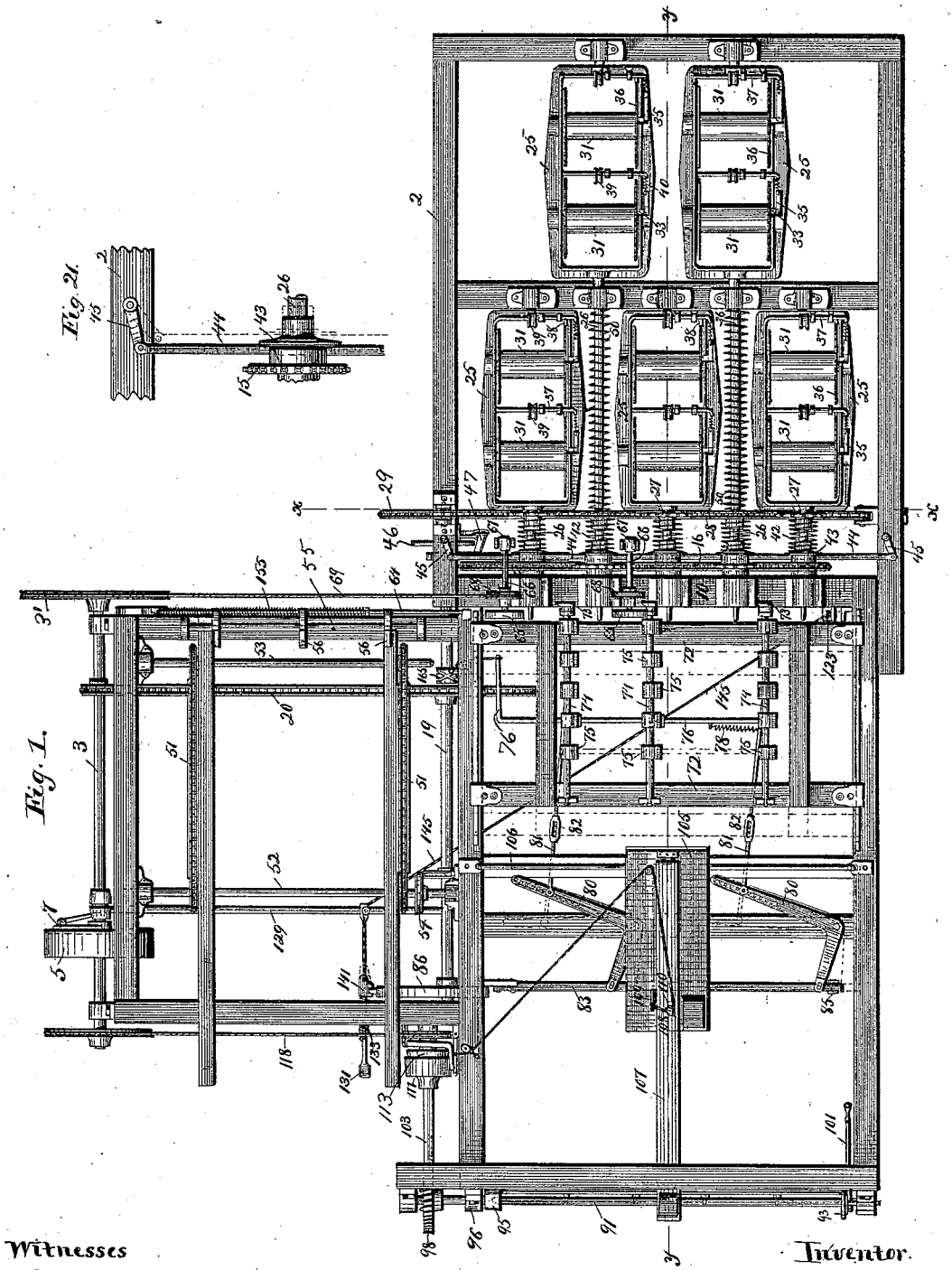
(No Model.) 5 Sheets—Sheet 1.

W. P. SHATTUCK.

AUTOMATIC FENCE MACHINE.

No. 418,759. Patented Jan. 7, 1890.



Witnesses
J. Jessen
A. M. Gaskell

Inventor.
William P. Shattuck
By Paul & Wherein Att'ys.

(No Model.) 5 Sheets—Sheet 2.

W. P. SHATTUCK.

AUTOMATIC FENCE MACHINE.

No. 418,759. Patented Jan. 7, 1890.

Fig. 2.

