(No Model.) 5 Sheets—Sheet 1.

# C. SKINNER.

## FENCE MACHINE.

No. 420,113. Patented Jan. 28, 1890.

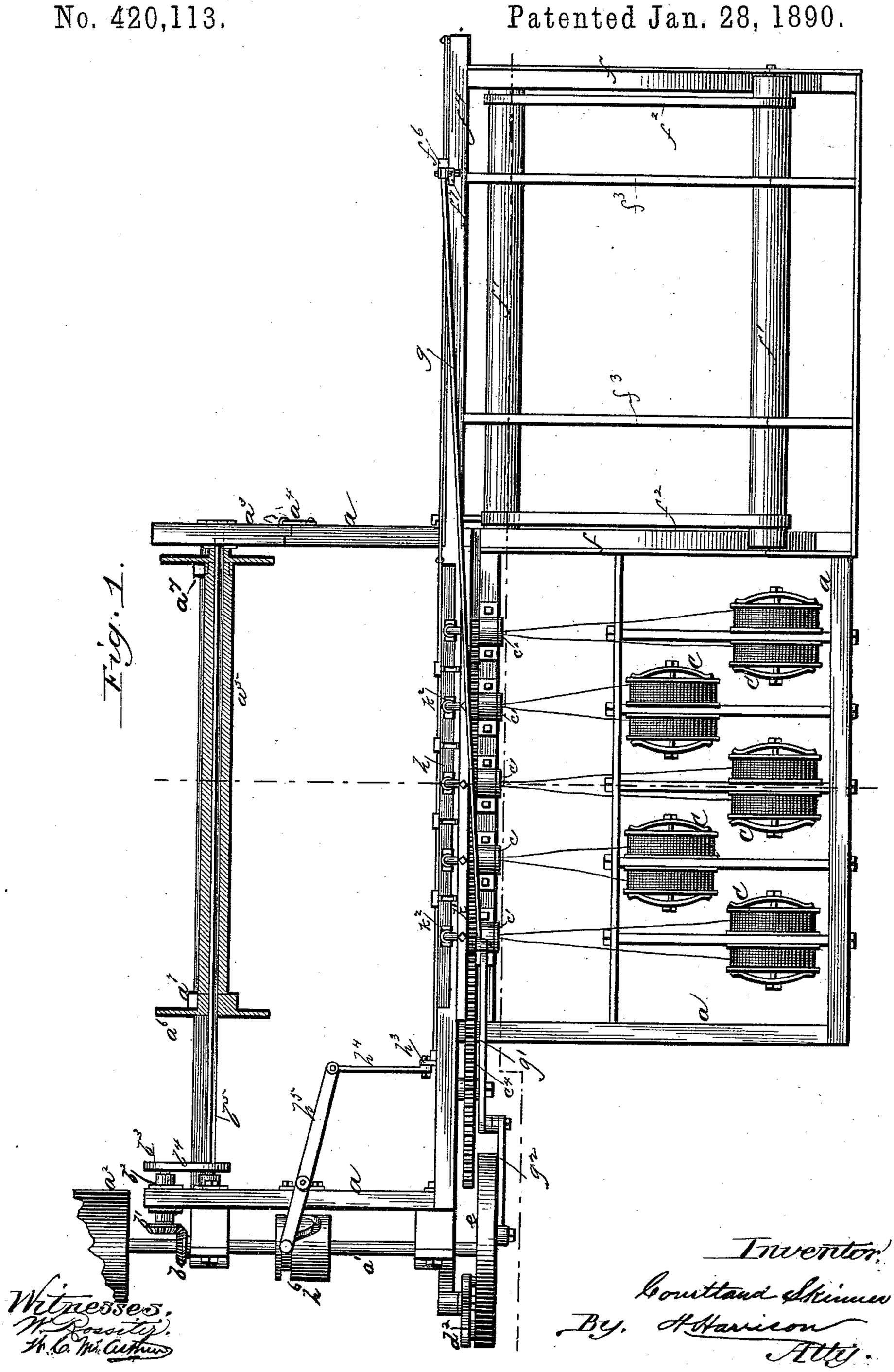

Fig. 1.

Witnesses:
W. Bossity.
H. C. Wm. Arthur

Inventor:
Courtland Skinner
By. H. Harrison
Atty.

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# C. SKINNER.

## FENCE MACHINE.

No. 420,113. Patented Jan. 28, 1890.

