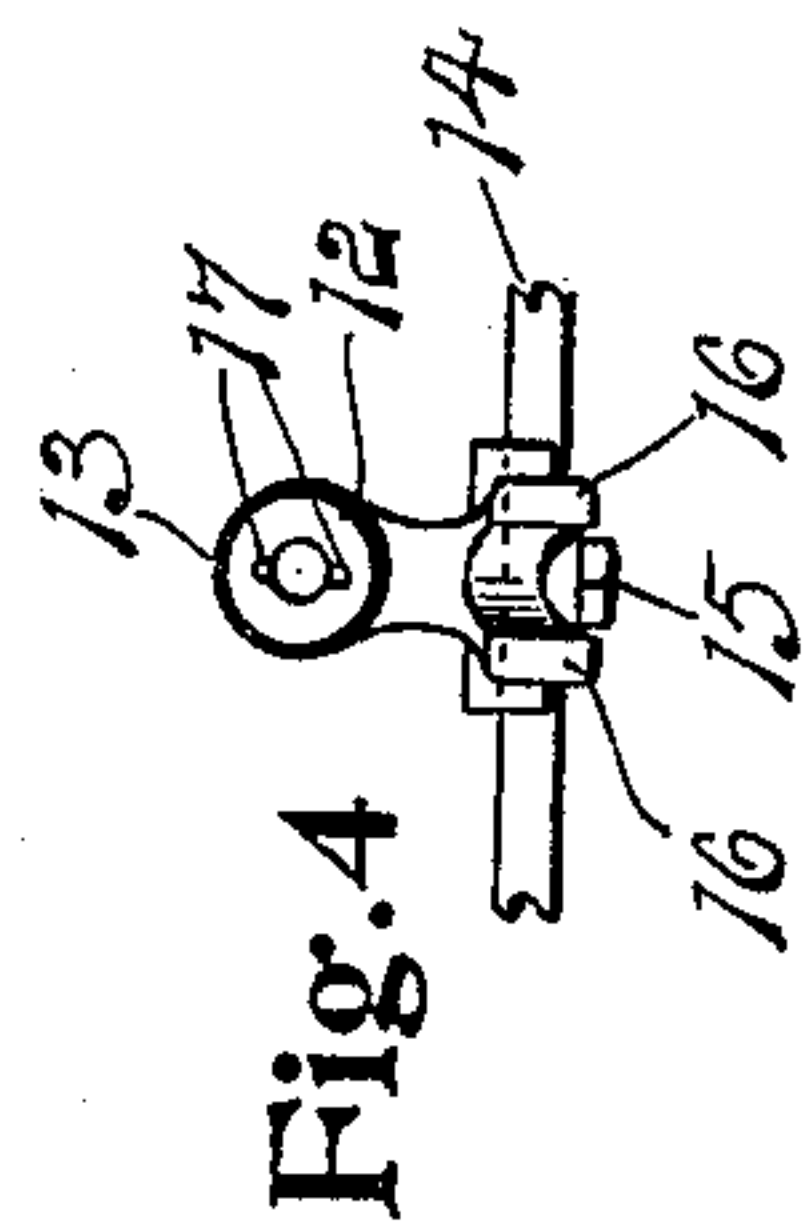
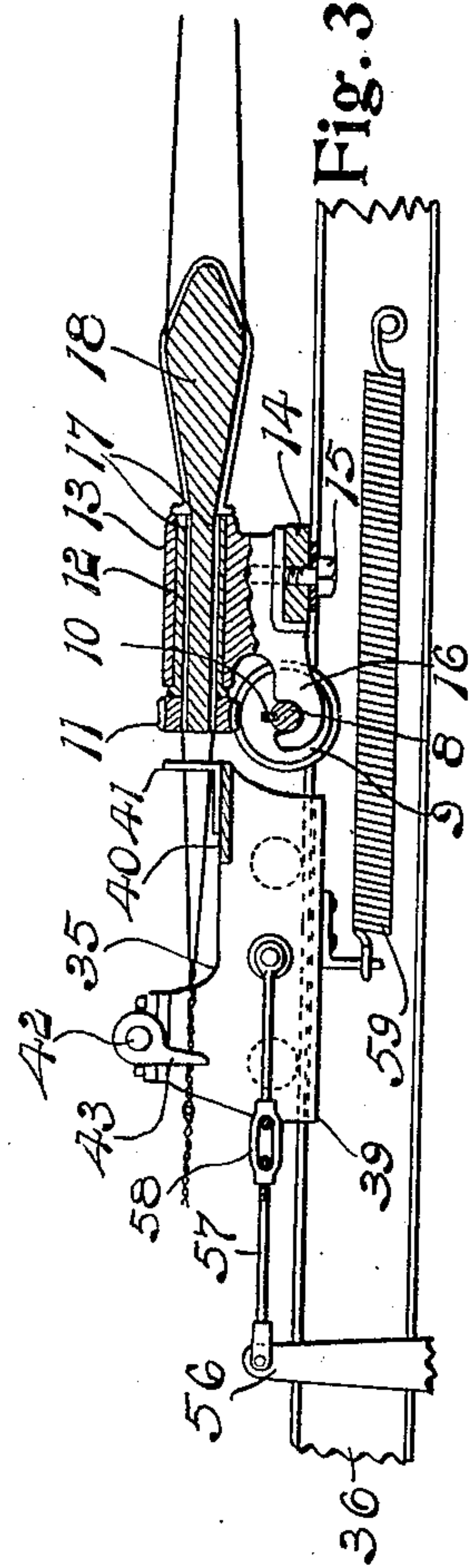
