

(No Model.)

4 Sheets—Sheet 1.

J. H. FELT & O. KING.

FENCE LOOM.

No. 361,582.

Patented Apr. 19, 1887.

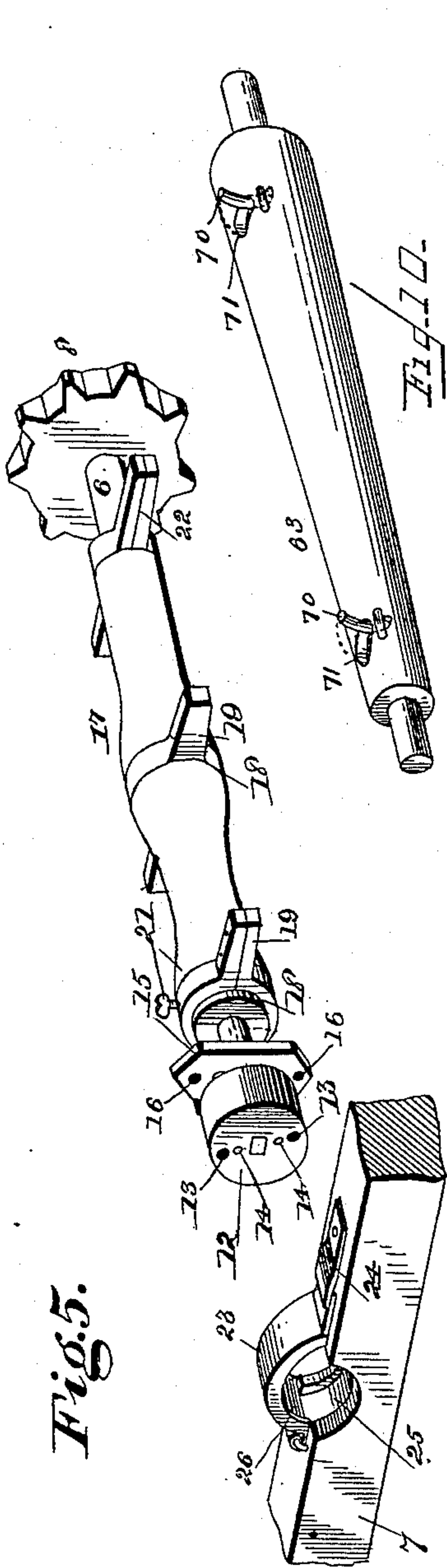


Fig. 5.

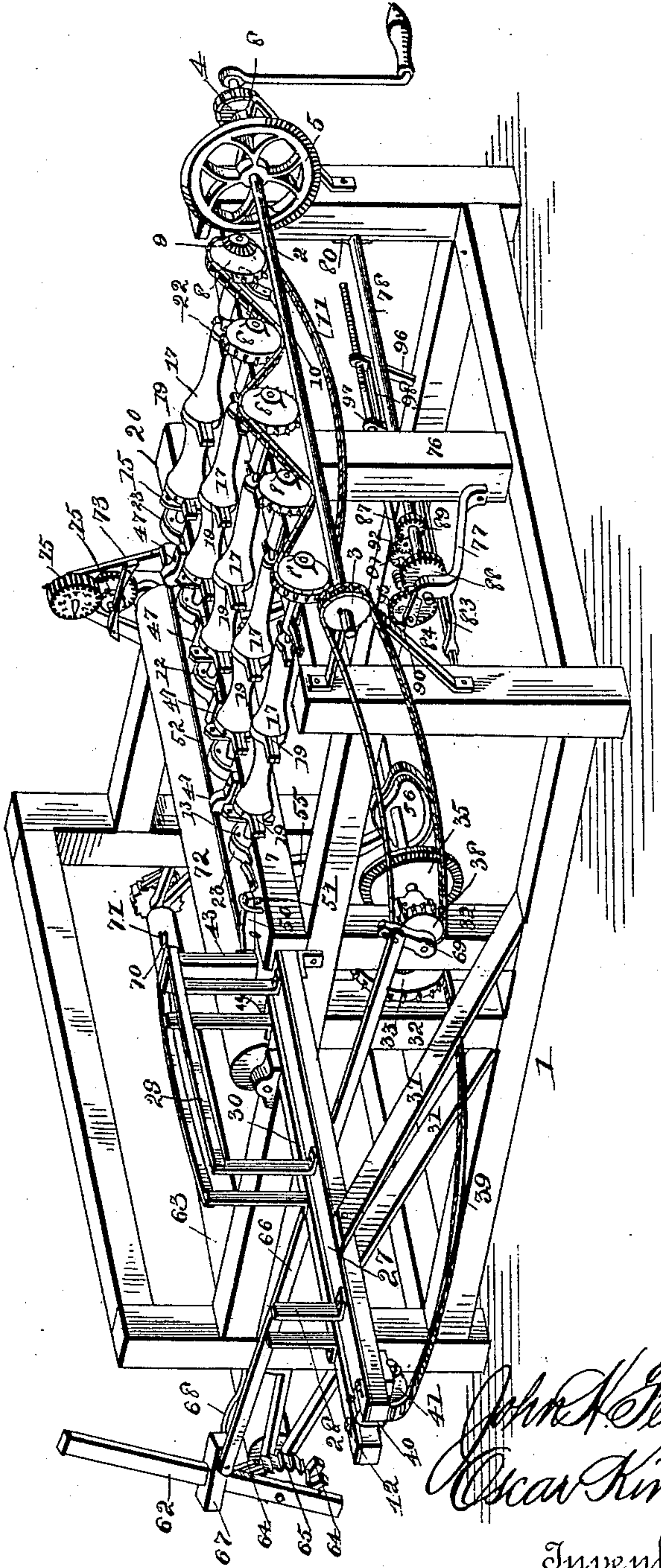


Fig. 1.