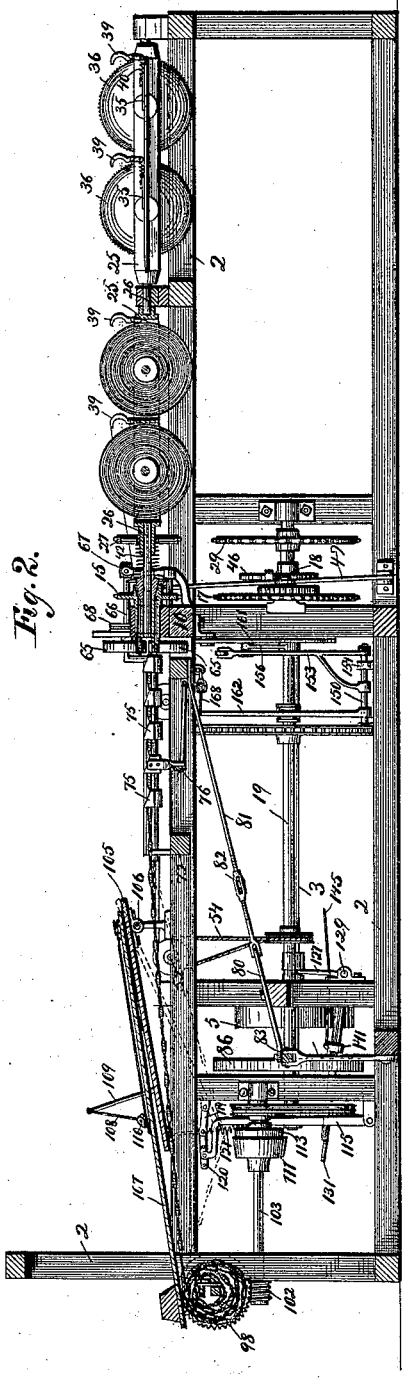


Fig. 14.

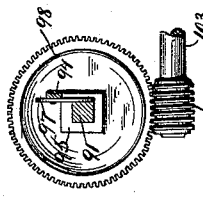


Fig. 13.

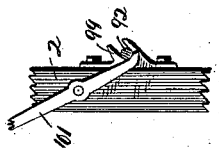


Fig. 12.

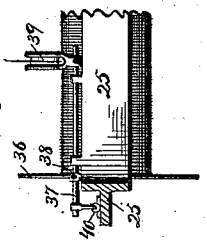


Fig. 11.

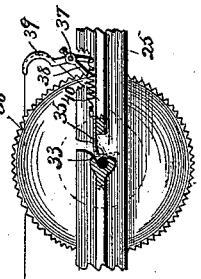
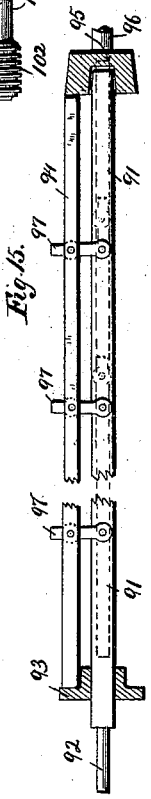


Fig. 15.



Witnesses.
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(No Model.) 5 Sheets—Sheet 3.

W. P. SHATTUCK.

AUTOMATIC FENCE MACHINE.

No. 418,759. Patented Jan. 7, 1890.

Fig. 3.

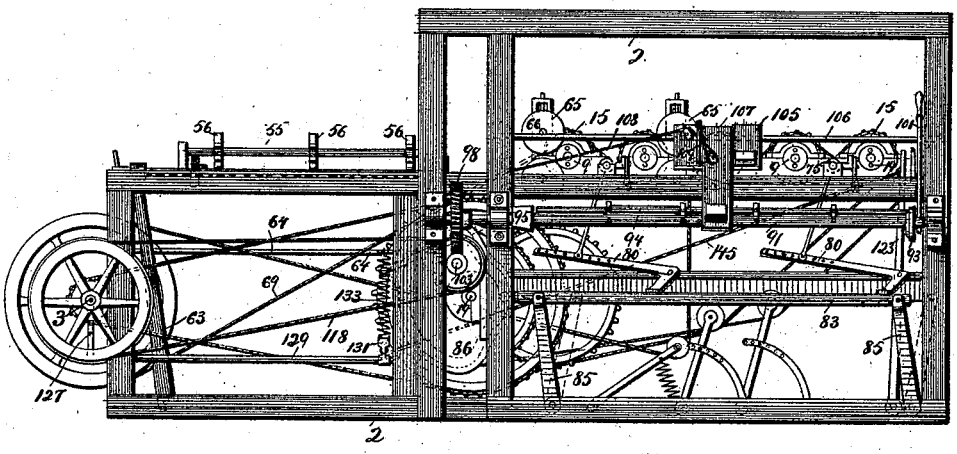


Fig. 4.

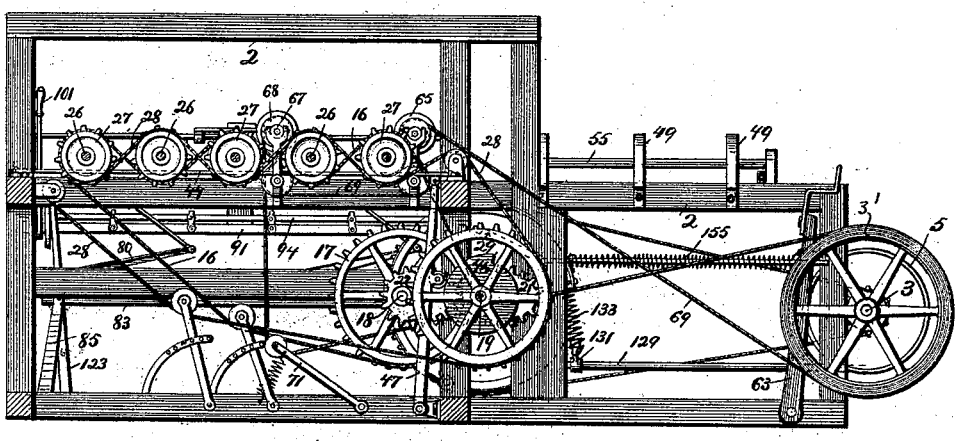
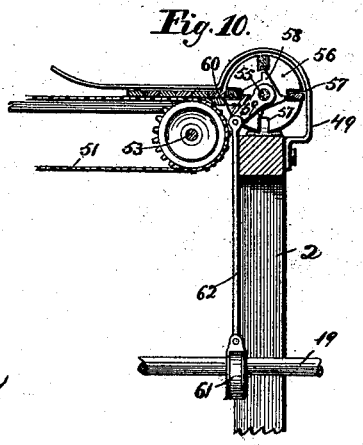


Fig. 10.