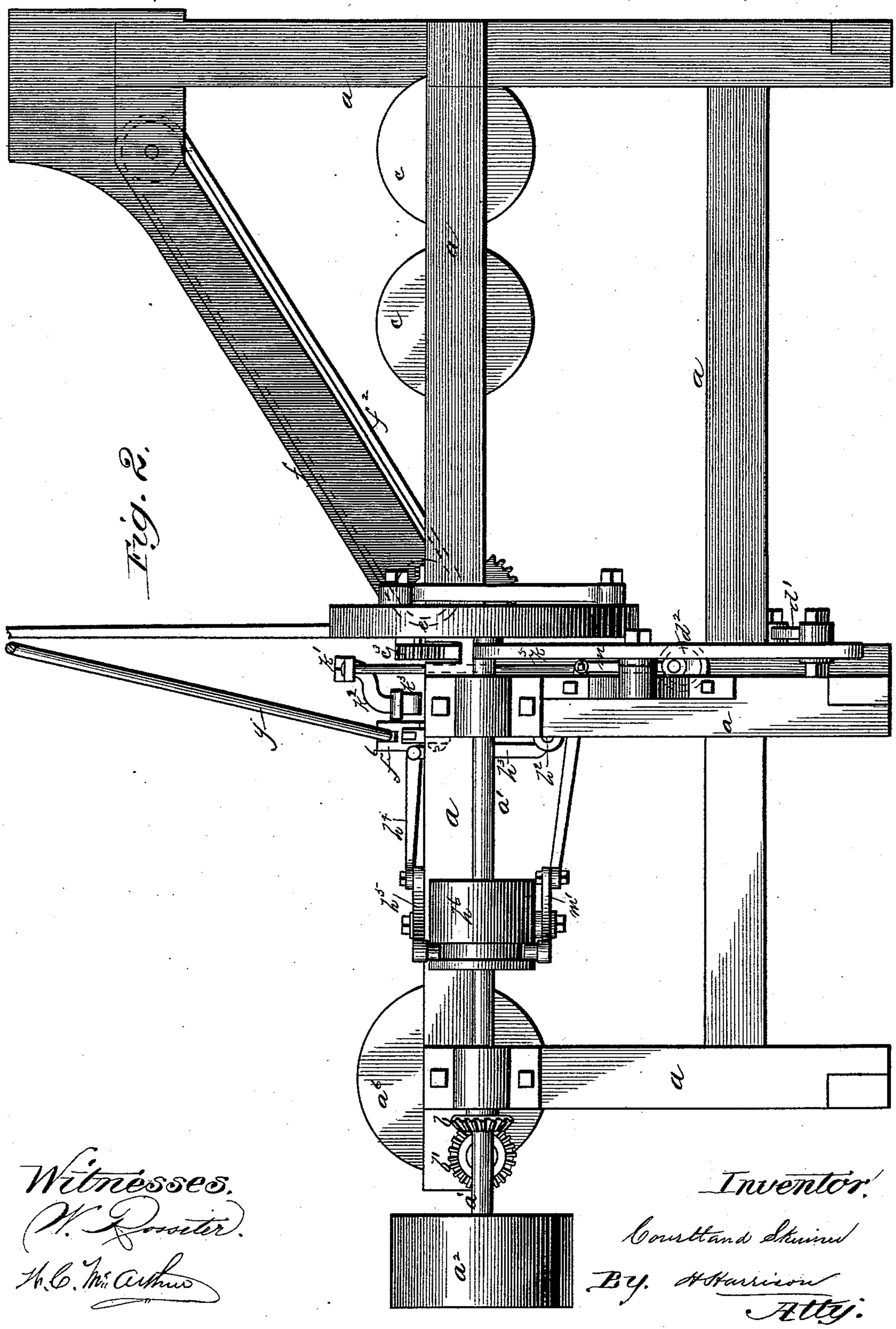


Fig. 2.

Witnesses.
W. Rossiter.
H. C. McArthur

Inventor.
Courtland Skinner
By. H. Harrison
Atty.

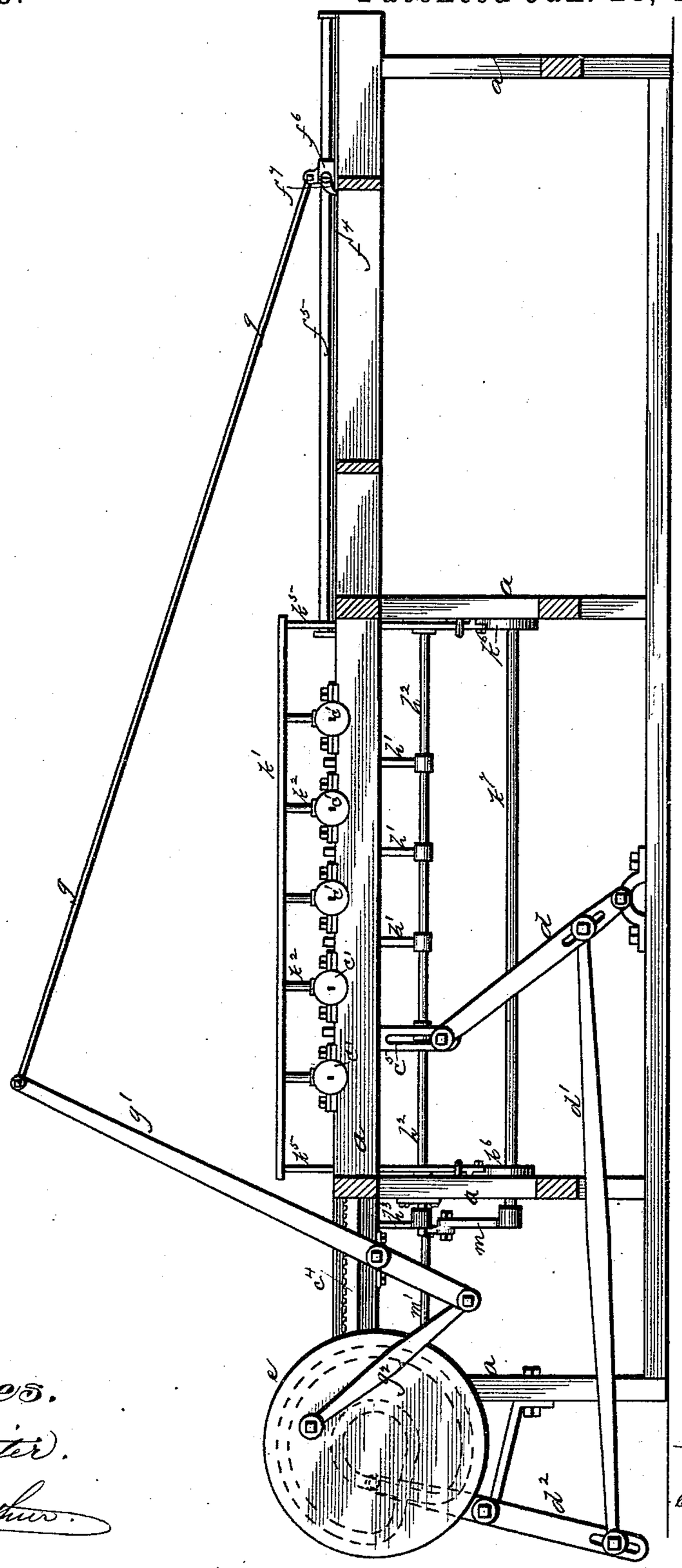
(No Model.) 5 Sheets—Sheet 3.