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(No Model.)

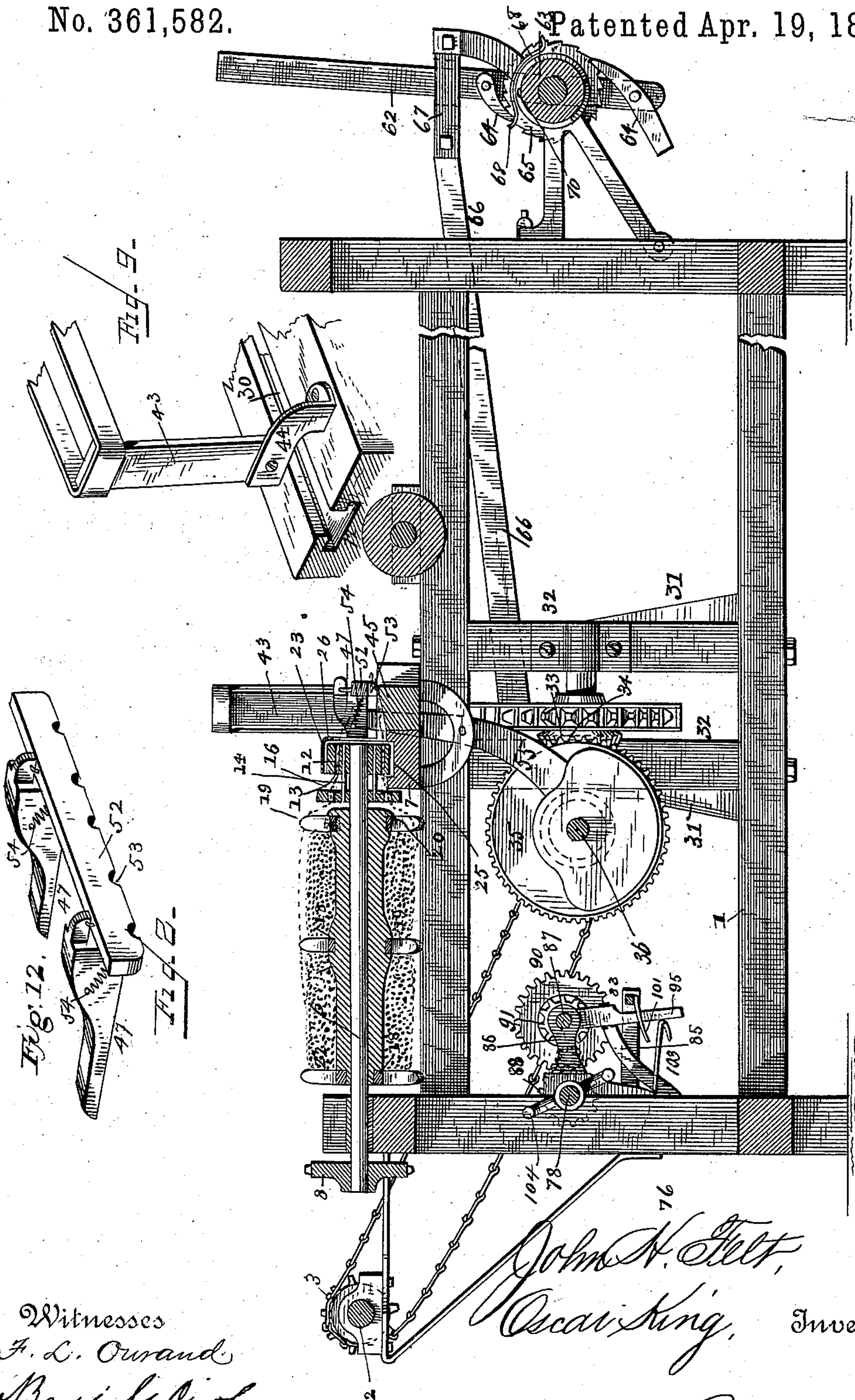
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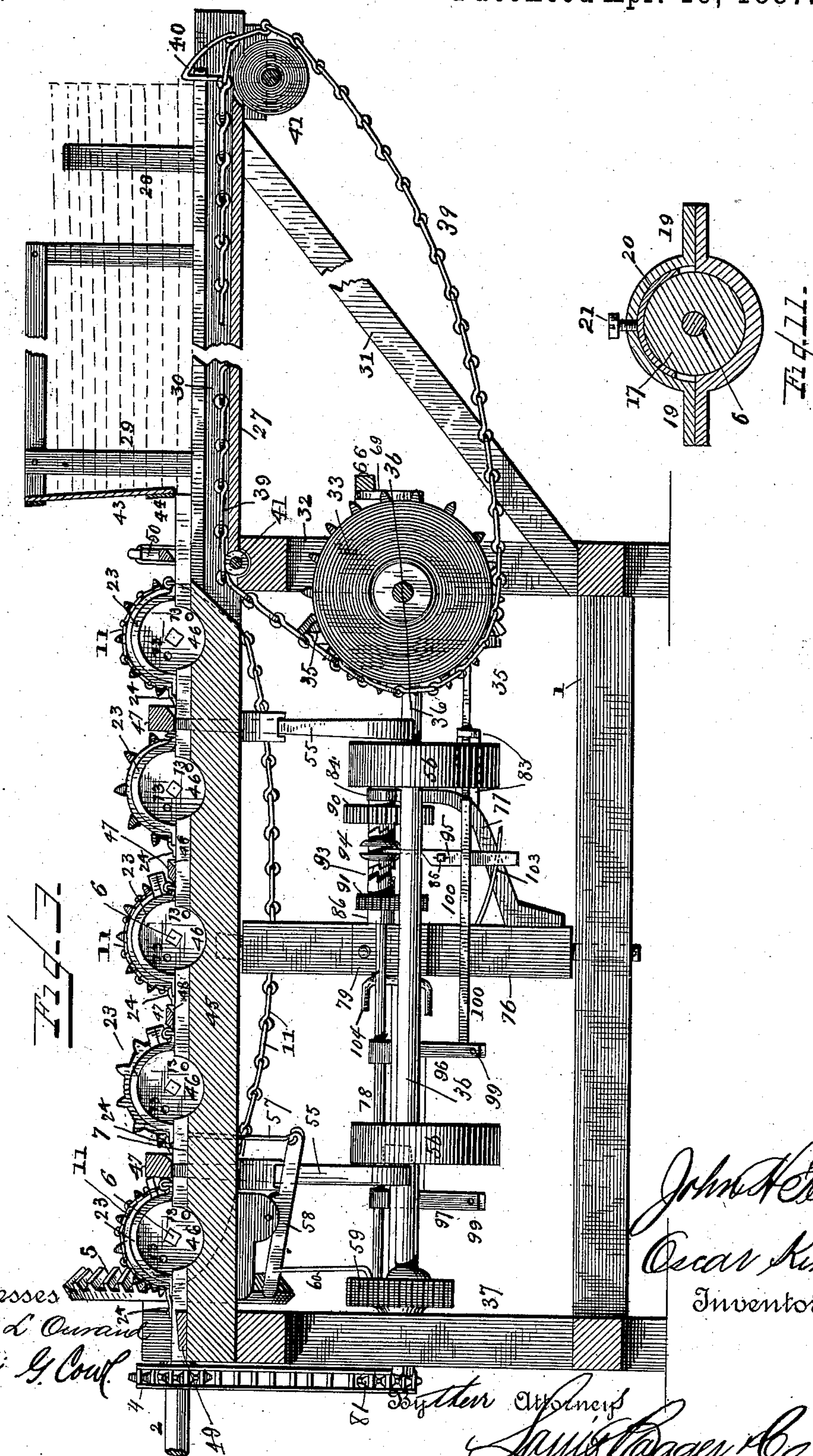
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FENCE LOOM.

