

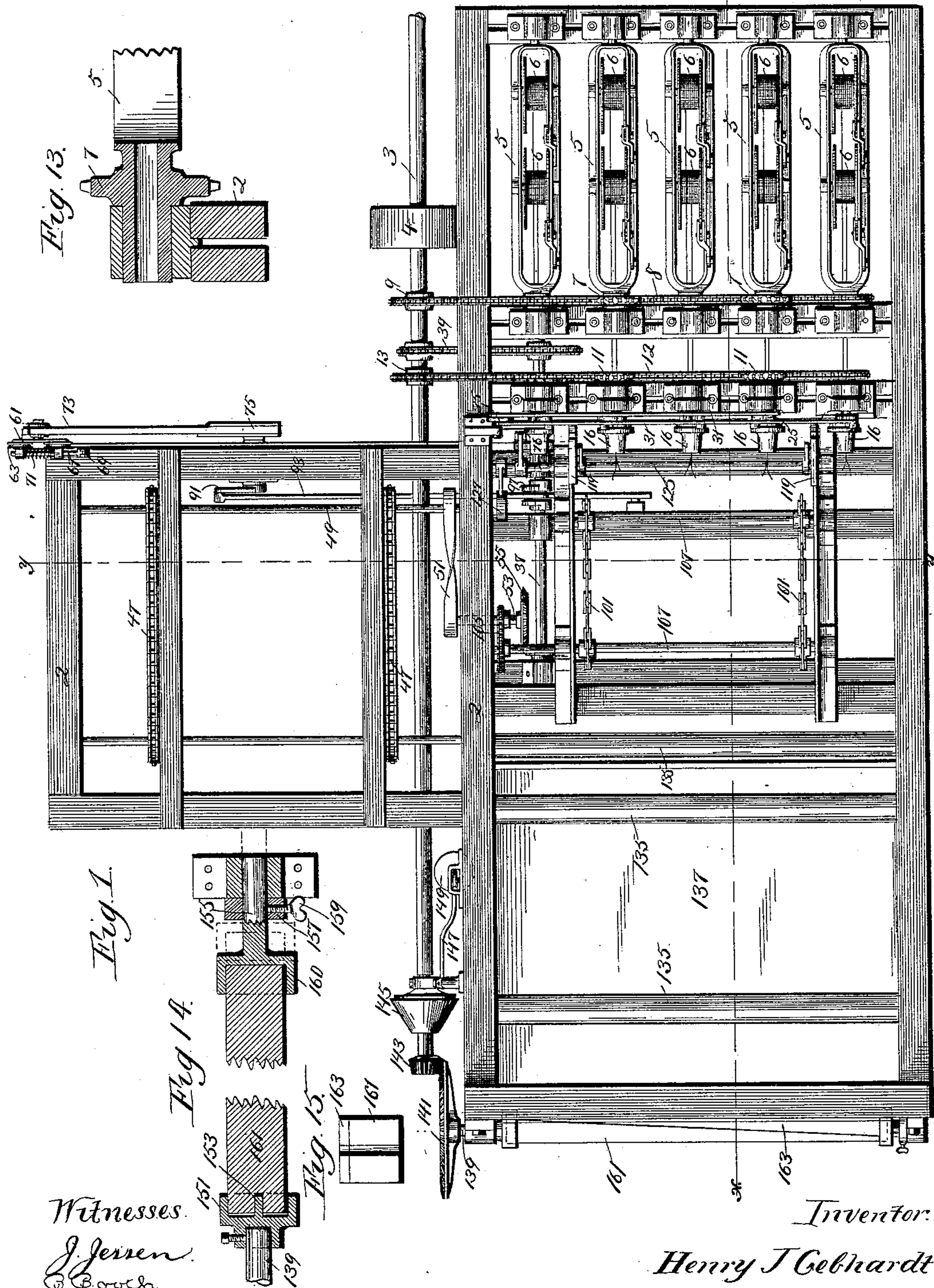
(No Model.)

4 Sheets—Sheet 1.

H. J. GEBHARDT.
WIRE AND PICKET FENCE MACHINE.

No. 435,539.

Patented Sept. 2, 1890.



Witnesses.
J. Jensen.
C. Booth.

Inventor:

