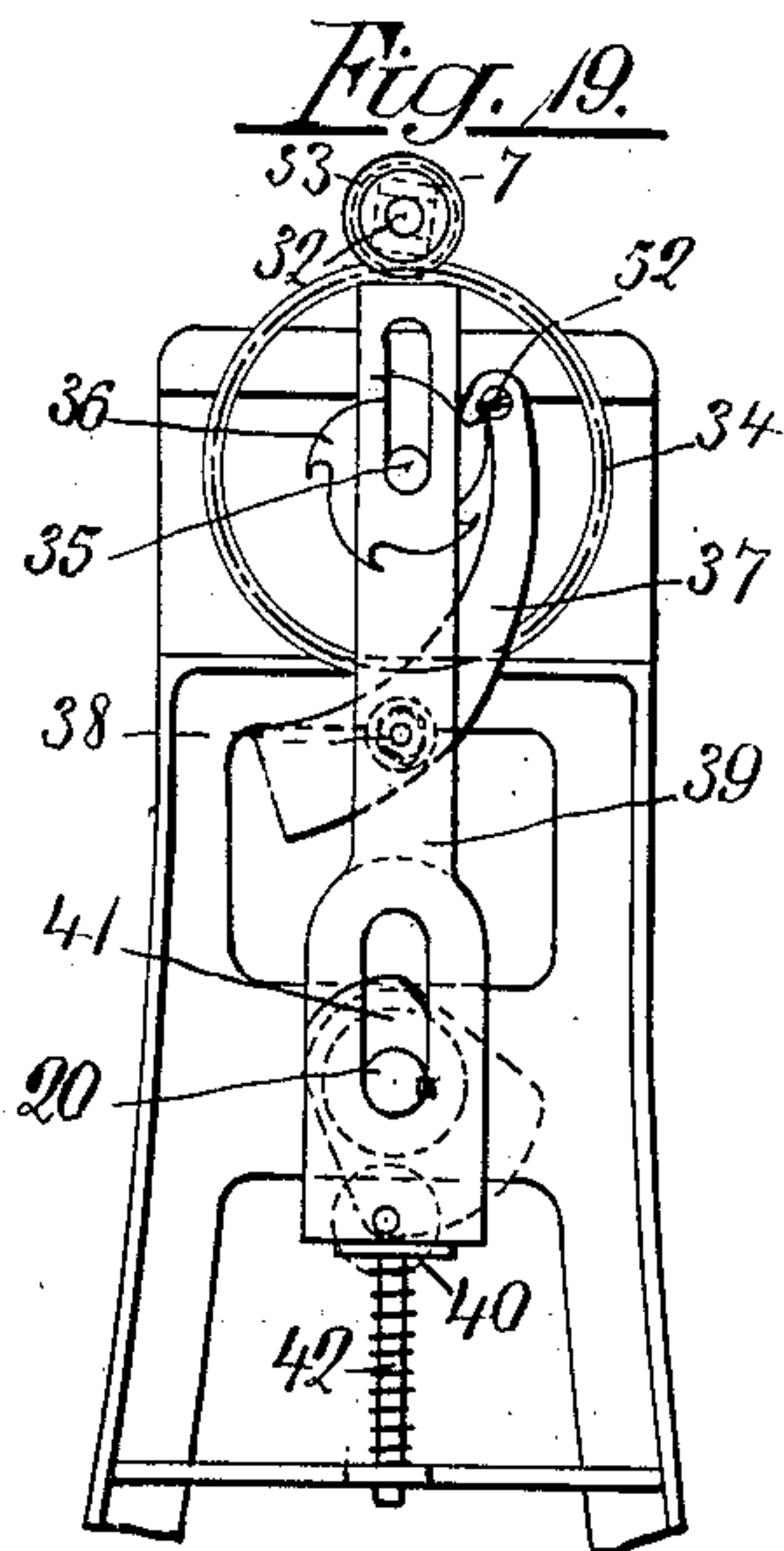
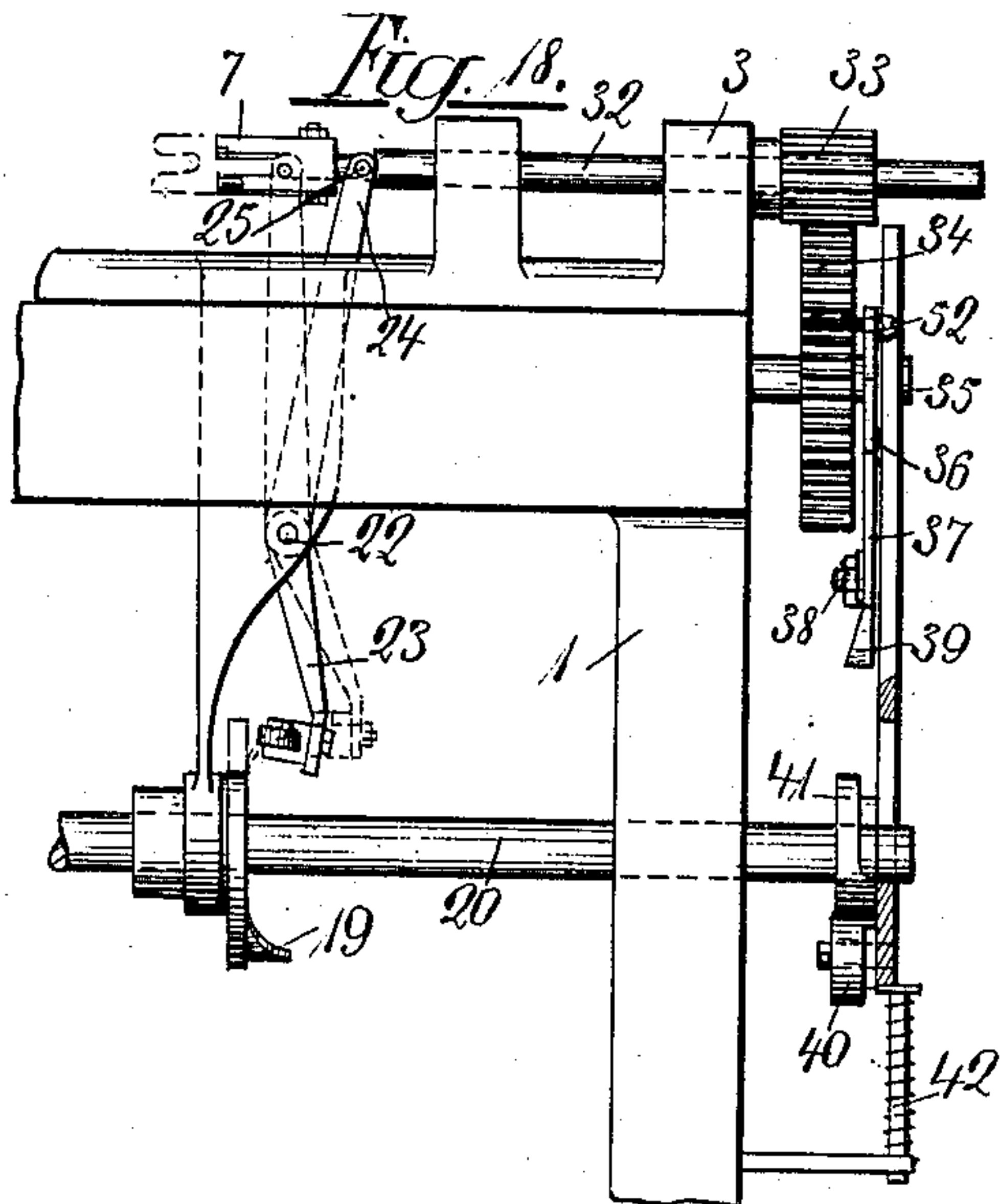