Witnesses.
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(No Model.) 5 Sheets—Sheet 4.

W. P. SHATTUCK.

AUTOMATIC FENCE MACHINE.

No. 418,759. Patented Jan. 7, 1890.

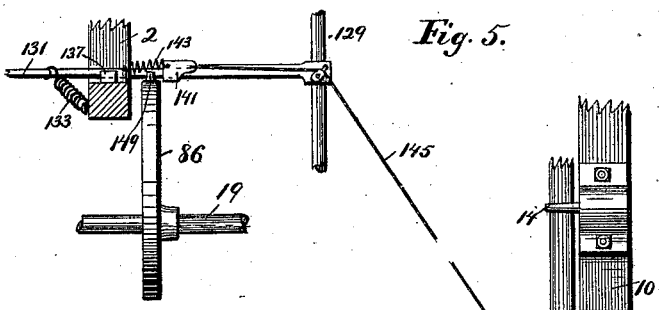


Fig. 5.

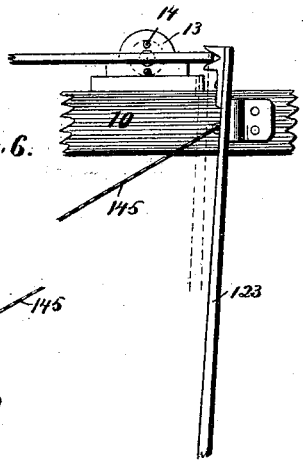


Fig. 6.

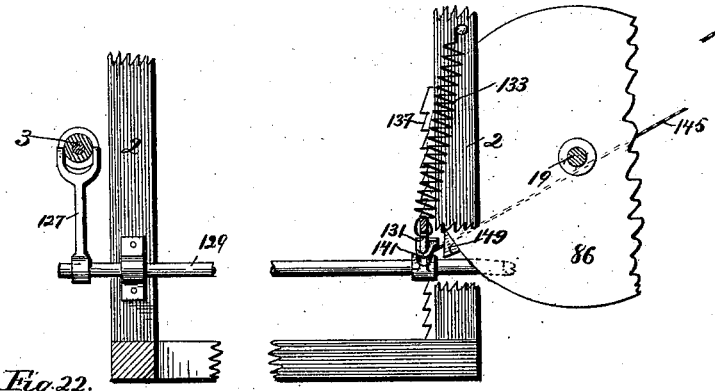


Fig. 22.

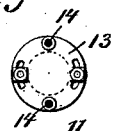


Fig. 23.

Fig. 7.

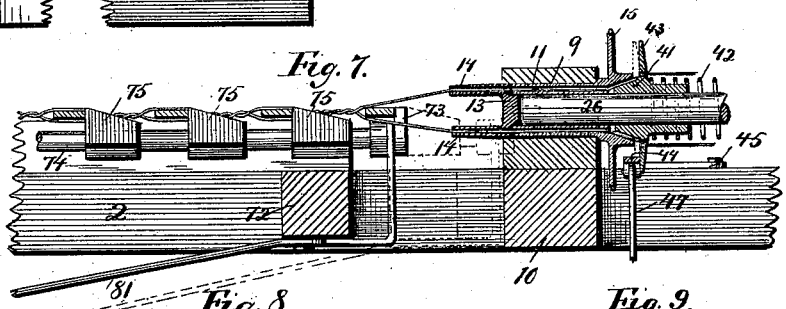


Fig. 8.

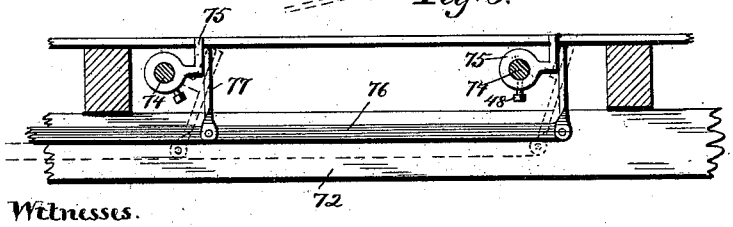
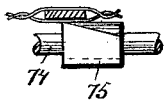


Fig. 9.



Witnesses.
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(No Model.) 5 Sheets—Sheet 5.

W. P. SHATTUCK.

AUTOMATIC FENCE MACHINE.

No. 418,759. Patented Jan. 7, 1890.

Fig. 16.