Henry J. Gebhardt

By Paul & Merwin attys

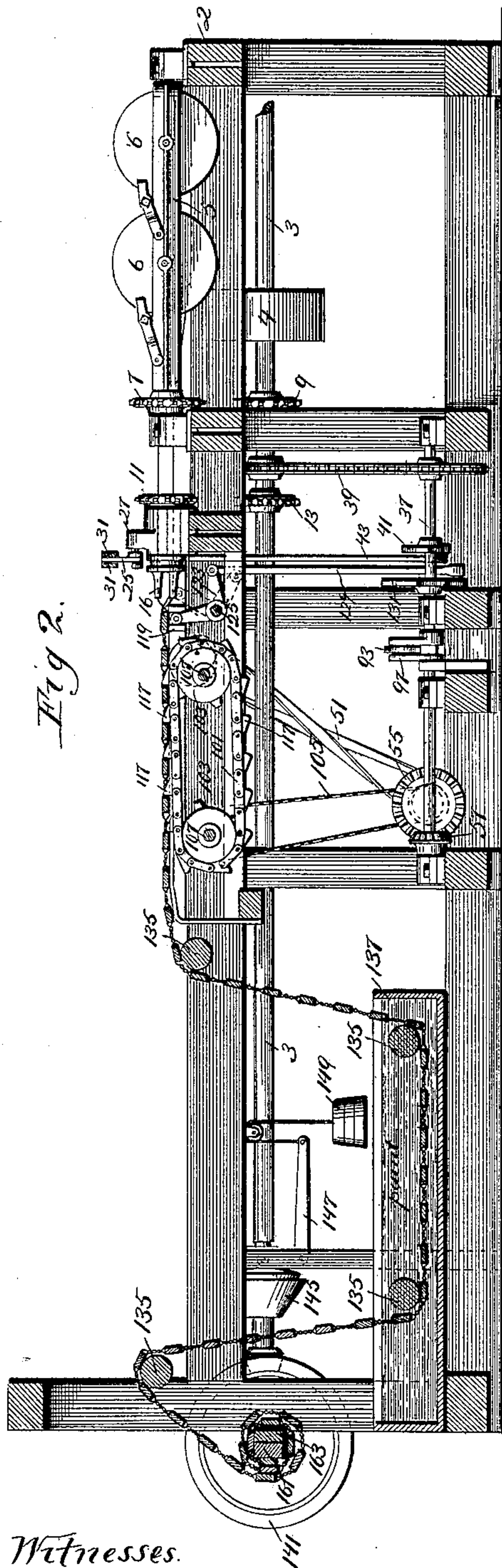
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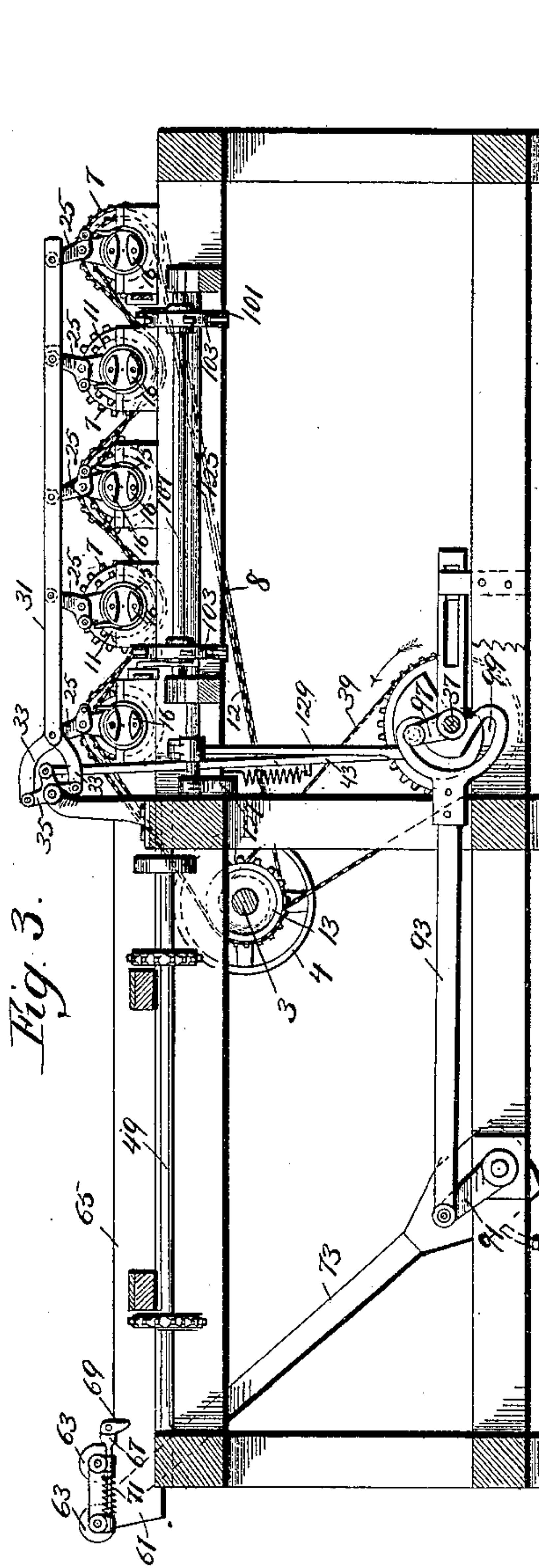
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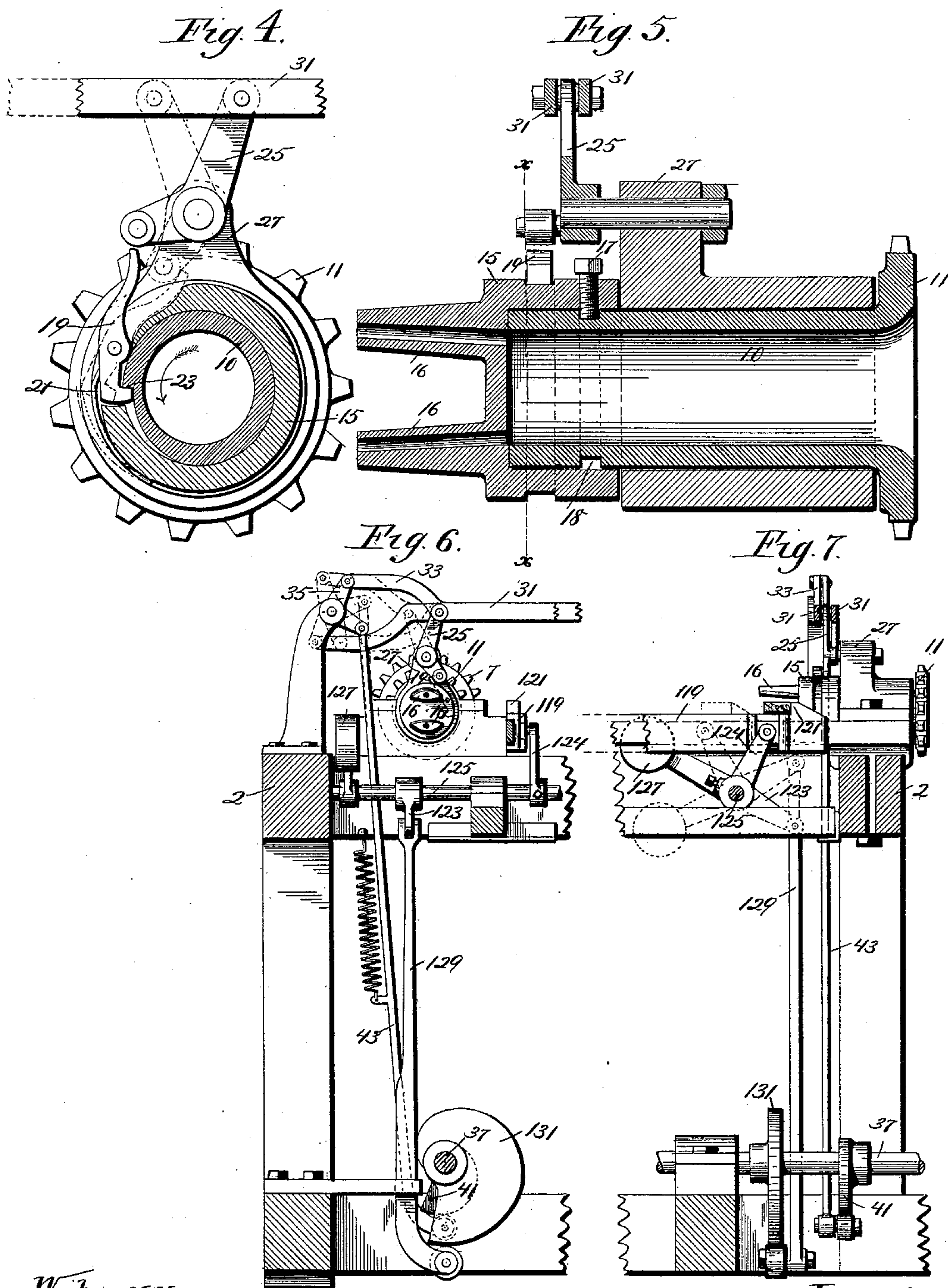
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Fig. 8.

