(No Model.) 2 Sheets—Sheet 1.

M. GLEASON.

FENCE MACHINE.

No. 525,495. Patented Sept. 4, 1894.

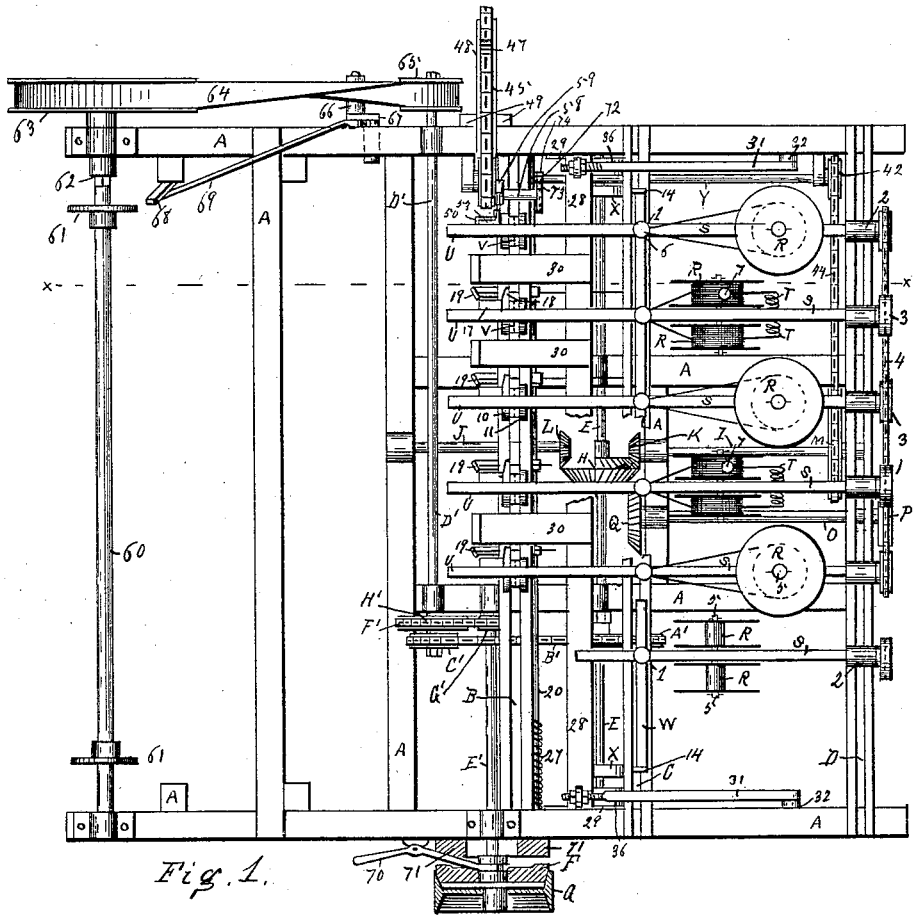

Fig. 1.

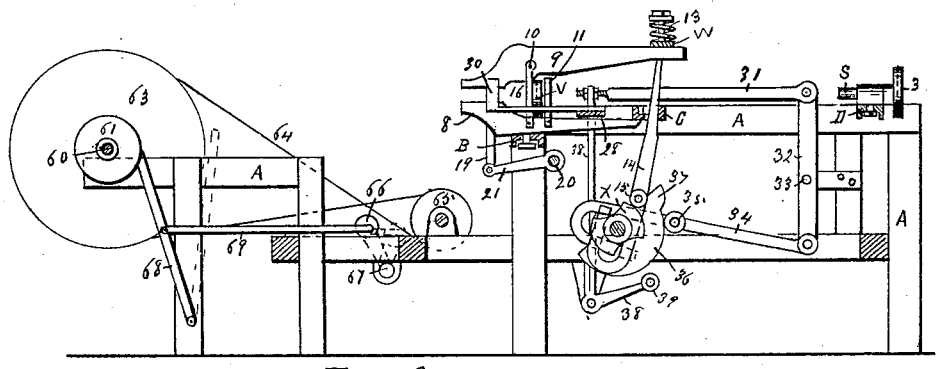

Fig. 2.