# C. SKINNER.

## FENCE MACHINE.

No. 420,113. Patented Jan. 28, 1890.

Fig. 3.



Witnesses.
W. Rossiter.
H. C. McArthur.

Inventor
Constant Skinner
per
H. Harrison
Atty.

(No Model.) 5 Sheets—Sheet 4.

# C. SKINNER.

## FENCE MACHINE.

No. 420,113. Patented Jan. 28, 1890.

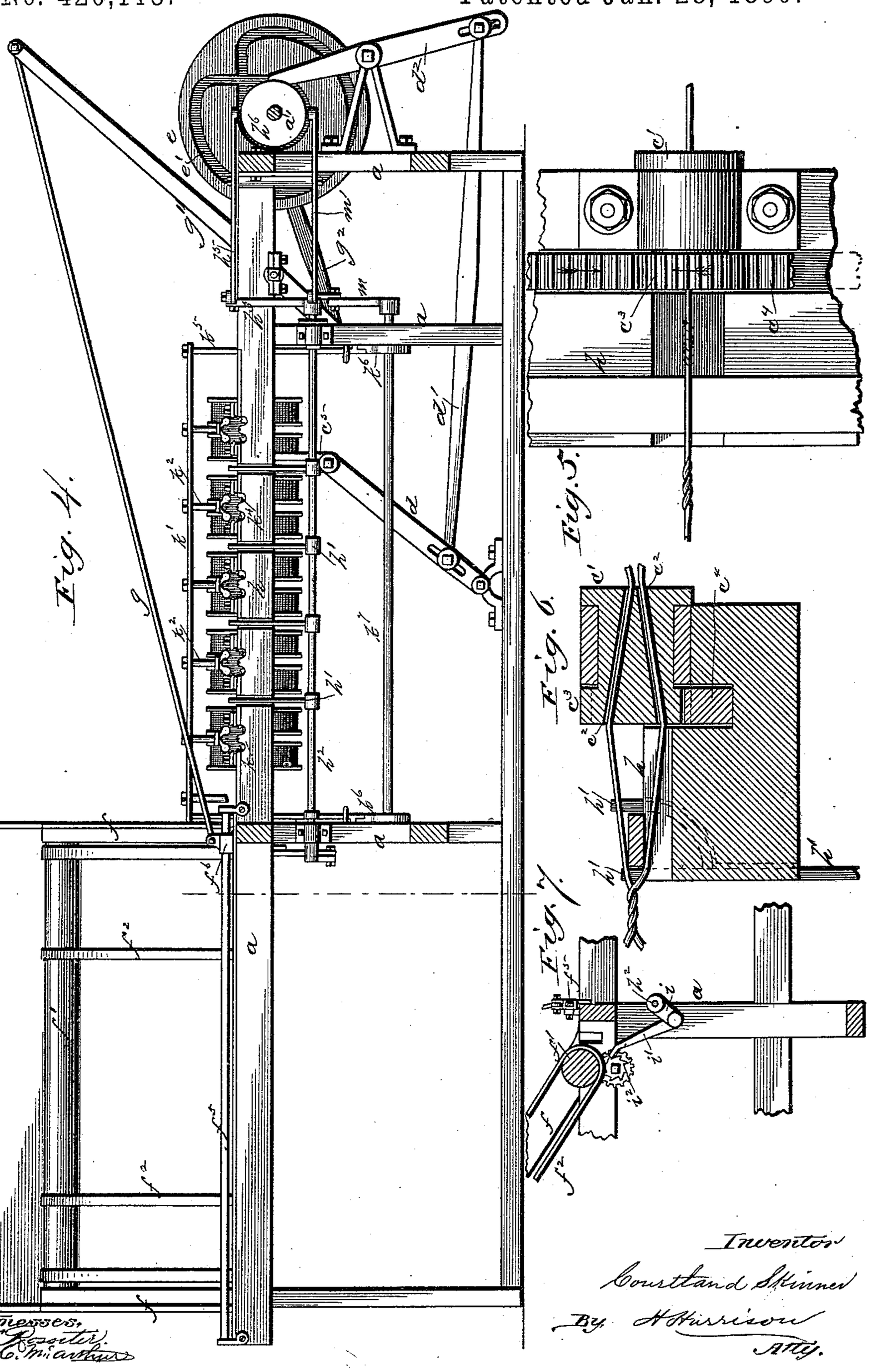


Fig. 1.