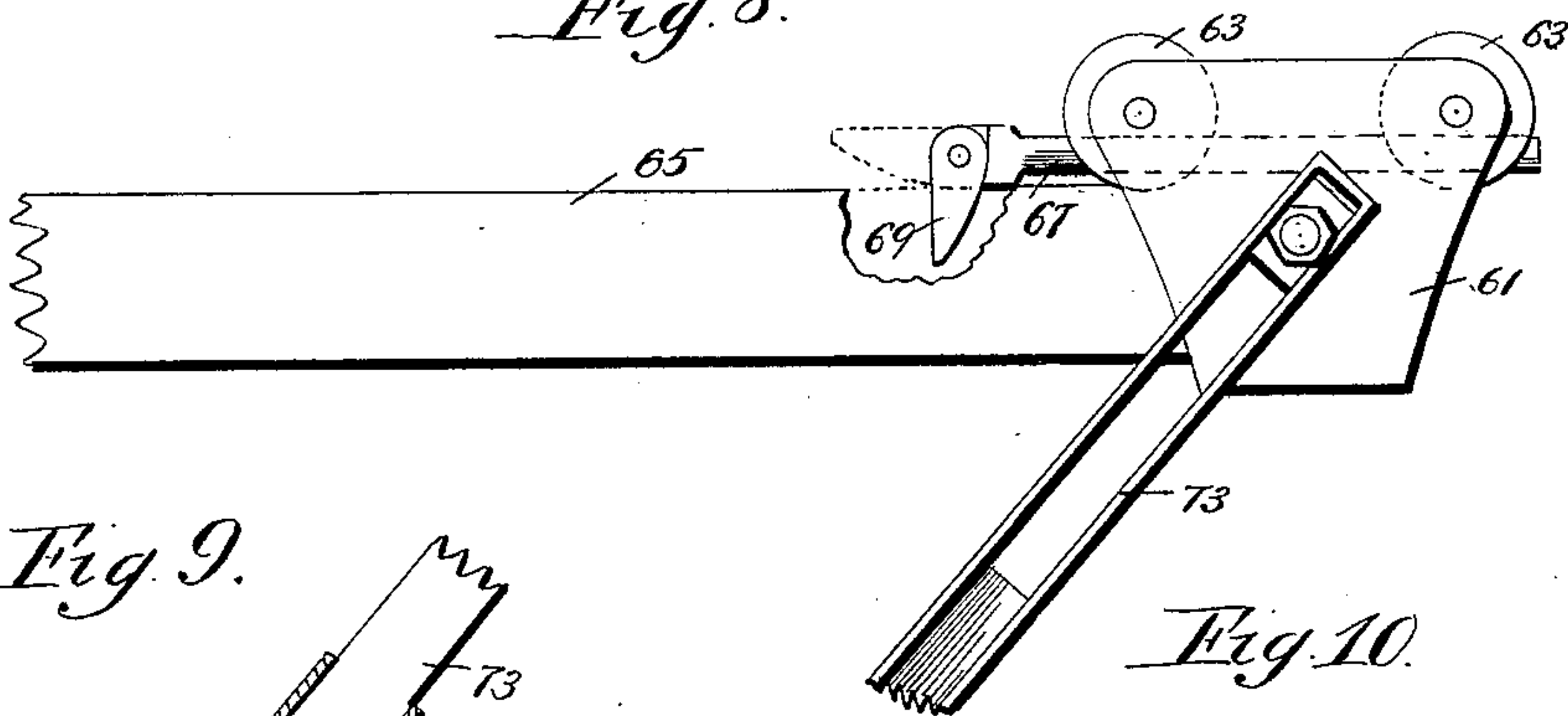


Fig. 9.

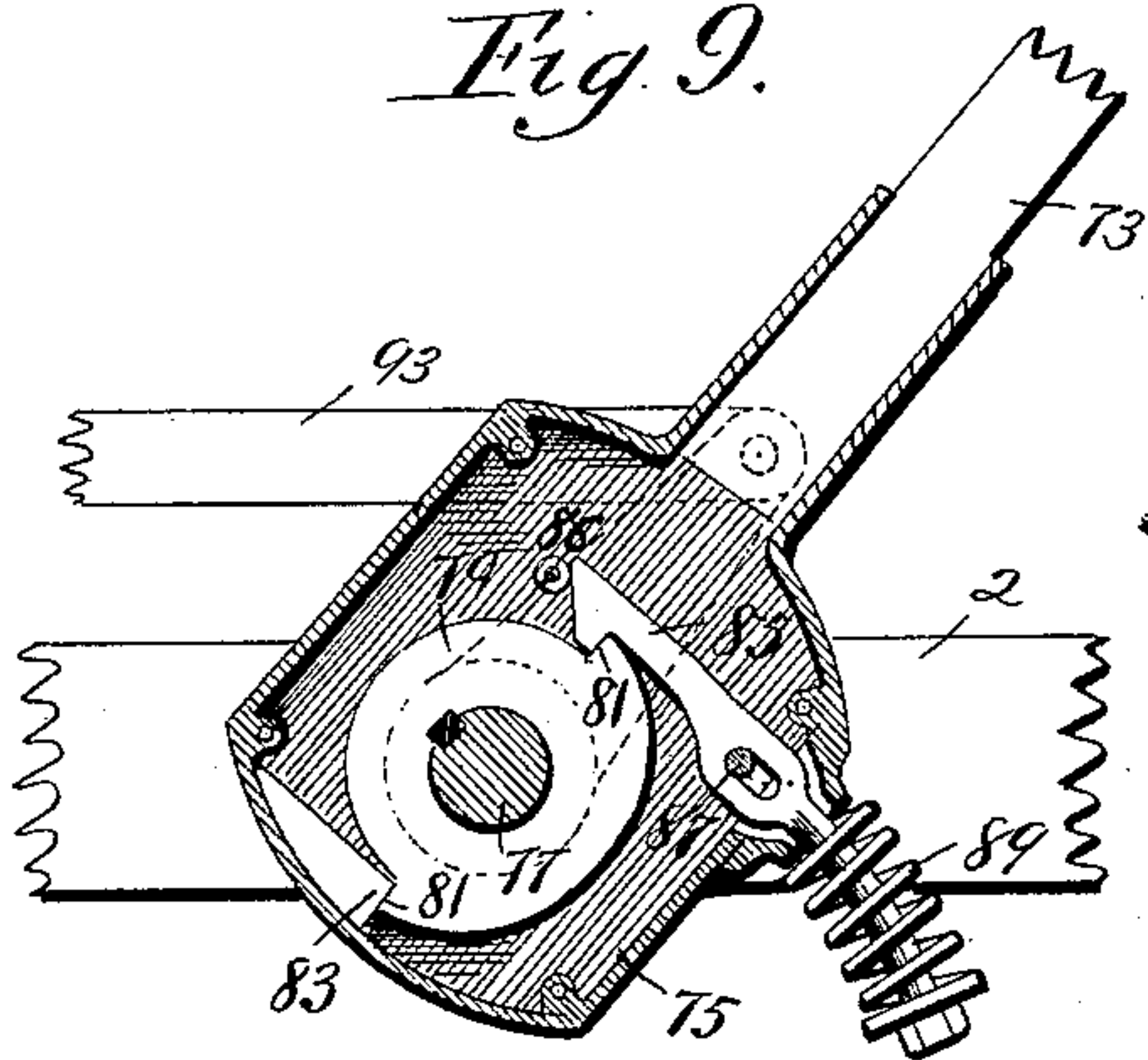


Fig. 10.