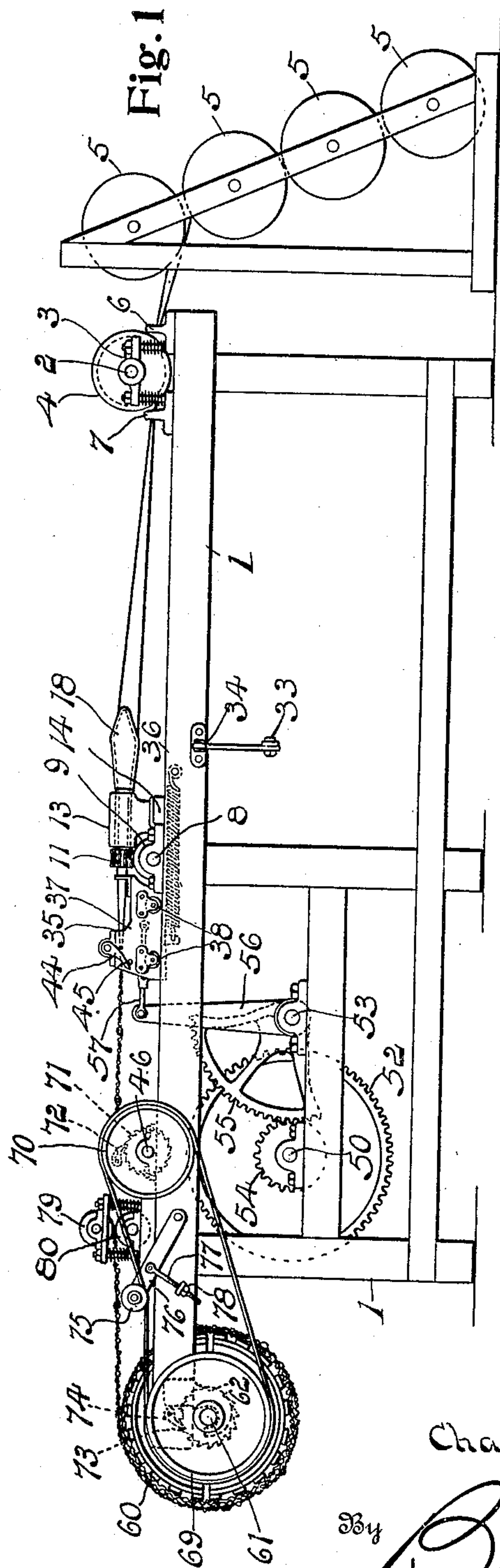