Fig. 20.

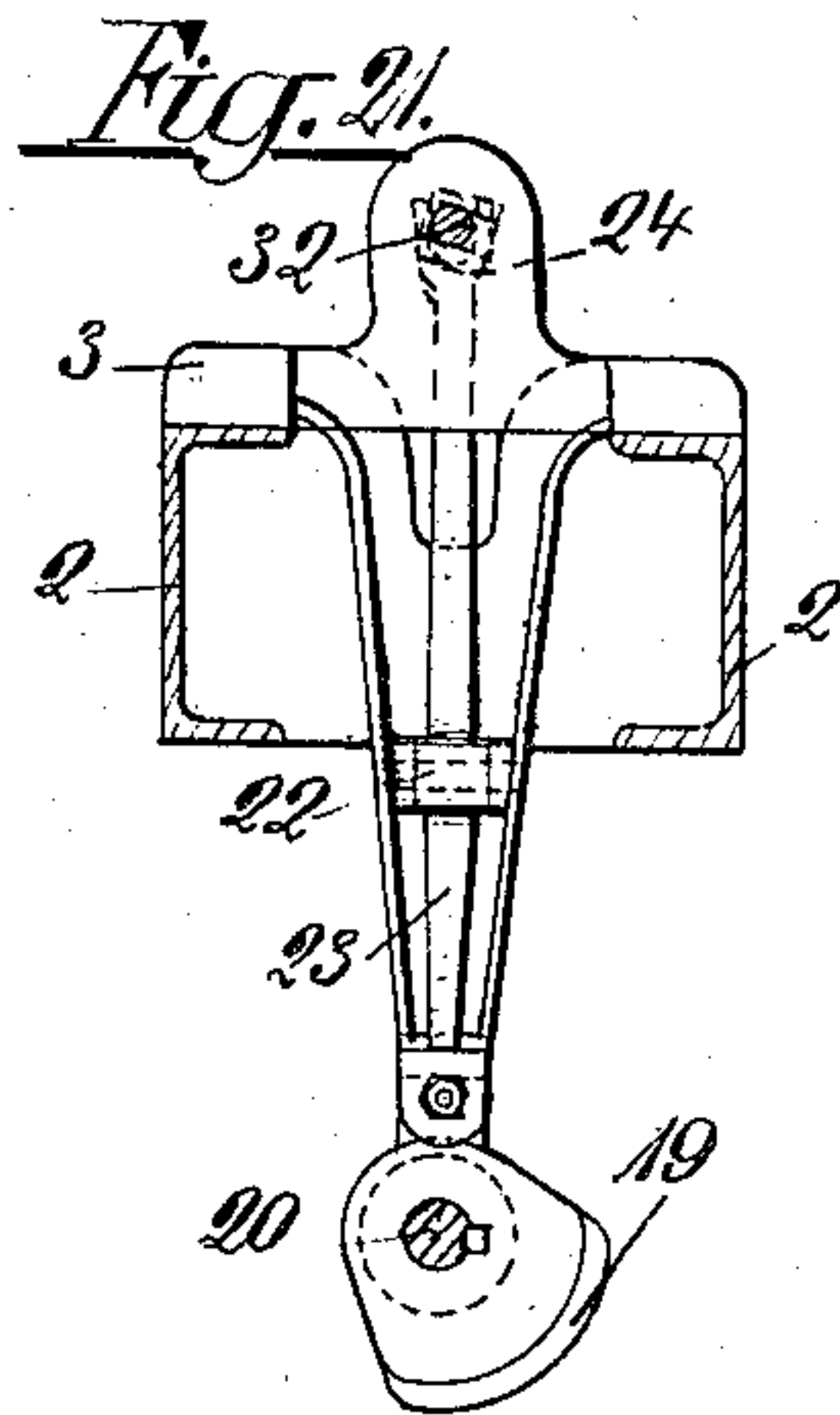
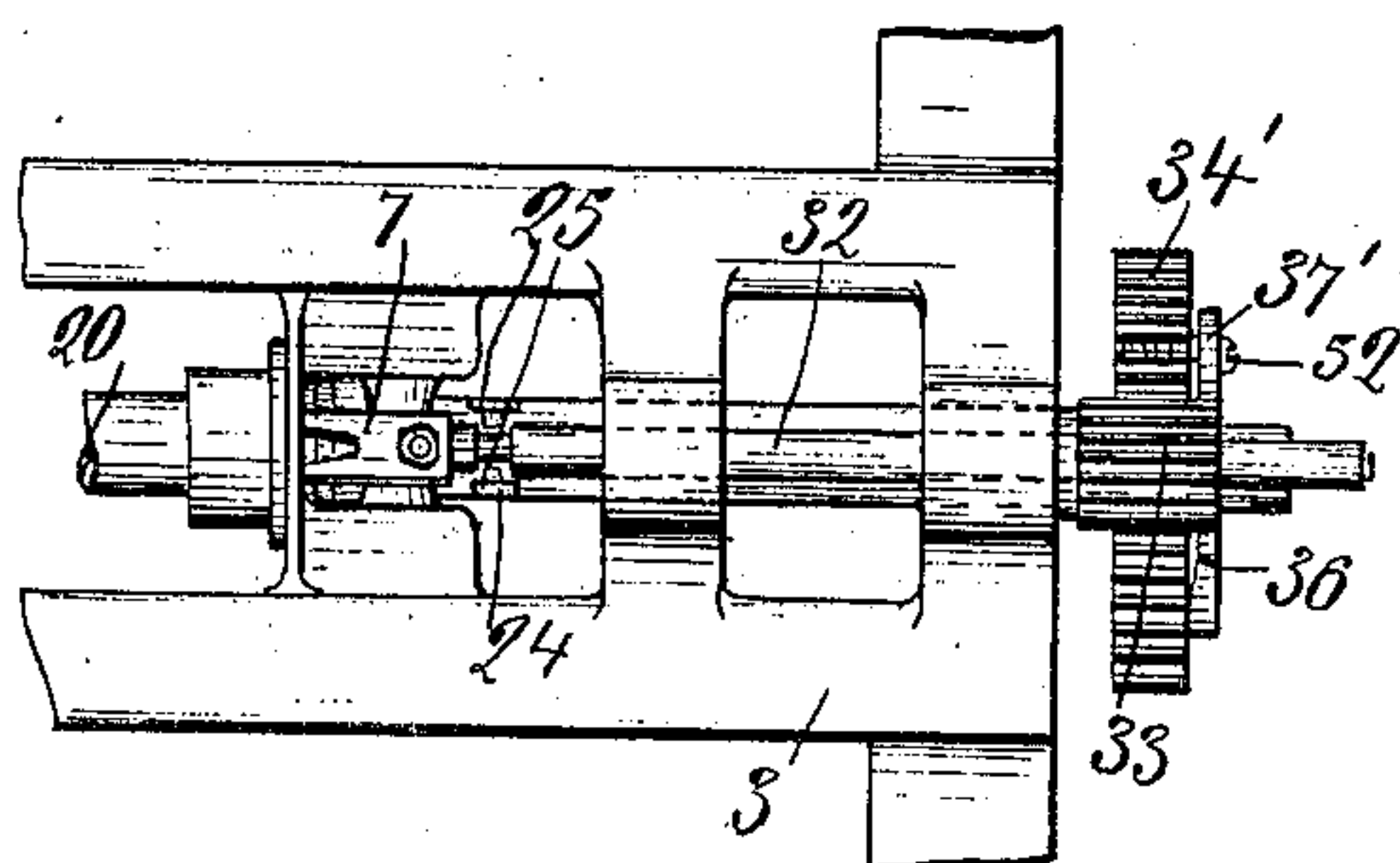