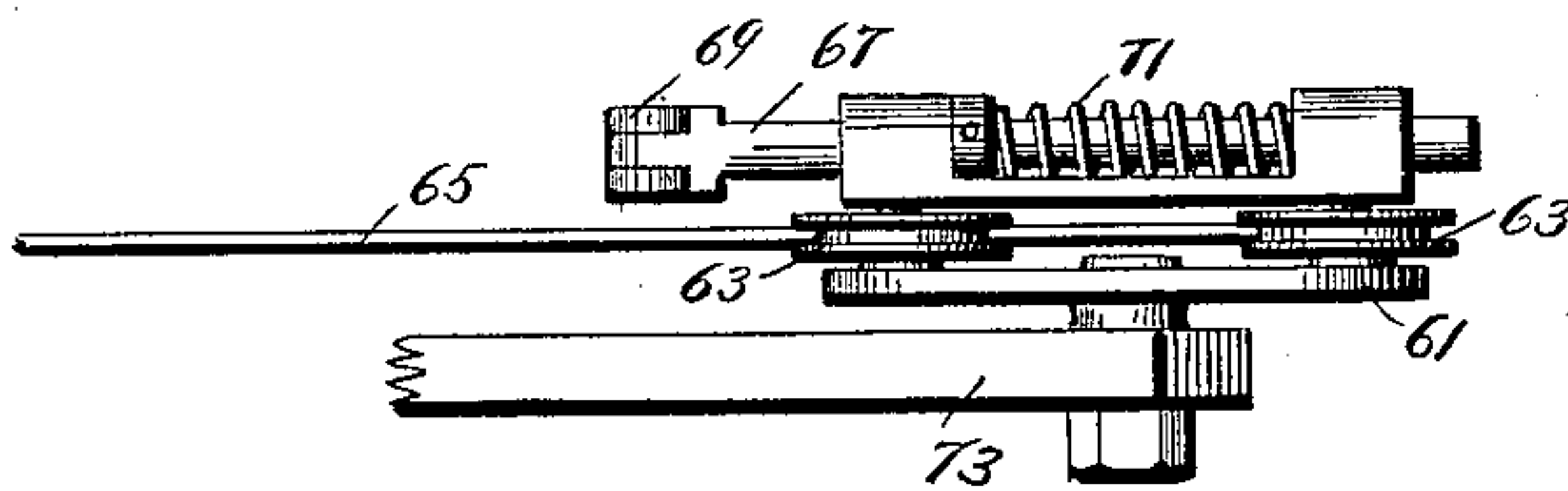


Fig. 11.

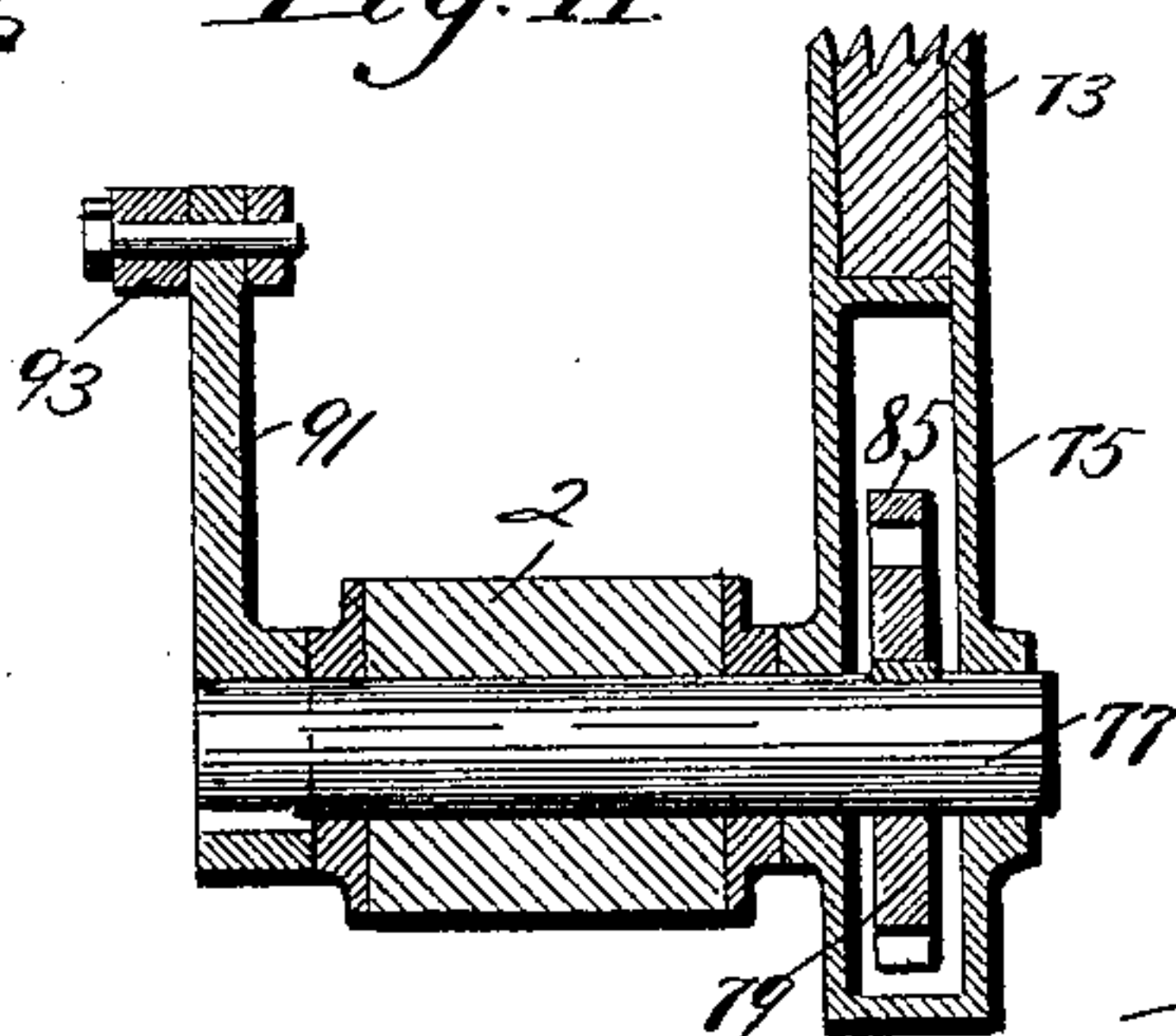


Fig. 12.