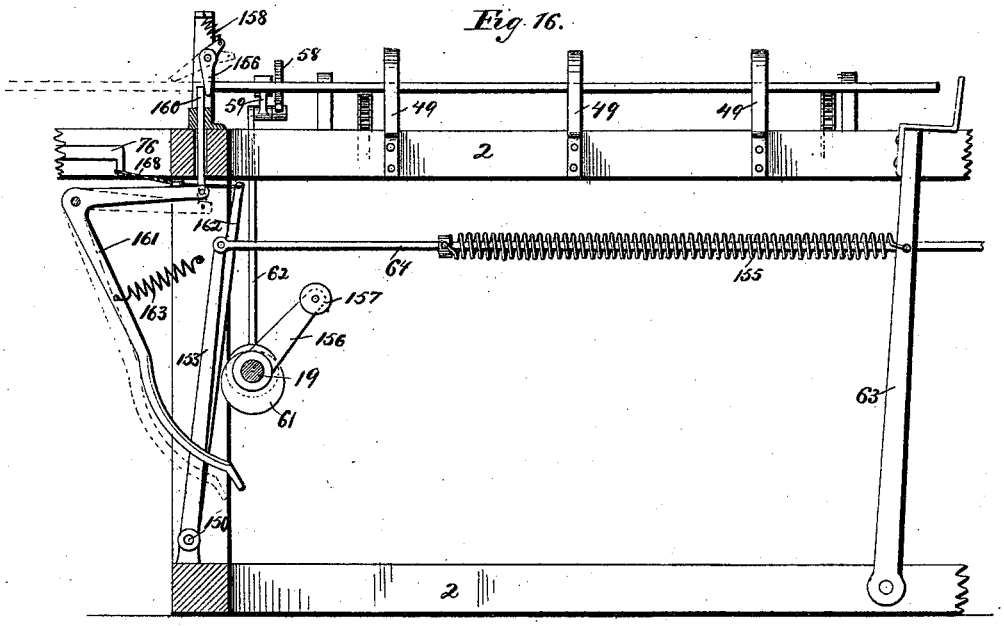


Fig. 17.

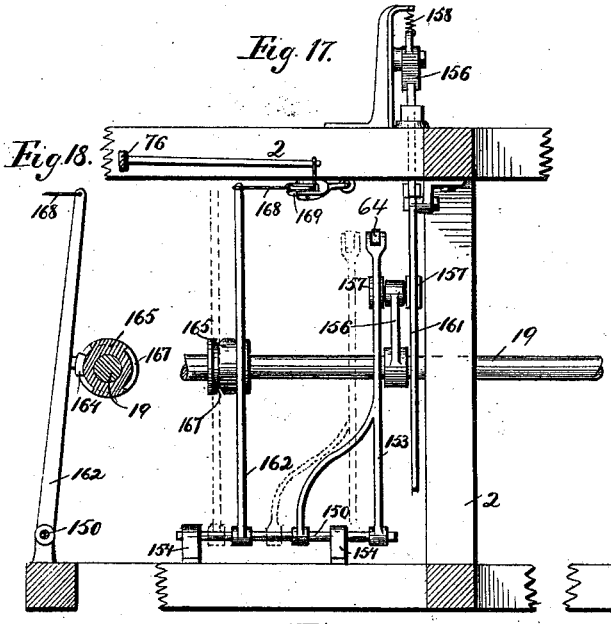


Fig. 18.

Fig. 19.

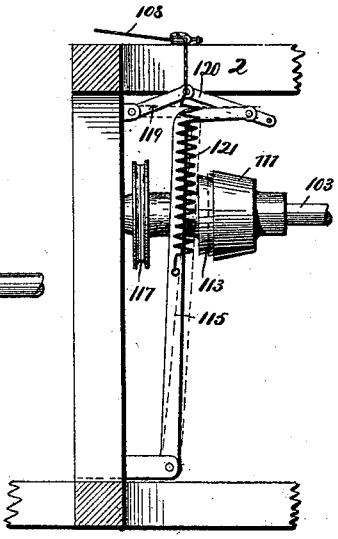
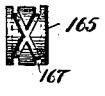


Fig. 20.



Witnesses.
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A. M. Gaskell.

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By Paul & Sherwin attys.

UNITED STATES PATENT OFFICE.

WILLIAM P. SHATTUCK, OF MINNEAPOLIS, MINNESOTA.

AUTOMATIC FENCE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 418,759, dated January 7, 1890.

Application filed March 30, 1889. Serial No. 305,417. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. SHATTUCK, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Automatic Fence-Machines, of which the following is a specification.

This invention relates to improvements in power-machines for the manufacture of wire-and-picket fence.

The objects I have in view are to provide improved mechanism for performing automatically all of the various steps in the manufacture of this kind of fence from the feeding of the pickets to the winding up of the completed fence. Other objects of the invention will appear from the following detailed description, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a longitudinal vertical section of the same on line *y y* of Fig. 1. Fig. 3 is a rear end elevation. Fig. 4 is a transverse vertical section on line *x x* of Fig. 1. Figs. 5 and 6 are details of the automatic stop. Fig. 7 is a detail section of the twister and the fence-advancing mechanism. Figs. 8 and 9 are details of the fence-advancing mechanism. Fig. 10 is a detail of the picket-feeding mechanism. Figs. 11 and 12 are details of the wire-spool. Figs. 13, 14, and 15 are details of the reel upon which the completed fence is wound. Figs. 16, 17, 18, and 20 are details of the picket-throwing mechanism. Fig. 19 is a detail of the clutch mechanism of the reel. Fig. 21 is a detail of the sliding wire-clamp. Figs. 22 and 23 are details of the twister-heads.

In the drawings, 2 represents a suitable frame-work upon which the mechanism of the machine is supported.

3 represents a counter-shaft, which is provided with a driving-pulley 5, mounted loosely thereon and connected therewith by a suitable friction-clutch 7. From the shaft 3 power is applied to the various parts of the machine, as hereinafter described.

I provide twisters which are independent of the spool-frames and are short and of little weight, so that they may be run easily and at an alternately fast and slow rate of speed. As the twisters slow up, the pickets are fed between the wires, and they are then rotated more rapidly and the wires are twisted about the pickets.