Fig. 3.

Fig. 6.

Fig. 2.

Witnesses,
W. Rossiter.
H. C. McArthur.

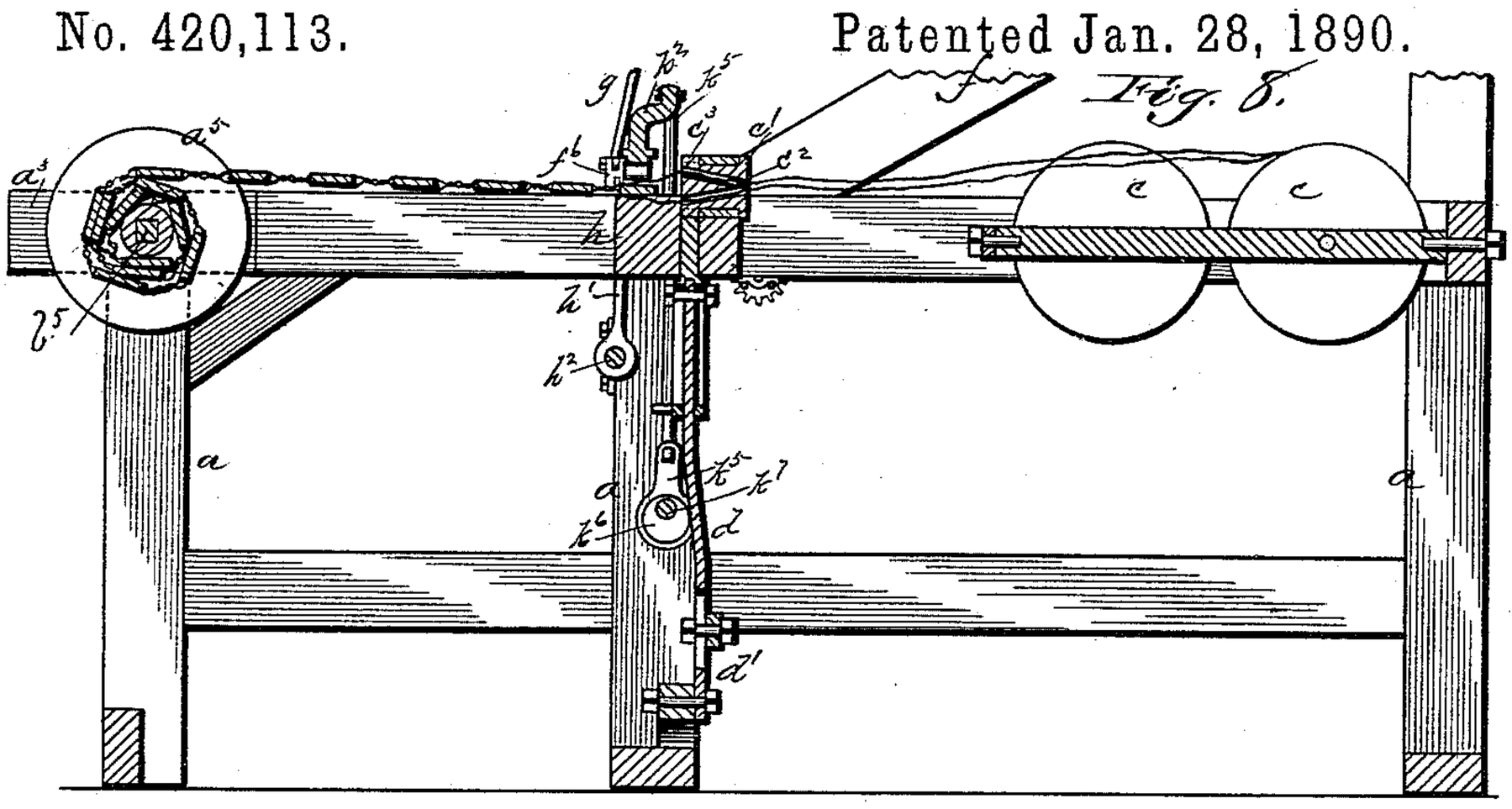
Inventor
Courtland Skinner
By A. Harrison
Atty.

(No Model.) 5 Sheets—Sheet 5.

# C. SKINNER.

## FENCE MACHINE.

No. 420,113. Patented Jan. 28, 1890.