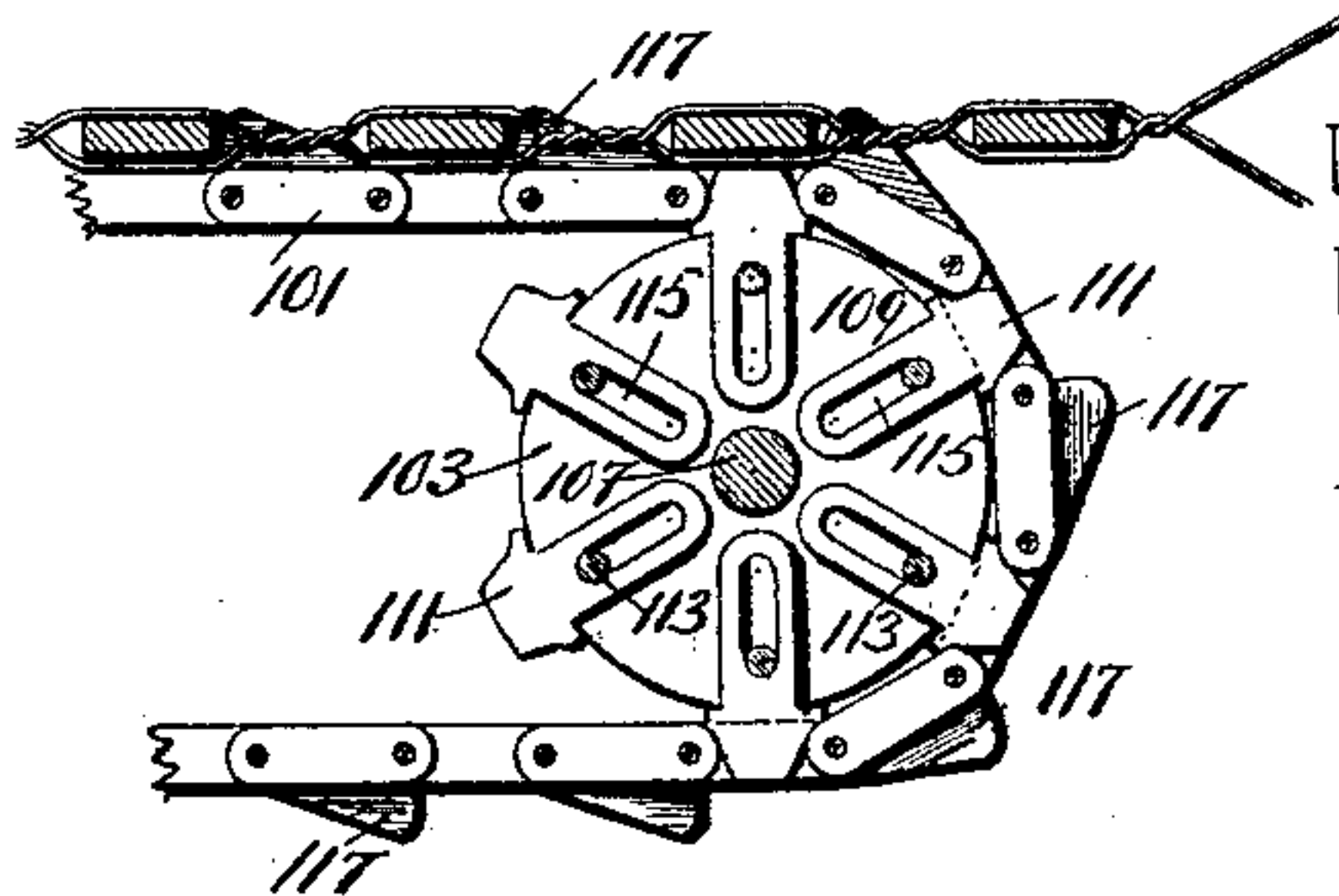
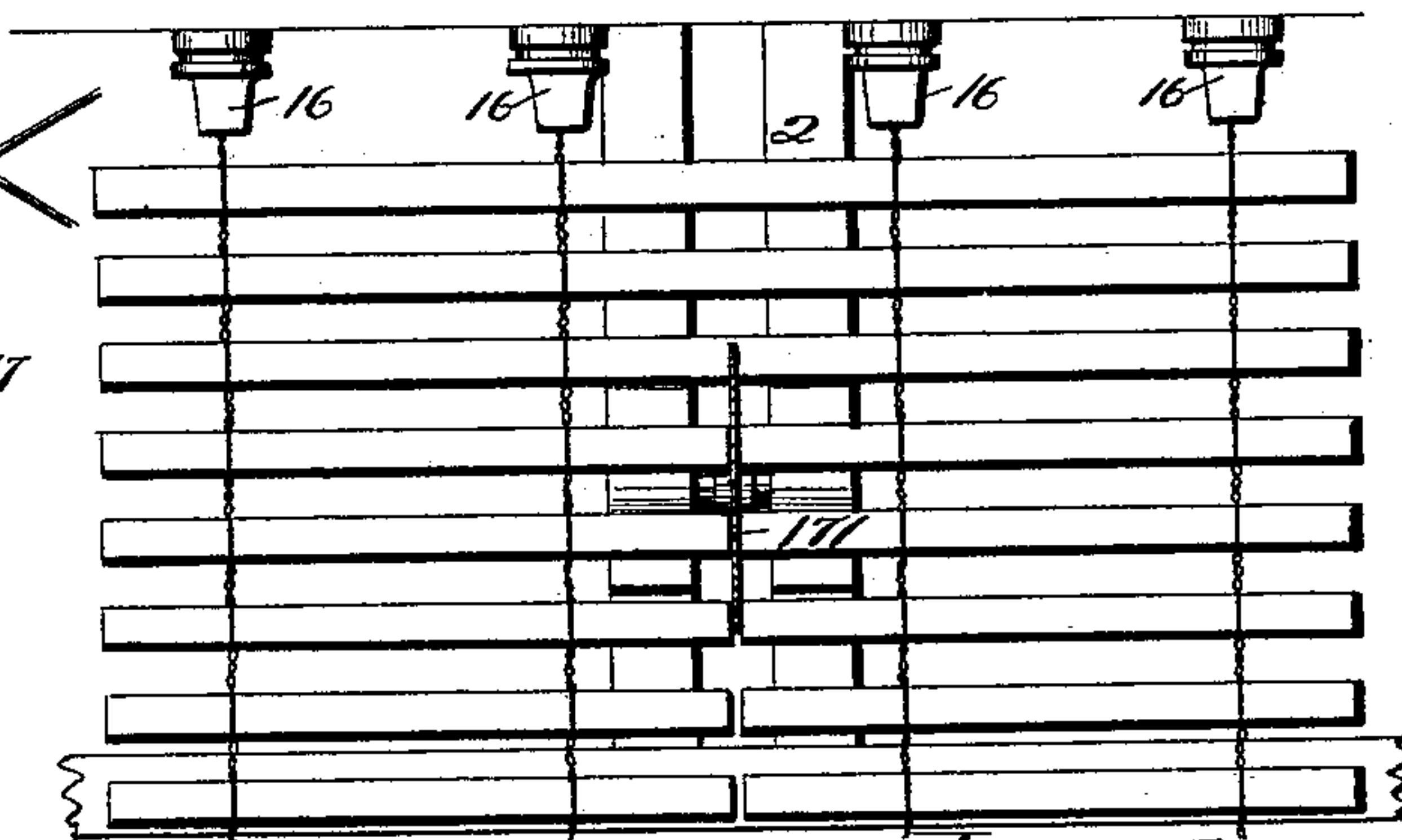