Fig. 23.

Fig. 24.

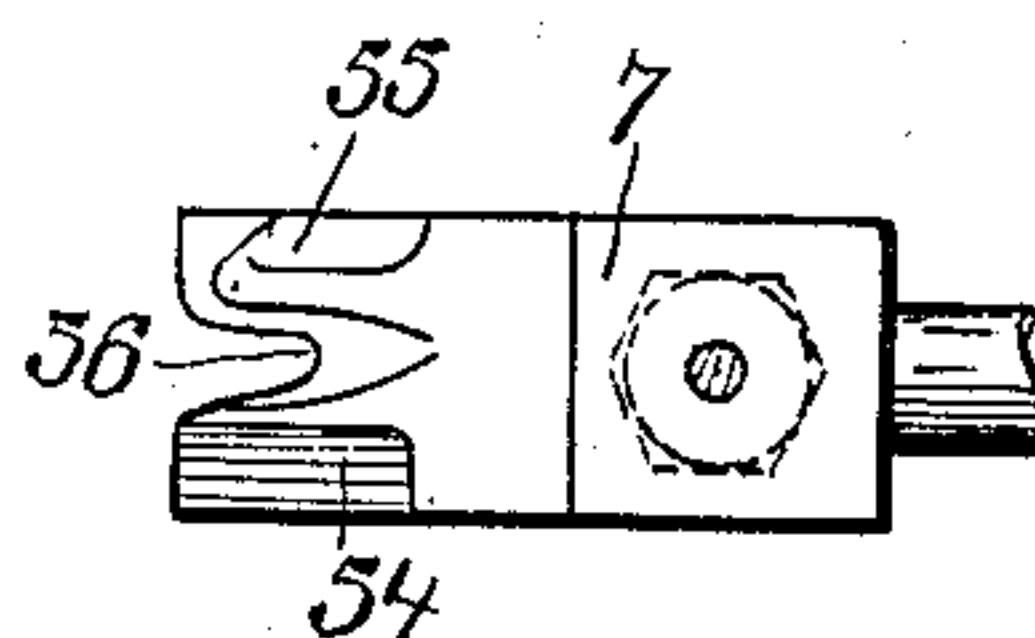
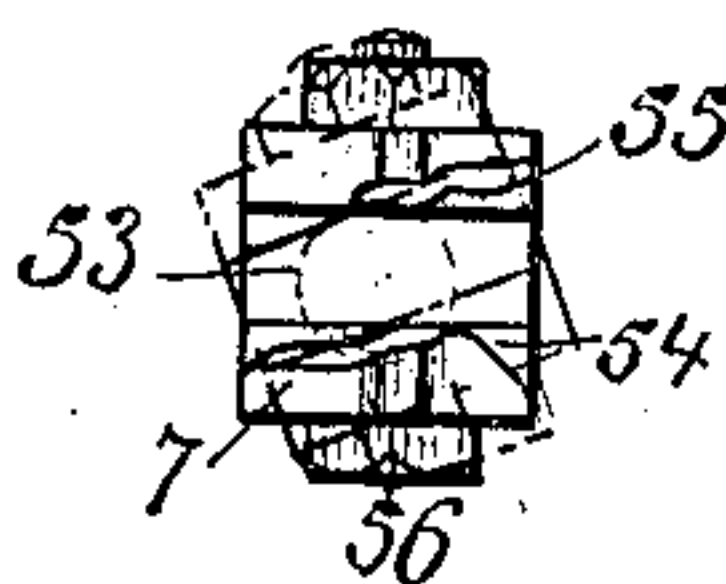