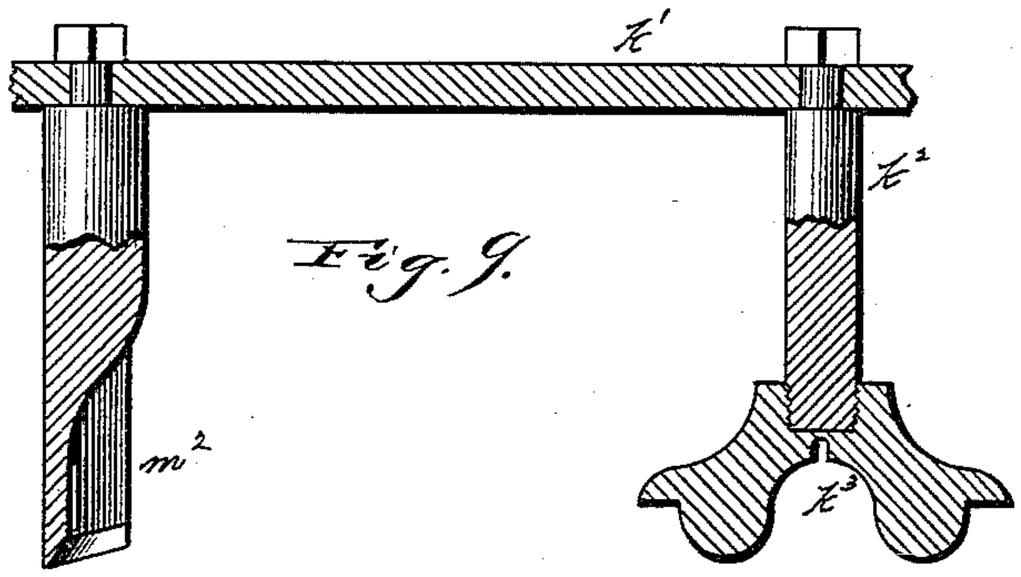
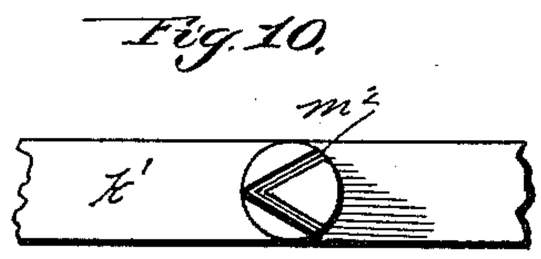




Fig. 9.



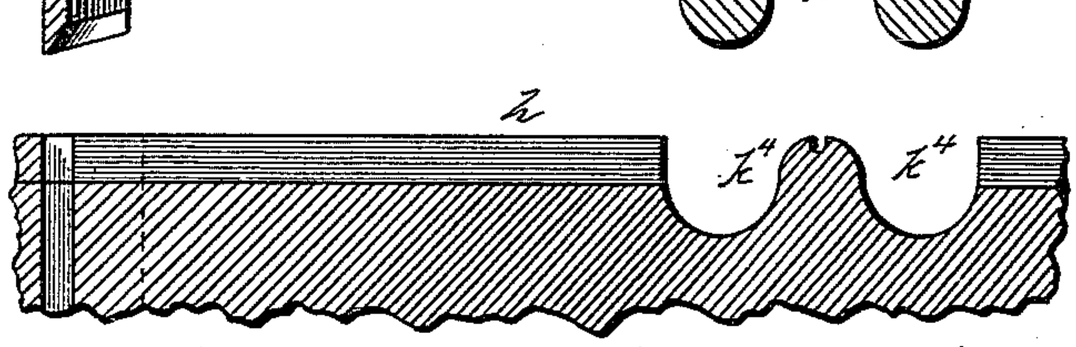
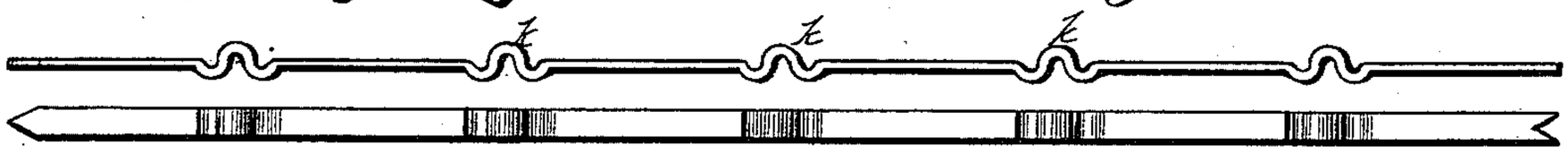
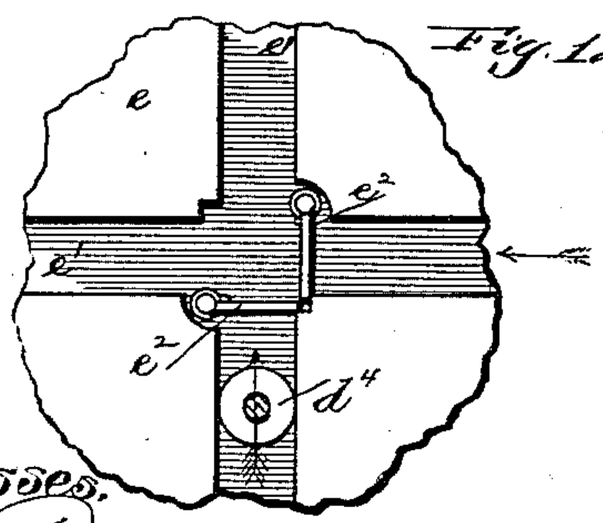
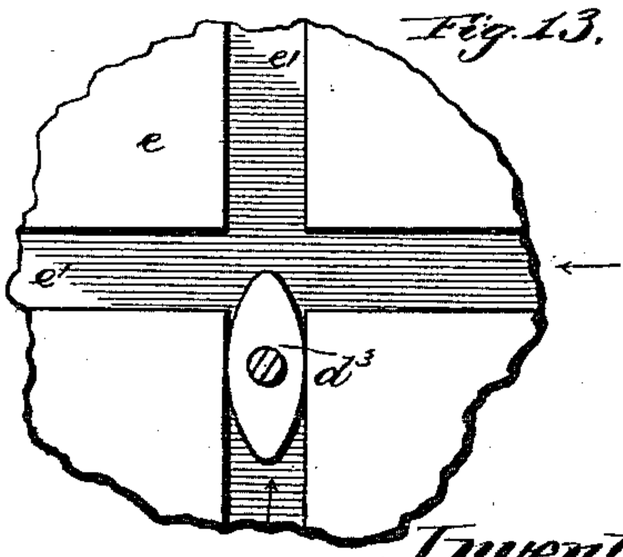




Fig. 11.