Fig. 16.



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UNITED STATES PATENT OFFICE.

HENRY J. GEBHARDT, OF MINNEAPOLIS, MINNESOTA.

WIRE-AND-PICKET-FENCE MACHINE.

SPECIFICATION forming part of Letters Patent No. 435,539, dated September 2, 1890.

Application filed August 20, 1889. Serial No. 321,368. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. GEBHARDT, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain
5 new and useful Improvements in Automatic Fence-Machines, of which the following is a specification.

The object of this invention is to provide
10 an improved automatic machine for the manufacture of combined wire-and-picket fence.

The invention consists, generally, in the construction and combination hereinafter described, and particularly pointed out in the claims.

15 In the accompanying drawings, forming a part of this specification, Figure 1 is a plan view of my improved machine. Fig. 2 is a longitudinal vertical section on line $x x$ of Fig. 1. Fig. 3 is a transverse vertical section
20 on line $y y$ of Fig. 1. Figs. 4 and 5 are detail sections of the twister-heads. Figs. 6 and 7 are details of the mechanism for stopping periodically the twister-heads. Figs. 8, 9, and 10 are details of the picket-throwing device.
25 Fig. 11 is a detail section of the mechanism for operating the picket-throwing device. Fig. 12 is a detail of the fence-advancing mechanism. Fig. 13 is a detail of the spool-frame. Figs. 14 and 15 are details of the reel. Fig. 16 is a
30 plan showing a saw for cutting the fence.

In the drawings, 2 represents the frame of the machine, which is of any preferred construction and of any suitable size and shape.

3 represents the main driving-shaft, to
35 which power is applied through the pulley or driving wheel 4.

At the rear end of the frame 2 and mounted in suitable bearings thereon are the series of
40 spool-frames 5. Any desired number of these frames may be used in the machine. I have in this instance shown the machine provided with five of these frames. Each spool-frame supports two spools 6, which are mounted in the spool-frames in any suitable way and from
45 which the wires pass to the twister-heads, hereinafter described, through the hollow forward ends of the twister-frames. Each spool-frame is provided with a suitable sprocket-wheel 7, and a suitable driving-chain 8 passes from a
50 sprocket 9 on the shaft 3 around all of said sprockets 7 and drives said spool-frames at the desired speed. I prefer to arrange said

chain 8 so that it will pass alternately over and under said sprocket-wheels, thereby giving a longer wrap on the wheels and driving
55 the alternate spool-frames in opposite directions.

Arranged in front of the spool-frames 5 are a series of short independent shafts 10, which are mounted in bearings upon the frame of
60 the machine and are provided, preferably upon their rear ends, with the sprockets 11. The shafts 10 are preferably hollow, and they are driven at the desired speed by means of a chain 12, which passes around a sprocket-
65 wheel 13 upon the driving-shaft 3 and alternately over and under the sprockets 11 upon the shafts 10. The shafts 10 are driven continuously and at a higher rate of speed than the spool-frames 5. The difference in the
70 rates of speed of the shafts 10 and the spool-frames is regulated by the size of the sprocket through which they are driven from the driving-shaft 3. I prefer, however, to have this
75 speed in the proportion of three to four—that is to say, so that the shafts 10 will make four revolutions while the spool-frames make three revolutions.

Arranged upon the forward ends of the shafts 10 are the twister-heads 15, provided
80 with the projecting twister-fingers 16. These heads are secured to the shafts 10 by means of screws 17—one in each head preferably—which engages a circumferential groove 18 in the shaft 10. By this means the twister-head
85 is prevented from slipping off the shaft, while the shaft may turn freely and the twister-head remain stationary. The twister-head is also provided with a dog 19, pivoted thereon and having a projecting end that is adapted
90 to extend to the inside of the twister-head through an opening in its wall. A spring 21 is arranged to bear upon this dog and tends to hold the pawl normally in position with its end projecting through to the interior of
95 the twister-head. The shaft 10 is provided with a shoulder 23 on its outer surface, and when the end of the dog 19 projects through the twister-head it encounters the shoulder 23, and the shaft 10 and the twister-head then
100 move together, the twister-head being carried around with this shaft. A lever 25 is pivoted upon a suitable projection 27, preferably arranged upon the box of the shaft 10. There

is preferably one of these levers 25 for each of the twister-heads, and the levers are preferably arranged above the twister-heads, as shown in Fig. 6. A bar 31 is connected with each of the levers 25, and this bar is connected by a rod 33 to a bell-crank lever 35. The alternate twistors preferably rotate in opposite directions, the driving-chain passing over one and under the next gear-wheel on the shafts to which the twister-heads are connected. Two bars 31 are therefore preferably provided, connected to opposite arms of the lever 35. The bars 31 are therefore moved in opposite directions, and the levers 25, that control the twister-heads that move in one direction, are connected to one of the bars 31, and those that control the twister-heads that move in the opposite direction are connected to the other bar 31.