No. 361,582.

Patented Apr. 19, 1887.



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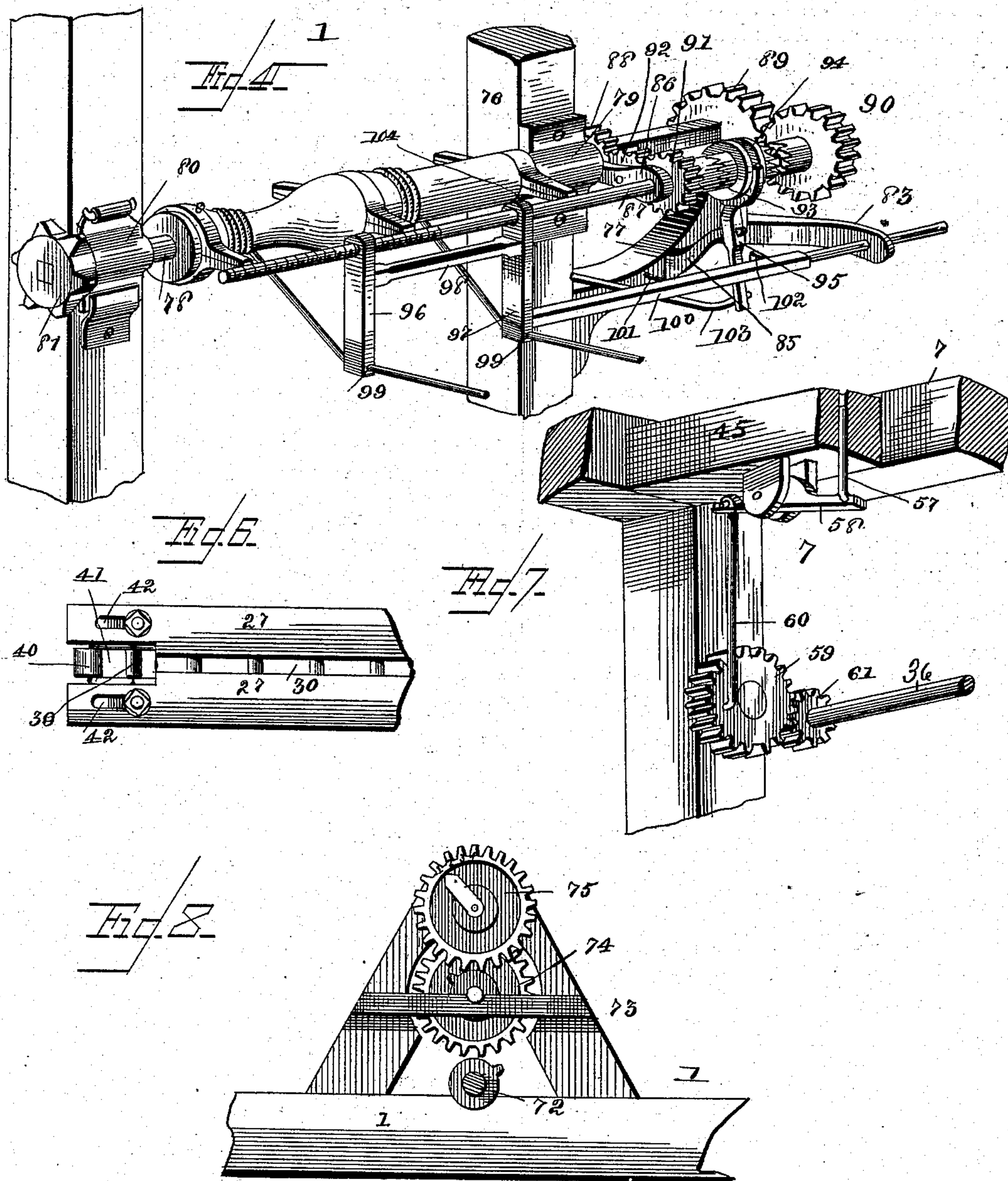
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FENCE LOOM.