The twisters consist of short hollow sleeves 9, as shown in Fig. 2, which are mounted in bearings upon a suitable cross-bar 10. Each of these sleeves is provided with openings 11, which extend longitudinally through it and are preferably of oblong shape in cross-section. Secured to the forward end of each sleeve 9 is a plate 13, provided with projecting fingers 14, having openings extending longitudinally through them for the passage of the wire. The plates 13 are adjustable upon the ends of the twisters 9, and the oblong shape of the openings 11 in the twisters, through which the wires pass, permits the plate to be adjusted for the purpose of bringing all of the fingers into similar position and still allow the passage of the wire through the openings 11 and the openings in the fingers 14. Upon each of the twisters and arranged, preferably, at its rear end is a sprocket-wheel 15. A driving-chain 16 passes from the sprocket-wheels upon the twisters and around a sprocket-driving gear 17, that is mounted upon a shaft 18. A main shaft 19 is mounted in bearings upon the frame of the machine, and is driven by the chain 20 from the counter-shaft 3. The shaft 19 is provided with an eccentrically-mounted gear-wheel 21 and the shaft 18 with a similar gear-wheel 22, that is loose on said shaft. The gear-wheels 21 and 22 are in engagement with each other, and thereby the wheel 17, which is bolted to eccentric gear 22, is given a variable rotary movement, which is dependent upon the position of the eccentric gears. The twisters will by this mechanism be driven with an alternating slow and rapid movement. They will be rotated rapidly while they are twisting the wires, and will then be slowed up while the pickets are being inserted.

Spool-frames 25 are mounted in bearings upon the frame of the machine in the rear of the twister-heads, and are provided with shafts 26, which extend, preferably, into the hollow twister-heads. The shafts project from the front and rear ends of the spool-

frames and form the axes thereof, but preferably do not extend through said frames. The space for the spools is the full width of the frames, and large spools of wire may be carried by these frames. Each spool-frame is provided with a sprocket-wheel 27, and a chain 28 passes around all of these wheels and around a sprocket-wheel 29 upon the shaft 19. For the purpose of economizing space in the frame of the machine, I prefer to arrange a part of the spool-frames in the rear of the others, providing them with longer shafts 26, which pass between the forward spool-frames, as shown in Fig. 1. The sprocket-wheels 27 are preferably arranged at the forward ends of the spool-frames, and are provided with openings for the passage of the wires.

Each spool-frame is provided with two spools 31, arranged, preferably, one behind the other, as shown in Figs. 1 and 2. In order to permit the spools to be readily inserted or removed from the spool-frames, each frame is provided with a slotted bearing 33, which receives the journal upon one end of the spool. A spring 35, arranged in the rear of the bearing, rests against the journal upon the spool and holds it in position, as shown in Fig. 11. When a spool of wire is to be placed in the spool-frame, the end of the journal is brought upon the spring 35, and the weight of the spool of wire depresses the spring and permits the journal to drop into the slotted bearing. The spring then returns to its normal position, locking the spool in place. As the wires are not drawn from the spool continuously, it is desirable that the spools be permitted to turn freely while the wire is being drawn forward, and that they stop as soon as the pull upon the wire ceases and remain at rest while the wire is being twisted. For this purpose each of the spool-frames is provided with a dog, which holds the spool stationary while the wire is at rest, and which releases the spool as soon as there is sufficient pull upon the wire. A rod 37, mounted upon the spool-frame, is provided with a dog 38, that engages the notched disk 36. A spring 40 tends to hold the dog in engagement with a notched disk, and thereby to hold the spool stationary. A frame 39 is secured upon the rod 37, and the wire from the spool passes over the frame 39. As soon, therefore, as there is sufficient pull upon the wire to overcome the spring 40 the frame 39 is moved, the dog 38 is disengaged from the spool, and the spool is free to turn. As soon as the pull upon the wire ceases the dog is again brought into engagement with the notched disk and the spool is held stationary.

It will be seen that the large spool-frames carrying the wire are driven at a uniform rate of speed and that the short and light twisters are driven at a variable speed. The twisters are arranged in front of the spool-frames and the axes of the twisters and the axes of the spool-frames are in line with each other. I also prefer to provide mechanism for clamping and holding the wires firmly while they are being twisted, which causes them to be twisted much more tightly about the pickets. For this purpose the rear end of the twister is of a hollow conical form, and the cone-shaped block 41 is arranged to fit into each of the twisters. The blocks 41 are mounted upon the shafts 26 and slide freely thereon. Springs 42 bear against the blocks 41 and tend to press them closely into the conical ends of the twisters. A flange 43 is provided upon each of the blocks 41, and a bar 44, extending across the machine, engages the flanges upon all of the blocks. The bar 44 is connected at each end to a link 45, pivoted to the frame of the machine. A lever 47 is connected to the bar 44, and a cam 46 on the shaft 19 strikes this lever and throws it forward and back, and thereby moves the bar 44 and with it the clamping-blocks. By this means, when the wire is to be drawn forward through the twisters, the blocks 41 are moved backward against the tension of the springs 42, and the wires can then pass freely through the twisters. The blocks 41 are moved forward by the springs 42, and the wires are rigidly clamped in the twisters while they are being twisted. Upon the shaft of each of the rear spool-frames I prefer to provide a loose coiled spring 50, as shown in Fig. 1. The wire from the spools passes between these springs and the shafts. These springs keep the wires in place while permitting the necessary freedom of movement thereof.