A counter-shaft 37 is driven from the shaft 3 by a suitable chain 39, and this shaft is provided with a cam 41, that operates the lever 35 through a suitable connecting-rod 43. By this means the levers 25 may be alternately moved toward or from the twister-heads. When they are moved toward the twister-heads and are brought into substantially the position shown by full lines in Fig. 6, they are in position to encounter the dog 19 as the twister-head revolves and to disengage it from the shaft 10. The twister-head will remain stationary while the shaft will continue to rotate. As soon as the lever 25 moves in the opposite direction, the spring 21 will cause the end of the dog to bear on the shaft, and the shoulder 23, again coming in engagement with the end of said dog, will cause the twister-head to again rotate with the shaft. By this means the twister-head may be periodically stopped for the purpose of permitting the insertion between the wires of the pickets. The spool-frames rotate continuously at a uniform speed. The shafts 10, as before stated, rotate continuously at a greater speed than the spool-frames. The twister-heads when connected to the shafts 10 move with them and at the same rate of speed. The twister-heads have a uniform movement with periodical stoppages. While they are disconnected from the shafts 10 they remain stationary, and they are preferably stopped with the wires in such position that a line drawn through the centers of both wires will be perpendicular to the surface of the inserted picket. As the wires remain in this position until after the picket is inserted, I am enabled to secure a much closer wrap about the pickets than can be obtained where the wires are started with a gradually-increasing speed before the pickets are wholly inserted. In such case the wires are not directly opposite each other on the pickets, and the distance between the wires is greater than the thickness of the picket, and when the fence is put in use the pickets will become loose. This objection is entirely obviated by my invention.

The pickets to be fed into the machine are

placed upon the carrying-belts 47, which are driven through suitable gearing from the counter-shaft 37. I have here shown the shaft 49, over which the belts pass, arranged to be driven by a belt 51, that is driven from a short shaft 53, having a bevel-gear 55, that meshes with the bevel-gear 57 upon the shaft 37. The belts or carriers 47 move the pickets into position to be operated upon.

The picket-thrower consists, essentially, of a carriage 61, provided with trucks 63, that are arranged upon a rail 65. This carriage is arranged to be moved back and forth upon this rail, and it is provided with a yielding buffer 67, having a pivoted head 69, and held in position upon the carriage 61 by means of the spring 71. The buffer 67 is arranged in line with the end of the picket when it is in position to be moved into the machine, and the head 69 is pivoted, preferably at its upper end, and its lower end engages the rear end of the picket. A shoulder on the head 69 strikes a shoulder on the buffer 67, so that the head cannot be turned back beyond the vertical position which it occupies when it strikes the end of the picket. When the carriage 61 moves in the reverse direction, the head 69 may turn into a substantially horizontal position in line with the buffer 67, as shown by dotted lines in Fig. 8. This construction permits the head to move back over the picket should one have dropped into position to be moved into the machine. When the carriage 61 reaches the end of its reversed movement, the head 69 will drop into a vertical position, as shown by full lines in Fig. 8, ready to engage the next picket and move it into the twister-heads. As the buffer 67 is arranged to yield when a certain pressure is brought upon it, it will be seen that if the pickets vary somewhat in length the ends which move first while being carried into the machine will all come in line with each other, being brought against the same fixed stop, and thus a fence will be made in which one end of the pickets will all be in line. A lever 73 is pivoted to the carriage 61, and its opposite end is provided with a box or casting 75, which is mounted upon and surrounds a short shaft 77. A disk or plate 79, having two oppositely-arranged shoulders 81, is secured to the shaft 77 and is arranged within the box 75. A shoulder 83 on the inside of the box 75 engages one of the shoulders 81. A hook 85 engages the other shoulder 81. This hook is slotted and extends over a guide-pin 87, and also extends outside of the box 75, and is provided with a spiral spring 89, by which it is held in position. The end of the hook is beveled, and a pin 86 is arranged in the casting 75 close to the beveled end of the hook. When the strain on the arm 73 is sufficient to overcome the tension of the spring 89, the hook 85 is thrown outward by its beveled or inclined end riding over the pin 86 and is released from the shoulder 81 on the plate 79. A crank 91 is connected to the shaft 77, and

this crank is arranged to be driven by a pitman or rod 93, that is connected to the crank-arm 91, and extends to a suitable crank 97 on the shaft 37. The crank 97 engages a slot 99 in the end of the pitman 93, whereby as the shaft 37 is rotated the pitman 93 will be vibrated back and forth, thrusting the pickets into the machine through the lever 73. The slot in the end of the pitman causes the picket-thrower to remain stationary during a portion of the movement of the crank. It will be seen that the projections 83, together with the lugs 81 and the dog 85, effectually protect this portion of the mechanism, as when a strain greater than that for which it is set comes upon the carriage the spring 89 will yield, thus permitting the shaft 77 to turn without moving the carriage 61 or its operating-lever. The rod 93, that is connected with the crank 91, is arranged to move as often as it is necessary to move a picket into the machine.

Arranged in front of the twister-heads is a fence-advancing mechanism, which is adapted to enter the spaces between the pickets and to grasp each picket by the rear edge thereof. This fence-advancing mechanism consists, preferably, of an endless chain 101, that is arranged to pass over suitable sprockets 103, that are driven by a suitable belt 105 from the shaft 53, these sprockets being mounted upon suitable horizontal shafts 107. I prefer to provide two of these endless chains, arranging one near each end of the pickets, as shown in Fig. 1. I also prefer to provide sprocket-wheels of a peculiar construction, consisting of disks 109 and adjustable teeth 111, having beveled ends, that are secured upon the disks 109 by bolts 113, that pass through slots 115 in said teeth. A portion of the links forming the chain 101 are provided with the inclined dogs 117. These dogs are arranged to engage the rear edges of the pickets, as shown in Fig. 12, and they advance the fence constantly and at a uniform rate of speed. The chains 101 are driven continuously and in the same direction, and each of the dogs engages the rear edge of one of the pickets. The distance between the vertical faces of the dogs is equal to the distance from the rear edge of one picket to the rear edge of the next picket, so that as the fence is advanced for the full length of the advancing mechanism each picket is engaged and moved by two dogs, one engaging each end of the picket. By this means the fence will be equally and evenly drawn forward, and will thus be kept straight and even.

For the purpose of moving each picket as it is fed into the machine forward from between the fingers of the twister-head and bringing it into the bight of the wires in position to be secured by twisting the wires, I provide sliding blocks 119, having shoulders 121. Said blocks are arranged to move toward and from the twister-heads or in the direction of the advance of the wire. When in

their normal position, the shoulders 121 do not project beyond the forward end of the face of the twister-head. Arms 123 and 124 are secured to the shaft 125, and the arms 124 are connected to the sliding blocks 119. The counterbalance-weight 127 is also secured to the shaft 125. A pitman 129 is connected to the arm 123, and its lower end engages a cam 131 on the shaft 37. As the shaft 37 is rotated, the blocks 119 are moved back and forth through the means described. The blocks are in the position shown by full lines in Fig. 7 when the picket is fed into position between these twisting-fingers. The blocks are then moved into the position shown by dotted lines in the same figure, carrying the picket with them and bringing it against the last-made twist in the wires. The picket will now be engaged by the dogs on the endless-chain carriers, hereinbefore described, and will thereafter be continuously advanced by such carrier. The twister-heads will at this time be brought into operation, and a twist will be made close to the rear side of the picket.