993,488.

C. A. WILLMARTH.
FENCE MACHINE.
APPLICATION FILED MAY 31, 1910.

Patented May 30, 1911.

3 SHEETS—SHEET 1.



Witnesses.
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3 SHEETS—SHEET 2.

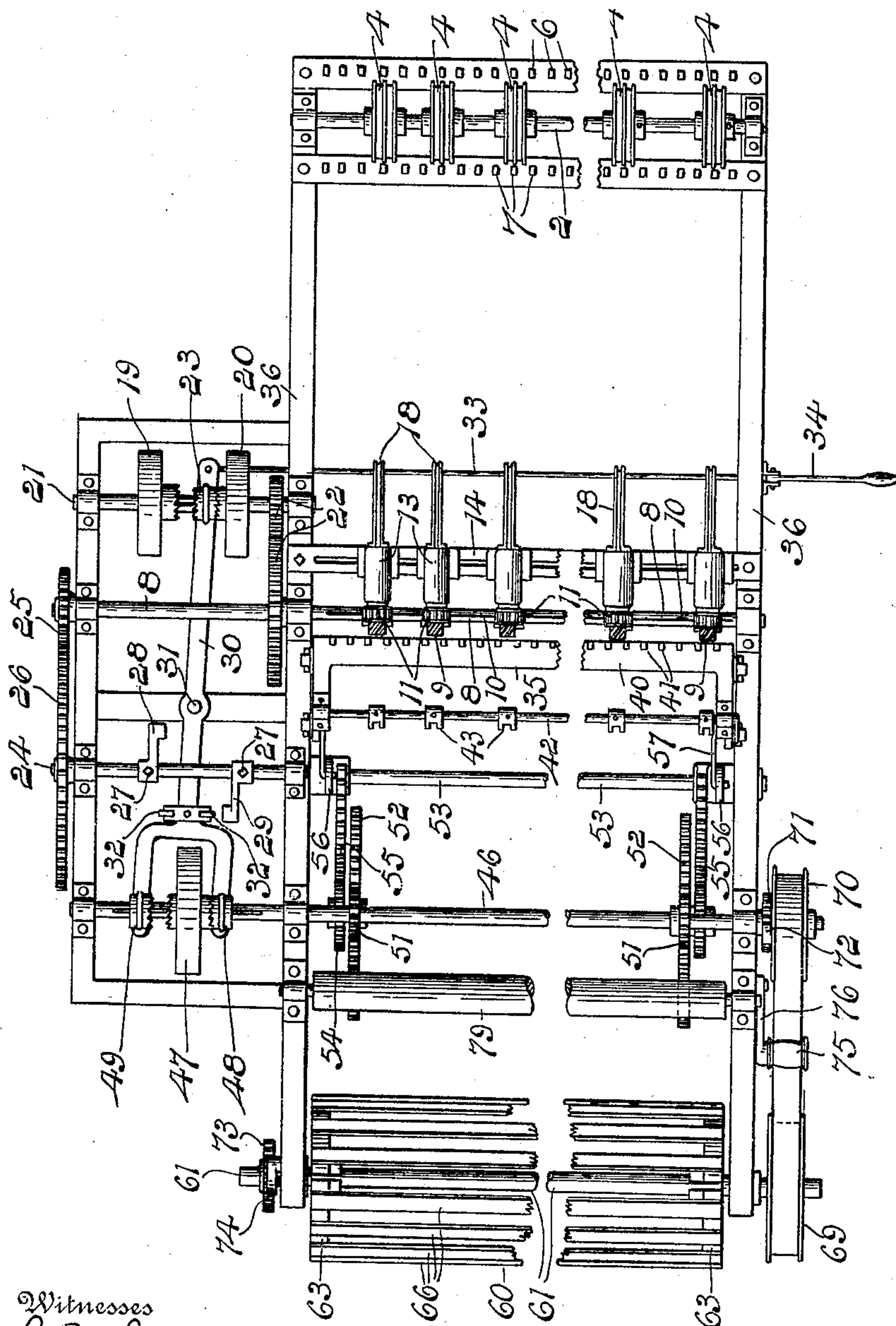


Fig. 2.

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3 SHEETS—SHEET 3.

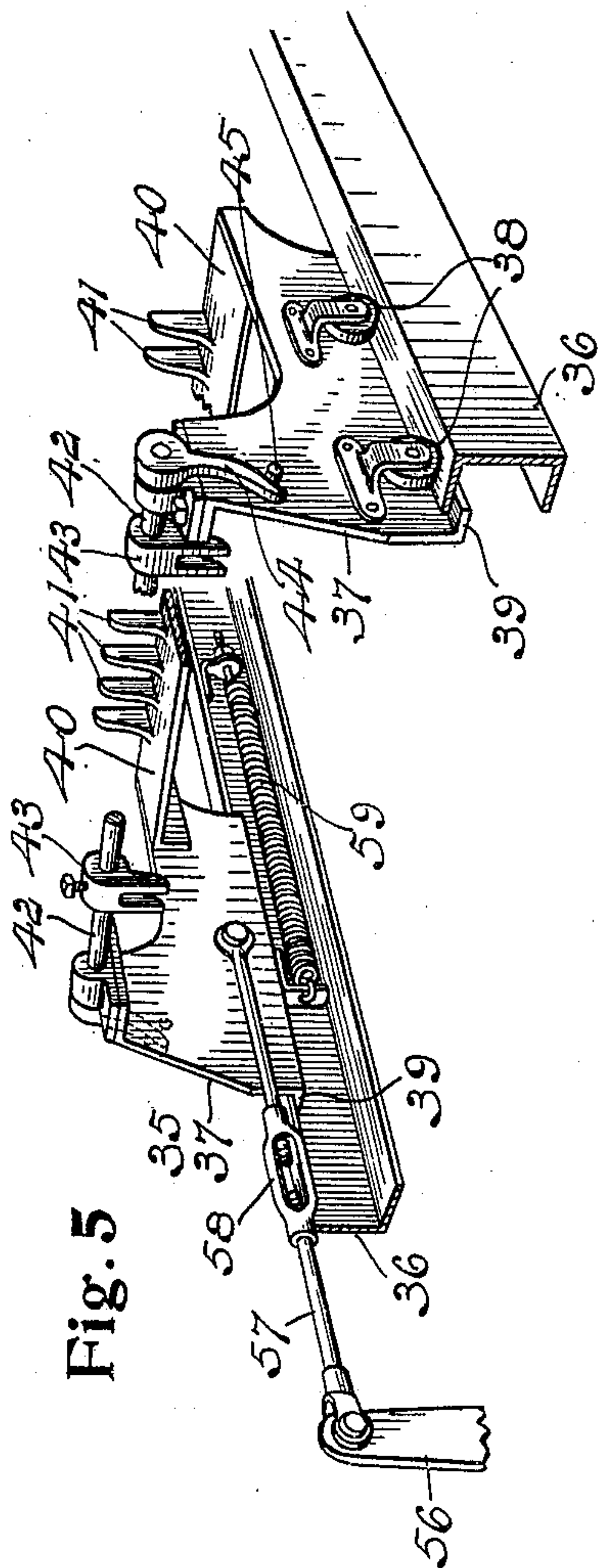


Fig. 5.