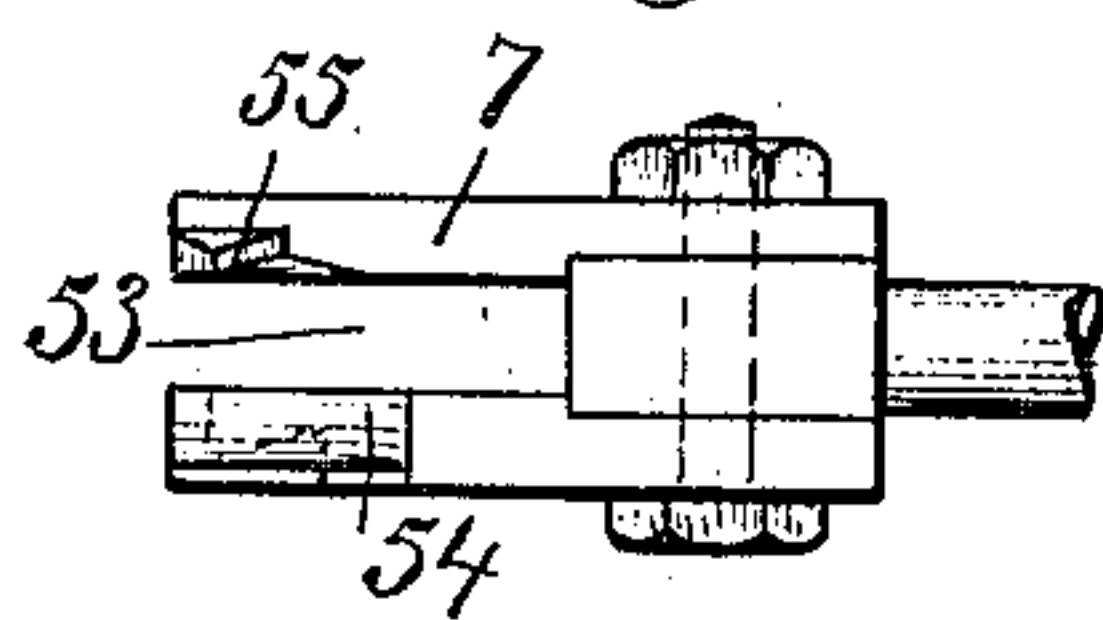
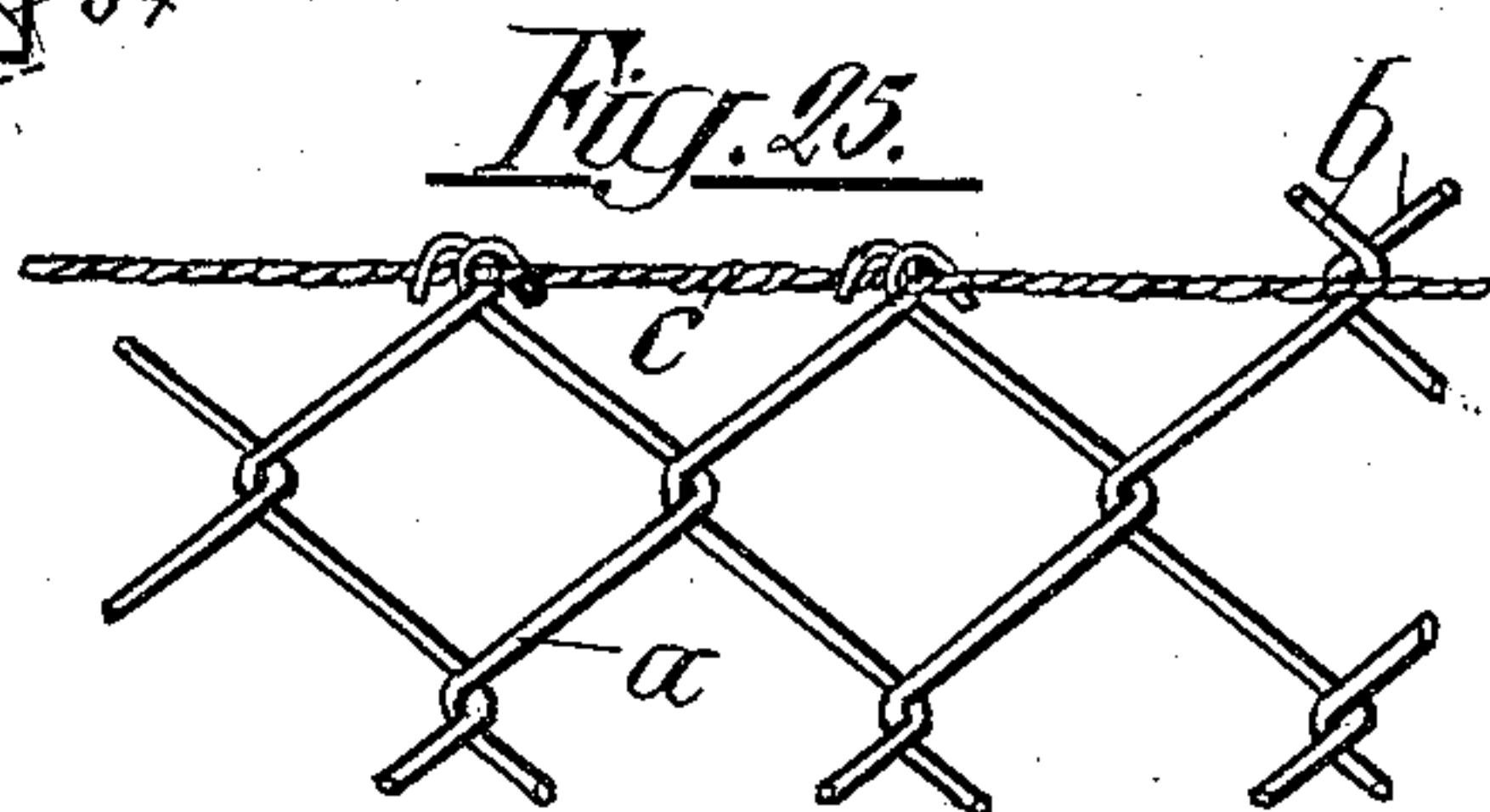