Witnesses.
V. Forster.
H. C. McArthur

Inventor
Courtland Skinner
By H Harrison
Atty.

# UNITED STATES PATENT OFFICE.

COURTLAND SKINNER, OF SPENCER, IOWA.

## FENCE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 420,113, dated January 28, 1890.

Application filed June 4, 1887. Serial No. 240,281. (No model.)

*To all whom it may concern:*

Be it known that I, COURTLAND SKINNER, a citizen of the United States, residing at Spencer, in the county of Clay and State of Iowa, have invented certain new and useful Improvements in Fence-Machines, of which the following is a specification, to wit:

This invention relates to an improvement in machines for making wire-and-paling fence; and it consists in certain peculiarities of the construction and arrangement of the same, substantially as will be hereinafter more fully set forth, and pointed out in the claims.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is a plan view of my invention. Fig. 2 is an end view of the same. Fig. 3 is a transverse section of the machine, showing the twisting devices in elevation and their operative connections. Fig. 4 is a similar view of the machine, looking in the opposite direction and showing the reverse sides of the twisters and their connections. Fig. 5 is a plan view, and Fig. 6 a cross-section, of one of the twisting-disks and the slat-supporting table, &c. Fig. 7 is a detail section of the lower end of the feeding-table. Fig. 8 is a longitudinal section of the machine, showing the wire-reels and the fence-reel. Fig. 9 is an enlarged detail section of the cutter, one of the forming-dies, and the supporting-table used with the metal pickets. Fig. 10 is a bottom plan view of the cutter for severing the lengths of pickets. Fig. 11 shows both an edge and a face view of the metal picket as it is made and used in the fence. Fig. 12 is a face view of the grooved disk which operates the feeding devices, showing the automatic gates which are used at the crossing of the grooves; and Fig. 13 is a view of the same without the gates and with an elongated tongue or dog for following them.

I have in view in this machine a construction which will not only accurately and automatically feed the pickets, twist the wire upon them, and reel off the completed fence, but which will also be equally adapted without alteration to the use of either wood or metal pickets, and in the latter case to so form the picket while under operation as to obviate any danger of its slipping out of place when in use upon the fence; and to this end my machine is constructed as follows:

*a* represents the main frame of the machine, which I form of any suitable material and in any suitable size and shape for the work to be performed.

Suitably journaled in a mechanical and proper manner at one end of the frame is a main driving-shaft $a'$, provided with a driving-pulley $a^2$, or equivalent device, by which power is applied to operate the machine. On this shaft is also a bevel-gear *b*, intermeshing with a similar gear $b'$ on a short shaft $b^2$, journaled in the main frame at right angles to the main shaft, and provided also with a belt-pulley $b^3$ on its inner end, connected by a belt $b^4$ with a similar pulley upon a square shaft $b^5$, running across the machine and journaled at its opposite end in a hinged part $a^3$ of the main frame. This hinged portion of the frame is held in position by a hook or latch $a^4$, and is swung out at any time to release the end of this shaft and permit the withdrawal of the spool $a^5$ thereon, on which the completed fence is reeled as fast as it is formed in the machine. This spool is of proper length to accommodate the fence, and at each end there is a head $a^6$, secured upon the shaft and formed with a socket $a^7$ to receive and hold the ends of the first picket and insure the proper winding of the fence. The belt $b^4$, by which this shaft and spool are operated, is made sufficiently loose to slip when all of the completed fence has been reeled up, and thus allow for the constantly-increasing size of the roll, which would ordinarily wind the fence in more and more rapidly if the connections between the reeling-shaft and its operating devices were made rigid and unyielding in their nature. This will be readily understood by all who are versed in this line of machinery.

Upon a part of the main frame in line with the reeling-shaft and spool are placed the various sets of wire-spools *c*, which are of a number corresponding to the number of lines of wire with which the fence is to be made. Opposite these spools are arranged the twisting devices, consisting of a series of small cylinders $c'$, journaled in suitable boxes and hav-

ing formed through them the wire-leads $c^2$, two in each cylinder. I prefer to make these as in Figs. 5 and 6, with the wire-leads close together at their inner ends and spread apart at their outer ends, in order that the motion of these twisters in one direction and then back again shall give but a light twist to the wire upon the side next the spools from which it is drawn; but upon the opposite side shall not only hold the two wires apart to facilitate the feeding of the picket, but will afterward form a tight twist of the wire upon this picket in a manner readily understood. The outer ends of these twisters are each formed or provided with teeth or cogs $c^3$ to form a gear-pinion, that is engaged by a cogged rack $c^4$, sliding reciprocally in a suitable guide-groove of the main frame, and which in its movements imparts the necessary oscillations to said twisters to twist the wire in one direction in front of one picket and back again in front of the next picket. This cogged rack is provided with a depending arm $c^5$, (seen in Figs. 3 and 4,) which is connected to a lever-arm $d$, hinged upon the base of the main frame and connected by a rod $d'$ with a lever $d^2$, also fulcrumed on the main frame, and it will be noticed that the connection of this rod with both levers is by slots and set-bolts, so that an adjustment is readily had to control the throw of the lever-arm $d$, and with it the motion imparted to the rack-bar and twisting-cylinders, thus easily regulating the number of times the wires are twisted to suit the operator or the necessities of the particular fence in process of manufacture.