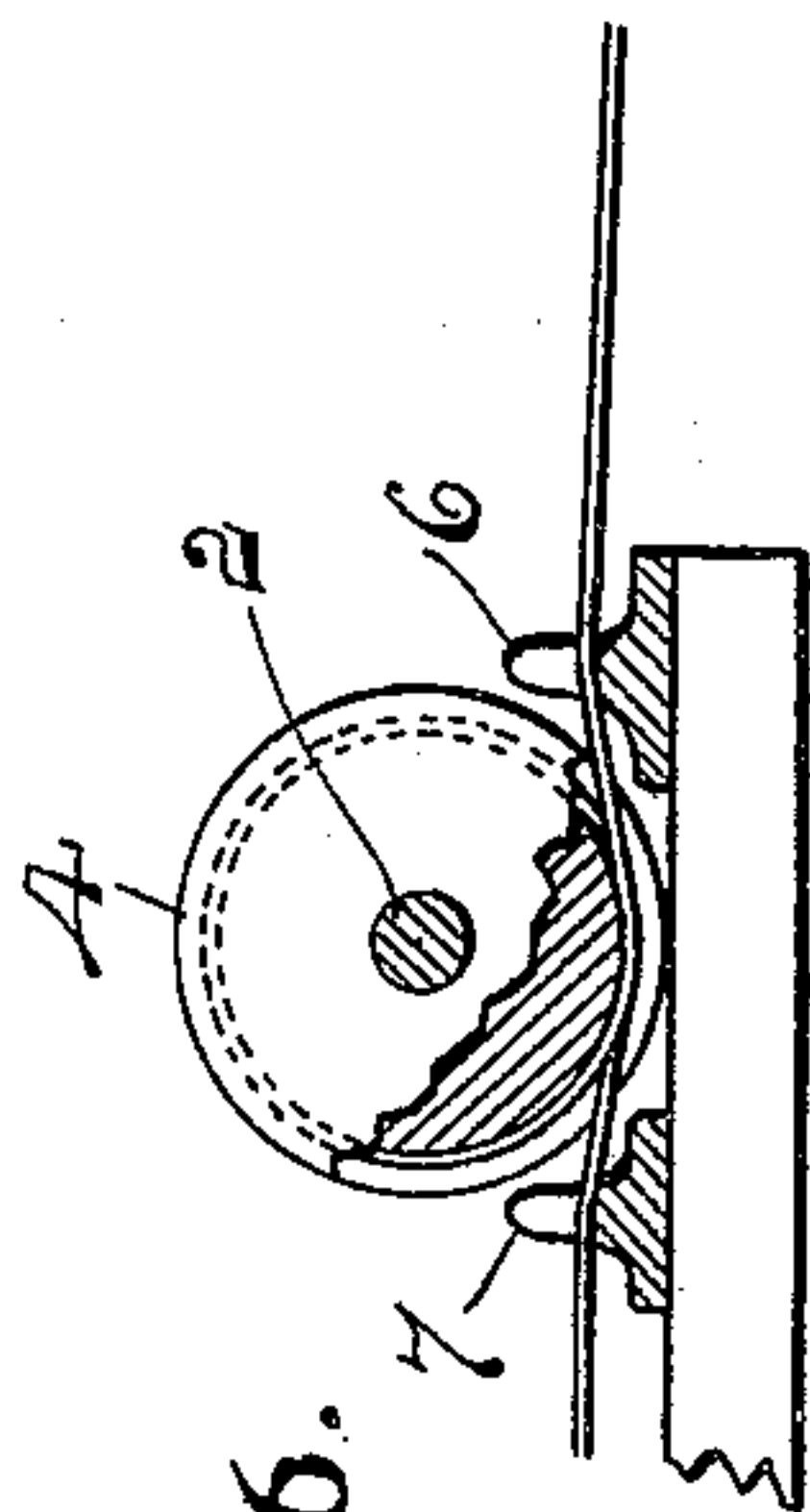


Fig. 6.

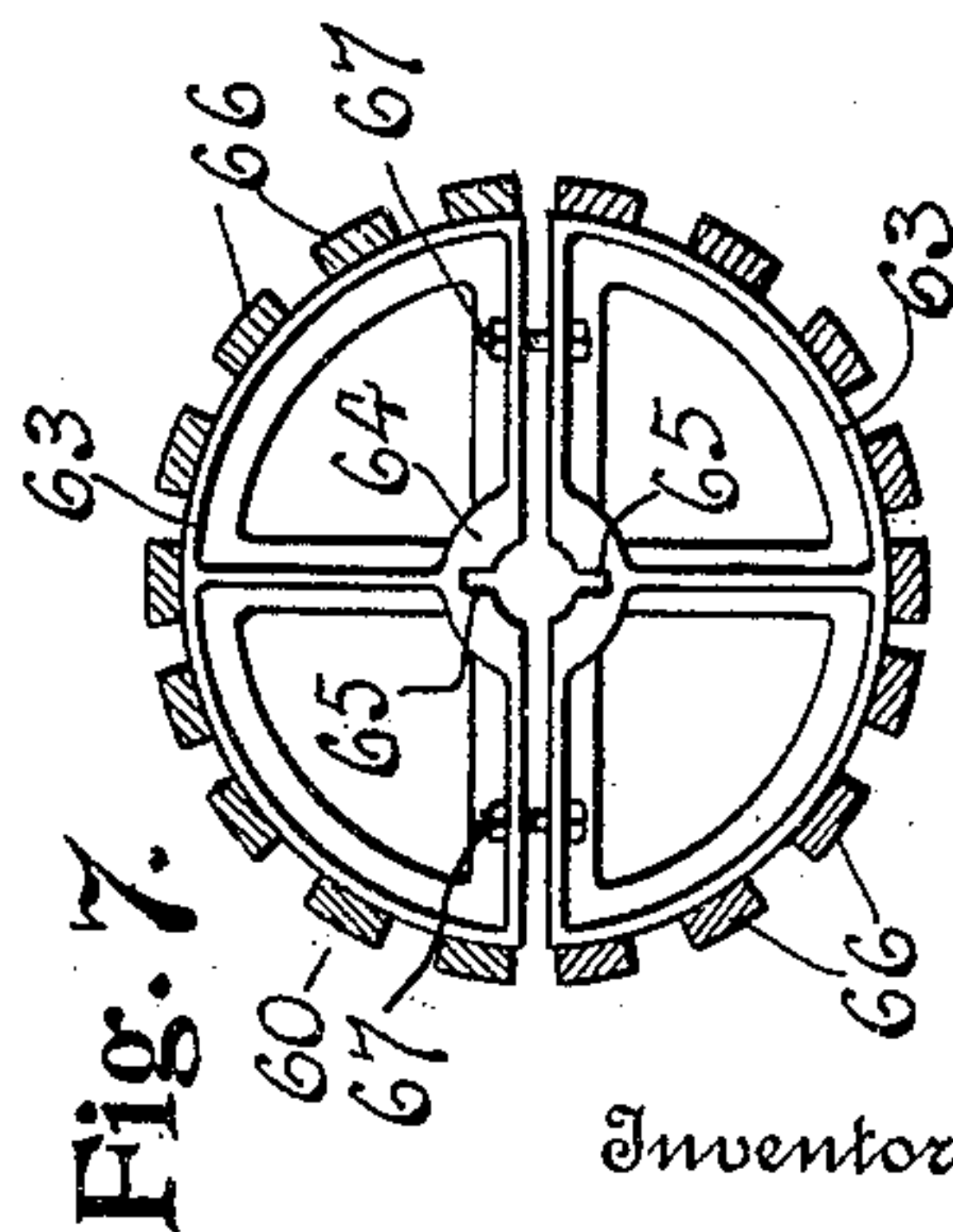


Fig. 7.