WITNESSES.
Wm. F. Roll
Wesley Umsteen.

Michael Gleason
INVENTOR.
By Robert S. Carr, ATT'Y.

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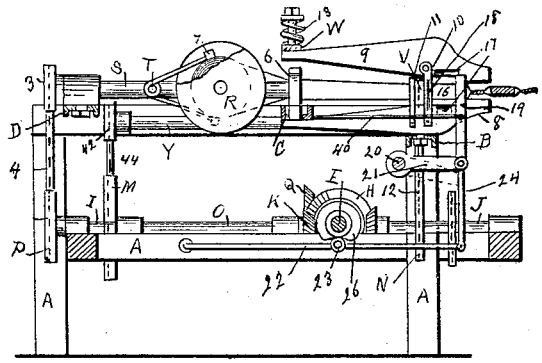

Fig. 3.

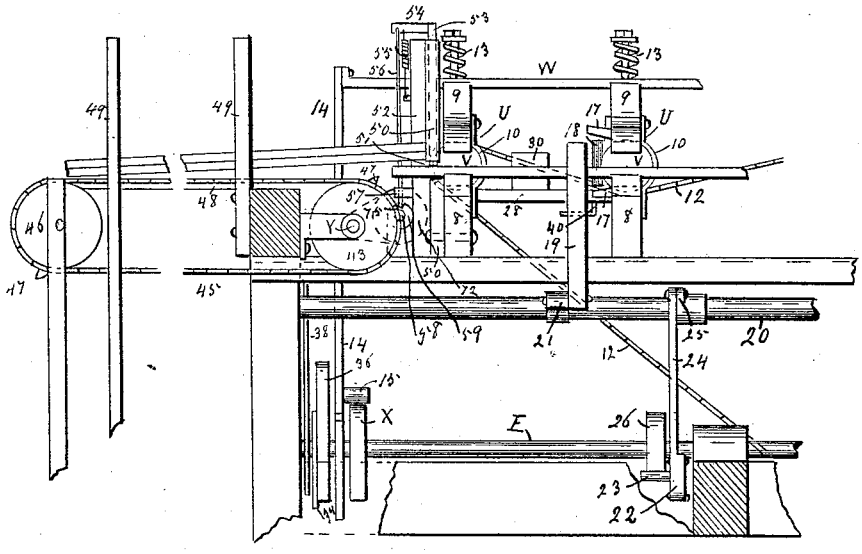

Fig. 4.

WITNESSES

Wm. F. Roll

Wesley Armator.

Michael Gleason

INVENTOR.

By Robert S. Carr, ATT'Y.

UNITED STATES PATENT OFFICE.

MICHAEL GLEASON, OF LIBERTY, INDIANA.

FENCE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 525,495, dated September 4, 1894.

Application filed May 23, 1894. Serial No. 512,175. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL GLEASON, of Liberty, Union county, Indiana, have invented certain new and useful Improvements in Fence-Machines, of which the following is a specification.

My invention relates to that class of power fence making machines that form a continuous web of fencing by securing the pickets a short distance apart between strands of twisted wire, and the objects of my improvement are: to guide the pickets properly between the wires that form the strands; to feed the pickets into the machine to such a distance that their rear ends will remain in the same line; to make the clamping jaws adjustable to pickets that differ in thickness; to provide a brake for the spools that will maintain the wire under a constant tension as it leaves the spools; to provide means to stop the machine at any desired point in its action; and to wind the fence in a roll of equal tension by means that are independent of the device that spaces the pickets. These objects are attained in the following described manner, as illustrated in the accompanying drawings, in which—

Figure 1 illustrates a plan of the machine with parts broken away to expose the driving gears. Figs. 2 and 3 are vertical sections shown in opposite directions, respectively, on the line x—x of Fig. 1; and Fig. 4 is a front elevation of portions of the machine, showing the mechanism for feeding the pickets.