No. 361,582.

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UNITED STATES PATENT OFFICE.

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OF ONE-HALF TO JAMES S. CLIFT AND SYLVESTER W. FELT, BOTH OF
SAME PLACE.

FENCE-LOOM.

SPECIFICATION forming part of Letters Patent No. 361,582, dated April 19, 1887.

Application filed January 22, 1887. Serial No. 225,087. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. FELT and OSCAR KING, citizens of the United States, and residents of Greenfield, in the county of Hancock and State of Indiana, have invented certain new and useful Improvements in Fence-Looms; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of our improved fence-loom. Fig. 2 is a longitudinal vertical sectional view showing the wire upon the spools in dotted lines. Fig. 3 is a transverse sectional view. Fig. 4 is a detail view of the spool-filling mechanism; and Figs. 5, 6, 7, 8, 9, 10, 11, and 12 are detail views.

To make a wire and picket fence that can be sold cheaply requires that the machine upon which it is manufactured must be as nearly automatic as possible, thus saving the cost of extra help, and it must be adapted to be operated by any kind of power. As the wire is being used from one set of spools another set should be filling, and the pickets should be placed in position when needed and at the right distance apart, and the amount of fence made should be correctly registered, and, finally, the completed fence should be put into a compact and convenient shape for the market.

Our invention relates to looms of this class; and it consists in the improved construction and combination of parts, as will be hereinafter more fully set forth and claimed.

Referring to the accompanying drawings, in which the same figures of reference indicate corresponding parts in all of the figures, 1 represents the frame of the loom. A shaft, 2, is journaled in brackets upon the front part of the machine, having two sprocket-wheels, 3 and 4, one at each end, and a disk, 5, secured upon it. One end of this shaft is adapted to receive the crank, if the loom is to be operated by hand, or a driving-pulley, if it is to be operated by power. The disk 5 is provided upon one face with a segmental series of cogs for op-

erating the twisters. The twisters consist of shafts 6 6; journaled at one end in the front cross-piece of the machine and at the other end in a cross-bar, 7, near the middle of the frame. One end of each of these shafts is provided with a sprocket-wheel, 8, one of which is provided with a beveled pinion, 9, which is engaged by and operated with the segmental cogs upon the disk 5. Owing to the slight longitudinal movement of the shafts 6 in consequence of making them removable, and the slight longitudinal movement of the shaft 2 permitted by the brackets in which it is supported, and also the wearing of said shafts in their bearings, a spring, 10, is secured to the frame and bears against the rear face of the sprocket-wheel having the beveled cogs 9, thus causing it to be kept in engagement with the cogs upon the disk 5. A chain, 11, passes over these sprocket-wheels, connecting them with each other and with the one having the beveled pinions, so that they are all operated in unison. By passing the chain over and under each alternate sprocket-wheel, as shown in the drawings, they can be caused to turn in opposite directions and a positive motion secured, as it prevents the chain from becoming disengaged from either of the wheels; but it can be passed over the tops of all of them, causing them all to turn in the same direction. The opposite end of each of these shafts 6 6 is provided with a disk, 12, having a central aperture for securing it upon the end of the shaft, and two smaller perforations, 13, upon diametrically-opposite sides of the central aperture, through which the wire passes from the spools to the pickets and by means of which it is twisted between said pickets. Secured to the rear face of each of these disks, by means of two short rods or pins, 14, is a cross-head, 15, having a hole or aperture, 16, at each end, through which the wire also passes. The cross-head is also provided with a central aperture, through which the end of the shaft passes.

As the holes in the cross-head are farther from the shaft than those in the disk, the wire passes from the one to the other at an angle, and thus the cross-heads act as a tension-regulator, and also prevent the wires from becom-

ing snarled in passing from the spools. Each shaft is provided with a hollow spool, 17, which is provided with an enlargement at one end and at the middle. Around each of these enlargements is a groove or channel, 18, within which is loosely secured a cross-arm, 19, the one at one end of the spool being provided with a tension-regulator, which consists of a clamp, 20, and a set-screw, 21. As the wire is drawn from this spool it engages with the ends of the cross-arm having this tension-regulator, thus causing the cross-arm to be slowly moved in the opposite direction from that of the spool itself. By means of the set-screw the clamp can be made to engage with the spool with a greater or less amount of friction, thus causing the spool to turn upon the shaft with more or less ease. A similar cross-arm, 22, is rigidly secured to the other end of the spool. The ends of all of the arms—of which there may be two or more—project far enough from the spool so that the wire which is wound upon the spools will be securely retained in place by them. The journals for each end of the shafts 6 are made with a cap or upper portion, 23, hinged to the lower portion, or the caps are hinged directly to the top of the beams and secured at their other ends, which are bent to lie flat upon the top of the lower portion by means of a turn-button, 24, or other similar catch or retaining device. Where the caps are hinged directly to the cross-pieces of the frame, the cross-pieces themselves are provided with notches in which the ends of the shafts are journaled. This construction permits of the easy removal of the shafts and spools for the purpose of replacing empty spools with filled ones.