By referring to the drawings, and more particularly to Figs. 3 and 4, it will be seen that upon the end of the main driving-shaft $a'$, I have secured a large disk $e$, in one face of which is formed a cam-groove $e'$, consisting of two concentrically-curved parts, one within the other, joined by two inclined portions crossing each other, as shown. This double cam-groove is used to operate the lever $d^2$ and through it, at proper intervals, the twisters, as will be readily seen, and the lever is often provided with a pivoted dog $d^3$, of oval form, as in Fig. 13, which will readily follow in the groove as the disk revolves. I prefer, however, in place of this dog to provide the lever with a simple anti-friction roller $d^4$, (shown in Fig. 12,) and at the junction of the cam-grooves in the disk to provide a pair of spring-actuated hinged gates $e^2$, which lie normally one across each of the grooves, as shown in said figure. It will be readily seen from this that as the disk revolves the roller approaches the crossing in the direction indicated by the arrow and presses aside the gate lying across its path, so that it, in connection with the other gate in its normal position, forms a continuation of the cam-groove, and the first gate springs back to place after the passage of the roller. This latter, passing around, repeats the operation with the other gate, and it will be at once understood that the roller is always given an unbroken guide groove or path, and all possibility of catching at the crossing of the cam-groove is obviated. I prefer this construction for this reason, as also the roller gives less friction than the sliding dog. The levers and all their connected mechanism are held stationary by the concentrically-curved parts of the cam-grooves during the feeding of the pickets, and a rapid motion in opposite directions is given to the levers and twisters at proper intervals to form the twist.

The pickets used are either of wood or metal, as desired by the user, and this machine is adapted to the use of either. When wooden pickets are used, they are laid upon an inclined table $f$, situated at one side of the main frame and which may be arranged either as a permanent or detachable part of the same. This table is provided with two rollers $f'$, one at the upper and one at the lower end of the same, and over these rollers run a pair of belts $f^2$, the upper parts of which run down over the face of the table and serve to feed down the pickets which are laid upon them. A guard $f^3$, supported above these belts, serves to prevent the pickets from piling one upon the other, but retains them in a single layer, so that their feed one at a time is insured. At the lower end of the table is a horizontal portion $f^4$, upon which the pickets are fed, and along its edge is a ledge $f^5$, which serves not only as a stop against which the pickets lodge, but also as a guide, upon which slides a block $f^6$, as in Figs. 3 and 4, carrying a spring-actuated pawl $f^7$, which slides back freely over the picket and drops in behind it to carry it forward or feed it into the machine on the reverse motion. To this block is connected one end of a long rod $g$, the other end of which is connected to a lever $g'$, fulcrumed on the main frame, and connected by a link $g^2$ with a wrist-pin on the cam-groove disk of the main shaft, and it will be seen at once that this arrangement imparts the necessary reciprocation to the block and its pawl to feed the pickets in proper time. These pickets are fed in upon a supporting table or beam formed on or attached to the main frame, as at $h$, in front of the twisters, and as in Figs. 5, 6, and 8, as well as in the main views, it will be seen that I provide a series of arms $h'$, secured upon a transverse rock-shaft $h^2$. These arms are forked at their upper ends, and lie normally in recesses of the supporting-table in such position that the pickets are fed into or between the ends of the fork. At the proper time after the wire has been twisted upon the picket this rock-shaft is operated to cause the forked arms to move the picket forward to give room for a new picket, and draw off a sufficient quantity of wire to form a new twist. The arms are then returned to place to receive the next picket as it is fed in. This motion is imparted as follows: Upon one end of the rock-shaft is a

crank-arm $h^3$, connected by a link $h^4$ with a lever $h^5$, fulcrumed on the main frame and having its end engaged by a cam-grooved roll $h^6$ on the main driving-shaft. As this roll revolves, the groove imparts the necessary oscillations to the lever to operate the rock-shaft. Upon the opposite end of the rock-shaft $h^2$ is also an arm $i$, as in Fig. 7, carrying a pawl $i'$, which operates a ratchet-pinion $i^2$, which drives the lower roller of the feeding-table, and the rocking of the shaft $h^2$ is thus made to feed the belts and pickets down at regular intervals, and in time to be engaged and fed in by the pawl, as previously described.

When the pickets are to be of metal, the material of which they are formed is wound in one continuous length upon a reel, which is set up on the feeding-table, or upon any desired point adjacent to the machine, and the end of the strip led in under the feeding-pawl, which in its forward movement pinches the material with sufficient force to feed it in properly and without slip. When wood is used, the wire, when tightly twisted, sinks into the fiber, and thus effectually prevents the picket from falling down when in place as a fence. This is not the case, however, with the metal picket, and I therefore form this latter with one or more sharp bends or corrugations, as at $k$ in Fig. 11, at the points upon which the wire crosses it, and this effectually prevents the picket from slipping out of the wires, as will be evident. I form these corrugations as follows: Above the supporting table or beam $h$ is a bar $k'$, to which are secured a series of depending arms $k^2$, on the ends of which are a series of dies $k^3$, of proper form to press the picket into similarly-shaped depressions $k^4$ in the table. (See Fig. 9.) This bar is carried upon suitable supports $k^5$, sliding vertically in the main frame and connected at their lower ends to eccentrics $k^6$ on a shaft $k^7$. This shaft is rocked in its bearings by an arm $m$, connected to a lever $m'$, which is actuated by the same cam-groove $h^6$ which operates the forked arms $h'$, but so placed as to be actuated by said cam-groove before the action of the forked arms, as will be at once understood. The same bar $k'$ also carries a V-shaped cutter $m^2$, which on the descent of the bar cuts off the length of material necessary to form a picket from the length of material drawn off the reel, and the form of cutter makes the point upon the picket, as shown in Figs. 10 and 11.