Fig. 28.



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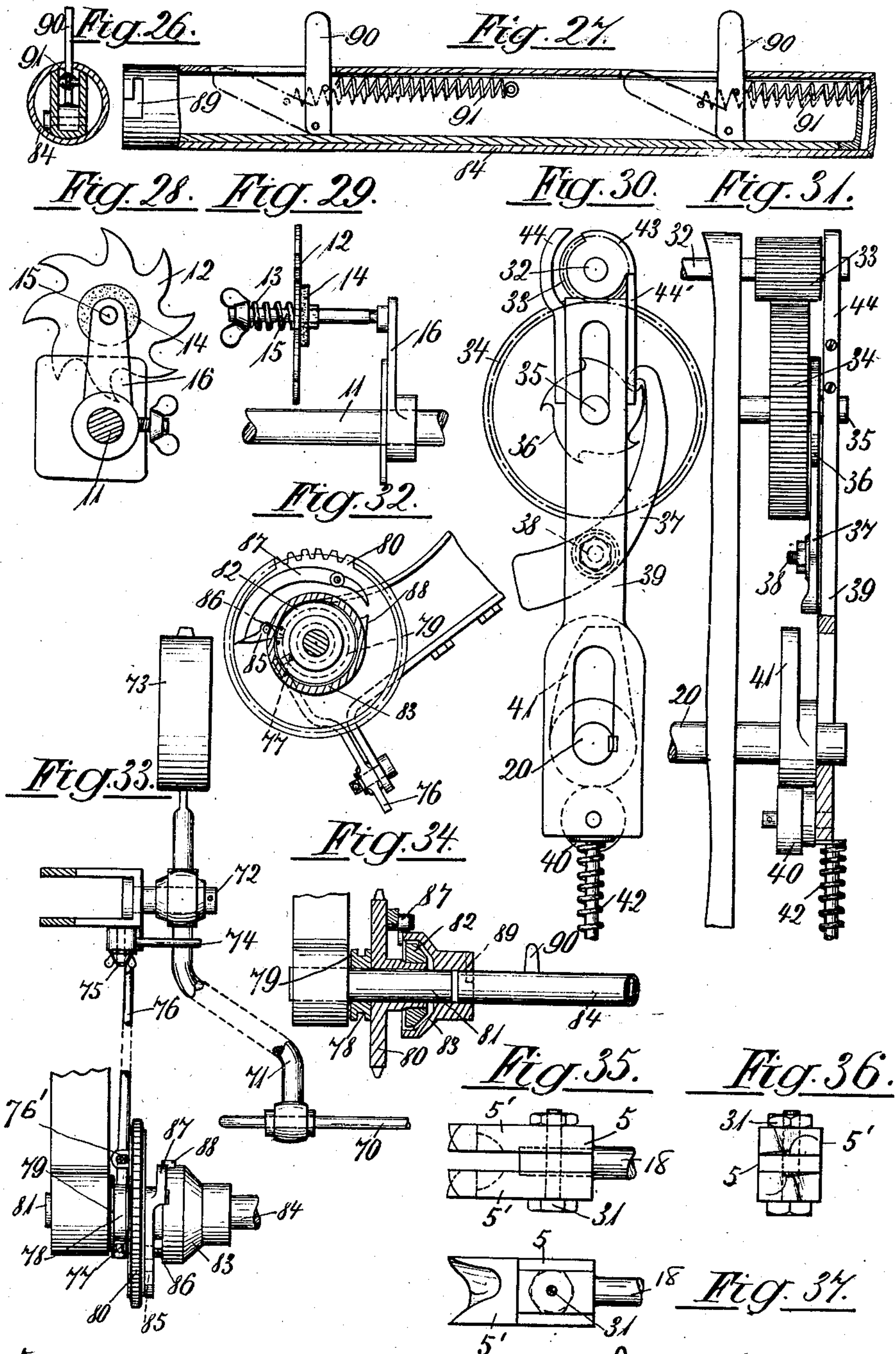
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APPLICATION FILED MAY 24, 1907.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

OTTO SCHMID, OF FEUERBACH-STUTTGART, GERMANY.

MACHINE FOR FINISHING AND SELVAGING WIRE FABRICS.

No. 889,815.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed May 24, 1907. Serial No. 375,471.

To all whom it may concern:

Be it known that I, OTTO SCHMID, a citizen of the German Empire, residing at Feuerbach-Stuttgart, in the Kingdom of Wurtemberg, Empire of Germany, have invented certain new and useful Improvements in Machines for Finishing and Selvaging Wire Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In some classes of diamond-mesh wire fabric, it is necessary to finish the edges by twisting or otherwise uniting the projecting ends of the wires, and the principal object of the present invention is to provide an improved mechanism for automatically accomplishing this operation.

A further object of the invention is to provide a machine which may be used for simply twisting the ends of the wire, or for introducing a binder or selvage wire, and uniting the ends of the fabric wire thereto.