To prevent the longitudinal movement of the shafts in their bearings, a groove or channel, 25, is cut in the bearing at one end, in which the twister-heads revolve, and the cap or upper portion of the bearing at that end can be provided with a flange, 26, which covers a portion of the face of the twister-head.

The slats or pickets are automatically fed or slipped between the wires from a feed-box at the side of the machine where they have been placed by the operator. This feed-box consists of a bottom piece, 27, having a channel or groove, 30, along its top, two standards, 28, near the outer end, and a frame, 29, at the inner end. The inner end of this bottom piece is bolted to the top side of said bar of the frame, and its outer end is supported by means of two braces, 31, the lower ends of which rest upon the bottom side pieces of the frame at the sides of two central posts, 32. Journaled between these posts is a sprocket-wheel, 33, having a beveled pinion, 34, by means of which it receives motion from a beveled wheel, 35, upon a shaft, 36, which is journaled in bearings upon the side of one of the posts 32 and a similar post, 37, upon the other side of the machine.

The shaft 36 receives motion from the shaft 2 upon the front of the machine by means of

a sprocket-wheel, 38, upon one end, and a chain from the sprocket-wheel 3. Around the sprocket-wheel 33 and through the groove 30 in the top of the bottom piece, 27, said groove being wider at its bottom than at its top, passes a chain, 39, one link of which is provided with a spur or projection, 40. The ends of the bottom piece are provided with friction-pulleys 41, the one at the outer end being adjustable by means of its bearings being secured in the slots 42 at the end of the bottom piece. The spur or projection 40 is only long enough to engage with the bottom picket of the pile of pickets placed in the box and standards on top of the bottom piece, so that as the chain is drawn through the groove only one picket is carried forward between the wires of the twisters, the rest of the pile of pickets being kept from moving by a gate or guard, 43, at the end of the frame, the lower end of which is only the thickness of a picket from the top of the bottom piece. The lower end of this gate is secured in position by a curved metal brace, 44, which is secured to the bottom piece and to the lower end of the gate.

A support or guide for the pickets as they are being pushed between the wires is formed by a bar, 45, which is secured across the top of the machine at the side of the bar 7, the top of the bar 45 being the thickness of a picket below the top of the beam 7, and is even with the top of the bottom piece, 27, and bears against it at that end. It is provided with a notch, 46, opposite each twister-head, in which the lower wire is placed or rests as the picket is being pushed through, so that the end of the picket cannot come in contact with the wire. The end of the picket is kept from coming in contact with the upper wire by means of guards 47, secured to the top of the bar 7, and projecting over the top of the bar 45. The lower edge of these guards toward the pile of pickets is beveled, as shown at 48, so that the end of the picket cannot catch upon them. The end of the bar 45 farthest from the entrance of the pickets is provided with a stop, 49, against which the pickets are forced by the chain 39, and which thus makes the ends of the pickets at that side of the fence in a line, and if the pickets are of the same length will also make the other ends in a line. As the pickets are carried in place with considerable force if the machine is being operated rapidly, when they strike this stop they have a tendency to rebound more or less, and thus cause the ends of the pickets to be out of line. To prevent this a spring-latch, 50, is pivoted to the top of the bar 7, with one end projecting beyond and slightly below the top of said bar. The lower edge of this latch next the feed-box is beveled, which permits the pickets to be forced under it; but as soon as they are past it the spring 51 under the other end of the latch forces it down behind the picket, so that it cannot rebound out of place. As the latch is placed directly over

the inner end or downward turn of the chain 39, the pickets are always carried in past this latch.

Two or more of the guards 47 may be made long enough to have the upper edge of a door, 52, pivoted to their outer ends, the door being provided upon its lower edge with a series of notches or recesses, 53, which pass over the wires of the fence, and thus permit the door to act as a guide for the pickets as they are being carried into place between the wires. After the picket has been secured in place, the fence can be drawn forward the proper distance, as the door will swing outward and permit the picket to pass under it. The springs 54, secured at one end to the side of the guard and at the other end to the lower edge of the door, will bring it back ready to guide the next picket between the wires. Two or more packers, 55, are pivotally secured to the under side of the bars 7 and 45, their upper ends projecting through holes in the bars, and their lower ends being operated by cams 56 upon the shaft 36. The lower ends of these packers are provided with the ordinary friction-rollers, which engage with the cams, and the upper ends move back and forth just beneath the under side of the guards. If desired, there can be a guard and packer between each of the twister-heads, but I have only shown two packers, one at each end.

Sometimes it is desired to have the fence composed of pickets of different lengths, and to have the different lengths alternate with each other. This is accomplished by placing the pickets in the feed-box so that the two lengths will alternate with each other, and when a short picket is carried into position to have a temporary stop placed in front of it, so that one end of it will not be carried as far as the ends of the longer pickets. This stop consists of a short rod, 57, which projects with its upper end through a hole in the bar 45. Its lower end is connected with one end of a lever, 58, the opposite end of which lever is connected to the cog-wheel 59 by a pitman, 60. The cog-wheel 59 is driven by a pinion, 61, upon the shaft 36, the pinion 61 being only one-half the size of the cog-wheel 59, so that it will have to make two revolutions to revolve the cog-wheel. This will cause the end of the rod 57 to project above the bar only when each short picket is being carried forward.