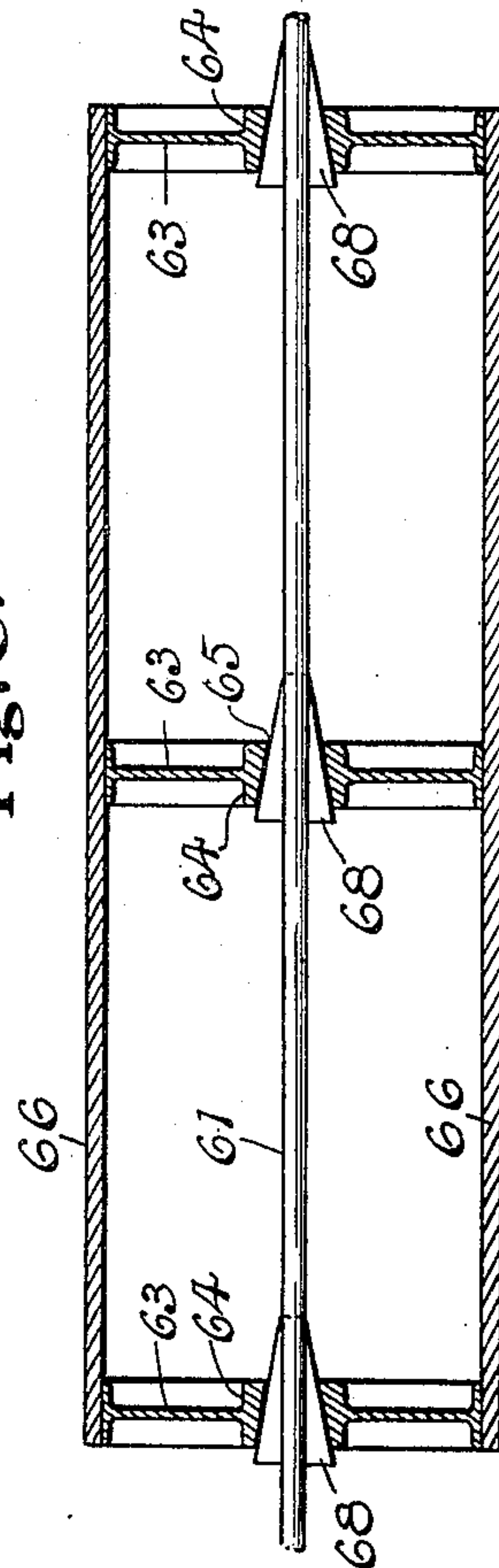


Fig. 8.

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UNITED STATES PATENT OFFICE.

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FENCE-MACHINE.

993,488.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed May 31, 1910. Serial No. 564,240.

To all whom it may concern:

Be it known that I, CHARLES A. WILLMARTH, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Fence-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to machines for weaving wire fences and its object is to provide an efficient device for the purpose having certain new and useful features all as hereinafter more fully described, reference being had to the accompanying drawings in which,

Figure 1 is a side elevation of a machine embodying the invention; Fig. 2 a plan view of the same; Fig. 3 is an enlarged longitudinal section through the twist-
20 ers and carriage; Fig. 4 is a detail of the twister head; Fig. 5 is a perspective detail of a carriage; Fig. 6 is an enlarged detail of a tension mechanism; Fig. 7 is an end elevation of a winding drum; and Fig. 8 a longitudinal section through the same.

As shown in the drawings 1 is a suitable supporting frame upon which near its forward end is mounted a shaft 2 in suitable bearings 3 and on this shaft is secured a series of sheaves 4 each provided with two grooves for the two line wires of a fence which wires are led from suitable spools 5 between guide fingers 6 at the forward side
35 of the sheaves and given a turn around the sheaves within the grooves, then led forward between the guide fingers 7 adjacent to the rear side of the sheaves.

Mounted in suitable bearings on the frame intermediate its ends, is a transverse shaft 8 upon which is a series of worm gears 9 adjustable upon the shaft longitudinally thereof and operatively connected thereto to turn therewith by means of a spline 10.

45 A series of similar worm gears 11 are provided to mesh with the gears 9 and each is formed with a trunnion 12 turning freely within a bearing provided therefor in an adjustable head or block 13 which heads
50 are secured to a supporting bar 14 bolted to the frame to be moved longitudinally of

said bar. The bar 14 is slotted longitudinally and bolts 15 extending upward through said slots engage the heads 13 and adjustably secure said heads to the bar. 55 Each head is formed with laterally extending arms 16 which embrace the gear 9 on the shaft 8 and also form open bearings for said shaft. Gears 11 and their trunnions are provided with two holes 17 extending longitudinally therethrough through which the line wires leading from the tension sheaves 4 are passed and to the forward end of each trunnion 12, a spreader 18 is secured having grooves in its edges to receive the
60 wires and spread the same apart. The gears 11 thus form twist-ers for twisting the line wires together and when the heads 13 are adjusted to change the distance between the line wires of the fence being woven, the
65 gears 9 will also be adjusted upon their shaft by reason of the arms 16 on the heads embracing said gears.