A still further object of the invention is to provide an improved mechanism for automatically feeding the fabric, step by step, to the twisting devices, and to so construct such mechanism as to permit ready adjustment for operating on wire fabric of different mesh.

A still further object of the invention is to provide a machine which may be adjusted to accommodate wire fabric of any width and made of wire of any gage.

A still further object is to provide a novel form of periodically operated take-up for the finished article.

In the accompanying drawings: Figure 1 is a front elevation of a machine for finishing and selvaging wire fabrics, constructed in accordance with the invention; Fig. 2 is a plan view of the same; Fig. 3 is an end elevation of the machine; Fig. 4 is a plan view, partly in section, of one of the wire bending devices and its support; Fig. 5 is a side elevation of the same, showing the operating connections, the view being partly in section; Fig. 6 is a sectional detail showing one of the twister heads and the wire fabric clamp; Fig. 7 is a plan view of the parts shown in Fig. 6; Fig. 8 is an end view of the same, showing the clamp plate in section; Fig. 9 is a view of a portion of the

fabric, showing the ends of the wire bent over in one of the finishing operations; Fig. 10 is a plan view of one end of the machine, the clamp plate being removed; Fig. 11 is a vertical sectional view of the same; Fig. 12 is a detail transverse section, showing the feeding mechanism; Fig. 13 is a plan view of one of the fabric-feeding hooks, detached; Fig. 14 is a detail plan view of a twister head; Fig. 15 is an end elevation of the same; Fig. 16 is a perspective view of a modified construction of twister head; Fig. 17 is a view of the finished fabric, showing the introduction of a selvage wire into a portion thereof; Fig. 18 is a side elevation, partly in section, of one end of the machine, illustrating a modified construction; Fig. 19 is an end elevation of the same; Fig. 20 is a plan view of the mechanism shown in Figs. 18 and 19; Fig. 21 is a detail view of a portion of the mechanism for effecting longitudinal movement of the twister head; Fig. 22 is a side elevation of a further modification of twister head, applicable to the mechanism shown in Fig. 18; Fig. 23 is an end view of the same; Fig. 24 is a plan view of the same; Fig. 25 is a view of the finished fabric, as produced by the mechanism shown in Figs. 18 to 24; Fig. 26 is a detail transverse section of the take-up roll; Fig. 27 is a longitudinal sectional view of the same; Fig. 28 is a detail view of the friction brake or retarding device; Fig. 29 is an elevation of the same; Fig. 30 is an end elevation of the twisting tool operating mechanism drawn to an enlarged scale; Fig. 31 is a side view of the same; Fig. 32 is a detail view of a portion of the winding or take-up mechanism; Fig. 33 is a plan view of the same, showing the carrying bracket in section; Fig. 34 is a detail sectional view of the take-up clutching mechanism; and Figs. 35, 36 and 37, are detail views of a form of twisting tool which may be employed.

The working parts of the machine are supported on a suitable frame including a pair of end standards or check plates 1 connected at the top by a pair of parallel bars 2, slightly spaced from each other. These bars support a pair of brackets 3 and 4, of which the bracket 3 is rigidly secured in position, while the bracket 4 is adjustable toward and from the bracket 3, in order to permit operation on fabrics of different widths. The brackets carry the two sections of a table 8, over which

the netting is passed, one of these table sections being carried by and adjustable with the bracket 4, and the opposite edges of the table are curved downward, in order to permit the free passage of the netting thereover.

In the lower portion of the frame is journaled a removable spindle 9 on which is wound the netting to be operated upon, the netting passing from thence over a frictional retarding device to the table and from the table to a suitable intermittently operated take-up mechanism.

Extending from one side of the frame are two arms 10, carrying a cross bar 11, to which are secured two brackets or arms 16 (Figs. 28 and 29), which may be adjusted in the direction of the length of the bar to alter the distance between them, as required by the width of the netting being treated. From each bracket 16 extends a stationary spindle 15, carrying a fixed friction disk 14 of leather or other suitable material and against the disk bears a toothed wheel 12, that is arranged to engage in the meshes of the netting. The spindle further carries a helical compression spring that bears against the wheel and tends to force the same against the friction disk. The stress of the spring is under the control of a wing nut on the spindle, so that greater or less retarding action may be exerted on the netting.

In connection with each of the table sections are means for holding the netting during the twisting operation, and for effecting a step by step feeding movement thereof, and with the exception that the parts associated with the bracket 4 are adjustable toward and from the bracket 3, the constructions are identical and a description of one of them will suffice for a thorough understanding of the structures.

To a vertical arm on each bracket is pivoted a plate 46, that is arranged slightly above and parallel with the table 8, and the edges of this plate are rounded to facilitate the passage of the netting. The plate is provided with a slot 46' (Fig. 8) and at a point below this the table has a slot 8'. These slots serve for the passage of a pair of wedge-shaped centering and locking members 45 and 48, which are arranged to move upward through the meshes of the fabric, and hold the same in a central position during the twisting or bending operation.

The wedge 45 is secured to the upper end of a vertically guided bar 47, having at its lower end an anti-friction roller that bears against the periphery of a cam 50 on the main shaft 20 of the machine, the cam serving to raise the bar, while the return movement is accomplished by a helical compression spring 51, that surrounds the lower portion of the bar (Fig. 12). The upper end of the bar 47 carries a laterally directed arm 49, on which the wedge member 48 is adjustably

mounted, so that the distance between the wedges may be adjusted for operation on fabric of different size mesh.

The fabric is fed forward step by step, and to accomplish this operation a reciprocatory hook 58 is employed. Mounted in suitable guides on the bars 2 is a reciprocatory blade 68, from which projects a pin 65, that is engaged by the bifurcated upper end of a lever 62 that is pivoted on a pin 61 on the frame. The lower end of the lever is pressed against a cam 17 on shaft 20, by means of a spring 66, the cam effecting movement of the lever in one direction, and the return movement being accomplished by means of the spring. The bar is preferably provided with a stop 67 by which excess movement may be prevented.