In the drawings A represents the frame work of the machine. Slotted bars B, C, and D, span the top of the frame for the attachments of certain parts. Main shaft E extends across the frame and is journaled in bearings thereon. It is rotated at a reduced speed by the engagement of sprocket wheel A′ thereon with sprocket chain B′, driven from sprocket wheel C′ on intermediate shaft D′. The speed of said intermediate shaft is reduced and it is driven from initial shaft E′ by chain F′ that engages with sprocket wheels G′ and H′ on said respective shafts. The initial shaft is driven by the frictional engagement of clutch F splined thereon with idle driven pulley G. The master wheel H secured on the middle portion of the main shaft E is formed with bevel gears on its opposite margins. On one margin of said wheel the gear is fractional and covers about one-third its surface leaving the remainder of the margin blank. Shafts I and J are intermittently rotated by the alternate engagement of bevel pinions K and L thereon with the fractional gear on the master wheel. Said shafts are journaled in bearings on the frame and extend at right angles from opposite sides of the main shaft. Sprocket wheels M and N are respectively attached to said shafts toward opposite ends of the machine. Shaft O carries sprocket wheel P and is journaled parallel to shaft I in bearings on the frame. It is rotated by the engagement of bevel pinion Q thereon with the continuous bevel gear on the master wheel.

Spools R that contain the wire for the strands are mounted in pairs on the respective carriers S. Said carriers are each journaled in bearings 1 and 2 attached to slotted bars C and D and are equal in number to the strands of wire in the fence. They are collectively and continuously rotated by sprocket wheels 3 thereon being in engagement with sprocket chain 4 that is driven from sprocket wheel P on shaft O.

Spindles 5 for the respective spools project from opposite sides of each carrier near its middle portion. The spools may turn on the spindles and are removable therefrom for the purpose of being refilled with wire when empty. An annular collar 6 is formed integral on the front end of each carrier and contains the usual peripheral perforations for the passage of the wire from the spools.

The usual manner of tensioning the wires leading to the twisters is by means of nuts movable on the spindles to compress flexible washers against one end of the spools and frictionally retard their rotation. The tension of the wire, however, increases with the reduction of its quantity on the spools and necessitates frequent modification in the pressure of the washers by the nuts. The quantity of wire on the spools continually varies and requires frequent adjustment of the nuts to regulate the tension of the different wires. To obviate this objection brakes T are provided for the respective spools and attached to the carriers. They each consist of a coiled spring and an arm extended there-

from that is forcibly pressed by the spring against the surface of the wire on the corresponding spool. A friction block or boss 7 preferably of wood may be removably attached to the extremity of the arm to receive the wear by contact with the wire and to be replaced by another when worn out. The extremity of said arm approaches the axis of the spool as the wire is being unwound therefrom and its pressure is correspondingly decreased owing to the relaxation in the tension of the coil spring by said radial movement of the arm.

The brakes may be proportioned to exert a resistance to the rotation of the spools that decreases in an inverse ratio to the increase in the tension of the wire necessary to unwind itself therefrom. In this manner the tension of the wire leading from the spools is retained substantially constant during its removal therefrom. The brakes may be thrown out of action to permit the removal of the spools from the spindles and they may be attached to the carriers in such manner as to permit a change in the tension of the coil spring.

The clamps U that hold the pickets during the twisting of the wire are located directly in front of the respective carriers S and each consists of similar jaws 8 and 9. Lower jaws 8 are bolted on slotted bars B and extend forward therefrom about one-third of their length. Their rear ends extend under and are bolted to slotted bar C directly beneath bearings 1 of the respective spool carriers.