Two belt pulleys 19 and 20 driven in opposite directions, are loosely mounted upon 75 a short counter shaft 21, and motion is transmitted from said counter shaft to the shaft 8 by means of gears 22. Slidable longitudinally of the shaft 21 between the pulleys and operatively connected to the shaft to
80 turn therewith, is a clutch member 23 having teeth at each end to engage similar teeth formed upon the adjacent ends of the hubs of said pulleys. When the clutch 23 is moved to mid position between the pulleys
85 it will be out of engagement with both of the clutch members on the pulleys and said pulleys will turn freely upon the counter shaft without transmitting motion thereto.

Extending parallel with the extended end 90 of the shaft 8 and at a distance therefrom is a cam shaft 24 receiving a slow motion from the shaft 8 by means of a small gear 25 on the twister shaft and a large gear 26 on the cam shaft. Adjustably secured to
95 the cam shaft by means of set screws 27 are two cam members 28 and 29 comprising arms each extending laterally from the shaft and provided with a beveled or cam shaped surface at its outer end. A lever 30
100 is pivoted at 31 intermediate its ends upon the frame and extending forwardly beneath

the clutch 23 is pivotally attached to said clutch member to shift the same longitudinally of the shaft. Said lever extends rearwardly from its pivot beneath the cam shaft 24 and is provided with rollers 32 adapted to be engaged by the cam members 28 and 29 which will come in contact with said rollers when their shaft is turned and shift the lever laterally, throwing the clutch 23 to mid position and stopping the transmission of motion to the twister shaft. These arms 28 and 29 may be adjusted upon the shaft 24 relative to each other so that just the desired number of twists will be put in the wire by the twisters before the other arm will come into contact with the lever and throw the same, stopping the twisters. When one of the arms shifts the lever 30 and stops the motion said arm is also stopped with its end in engagement with the roller on the lever and thus said lever is prevented by the arm from being shifted to again engage the clutch with the same pulley from which it has just been disengaged by the said arm. The twisters may, however, be again started by shifting the lever and throwing the clutch into engagement with the other pulley, thus reversing the motion of the twisters and twisting the wire in a reverse direction. The lever is manually shifted to start the twisters by a rod 33 attached to the lever and extending across the machine frame where it is pivotally connected to a hand lever 34.

A spacer carriage 35 is supported upon the side members 36 of the frame 1 which members are preferably formed of channel iron and this carriage consists of ends 37 to the outer sides of which suitable rollers 38 are secured to engage the upper side of the upper flange of said channel iron and the lower edge of the ends 37 are each provided with an outwardly extending flange 39 to engage beneath said flange of the channel iron. The rollers 38 support the carriage so that it will move freely along the frame toward and from the twisters and the flange 39 holds the carriage in place. The ends of the carriage are connected by a cross bar or plate 40 having a series of upwardly extending spacing fingers 41 for spacing the line wires and said ends are also provided with bearings for a shaft 42 which extends across the carriage and has adjustably secured thereon a series of fingers 43 to engage the stay wires of the fence and pull the line wires through the twisters when the carriage is moved. The shaft 42 is free to turn in its bearings and is provided at each end with an arm 44 to engage a stop pin 45 on the end of the carriage and prevent the turning of the shaft in one direction when the fingers are hanging downward. Upon rearward movement of the carriage, the fingers will engage the stay wires and being prevented from forward

turning by the stops 45 they will draw the line wires through, but upon forward movement of the carriage they will be free to turn upward and pass over the stays, dropping by gravity forwardly of the last stay in position to engage the same when the carriage is again moved rearwardly.

Mounted in bearings upon the machine frame rearwardly of the carriage is a transverse shaft 46 and upon this shaft is loosely mounted a driving pulley 47. The hub of this pulley is formed at each end with teeth and clutch members 48 and 49 slidable upon the shaft at each side of the pulley are also formed with teeth to engage the teeth upon the hub of the pulley. The clutch members are connected to the shaft to turn therewith and are each pivotally connected to the rear end of the lever 30 so that when said lever is shifted to throw the clutch 23 into operative position one of the clutch members 48 and 49 is at the same time thrown into engagement with the pulley and motion will be transmitted from the pulley to the shaft 46. When the lever 30 is thrown to mid position by one of the cam members 28 and 29 to stop the twisters, the clutches 48 and 49 will also be thrown out of engagement with the pulley and the shaft 46 will stand still. Motion is transmitted from the shaft 46 to a shaft 50 extending parallel therewith and directly below said shaft, by small gears 51 on the shaft 46 engaging large gears 52 on said shaft 50 and motion is transmitted to a shaft 53 extending parallel with the shaft 50, by means of small gears 54 on the shaft 50 engaging sectors 55 on said shaft 53. Secured upon the shaft 53 near each side of the frame are arms 56 to the upper ends of which connecting rods 57 are pivotally attached, the opposite ends of said rods being pivotally attached to the ends of the carriage 35. Turn-buckles 58 in said rods 57 provide an adjustment in the length of said rods. The carriage is thus automatically moved rearwardly when the twisters are started by the throwing in of one of the clutches 48 and 49 and such rearward movement is limited by the length of time which said clutch is held in engagement with the driving pulley. As soon as the lever 30 is shifted by one of the cam members and the driving pulley 47 thus disconnected from its shaft, said shaft is free to turn in the opposite direction and thus coiled springs 59 attached at one end to the carriage and at their opposite ends to the frame will move the carriage back to its forward position adjacent to the twisters.