On the forward end of the bar 68 is arranged a bracket 69, which may be adjusted on the bar to accommodate fabric of different size mesh, and which may be locked in place by a screw 92 (Figs. 12 and 13). The rear end of the bracket carries a pair of ears 60, between which extends a pin 61, and on the pin is pivoted the hook 58. The bracket has a transversely extending series of teeth 60', which may be engaged by similar teeth at the pivoted end of the hook and said hook may be shifted laterally on the pin, and the proper teeth interengaged to accommodate fabric of different mesh. The hook is yieldably supported by a spring 59, so that on the back stroke it may yield downward to pass under the wires and enter the next mesh, and the fabric thus receives a step-by-step forward movement, and at the completion of each feeding movement is properly centered and locked by the wedges.

The crossed wires at the edge of the fabric may be treated in different ways, for instance by bending back the ends of the wire, as shown in Fig. 9, or by twisting the ends as in Fig. 17, or by the introduction of selvage wires, as shown in Figs. 17 and 25. When the ends are to be bent back, a tool 5 of the character best shown in Figs. 35, 36 and 37, is employed. This tool has a pair of removable jaws 5', secured to a central block or tool head, at the end of a spindle 18, the jaws being detachable to provide for renewal when worn, or to permit the use of jaws of different size to accommodate wire of different gage.

The spindle 18 is mounted in bearings in the bracket 4, and at its forward end is an annular groove 26, to receive a pair of pins 25, carried by the forked end of a lever 23. This lever is pivoted on a pin 22, and its lower end is engaged by a cam 19 on the shaft 20, (Figs. 4 and 5).

The cam moves the spindle 18 forward and its rearward movement is accomplished by a helical compression spring 27, which surrounds the spindle. It is in many cases

desirable to partly rotate the tool, and for this purpose the spindle is provided with a fixed collar or enlargement 28, in which is cut a helical groove 29, that receives a stationary pin 30, so that as the spindle reciprocates it will also be turned on its axis, for the purpose of partly twisting the ends of the wires.

When the ends of the wires are to be inter-twisted, a tool 6 of the character shown in Figs. 14 and 15, is preferably employed, said tool comprising a pair of plates 6', secured to a carrying head at the end of a shaft 32, the outer ends of the plates being provided with beveled corner portions to facilitate the introduction of the wires, or the more simple form of tool shown in Fig. 16 may be employed.

The shaft 32 is mounted in bearings in the bracket 3, and at the outer end of said shaft is a pinion 33, which meshes with a gear 34 on a short shaft 35. Secured to the gear 34 is a ratchet disk 36, which is engaged by a hooked pawl 37, pivoted on a pin 38, that is carried by a vertically reciprocatory slide 39, the tail of the pawl being weighted to insure its engagement with the teeth of the ratchet disk.

The upper or lower portions of the bar are provided with vertically elongated slots to receive the shafts 35 and 20, which serve as guides to maintain the bar in place, and on the lower end of the bar is an anti-friction roller 40, which is held against the lower side of a cam 41 on shaft 20, by means of a compression spring 42. The number of teeth on the ratchet disk and the size of the gear and pinion, are so calculated that at each movement the head 6 is turned slightly beyond the actual point of twist, that is to say, a turning movement of 180° would accomplish the desired twisting operation, were it not for the elasticity of the wire of which the fabric is composed. To compensate for this, the twisting head is turned slightly more than 180° , so that the finished twist will be allowed to spring back slightly. Owing to this excess movement, it becomes necessary to turn the twister back, or center it, so that the opening between the plates of the twister shall be held horizontal, for the entrance of the next pair of ends to be united. For this purpose, the end of the shaft 32 is provided with a disk 43, having a pair of angularly related shoulders with which a pair of pawls 44 and 44' on slide 39 may engage.

When the twisting operation is complete, the bar 39 moves upward, and the pawl 44 engages one of the shoulders of the cam and moves the same, turning the shaft until the twister head is in approximately correct position. The second pawl 44' then engages the second shoulder, and turns the disk 43, and twister head to the exact central position.

When a binder or selvage wire *c* is to be in-

serted to form an edge, such as shown in Fig. 25, the binder is guided through the head 7 (Figs. 22 to 24) by a grooved disk 57 (Fig. 12). The head 7 is provided with beveled edges 54, to facilitate the entrance of the wire ends, and has ribs 55 and transverse slots 56 to more firmly engage the wires, so that when the head is slightly turned, as shown by dotted lines in Fig. 23, the ends of the wires will be moved across the plane of the binder or selvage wire *c*, and then, by pushing the head forward the ends of the wires may be bent over the binder, as shown in Fig. 25. The spindle 32 in this case is reciprocated by the mechanism best shown in Figs. 5 and 21, and the partial rotative movement may be accomplished by pivoting the pawl or arm 37' directly to the large gear wheel 34', by means of a pin 52, as shown in Fig. 20. A binder *c'* may be inserted in the twisted edge, as shown in Fig. 17 by merely guiding such binder between the crossed ends of the wires in advance of the twister head.

Projecting from an arm at one side of the frame is a short stationary shaft 81 (Fig. 34), on which is loosely mounted a continuously revolved sprocket wheel 80, and frictionally mounted on the hub of this wheel is a friction cone 82, that may be moved into engagement with a conical recess formed in a sleeve 83, that has a bayonet slot connection 89, with a take-up roller 84. This take-up roller is journaled in an arm at the opposite side of the machine, and is operated intermittently to take up the finished fabric.

Mounted on a stationary pin 72 carried by one of the standards is a lever 71, from one end of which projects a rod 70, that enters the depending loop of fabric as it passes from the twisters to the take-up rollers. A portion of the weight of this rod 70 is counterbalanced by an adjustable weight 73 carried by the opposite arm of the lever, but the rod is free to follow down the loop of fabric.

Mounted on a pin 75 carried by the frame is a bell crank lever 74, the approximately horizontal arm of which is provided with a fork embracing the lever 71. The approximately vertical arm of the bell crank lever is connected to the lower arm of a clutch operating lever 76, that is pivoted on a pin 76' carried by the frame. The upper end of the lever 76 has a pin 77 entering an annular groove in a collar 79, that is mounted loosely on the shaft 81, and is secured to the sprocket wheel 80.