Twisters V with peripheral sprockets and perforated for the passage of the wire are journaled in collars 10 and 11 on the respective lower jaws 8. The position of said twisters is directly above the slot in bar B and they are collectively and intermittently rotated by sprocket chain 12 driven by sprocket wheel N on shaft J. The upper jaws 9 are hinged on collars 10 directly over the bottom jaws and parallel thereto. The rear extremity of the top jaws is yieldingly secured under truss W by bolts that are supported on compression springs 13 thereon. Said truss spans the machine parallel with and above slotted bar C and is supported at its opposite ends by legs 14 that depend through the slot therein. Said legs ride on cams X by means of rollers 15 thereon. Said cams are secured on the main shaft near its opposite ends and are of such form or peripheral contour that the truss is moved up and down at intervals in their rotation to close and open clamps U. Throats 16 are formed in the clamps by an enlargement of the opening between the jaws directly in front of the twisters. The contiguous edges of the jaws beyond the throat are flat and substantially parallel with each other. Lips 17 formed integral with one side of the respective jaws and lips 18 integral with collars 10 diverge outwardly therefrom and together with the beveled guides 19 form funnel shaped entrances for the front end of the pickets to throats 16 in the clamps. Rock shaft 20 extends across the front portion of the frame and is provided with forwardly projecting arms 21. The respective guides 19 are pivotally secured on and project above the extremity of said arms, whereby they are moved up and down by the rocking of shaft 20. Stay rods 40 connect the middle portion of the arms with slotted bar C to hold them vertical. Beam 22 is pivotally attached to the frame and extends forward under the main shaft beyond shaft 20. It is provided with roller 23 and connected by rod 24 on its front end to arm 25 on the rock shaft. Cam 26 on the main shaft acts upon roller 23 to depress the front end of the beam and hold it down during about three-fourths of each rotation. This movement of the beam actuates shaft 20 to move and retain guides 19 below the mouth of the clamps during the forward movement of the picket therefrom.

A depression in cam 26 permits beam 22 to be raised during a portion of its rotation, by a reversed motion of the rock shaft caused by the action of spring 27 thereon. In this manner the guides 19 are caused to resume their elevated position to direct the entrance of the succeeding picket in the machine.

Plate 28 extends across the machine against the front edge of slotted bar C. It is movable forward and backward on tracks 29 on the sides of the frame and under its opposite ends. Plungers 30 secured on the plate project forward therefrom between the respective clamps and terminate on a line with collars 10 when plate 28 is in its most rearward position.

Drivers 31 are adjustably attached at their front ends to the respective ends of plate 28 and are pivoted at their rear ends to the top of vertical levers 32, said levers are permitted to oscillate on pivots 33 by which they are supported on the frame.

Reciprocating bars 34 provided with anti-friction rollers 35 are pivotally connected to the lower end of vertical levers 32 and extend forward therefrom over the main shaft. Said bars are moved at intervals in a rearward direction by the action of segmental cams 36 on rollers 35. Said cams are mounted on opposite ends of the main shaft and are of less extent than a semi-circle. They terminate in lugs 37 that extend therefrom and give additional rearward motion to bars 34. In this manner plate 28 is moved forward together with the plungers 30 thereon to push the pickets from throats 16 of the clamps, and to form the space between the pickets of the fence.

Levers 38 in the form of bell cranks are pivoted on opposite sides of the frame below the main shaft. One end of each lever engages with the respective end of plate 28, and the opposite ends thereof are provided with rollers 39. In the rotation of cams 36 lugs 37 thereon impinge on rollers 39 and cause levers 38 to return plate 28 to its normal position against slotted bar C. This return of plate 28 to its normal position moves bars 34

in a forward direction with rollers 35 thereon and in position to be again acted upon by segmental cams 36 on the main shaft. The adjusting of plate 28 forward on drivers 31 increases the movement of said plate and causes it to make wider spaces between the pickets.