In order that the pickets shall be placed at the proper distance apart, it is necessary that the take-up mechanism will always draw just so much wire from the spools, and consequently the larger the roll of fence becomes the slower it must be rotated. In our improved loom the take-up consists of a lever, 62, loosely secured upon one end of the roller 63, which is journaled in bearings at the end of the machine, the lever being provided with pawls 64, which engage with the ratchet 65 upon the end of said roller. A pitman, 66, is secured at one end to this lever by means of a slotted guide, 67, which is gradually moved or raised up on the lever by a rider, 68, which

rests upon the top of one end of the roll of fence. The other end of the pitman is secured to the outer end of the shaft 36, by means of a crank, 69, which is slotted so that the device can be set to space the pickets at different distances apart.

As the roll of fence increases in size the guide 67 is gradually raised upon the lever 62, so that the revolution of the crank 69 will only rotate the roll of fence sufficiently to draw the same amount of wire from the spools as it did when the roll was just begun. Suitable holdfast-pawls are pivoted to the side of the bracket that supports the roller at the opposite end, there being two sets of different-lengthed pawls at each end of the roller, so that there will be no lost motion by reason of some of the pawls not engaging with the teeth of the ratchets.

For the purpose of removing the roller 63 from the interior of the roll of fence after it has been completed, it is made slightly tapering and provided with two or more pins or hooks, 70, which are secured in holes 71 in the side of the roller. These hooks or pins each consist of a short piece of metal curved so that its ends stand almost at right angles to each other. By securing one end in the bottom of the holes in the roller the other end will project beyond the face of the roller when turned out and will engage with the paling of the fence; but when the roll of fence is being slipped off the roller, the outer ends of these hooks turn into these holes in the sides of the roller, and thus let the roll of fence slip off the roller. To start a roll of fence temporary wires are secured to the first picket and secured to these hooks and wound around the roller until enough fence has been made to reach to the roller, when the temporary wires are taken off, the first picket placed over the hooks, and the operation of weaving continued. Small pieces of wood are placed upon the small end of the roller, so as to make that end of the same size as the other end.

As the fence is being drawn across the top of the frame 1 it passes over a measuring-roller, 72, which has a pin or lug upon one end. Secured to the side of the frame above this end of the roller 72 is an A-shaped bracket, 73, the middle piece of which has a cog-wheel, 74, journaled upon it, which is engaged by the lug upon the roller, and is provided with a lug or pin, which, in turn, engages with another cog-wheel, 75, journaled at the top of the bracket. A pointer is rigidly secured to this bracket, and by having the roller and cog-wheels of the proper dimension the number of rods of fence made will be indicated by one of a series of figures upon the top cog-wheel by the pointer.

In operation, the pickets are placed one upon the other in the feed-box at the side of the machine. Motion is given to the main shaft, which is imparted to the chain under the pickets, by means of which the bottom picket is carried into position between the wires. By

this time the cogs upon the disk of the main shaft engage with the twister-head shafts and set them in motion, the packers keeping the pickets securely in place. By the time the twisters have stopped, and the fence has been drawn forward the required distance, the lug upon the chain under the pile of pickets has passed down around the outer end of the feed-box and engages with the end of another picket, which it carries in between the wires, the twister-heads always stopping with one wire in the notch of the bar and the other wire directly above it. The packers then press the picket firmly against the last twist of the wire, and the twister-heads are again set in motion. Thus the operation goes on, each piece of mechanism performing its duty in rapid succession and at such a time as not to interfere with the operation of any other, and all that the operator is called upon to do is to keep a supply of pickets in the feed-box, to take off the empty wire spools and put the filled spools in their place, and to remove the rolls of fence as fast as completed.

When the machine is operated by power, which is the more preferable, it is necessary to have an extra set of spools, so that while one set is being emptied another can be filling. Instead of having a separate machine for this purpose, we attach one to the frame of our machine in such a manner that it can be connected with and operated by the motion of the driving-shaft of the loom. This winding device consists of an upright, 76, pivotally secured between the front, top, and bottom cross-bars of the frame by means of a pin or gudgeon at each end. A bracket, 77, is secured to one side of this post near its bottom, the outer end of which is provided with a bearing. A driving-shaft, 78, is journaled at one end in this bearing and in a bearing, 79, upon the side of the post 76, and at the other end in a bearing, 80, at the side of one of the corner-posts of the frame. The bearing 80 is made so that the outer portion can be easily removed and that end of the shaft released and swung around, the post 76 being partially rotated. This bearing is most easily made by cutting a notch in the side of the post and securing the outer portion of the bearing, by means of a hinge at one end, to the side of the post, and the other end by means of a turn-button, in the same manner that the spool-shafts are secured upon the top of the frame. The outer end of this shaft is provided with a sprocket-wheel, 81, having a square hole at its middle, so that it can be readily removed and replaced, and is operated by means of a sprocket-chain, 82, which passes over the sprocket-wheel 4 upon the main shaft. Three arms, 83, 84, and 85, are secured to the bracket 75, and another arm, 86, is secured to the post 76. The outer ends of two of these arms are provided with bearings in which are journaled one end of a shaft, 87, the other end of which projects nearly to the end of the shaft 78, and is screw-threaded. The end of the