At the extreme rear end of the machine is a winding drum 60 upon which the woven fence is wound, and this drum is mounted upon a shaft 61 removably supported in open bearings 62 on the rear end of the supporting machine frame. The drum 60 is made

in halves movable toward and from each other to expand and contract the drum so that when it is desired to remove a roll of fence from the drum said drum may be contracted by moving the two halves toward each other sufficiently to permit of the withdrawing of the drum from the roll. This drum consists of a series of spiders 63 made in two parts with a hub portion 64 formed with a bore to receive the shaft 61 and also provided with slots 65 extending laterally in opposite directions from said bore. To the peripheries of these spiders longitudinally extending slats 66 are secured forming the exterior of the drum and the two halves of each spider are connected by bolts 67 which limit the movement of the halves away from each other and permit the same to move freely toward each other. Secured to the shaft 61 adjacent to each spider is a tapering fin or wedge member 68 extending laterally from each side of the shaft to engage the grooves 65 in the hubs of the webs. The shaft is arranged to have a longitudinal movement through the drum and by moving said shaft longitudinally the wedges are brought into the grooves 65 and the two halves of the drum are thus separated or wedged apart. After a sufficient roll of fence has been wound upon the drum the shaft with the drum is lifted out of the open bearings 62 and by means of a mallet or other tool the shaft is driven endwise in the drum to move the wedges out of engagement with the slots and permit the drum to collapse when it may be easily pulled endwise out of the roll of fence.

The drum is turned in timed relation to the movement of the carriage 35 to wind the fence thereon, by means of a pulley 69 secured upon one end of the shaft 61 and this pulley is engaged by a belt running over a pulley 70 upon the end of the shaft 46. The pulley 70 is loose upon its shaft and secured to the shaft adjacent to the pulley is a ratchet wheel 71 engaged by a dog 72 carried by the pulley so that the pulley will be turned in one direction only to turn the drum and wind the fence thereon. The drum is prevented from turning backward and permitting the fence to unwind by providing a ratchet wheel 73 on the shaft 61 which ratchet wheel is engaged by a dog 74 pivotally attached to the machine frame.

A belt tightener for the belt which drives the drum is provided, said tightener roll 75 being carried upon one end of an arm 76 pivotally attached at its opposite end to the machine frame. This arm is swung upon its pivot to adjust the tightener by means of a rod 77 pivotally attached to the arm and adjustable through an eye on the machine frame by means of a nut 78 on the screw-threaded end of the rod.

Rolls 79 and 80 are suitably journaled in

bearings upon the machine frame adjacent to the shaft 46 and between these rolls the woven fence is passed to guide the same on its way to the winding drum.

This machine is especially adapted to make fence formed of line wires and wire cross stays or pickets, but wooden pickets may be used if desired. When the machine is in the position shown in Fig 1, a cross stay or wire is inserted endwise between the wires of each pair which when twisted together form the line wires of the fence. After placing the stay in position against the fingers 41, the operator starts the machine by operating the handle 34 to move the clutch members 23 into engagement with one of the revolving pulleys 19 or 20 as shown in Fig. 2, when motion will be imparted to the twister shaft to turn the same a certain number of times, depending upon the position of the arms 28 and 29 as hereinbefore described. Simultaneously with the throwing in of the clutch 23, one of the clutches 48 or 49 is thrown and motion is imparted to the shaft 46 to move the carriage, upon which the cross stay was placed, rearwardly and force the same firmly into the angle formed by the diverging wires of each line, at the same time spacing the stays and pulling the line wires through the twist-ers. When the machine is again stopped by one of the arms 28 or 29 coming into contact with its roller 32 and throwing the clutches out, and the carriage is returned to its forward position adjacent to the twist-ers by the spring 59, another stay may be inserted between the wires forming the line wires of the fence, and the machine again started by means of the lever 34. The twist-ers will, however, be turned in a direction opposite to that in which they were just previously turned, owing to the fact that the clutch member 23 is prevented from being thrown into engagement with the same pulley, by the cam arm which has just previously thrown out the clutch, as hereinbefore more fully described.

Having thus fully described my invention what I claim is:—

1. In a fence machine, the combination of a frame, a shaft mounted in bearings on said frame, a series of gears on said shaft slidable longitudinally thereof and operatively connected thereto, a series of heads supported by the frame adjacent to said shaft and adjustable along the shaft, twist-ers mounted in bearings in said heads in engagement with said gears, and means projecting from each head into engagement with each adjacent gear to shift the gears upon their shaft when the heads are adjusted.

2. In a fence machine, the combination of a frame, a shaft mounted in bearings on the frame, a series of gears on said shaft slidable longitudinally thereof and opera-

tively connected thereto, a supporting member extending parallel with the shaft adjacent thereto, a series of bearing heads adjustably secured to the supporting member, a series of twisters mounted in bearings on said heads in engagement with the gears, and arms extending laterally from each head at each side of each adjacent gear and forming open bearings for said shaft.

10 3. In a fence machine, the combination of a frame, a shaft mounted in bearings on said frame, a series of worm gears on said shaft slidable longitudinally thereof and attached thereto to turn therewith, a bar supported by the frame parallel with said shaft and having a longitudinal slot, a series of bearing heads engaging said bar and adjustable longitudinally thereon, bolts extending through the slot in the bar into engagement with the heads to adjustably secure said heads upon the bar, twisters each comprising a gear to engage one of the worm gears and formed with an extended trunnion to engage a bearing in one of the heads and provided with holes extending through the gear and trunnion for the passage there-through of wires, and arms on each head extending laterally therefrom at each side each adjacent gear on the said shaft to move said gears upon said shaft when the heads are adjusted along their supporting bar.