Shaft Y is journaled in bearings attached to one side of the frame and provided with sprocket wheels 42 and 43 on its respective ends. It is intermittently rotated by sprocket chain 44 that engages with sprocket wheel 42 thereon and is driven from sprocket wheel M on shaft I. Sprocket wheel 43 on said shaft carries feeding sprocket chain 45 that is supported without the machine on an idle wheel 46 mounted on a stand. Said chain travels toward the machine over said wheels in a direct line with the throats of clamps U and is provided at opposite points in its length with outwardly projecting lugs 47. Table 48 forms a support for the top stretch of said chain in its movement toward the machine. Parallel standards 49 extend above opposite sides of the table to hold the pickets in position to enter the machine. The movement of said chain causes the projecting lugs thereon to successively engage with the rear end of the bottom picket of the pile and drive its front end forward through the throats of the respective clamps and between the wires that form the respective strands of the fence. Lips 17 and 18 on the jaws and collar 10 of the first clamp together with the corresponding guide 19 are omitted. On the remaining clamps however, these parts are necessary to properly guide the pickets to the throats.

Vertical abutment 50 is secured in front of the entrance to the first clamp and is formed with an open horizontal gap 51 in its front edge to admit the pickets singly to the machine. The flange 52 extends from its rear edge and forms an angle to receive the front end of the pile of pickets, awaiting entrance to the machine. Stop 53 formed with arm 54 is movable on the side of the abutment adjacent to the clamp to open and close the gap 51. Spring 55 connects arm 54 with the abutment to pull the stop downward to close the gap and standard 56 depends from said arm through guide 57 on the abutment to raise the stop and open the gap.

Short shaft 58 is provided with annular collar 59 on its front end and sprocket wheel 72 on its rear end. Said shaft is journaled parallel to shaft Y and in bearings on slotted bar B. It is rotated by sprocket chain 73 that engages with wheel 72 thereon and with wheel 74 on shaft Y. A deep notch 75 is formed in the edge of the collar to receive the foot of the standard 56 to permit stop 53 to descend within gap 51. When the collar is rotated the standard is forced upward out of the notch therein and rides on the periphery of the collar to carry the stop clear of the gap. And each of its rotations terminates with the standard in notch 75 and simultaneously with the stoppage of the feeding chain or with the escapement of the lug thereon from the rear end of the picket. During the inaction of the collar the standard remains in the notch and stop 53 is forced downward by spring 55 to clamp the rear end of the picket in gap 51.

The rotation of the collar begins with the movement of the feeding chain and forces the standard out of the notch to open gap 51 before the lug on said chain starts the next picket through said gap to the machine. The pickets are removed edgewise from gap 51 by the first forward action of the plungers to form the space for the twisting of the wire thereon. The top portion of the abutment may be made adjustable to increase the size of the gap to admit pickets of any desired thickness.

Shaft 60 mounted on a forward extension of the frame of the machine is provided with the usual movable flanges 61 and is detachably coupled together by the usual form of coupling, 62. It is rotated by pulley 63 mounted thereon just without the side of the frame. Said pulley is driven by belt 64 from small pulley 65 that is mounted on the extremity of intermediate shaft D′. The front end of the web of fencing is attached to the flanges 61 on shaft 60 and by the slow rotation of said shaft the fence as completed is wound thereon in a roll of the usual size.

The adhesion of belt 64 on the pulleys is increased by means of belt tightener 66 carried on a crank arm 67 that is pivotally attached to the frame. Lever 68 is connected with said tightener by rod 69 and is hinged at its lower extremity to the frame. The top portion of the lever rides against the surface of the roll of fencing and is moved rearwardly as said roll of fence increases in size.

To form the roll of fence with a uniform tension requires the power to be exerted by the belt on the reel shaft at an increasing ratio proportionate with the increase in the diameter of the roll. This is accomplished by the movement of the lever by the roll during its formation actuating the tightener into closer engagement with the belt and increasing its adhesion to the driving pulley. During the formation of the roll the speed of the reel shaft decreases and the slipping of the belt on the driving pulley is correspondingly greater. The amount of power transmitted by the belt before slipping on the pulley is intended to be regulated by the tightener to meet the requirements necessary to maintain the tension of the fence constant during the formation of the roll.