shaft 78, between the end of the bracket 77 and the bearing 79, is provided with cog-wheels 88 and 89, which impart motion to two similar wheels, 90 and 91, upon the end of the shaft 87, between its bearings. An idle-wheel, 92, upon the side of the arm 86 meshes with the wheel 88 and with one of the wheels upon the shaft 87, thus making those two wheels turn in a contrary direction to that of the other. A collar, 93, having each of its ends provided with a ratchet-clutch and a central groove, 94, is secured upon the shaft 87 by means of the ordinary rib or fin, allowing it to be moved longitudinally upon the shaft by preventing its rotating without rotating the shaft. The wheels 90 and 91 are loosely journaled upon the shaft 87, and have their inner or facing sides provided with a ratchet-clutch similar to that upon the ends of the collar 93. The outer end of the arm 85 is provided with a pivot, upon which is secured a lever, 95, the upper end of which is provided with a yoke or bifurcation which engages with the groove 94 of the collar 93. By moving the lower end of this lever to one side or the other, the collar 93 can be moved upon the shaft 87 in either direction, thus causing the ratchet at either end to come into engagement with the ratchets at the inner faces of the wheels 90 and 91, as desired. Two bars, 96 and 97, and connected near the upper ends by means of a cross-piece, 98, are each provided with a perforation, one of which is screw-threaded and fits upon the screw-threaded end of the shaft 87, and the other perforation is large enough to pass freely upon the shaft. The lower end of each of these bars is provided with a smaller aperture, 99, through which the wires are guided as they pass from the spools upon which they are wound or manufactured to the spool upon the shaft 78. A guide-rod, 100, is secured at one end to the lower end of one of the bars, 96, and its other end passes through a guideway in the end of the arm 83. The intermediate portion of this rod has two pins, 101 and 102, secured to it, which engage with the lower end of the lever 95 as the rod is moved back and forth by reason of the screw-threaded end of the shaft 87 working in the screw-threaded perforation in the end of the bar 97. A spring, 103, is secured at one end to the post 76, and bears with its inner end against the lower end of the lever 95, the lower end of said lever being beveled upon each of its sides and the spring being bent at an angle, so that it will hold the end of the lever to either side.

To place a spool upon the shaft 78 for the purpose of filling it, the sprocket-wheel 81 is removed from the end of the shaft, and the shaft released from its bearing at that end and swung around to one side. The empty spool is then slipped upon the shaft, the end having the stationary arms being put on first, and the end of the shaft is then replaced in its bearing and the sprocket-wheel placed upon the end of the shaft. A small cross-arm, 104, upon the shaft 78 engages with the arms of the spool

and causes it to revolve with the shaft, the opposite end of the spool bearing against the corner-post of the frame. The ends of the wires are then passed through the perforations in the ends of the bars 96 and 97, and secured to the opposite portions of the spools, so that an equal amount of wire will be wound between each of the end cross-arms and the middle cross-arm of the spool. As the shaft 78 turns the spool the shaft 87 is also caused to rotate by the cog-wheels at the other end, which slowly moves the bars and cross-piece in one direction or the other, and causes the wire passing through the lower ends of the bars to be wound in a smooth layer upon the spool. When the bars have moved the proper distance, one of the pins upon the guide-rod presses the lower end of the lever 85 past the end of the spring 103, and the collar 93 is moved upon the shaft sufficiently to disengage it from one of the wheels upon the shaft 87, and causes it to engage with the other one. This shifting of the collar causes the shaft 87 to turn in the opposite direction and to move the bars upon the outer end of the shaft in the opposite direction, thus guiding the wires across the spool in another smooth layer. One set of spools are thus being filled at the same time and by the same power that is emptying another set, the speed of the winding device being sufficient to fill one set while the other is being emptied.

Having thus described my invention, I claim—

1. In a fence-loom, the combination of a frame, a series of twistors journaled upon said frame, a beveled cog-wheel upon one end of one of said twistors, a spring adapted to bear against said wheel, a shaft journaled across the front of said frame, a disk upon said shaft, having a segmental series of cogs upon its face, and means, substantially as described, for connecting said twistors and for placing pickets in position between the wires in front of said twistors.

2. In a fence-loom, the combination of a frame having a bar across its top, notches in the top of one of the end pieces of said frame and of said bar, each of the notches in said bar being provided with a groove or channel, a series of shafts each having a twister-head upon one end journaled in said notches, a cap hinged at one end at the side of each of said notches, a turn-button at the opposite side of each of said notches, and means, substantially as described, for rotating said twister-heads.

3. In a fence-loom, the combination of a frame, a series of shafts journaled upon the top of said frame, having a twister-head upon one end, a spool upon each of said shafts, having a stationary cross-bar at one end, a cross-arm loosely journaled upon the other end, and another cross-arm loosely journaled upon the middle of said spool, and means, substantially as described, for rotating said shafts.

4. In a fence-loom, the combination of a frame, a series of shafts journaled upon the top

of said frame, a spool upon each of said shafts, having cross-arms, one of said arms being provided with a tension-regulator consisting of a clamp adapted to bear against said spool and a set-screw, and means, substantially as described, for rotating said shafts.

5. In a fence-loom, the combination of a frame having a series of twistors journaled upon its top, a feed-box secured to one side of said frame, consisting of a bottom piece, a frame secured to one end of said bottom piece, and a gate secured to the end of said frame, the lower end of said gate being only the thickness of a picket from the bottom piece, a brace secured to the lower end of this gate and to said bottom piece, a chain, and means, substantially as described, for moving said chain and rotating the twistors.