4. In a fence machine, the combination of a frame, a series of twisters mounted upon said frame, a shaft mounted in bearings upon the frame and provided with gears for actuating the twisters, a carriage reciprocable on the frame, a power shaft mounted in bearings on the frame, means for transmitting motion from said power shaft to reciprocate the carriage, a pulley for turning the power shaft, pulleys for actuating the twister shaft, a clutch for connecting said pulleys to their shaft to control the transmission of motion from the pulleys to the twister shaft, a clutch controlling the transmission of motion from said pulley to the power shaft, a lever pivotally supported intermediate its ends and attached at one end to the clutch controlling the transmission of motion to the twister shaft and attached at its opposite end to the clutch controlling the transmission of motion to the power shaft, a cam shaft, means for transmitting motion from the twister shaft to the cam shaft, and cam members on the cam shaft for actuating said lever.

5. In a fence machine, the combination of a frame, a series of twisters mounted upon the frame, means for actuating the twisters, a movable carriage upon the frame, means for reciprocating the carriage, and a tension device mounted upon the forward end of the frame and comprising a transverse shaft, a series of sheaves on said shaft each having two grooves in its periphery to re-

ceive the two wires of each line wire of a fence, and a series of guide fingers at each side of and adjacent to the sheaves.

6. In a fence machine, the combination of a frame, a series of twisters supported upon said frame, a shaft mounted in bearings upon the frame and provided with a series of gears for actuating the twisters, a pair of driving pulleys loosely mounted upon their shaft, a clutch for connecting said pulleys to their shaft, a reciprocable carriage mounted upon the frame, a power shaft extending across the frame in bearings thereon, a pulley loosely mounted upon said shaft, a clutch to connect said pulley to said power shaft, a transmission shaft mounted in bearings on the frame below and at the rear of the carriage, upwardly extending arms secured to said shaft, connecting rods connecting the upper ends of said arms and the said carriage, means for transmitting motion from the power shaft to the transmission shaft, a lever pivotally connected at its ends to the said clutches and pivotally supported intermediate its ends to turn and shift the clutches, a cam shaft mounted in bearings on the frame and extending transversely of said lever, means for transmitting motion from the twister shaft to the cam shaft, and cam members on the cam shaft at each side of the lever to engage and turn the lever upon its pivot to shift the clutches.

7. In a fence machine, the combination of a frame, a series of twisters upon said frame, a shaft mounted in bearings on the frame and provided with gears to actuate the twisters, a pair of pulleys loosely mounted upon their shaft, a clutch located between said pulleys and adapted to be shifted into engagement with either of the same to connect the pulleys to their shaft and transmit motion to actuate the twisters, a reciprocable carriage mounted upon the frame, a power shaft mounted in bearings on the frame, a pulley on the power shaft, a clutch for connecting the pulley to the power shaft, a lever pivotally supported intermediate its ends and pivotally connected at one end to one of the clutches and at its opposite end to the other of the clutches, means for manually shifting the lever to shift the clutches, a cam shaft, means for transmitting motion from the twister shaft to the cam shaft, arms adjustably secured to the cam shaft and each provided with cam portions adapted to engage and shift said lever when the cam shaft is turned, and means for transmitting motion from the power shaft to reciprocate the carriage.

8. In a fence machine, the combination of a frame, a series of twisters mounted upon the frame, means for actuating the twisters, a reciprocable carriage upon the frame, means for reciprocating the carriage, a winding drum mounted in bearings upon the rear

end of the frame and comprising parts adjustable toward and from each other to increase and diminish the diameter of the drum, a shaft movable longitudinally through the drum for supporting the same, and means on the shaft for expanding the drum when the shaft is moved longitudinally through the drum.

9. In a fence machine, the combination of a frame, a series of twisters mounted on said frame, means for actuating said twisters, a reciprocable carriage mounted on the frame, means for reciprocating the carriage, a winding drum detachably mounted upon the rear end of the frame, said drum being divided longitudinally into a plurality of parts, means connecting the parts and permitting the same to move relatively toward and from each other, a shaft for supporting the drum extending through the axis thereof and movable longitudinally through the same, means on the shaft for engaging the parts of the drum and separating the same when the shaft is moved longitudinally, and means for turning the drum in timed relation to the reciprocation of the carriage.

10. In a fence machine, the combination of a frame, a series of twisters upon the frame, means for actuating the twisters, a reciprocable carriage on the frame, means for reciprocating the carriage, a winding drum detachably mounted upon the rear end of the frame, said drum being divided longitudinally into two parts, means connecting the two parts of the drum, a shaft in the axis of the drum for supporting the same, tapered wedges on the shaft for separating

the two parts of the drum when the shaft is moved longitudinally through the drum, and means for turning the drum.

11. In a fence machine, the combination of a frame, a series of twisters mounted upon the frame, a shaft mounted in bearings on the frame, and provided with a series of gears for actuating the twisters, a reciprocable carriage mounted upon the frame, a power shaft mounted in bearings on the frame, means for transmitting motion from the power shaft to reciprocate the carriage, a clutch controlling the transmission of motion to the power shaft, a lever pivotally attached to said clutch to actuate the same, means actuated in timed relation to the turning of the twister shaft for moving the lever to shift the clutch, a winding drum detachably mounted upon the rear end of the frame, said drum being divided longitudinally into a plurality of parts movable toward and from each other, a longitudinally movable shaft in the axis of the drum for supporting the same, means on the shaft for moving the parts of the drum when the shaft is moved longitudinally, and means for transmitting motion from the power shaft to the drum shaft for turning the drum in timed relation to the movement of the twisters and carriage.

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

CHARLES A. WILLMARTH.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."