A stationary abutment 71 is attached to the outside of the frame of the machine adjacent to the friction driving clutch F on the initial shaft E′. Said clutch is movable on the shaft by means of lever 70 being engaged therewith and fulcrumed on the frame. The clutch may be moved out of frictional engagement with the idle driven pulley and into frictional

contact with the abutment to overcome the inertia of the moving parts and effect a sudden stoppage of the machine.

In operation the ends of the wires are passed from the spools through the collars on the spool carriers and through the respective twisters and secured to a picket placed within the throats of clamps U. The machine being started, guides 19 are moved downward from the front of the picket by cam 26 on the main shaft; the plungers then push the picket forward in the clamps from the throats therein. Said clamps are now closed thereon by an upward movement of the truss, and the twisters are rotated to form a desired twist in the respective pairs of wires behind said picket. The clamps now open and lugs 37 on the segmental cams 36 actuate the plungers to drive said pickets farther forward when the clamps again close thereon. Said lugs 37 immediately actuate levers 38 to return the plungers rearwardly to their normal position, and the gap in cam 26 permits spring 27 to reverse the rock shaft and raise guides 19 into operative position. Motion is now imparted to the feeding chain by the fractional gear on the master wheel to place another ticket in the machine. This entire operation is accomplished by a single rotation of the main shaft and may be repeated continuously.

When the clamps are first closed on each picket they press the wire closely against its opposite sides before being twisted to prevent the fence from stretching. And compression springs 13 on the truss permit the clamps to adjust themselves to pickets of different thickness. The spaces are formed of uniform width by the plungers acting against the rear edge of the pickets although the pickets should differ in width.

The spool carriers are rotated continuously while the twisters are rotated intermittently and both complete the same number of rotations in a given time to avoid entangling the wires. The speed of both may be correspondingly changed to form a different number of twists in the wire between the respective pickets by displacing sprocket wheels M and P on their respective shafts and substituting others of different size.

Any difference in the length of the pickets will appear on their front ends in the completed fence and may be cut away by a small circular saw (not shown) attached to the frame and driven from the initial shaft.

I am aware that fence machines have been made and patented that embody many of the features of this machine. I therefore do not claim such features broadly, but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A clamp consisting of two similar jaws and a bearing interposed between them for the journal of a wire twister, the one of said jaws being rigidly secured, and the other of said jaws being movably secured on opposite sides respectively of said bearing and forming a gap between the front ends of the jaws.

2. In combination, a stationary jaw, bearings mounted perpendicular thereon and parallel with each other, a wire twister adapted to be rotated between said bearings and journaled therein by hubs on its respective ends, and a jaw movably secured on one of said bearings and adapted to be oscillated in a plane with the stationary jaw.

3. The combination with a stationary jaw, a movable jaw, and means connecting said jaws together in the same plane and with an open space between the front ends thereof, of a movable transverse truss, and means to yieldingly secure the rear end of the movable jaw thereto, whereby pickets differing in thickness may be clamped within said space.

4. The combination with clamps for the pickets, and formed with a throat in front of the connection between the jaws thereof, of lips formed on one side of the clamp that diverge outwardly from the throat to direct the entrance of the pickets therein.

5. The combination with a clamp, a wire twister journaled in bearings attached thereto and between the jaws thereof, of lips formed on one side of the respective jaws and on one of the bearings, said lips being diverged from the edge of the throat to direct the pickets therein.

6. The combination with a series of beveled guides supported in a vertical position on arms that project from a rock shaft, of a spring on the rock shaft, and lever mechanism actuated by a cam on the main shaft to raise and lower said guides.