The wheel 80 carries a pawl 87, which may be moved into engagement with a lug 88 projecting from the conical sleeve 83 for the purpose of transmitting positive rotative movement to the take-up shaft. The tail of this pawl is under the control of a small lever 85 pivoted to the wheel 80, and having its inner end playing between two pins 86 on the cone 82.

When the loop of fabric accumulates, the rod 70 descends and moves the clutch lever 76, forcing the cone 82 into the conical sleeve 83. This retards the movement of the cone, the latter slipping slightly on the hub of the sprocket wheel, and one of the pins 86 of the cone is then engaged by the inner end of the small lever 85, throwing the outer end of the latter forward, or in the same direction as the sprocket wheel is rotating. The immediate effect of this is to throw the tail of pawl 87 outward, and its operating end then engages the lug 88 and transmits positive rotative movement to the take-up roll, so that the finished fabric is wound up until the rod 70 is raised to an extent sufficient to shift the clutch lever in the opposite direction. When this occurs the cone 82, rotating freely will carry the second of its pins 86 against the small lever 85, and release the main pawl 87, so that the operation of the take-up roll ceases.

Within the take-up roller is a channel bar 84, to which are pivoted fingers 90, that are arranged to project through slots in the roller. These fingers are normally held against the end walls of the slots by coiled springs 91, and the fingers project outward in a plane at a right angle to the axis of the roller, in position to engage in the meshes of the fabric.

When the fabric is to be removed from the roller, it is merely necessary to detach the roller from the collar 83, and then withdraw the roller lengthwise, the fingers folding down through the slots to the position indicated by dotted lines in Fig. 27.

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

1. In a machine of the class described, a frame, and a pair of relatively adjustable mechanisms carried thereby, each of such mechanisms including a table section, a fabric gripper, and a twister.

2. In a machine of the class described, a frame, and a pair of relatively adjustable mechanisms carried thereby, each of such mechanisms including a fabric feeding device, a table, a twister, and actuating means for the feeding device and the twister.

3. In a machine of the class described, a twister, a step-by-step feeding device for presenting the crossed wires successively to the twister, and automatic means for engaging and clamping the wires adjacent the twisting mechanism.

4. In a machine of the class described, a frame, a pair of twisters, twister carrying and operating means adjustable on the frame to vary the distance between them, and a sectional fabric-supporting table, one section of the table being connected to and movable with each of the twisters.

5. In apparatus of the class described, a

twister head, a supporting table having an opening therein, a recessed clamp plate, and an inclining clamping member arranged to pass through the opening in the plate and enter the recess, said clamp serving to engage and hold the wire fabric against the clamp plate.

6. In apparatus of the class described, a twister head, a fabric-supporting table, a recessed clamp plate arranged above the table, and a pair of vertically movable clamping members arranged to enter said recesses and clamp the fabric against said plate.

7. In apparatus of the class described, a twister head, a fabric-supporting table, a recessed clamp plate above the table, a fabric clamp arranged to enter said recess, an arm extending from the clamp, and a secondary clamping member adjustably mounted on the arm to permit engagement with fabric of different mesh.

8. In a machine of the class described, a clamping means for diamond mesh fabric, comprising a pair of relatively adjustable members having inclined clamping faces arranged to engage against the untwisted portions at diagonally opposite points of mesh.

9. In a machine of the class described, a twister head, a fabric-supporting table, a reciprocatory rod, means for actuating the same, and a yieldably mounted fabric-engaging hook carried by the rod and arranged to successively engage the meshes of the fabric.

10. In a machine of the class described, a twister head, a fabric-supporting table, a reciprocatory rod, means for actuating the same, and a spring mounted hook carried by the rod and arranged to successively engage the fabric meshes, said hook being laterally and longitudinally adjustable with respect to the rod to permit engagement with fabric of different mesh.

11. In a machine of the class described, a tension means including a toothed disk arranged to engage the mesh of the fabric, and an adjustable friction means for retarding the rotative movement of said disk.

12. In a machine of the class described, a toothed disk arranged to engage in the mesh of the fabric, a shaft carrying the disk, an adjustable support for the shaft, and an adjustable friction disk for retarding the movement of the fabric-engaging disk.

13. In a machine of the class described, a revoluble twister, a shaft carrying the same, a shouldered disk arranged on the shaft, and a pair of successively operable centering devices serving to engage the shoulders of the disk and restore the twister to initial position after each operation.

14. In a machine of the class described, a twister, a shaft carrying the same, a disk arranged on the shaft and provided with a pair of oppositely directed shoulders, and a pair of successively operable pawls, arranged to

engage said shoulders and restoring the twisters to initial position after each operation.

15. In a machine of the class described, an
5 automatic feeding means, a gripping device thereof, a twister head, a shaft carrying the same, a pinion arranged on the shaft, a shouldered disk also carried by the shaft, a gear wheel engaging the pinion, a ratchet
10 wheel mounted with the gear, a cam actuated slide, a pawl carried by the slide and arranged to engage the ratchet wheel, and a pair of pawls also carried by the slide and arranged to successively operate on the shoulders of the disk to restore the twisters to initial position after each operation.
15

16. In a machine of the class described, an intermittently operated take-up roll, an operating means therefor, a clutch between the
20 operating means and the roller, and a clutch-actuating device including an arm arranged

to engage the fabric in advance of the roller, said arm raising and lowering to follow the fabric and to actuate the clutch.

17. In an apparatus of the class described, 25 an intermittently operable take-up roller, an operating means therefor, a clutching device between the operating means and the roller, and a clutch-operating arm arranged to hang in a loop on the fabric in advance of the
30 roller, and operable by the fabric for controlling the position of the clutch.

18. In a machine of the class described, a twister, and means for guiding a binder or selvage wire between the ends of the fabric 35 to be twisted.

In testimony whereof I affix my signature, in presence of two witnesses.

OTTO SCHMID.

Witnesses:

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