The pickets are placed upon the endless-chain carriers 51, which pass over sprocket-wheels upon the shafts 52 and 53. The shaft 53 is driven by means of a belt 54 from the shaft 19. A shaft 55 is arranged upon the frame of the machine, and is provided with a series of plates 56. These plates are provided with notches 57, each of suitable size, to receive a single picket. I prefer to provide each plate with four notches. The shaft 55 is also provided with a ratchet-wheel 58, the teeth of the ratchet-wheel equaling in number the notches in the plates 56. A swinging pawl-carrier 59 is arranged upon the shaft 58, and is provided with a pawl 60, that engages the ratchet-wheel 58. An eccentric 61 is secured upon the shaft 19, and is provided with a rod 62, that connects it with the pawl-carrier 59. The shaft 51 is arranged substantially upon a line with the tops of the carriers 51, and when the shaft 55 is at rest one of the notches in each plate 56 is opposite the top of the carriers. The foremost picket as it is moved along by the carriers enters the notches in the plates 56. The shaft 55 has a step-by-step movement, and the pickets are carried over one at a time to the other side of the shaft, and they are then fed into the machine. Guides 49 extend over the plates 56 and partially over the carriers 51 and keep the pickets in place.

The picket-thrower consists of a lever 63, having a rod 64 operated by a cam upon the shaft 19. This lever strikes the end of the picket that is in position for being fed into the machine, and moves it forward until it is grasped by the feed-rolls and moved between the fingers upon the twister-heads, as hereinafter described.

The feed-rolls 65 are mounted upon short shafts 66, having, preferably, their rear ends arranged in pivoted journal-boxes 67. Each of the shafts 66 is provided with a belt-pulley 68, and a driving-belt 69 is arranged to pass over and around said pulley 68, and thereby the feed-rolls are drawn together. A suitable tightener 71 is preferably provided for the belt 69.

For the purpose of advancing the fence after it is made, and also drawing and holding each picket while the wire is being twisted around it, I provide a sliding frame 72, that is arranged in front of the twisters, and is provided with arms 73, which project upward between the ends of the twisters and come in the rear of each picket as it is fed into the machine. The frame 72 is also provided with a series of rods 74, which are free to turn in bearings thereon. Each of the rods 74 has secured to it a series of dogs 75, having beveled or inclined upper surfaces. These dogs are preferably secured adjustably to the rods by set-screws 48. (See Fig. 8.) A rod 76 extends beneath the rods 74, and is provided with arms 77, that are connected to one of the dogs upon each of the arms 74. A spring 78 is connected with the rod 76, and tends to hold the arm 77 in an upright position, and thereby keep the dogs 75 elevated. The frame 72 is reciprocated toward and from the twisters. As it moves toward the twisters the inclined surfaces of the dogs, passing under the pickets, cause the dogs to be depressed by turning the rods 74 upon their axes. The spring then elevates the dogs, and with the return movement of the frame they engage the pickets and draw the fence forward and pull the wires through the twisters a sufficient distance for the next twist to be made. Arranged upon the frame of the machine, in front of the sliding frame 72, are the bell-crank levers 80. Rods 81, preferably provided with the adjusting turn-buckles 82, are connected to the sliding frame 72, and are adjustably connected to the bell-crank levers 80. The opposite ends of the levers 80 are connected to the cross-bar 83, which is supported upon the swinging standards 85. The bar 83 engages the grooved cam 86 upon the shaft 19. By this means the reciprocating frame is moved to and from the twisters, and the completed fence is moved away from the twisters. By changing the connection between the bell-crank levers 80 and adjusting the dogs on the sliding frame to correspond the spacing of the pickets may be varied.

It will be noticed that the frame is provided with a series of dogs, and that these dogs are arranged to engage several of the pickets at each movement of the frame. This causes the frame to engage the fence more firmly, so that the fence is advanced evenly from the twisters toward the reel, and does not crush the pickets into the side of the opening of the wire.

The fence is wound upon a reel that is arranged at the end of the machine. This reel consists of a shaft 91, that is provided at one end with a collar 93, and enters at the other a cup-shaped block 95 on a journal 96. A series of short arms 97 are hinged upon the shaft 91, and they are each pivoted at a short distance from their ends to a bar 94, that extends lengthwise of the shaft. This bar may be swung out from the shaft to the position shown in Figs. 3 and 15, or it may be turned down to the position indicated by dotted lines in Fig. 15. When the bar is in the position shown by full lines in Fig. 15, one end strikes against the collar 93 and the other against the block 95, and the bar cannot move out of this position. The journal 96 is secured in a bearing upon the frame 2, and is provided with the worm-wheel 98, Fig. 14. The other end of the shaft 91 is provided with a journal 92, that is adapted to engage an open bearing 99 upon the frame 2. A lever 101 is pivoted upon the frame 2 in position to engage the journal 92 and lift it out of its bearing. When the machine is to be used, one end of the shaft 91 is inserted into the block 95 and the journal 92 is dropped into the open bearing 99, the bar 94 being turned out from the shaft to the position shown by full lines in Fig. 15. One of the first pickets in the fence is caught over the projecting ends of the arms 97, and the fence is then wound upon the reel. After a sufficient amount of fence has been wound upon the reel the lever 101 is operated to pry the journal 99 out of its bearing. The other end of the reel-shaft drops out of the block 95 and the bundle is removed. The reel-shaft may now be drawn through the bundle, the arms 97 and the bar 94 turning down into the position shown by dotted lines in Fig. 15. The reel is turned by means of a worm 102, that engages the worm-wheel 98. This worm is upon a shaft 103, mounted in bearings upon the frame 2. The reel is arranged to be operated whenever it is necessary to wind up the fence and to remain stationary at all other times. For securing this operation, an automatic mechanism is provided, which is governed by the position of the fence. A friction-clutch or equivalent device is provided upon the shaft which operates the reel, and this device is controlled by this automatic mechanism. When the fence is in a straight line from the advancing mechanism to the reel, the mechanism for turning the reel will be out of operation. When the fence is out

of a straight line between these points, this mechanism will be operated and the fence will be wound up.