7. The combination with a series of clamps containing throats to receive the pickets, lips projecting from the one side of the clamps to form funnel-shaped entrances to the throats, of a series of vertical beveled guides on a line with the throats and retained in an elevated position between the respective clamps by means of a spring on the rock shaft, and lever mechanism actuated by a cam on the main shaft to intermittently move the guides in a downward direction.

8. In combination, a series of vertical beveled guides supported on arms projecting from a rock shaft to elevate the guides across the front edge of the pickets during their entrance to the machine, and means engaging with the rock shaft and actuated by a cam on the main shaft to lower said guides out of contact with said pickets.

9. The combination with a clamp formed with an open gap between its jaws, of a guide movable endwise across the front portion of the entrance to the gap and near one side of the clamp, said guide having its rear surface slanted rearwardly toward the clamp to direct the front end of the pickets toward the rear portion of the gap, and means to remove the guide from the line of the gap for the removal of the picket laterally therethrough.

10. In combination, a series of clamps mounted on the frame, a rock-shaft on the frame and provided with forwardly projecting arms, vertical guides supported on the arms and situated between the respective clamps to direct the front edge of the pickets in their entrance to the clamps, and means to actuate the rock-shaft to lower said guides for the removal of the pickets from the clamps.

11. The combination with a series of clamps secured on the frame, and each provided with a movable jaw, of a truss intermittently movable up and down, and means to secure the jaws to the truss whereby said clamps are simultaneously actuated.

12. The combination with a series of clamps, each provided with a movable jaw, and a transverse truss intermittently movable up and down by the action of cams secured on the main shaft, of means to yieldingly secure the rear ends of said movable jaws to the truss whereby said clamps are adapted to pickets that differ in thickness.

13. The combination with a series of clamps mounted on a frame, mechanism to successively feed the pickets therein, of an abutment formed with a gap for the passage therethrough of the pickets to the clamps, and means to clamp the rear end to the picket in the gap and hold it immovable upon becoming released by the feeding mechanism.

14. The combination with an automatic feeding mechanism for the pickets to the machine, of clamping mechanism to hold the rear end of the picket immovable, and whose action alternates with and immediately succeeds the intermittent action of the feeding mechanism.

15. The combination with an endless chain provided with a lug and adapted to successively feed the pickets into the machine, of an abutment formed with an open gap for the passage of the pickets therethrough, said gap being adjustable in height, a stop movable on the abutment to clamp the picket in the gap, and means to actuate the chain and the stop intermittently and at alternating intervals.

16. The combination, with a series of clamps mounted on the frame, a plate movable on the frame, and a series of plungers projecting thereon and between the respective clamps, of lever mechanism engaging with the plate and actuated by cams on the main shaft, whereby the plungers are intermittently reciprocated between the clamps.

17. The combination with a series of plungers mounted on a movable plate and projecting forward therefrom and between the respective clamps, of lever mechanism engaging with the plate and actuated by cams on the main shaft to intermittently impel the plungers in a forward direction, and separate lever mechanism actuated by said cams to return the plungers rearwardly to their normal position.

18. The combination, with a series of plungers mounted on a movable plate and projecting therefrom between respective clamps, of lever mechanism adjustably engaging with the plate and actuated intermittently, whereby the plungers may be reciprocated a greater or less distance, as desired.

19. The combination with a reel shaft to form the fencing into a roll, and a belt leading from a driving pulley to a pulley on the shaft, of a tightener for the belt, and lever mechanism engaging therewith and in contact with the roll whereby the tension of the belt is increased by the tightener proportionately to the increase in volume of said roll.

20. The combination with a reel shaft to form the fencing into a roll, and a belt leading from a driving pulley to a pulley on the reel shaft, of a tightener for the belt, and lever mechanism engaging therewith and movable by contact with the surface of the roll, whereby the efficiency of the belt on the pulleys is proportioned to the diameter of the roll to maintain constant the tension of the fencing leading thereto from the machine.

MICHAEL GLEASON.

Witnesses:
CHARLES J. PARRISH,
ROBERT S. CARR.