6. In a fence-loom, the combination of a frame having a series of twistors and a main shaft for operating the same at regular intervals, a feed-box secured to the side of said frame, a sprocket-wheel journaled below said feed-box, having a beveled pinion upon one side, a chain, a shaft having a beveled wheel upon one end adapted to engage with said beveled pinion upon said sprocket-wheel, cams upon the said shaft, packers adapted to be operated by said cams, and means, substantially as described, for imparting motion to said shaft from the main shaft.

7. In a fence-loom, the combination of a frame having a series of twistors journaled upon its top, two bars across the top of said frame, the top of one bar being the thickness of a picket higher than the top of the other bar, guards secured to the top of the higher bar and projecting over the top of the lower bar, and means, substantially as described, for rotating said twistors and placing pickets between the wires.

8. In a fence-loom, the combination of a frame having a series of twistors journaled upon its top, two bars across the top of said frame, the top of one of which is higher than the top of the other, a stop at one end of said lower bar, a spring-actuated latch secured to the opposite end of the higher bar, the outer end of said latch projecting beyond and below the top of said bar and having its lower edge beveled upon one side, and means, substantially as described, for rotating said twistors and placing pickets between the wires.

9. In a fence-loom, the combination of a frame having a series of twistors journaled upon its top, two bars across the top of said frame, the top of one of which is higher than the top of the other, guards secured to the top of said higher bar, a spring-actuated door hinged to the outer ends of said guards, having notches upon its lower edge, and means, substantially as described, for rotating said twistors and placing pickets between the wires.

10. In a fence-loom, the combination of a frame having a series of twistors journaled upon its top, two bars across the top of said frame, having holes through them, guards se-

cured to the top of one of said bars, a shaft journaled across said frame below said twist-ers, cams secured upon said shaft, packers pivotally secured to the under side of said bars, the lower ends of the packers engaging with said cams, and means, substantially as described, for rotating said twist-ers and placing pickets between the wires.

11. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, a bar across the top of said frame, a lever pivotally secured at the bottom of said bar, a rod secured to one end of said lever, the upper end of which is adapted to be moved above the top of said bar through a hole, two cog-wheels, one of which is half the size of the other, a shaft across said frame below the twist-ers, the smaller cog-wheel being secured upon said shaft, and a pitman for connecting said larger wheel with said lever, and means, substantially as described, for rotating the twist-ers and placing pickets between the wires.

12. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon one end, a roller journaled across the other end of said frame, having holes in its periphery, a hook consisting of a bent piece of metal, one end of which is pivotally secured in each of said holes, and the other end is adapted to be turned below the surface of the roller for the removal of the roll of fencing, and means, substantially as described, for rotating said twist-ers and roller.

13. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, an upright post pivotally secured to said frame, a bracket secured to said post, having a bearing at its outer end, a shaft journaled in said bearing and in bearings upon said post and one of the corner-posts of said frame, arms secured to said bracket, having bearings at their outer ends, a shaft journaled in the bearings at the ends of said arms, a wire-guiding frame adapted to be operated by said second shaft, and means, substantially as described, for automatically reversing the rotation of said second shaft and for connecting the first shaft with the main operating-shaft of the loom.

14. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, an upright post pivotally secured to said frame, a bracket secured to said post, having a bearing at its outer end, a shaft journaled in said bearing and in a bearing upon the post and one of the corner-posts of the frame, two wheels upon the inner end of said shaft, and a sprocket-wheel at the other end, two arms secured to said bracket, having bearings at their outer ends, a shaft journaled in said bearings, having its outer end screw-threaded, cog-wheels upon the inner end of said shaft, having ratchets upon their facing sides, a collar upon said shaft, having a ratchet

at each end, an idle-wheel upon one of said arms, a wire-guiding frame having a screw-threaded perforation and adapted to be moved by said screw-threaded shaft, and means, substantially as described, for automatically shifting said collar and connecting said sprocket-wheel with a sprocket-wheel upon the main driving-shaft of the loom.

15. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, an upright post pivotally secured to said frame, a bracket upon said post, three arms secured to said bracket, shafts journaled upon said post, arms, and bracket, one of said shafts having a grooved ratchet-collar, a lever pivotally secured upon one of said arms, the lower end of which is beveled upon its sides and its upper end engages with said collar, a spring secured to said post, the outer end of which is bent at an angle and engages with said lever, and means, substantially as described, for automatically shifting the lower end of said lever and for connecting one of said shafts with the main driving-shaft of the loom.

16. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, an upright post pivotally secured to said frame, a bracket secured to said post, three arms secured to said bracket, two shafts journaled to said post, bracket, and arms, one of said shafts being adapted to be rotated in opposite directions, two bars upon the outer end of said shaft, each end of which is provided with a perforation, a cross-piece connecting said bars, and a guide-rod secured at one end to one of said bars and secured in a guide-way in the end of one of said arms, and means, substantially as described, for connecting the other of said shafts with the main operating-shaft of the loom.

17. In a fence-loom, the combination of a frame having a series of twist-ers journaled upon its top, an upright post pivotally secured to said frame, a bracket upon said post, four arms secured to said bracket, two shafts journaled to said post, bracket, and arm, a lever pivotally secured to the end of one of said arms, a guiding-frame upon the outer end of one of said shafts, having a guide-rod, two pins upon said rod, adapted to engage with the lower end of said lever, a cross-arm upon the other of said shafts, and means, substantially as described, for connecting said second shaft with the main driving-shaft of the loom.

In testimony that we claim the foregoing as our own we have hereunto affixed our signatures in presence of two witnesses.

JOHN H. FELT.
OSCAR KING.

Witnesses:

RENE. J. STEPHENS,
ALBERT WHITE.