A plate or board 105 is mounted upon a rod or pivot 106 above the frame of the machine, and the free end of this board lies upon the fence at a point between the feed mechanism and the reel. A bar 107 is hinged to this plate and its opposite end rests upon the outside of the fence upon the reel. An arm 109 is secured upon the plate 105. A cord 103 passes from the arm 109 around sheaves 110 upon the bar 107 and to a friction-clutch upon the reel-operating shaft. The shaft 103 has secured to it one member 111 of a suitable friction-clutch. The other member 113 of the clutch slides upon the shaft, being moved by a lever 115. A pulley 117 is connected with the movable member of the clutch and is driven by a belt from the counter-shaft 3. An arm 119 is pivoted to the frame of the machine, and an arm 120 is pivoted to this arm and to the lever 115. A spring 121 tends to draw these arms downward into line with each other, and thereby to throw the clutch into engagement and start the reel-winding mechanism. When the fence-feeding mechanism has drawn along a portion of the fence, so that the fence is slack or hangs down between the feeding mechanism and the reel, the plate 105 will drop down, resting on the fence and releasing the arms 119 and 120 and permitting the spring to move the clutch. The reel will now be turned until the fence is fully wound up. The plate 105 will be moved back to its original position and through the cord 108 the clutch disengaged. The reel will become stationary and will remain so until more fence is made and requires rewinding. The operations will be repeated as often as is necessary as long as the machine is running.

A picket-receiver consisting of a lever 123, provided with a V-shaped receiving-block, is arranged upon the machine in such position that the end of the picket strikes the V-shaped block upon the lever. The lever is thereby moved backward and the picket is stopped. The V shape of the picket-receiver causes it to gradually stop the picket without bruising its end. This lever is connected with the driving mechanism of the machine, so that any failure of the picket to move the lever causes the machine to be stopped. The driving-shaft of the machine is provided with a friction-clutch, which is operated by a shaft 127. A rod 129 is connected to the shaft 127 and a treadle 131 is connected to the rod 129. A spring 133 is connected to the treadle 131 and tends to hold the treadle in an elevated position, and through the rod and shaft to throw the clutch upon the driving-shaft out of engagement with the driving-pulley, thereby stopping the machine. A notched bar 137 is arranged to be engaged by the treadle and to hold it in a depressed position against the tension of the spring and with the clutch in engagement with the driving-pulley. A sliding block 141 is arranged upon the rod 131 and is held in position by a spring 143. A cord 145 connects the picket-receiver with the sliding block 141. A cam-wheel 86 is arranged upon the shaft 19 directly opposite the block 141. This wheel is provided with an inclined lug 149, which is adapted to engage the block 141, and thereby to throw the treadle out of engagement with the notched bar, thereby releasing the treadle and clutch and permitting the clutch to be disengaged from the driving-pulley and the machine stopped. The mechanism is so timed that this projection on the wheel reaches the sliding block just after the picket fed into the machine should reach the picket-receiver. If, therefore, the picket strikes the receiver the sliding block will be moved and the projection on the wheel will pass the block without engaging it and the operation of the machine, will continue. If, however, the picket fails to reach its proper position in the machine, the picket-receiver will not be moved, the sliding block will retain its position, and the projection on the wheel will strike the sliding block and cause the machine to stop.

I prefer to arrange the picket-thrower so that it cannot move the picket until a predetermined time and will then give it a quick throw. For this purpose the rod 64 is connected to a lever 153, and a spring 155 is connected to the rod 64 and to the picket-thrower 63.

An arm 156 is arranged upon the shaft 19 and is provided with the friction-rolls 157, one of which is arranged to strike the lever 153. The lever 153 is secured upon a short shaft 150, which is mounted in bearings 154. The shaft is free to turn in these bearings and to slide longitudinally therein. Arranged above the point where the forward end of the picket comes when it is in position to be thrown into the feed-rolls is a pivoted stop 156, provided with a spring 158, which tends to hold it in a vertical position, where it will be in front of the end of the picket. A sliding latch 160 is connected to a bell-crank lever 161, which is provided with a suitable spring 163. This spring tends to hold the latch in an elevated position and in engagement with the stop 156. One of the rolls 157 strikes the bell-crank lever 161, drawing the latch 160 away from the stop 166 and releasing the picket. After the picket is brought into position to be moved to the feed-rolls the arm 156 strikes the lever 153, draws the picket-thrower 63 against the end of the picket, and as the picket is held by the stop 156 the spring will be gradually distended, until at the proper time the picket-stop will be released and the spring will cause the picket to be suddenly shot forward to the feed-rolls.