For the purpose of winding up the fence into suitable bundles, I arrange a reel at the end of the frame-work, and upon this reel the completed fence is wound. The fence passes, preferably after leaving the advancing mechanism, over and under suitable rolls 135 and through a receptacle 137 containing a supply of paint. By this means the fence is painted before it is formed into bundles.

The reel upon which the fence is wound consists, preferably, of a shaft 139, mounted in a suitable bearing upon the end of the frame of the machine and provided with a beveled gear 141, that is driven by a pinion 143, connected to the counter-shaft 3 by a friction-clutch 145. One member of the clutch 145 is connected to a lever 147, to which is connected a weight 149. This weight may be increased or diminished, as may be found necessary, to cause the friction-clutch to operate. When desired, the clutch may be separated, in which case the reel will cease to revolve.

Secured upon the shaft 139 is a cup-shaped casting 151, having a web or projection 153 extending across the cup.

A short shaft 155 is mounted in a suitable bearing at the other side of the frame of the machine, and is adapted to be moved longitudinally in its bearings. A collar 157 is secured to this shaft by a suitable set-screw 159 and prevents longitudinal movement of the shaft when the reel is in use. This shaft is also provided with a cup-shaped casting 160. Wedge-shaped bars 161 and 163 are arranged with their ends engaging the casting 151 and 160, the large end of one bar and the small end of the other bar being arranged in each of said castings. Each of said bars is provided in one end with a groove adapted to engage the web or projection 153 in the casting 151. By this means both of said bars will be rotated with the shaft 139. When the reel

has been filled with fencing, the shaft 155 is moved longitudinally in its bearings so as to disengage the ends of the bars 161 163. The bars are then removed from the inside of the bundle by pulling them out in opposite directions, and may then be replaced in position to receive another bundle.

It will be noticed that in this machine the twister-heads are stopped by positive mechanism and so that the wires always retain the same relative position to the pickets, or, in other words, that the wires are directly opposite each other upon the sides of the picket and in the same perpendicular line to the faces of the picket. In other machines in which the twister-heads are not stopped by positive mechanism the wires will be often moved beyond a line perpendicular to the faces of the picket, and will therefore not be in a line perpendicular to the faces of the picket, and the wire will not be as closely wrapped about the picket, and the pickets will often become loose and drop out when the fence is in use.

In some instances it is desirable to manufacture fence with short pickets, and for this purpose I prefer to arrange a suitable saw 171 upon the frame of the machine in front of the twisters, with its cutting-edge toward the twisters, so that as the fence is moved forward by the fence-advancing mechanism the pickets will be sawed in two after they have been fastened by the wires. In this way I am enabled at one operation by one machine to simultaneously manufacture two lengths of fencing, and a very material amount of saving in time and labor is effected, as it requires as much time to handle a short picket as it does a long one, and the machine arranged in this way will turn out twice as much fence as an ordinary machine.

I claim as my invention—

1. The combination, in a fence-machine, of a rotating shaft, a twister-head arranged with its axis coinciding with the axis of said shaft, and a clutch mechanism connecting said twister-head with said shaft so that it is rotated thereby, substantially as described.

2. The combination, in a fence-machine, of a rotating shaft, a twister-head mounted on said shaft, a clutch mechanism connecting said twister-head with said shaft so that it is rotated thereby, and mechanism for periodically disconnecting said twister-head from said shaft.

3. In a fence-making machine, the combination of a series of continuously-rotating shafts and a series of twister-heads mounted on said shafts and connected therewith and arranged to be periodically disconnected from said shafts, substantially as described.

4. In a fence-making machine, the combination of a series of rotating spool-frames, a series of shafts arranged to rotate at greater speed than said spool-frames, and a series of twister-heads connected with said shafts

and arranged to be periodically disconnected therefrom.

5. In a fence-making machine, the combination, with the hollow shaft 10, of the twister-head 15, mounted thereon and provided with the spring-controlled dog 19, arranged to engage said shaft 10, and the lever 25, arranged to engage said dog and disconnect it from said shaft, for the purpose set forth.

6. In a fence-machine, the combination of a rotating spool-frame, a shaft located in front of said spool-frame and arranged to rotate at a greater speed than said spool-frame, and a twister-head connected with said shaft by a suitable clutch and arranged to be periodically disconnected therefrom.

7. The combination, in a fence-machine, of a series of rotating spool-frames, a series of hollow shafts located in front of said spool-frames and arranged to rotate at a greater speed than said spool-frames, a series of twister-heads mounted on said hollow shafts, and clutch mechanisms connecting said twister-heads with said hollow shafts and arranged to be periodically disconnected therefrom.

8. In a fence-machine, the combination, with suitable twisters, of the carriage 61, provided with a wheel 63, arranged to travel upon a suitable rail 65, and the spring-buffer 67, secured upon said carriage and provided with the pivoted head 69, substantially as described.

9. In a fence-making machine, the combination, with the picket-moving carriage, of the operating-arm provided with the casing 75, the rock-shaft 77, provided with the lugs or shoulders 81, and the spring-dog 85, engaging one of said shoulders, substantially as described.

10. In a fence-making machine, the combination, with a suitable rock-shaft, of a reciprocating picket-moving carriage and an operating-arm connected with said carriage and having a yielding connection with said rock-shaft, substantially as described.

11. In a fence-making machine, the combination, with suitable twisters, of a fence-advancing mechanism consisting of endless chains provided with dogs arranged to engage the fence-pickets and means for moving said chains continuously, and thereby moving forward the fence with a continuous movement, substantially as described.

12. In a fence-machine, the combination, with suitable twisters, of the fence-advancing mechanism comprising endless chains having a series of dogs arranged to engage the pickets near their opposite ends and means for moving said chain continuously, and thereby moving forward the fence with a continuous movement, substantially as described.

13. In a fence-machine, the combination, with suitable twisters, of a fence-advancing mechanism and means for operating said fence-advancing mechanism continuously, and thereby moving forward the fence with

a continuous movement, substantially as described.

14. The combination, in a fence - machine, of continuously-rotating spool-frames, periodically-rotating twisters, and continuously-operating advancing mechanism, substantially as described.

15. The combination, in a fence - machine, with the fence-advancing mechanism and the reel, of a paint-receptacle arranged between said fence-advancing mechanism and said reel and means for directing said fence through said receptacle, substantially as described.

16. In a fence - machine, the combination, with the shaft 139, provided with the gear 141,

and the friction mechanism for driving said shaft, of the cup-shaped casting 151, secured upon said shaft and provided with a flange 153, the sliding shaft 155, having the collar 157 and the set - screw 159, the cup-shaped casting 160, secured upon said shaft, and the wedge-shaped bars 161 and 163, provided with grooves engaging said flange 153 and having their opposite ends fitting in said cup-shaped castings, substantially as described.

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