From the foregoing the mode of operation of this machine is evident. If a wooden fence is to be made, the pickets are placed upon the inclined table and fed by the belts to the lower end of the table, where it is engaged by the pawl and sliding block and drawn into the machine to proper position, which movement is effected by the rotation of the disk on the main driving-shaft and its connections with the feeding-pawl. During this time the twisters are held stationary by the travel of the roller on the lever $d^2$ in one of the concentric parts of the cam-groove. This roller has at this time, however, arrived at the inclined or cam part of the groove, and this throws over the lever and through it moves the cogged rack and causes the twisters to twist the wires tightly upon the picket. The lever and its mechanism are then held firmly by the other concentric part of the cam-groove, as shown. At this point the grooved roll $h^6$, acting on its lever $h^5$, causes the rocking of the shaft $h^2$, and its forked arms carry the picket forward and at once return to position to receive a second picket. The formed fence is at the same time wound upon the reel provided for that purpose, and the pawl and ratchet connecting the rock-shaft with the feeding-belts operate these to feed the next picket down when the feeding-pawl can grasp it, and the operation is repeated, except that in this next movement the twisters are operated in the opposite direction. This operation is the same for a metal picket, except that the length of the material is first fed in from the roll on which it is held. Then the dies and cutter are depressed to form the corrugations and sever the blank, then the wire is twisted, the completed fence fed off, and the operation is repeated.

No change of material character is needed to use either wood or metal pickets. The wood pickets are fed in upon the recessed supporting-table, and the operating-lever of the corrugating-dies simply detached to stop the operation of this part of the machine, which is again set in motion when metal pickets are used.

I do not desire to confine myself to the exact construction herein described for operating the various parts of the machine, but will make such changes in detail as are required by practice without departing from the spirit of my invention.

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

1. In a fence-machine, the combination, with an inclined feeding-table, of endless feeding-belts running over the face of said table, guards arranged over and parallel with the belts, and connections, substantially as described, between these belts and the fence-forming devices for intermittently feeding the pickets at proper intervals to the bottom of the table, substantially as and for the purpose set forth.

2. In a fence-machine, the combination, with a feeding-table provided with a guide-ledge at its forward edge and a sliding block upon said guide-ledge, provided with a pawl for engaging the picket, of a disk upon the main driving-shaft and a lever on the main frame connected at one end to said disk and at the other to the feeding-block, substantially as and for the purpose set forth.

3. In a fence-machine, the combination, with the revolving twisters formed with spur-

teeth and a reciprocating toothed bar engaging said twisters, of a cam-grooved disk on the driving-shaft, a rock-lever engaged by said cam, and a second rock-lever connected to the first and also to the rack-bar, substantially as and for the purpose set forth.

4. In a fence-machine, the cam-disk *e*, provided with a cam-groove having two concentric parts, one within the other, and two inclined parts crossing each other, in combination with the spring-gates placed at the crossing of the inclined grooves and lying normally one across each groove and the rocking lever, a traveler mounted at one end thereof and in the grooves, and mechanism connecting the opposite end with the twisters, substantially as and for the purpose set forth.

5. In a fence-machine, the combination, with the twisting-table recessed on one side of a rock-shaft provided with forked arms lying in said recess, of a cam-grooved roll on the main shaft, a lever engaging the same, and a link connecting this lever with the rock-shaft, whereby the forked arms are caused to push forward the completed part of the fence at regular intervals, substantially as and for the purpose set forth.

6. In a fence-machine, the combination, with the twisting-table formed or provided with forming-dies on its upper side, of a vertically-reciprocating bar provided with depending dies for indenting or corrugating the picket at suitable intervals to retain the wires in place, substantially as and for the purpose set forth.

7. In a fence-machine, the combination, with the twisting-table provided with a series of forming recesses and a bar reciprocating to and from said table and provided with a series of dies for pressing the body of the picket into the recessed table, and also with a V-shaped cutter for severing the picket from a continuous strip of metal, of a rock-shaft provided with eccentrics connected to the die-carrier, a cam-grooved roll on the main shaft, a rock-lever engaging the same, and a link connecting this lever with the rock-shaft, substantially as and for the purpose herein shown and described.

8. In a fence-machine, a reeling-shaft provided with a recessed head for engaging and holding the first picket and a removable spool adjacent to said head, having an opposite recess for receiving the opposite end of the picket, substantially as and for the purpose set forth.

9. The combination, in a wire-fence machine, with the table provided with a series of slots, of a series of forked rock-arms projecting up through the slots, a rock-shaft for supporting the series of arms, and mechanism for intermittingly operating the shaft, substantially as specified.

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

COURTLAND SKINNER.

Witnesses:
JUSTIN A. BRANDE,
A. LINCOLN.