In some instances I prefer to omit every other picket, thus forming a fence with wider spaces between the pickets. In this case it is desirable to form a solid twist from one picket

to the other and across the spaces of the omitted pickets. For this purpose I provide means which will cause the picket-thrower to skip every other time, thus throwing in only half as many pickets.

A collar 165 is arranged upon the shaft 19, and is provided with a double-worm groove 167. A lever 162 is secured upon the shaft 150, and is provided with a traveler 164, which engages the groove 167. This will cause the lever 162, the shaft 150, and the lever 153 to travel back and forth from the position shown in full lines in Fig. 17 to the position shown in dotted lines in the same figure. When the lever 153 is in the position shown in dotted lines, the arm 156 will not strike the lever 153 and the picket-thrower will not be operated. When, therefore, it is desired to form this kind of fence, the traveler 164 is brought into engagement with the groove 167, and then every other time the arm 156 will miss the lever 153, and the picket-thrower will fail to operate. A cord 168 may be connected to the lever 162 and pass around pulleys 169 and 170 and be connected to the rod 76 on the sliding frame 72. This will cause the rod 76 to be drawn against the tension of its spring each time the picket-thrower fails to operate, thereby depressing the dogs on the sliding frame and preventing them from giving the fence a further movement. A solid twist in the wire will then be formed across the space which would have been occupied by the omitted picket.

If the mechanism for alternating the operation of the picket-thrower is used without using the device for depressing the dogs, the twist between the pickets will not be solid, but there will be a portion of the wire which will not be twisted. This will be the portion that would have inclosed a picket had the picket-thrower operated.

By making the twister-heads of short tubes independent of the spool frames I avoid long and heavy twisters, which cannot successfully be given a variable speed. The spool-frames, which are driven at a uniform speed, are heavy and large and carry considerable weight; but the twisters are short and light, and they can therefore be driven at an alternately fast and slow speed without shocking or jarring the machine. It will be understood that these light independent tubular twisters may be driven at a variable speed and at the same time be given a high velocity, so that a great many twists per minute may be given to the wire, whereas a heavy twister, or one that is connected to the spool-frame by friction of contact or otherwise, if driven at a high velocity, could not be given a variable speed, as its inertia would be so great as to cause it after it had once obtained the maximum velocity to be maintained at that velocity, or very nearly so.

The operation of the machine will be understood from the foregoing detailed description. A continuous twist is formed in the wires and the fence is very rapidly made. The use of the independent light twisters permits a very rapid alternating movement to be given to the twisters.

The details of the mechanism for operating the various parts of the machine may be varied and equivalent devices substituted for those shown without departing from my invention.

I make no claim to the means shown and described for clamping the wire between the spool-frames and twisters while it is being twisted.

I claim as my invention—

1. In a machine of the class described, the combination of a series of spool-frames, a series of independent tubular twisters arranged upon the axes of the spool-frames and mounted in bearings in front of said spool-frames, mechanism rotating the spool-frames at a uniform speed, and mechanism rotating the twisters at a variable speed.

2. In a machine of the class described, the combination of a series of spool-frames, a series of independent tubular twisters arranged upon the axes of the spool-frames and mounted in bearings in front of said spool-frames, mechanism rotating the spool-frames at a uniform speed, and mechanism rotating the twisters at a higher speed, with periodical intermissions for the insertion of the pickets.

3. In a machine of the class described, the combination of a series of spool-frames, a series of twisters consisting of short sleeves arranged upon the axes of the spool-frames at their forward ends, with means for rotating the spool-frames at a uniform speed, and means for rotating the twisters at a higher speed, with periodical intermissions for the insertion of the pickets.

4. In a machine of the class described, the combination, with a rotating twister, of an independent spool-frame and a clamp located between said spool-frame and twister and arranged to clamp the wire while it is being twisted.

5. The combination, in a machine of the class described, with tubular twisters provided with conical openings in their rear ends, of spool-frame shafts extending into said tubular twisters, the sliding conical blocks arranged upon said shafts, springs upon said shafts engaging said blocks, a movable bar engaging said blocks, and means for moving said bar and thereby withdrawing said blocks from engagement with said twisters, substantially as described.

6. The combination, with a twister having openings which are oblong in cross-section, of a plate adjustably secured upon the end of said twister and provided with twister-fingers having openings extending through them and registering with the openings in the twister, substantially as described.

7. The combination of the spool-frame provided with the slotted bearing 33 and the spring 35, arranged in the rear of said bear-

ing and extending across the slot entering said bearing, and the spool 31, provided with a journal fitting in said bearings and held therein by said spring, substantially as described.

8. The combination, with the twisters provided with sprockets 15 and the independent spool-frames provided with sprockets 27, of the shaft 19, provided with the sprocket 29, the chain 28, extending from the sprocket 29 around the sprockets on the spool-frames, the shaft 18, the eccentric gear-wheels 21 and 22, arranged upon said shafts 19 and 18, the sprocket 17, connected to the gear-wheel 22, and the driving-chain extending from said sprocket-wheel around the sprockets on said twisters, substantially as described.

9. The combination, with the twisters, of the reciprocating frame arranged in front of said twisters, the rods arranged upon said frame, the series of dogs secured upon said rods and arranged to be depressed by turning said rods upon their axes, and a spring arranged to hold said dogs in an elevated position, substantially as described.

10. The combination, with the twisters, of a sliding frame provided with a series of spring-controlled rods, and a series of inclined dogs secured upon said rods, substantially as described.

11. The combination, in a machine of the class described, with the twisters, of a fence-advancing mechanism comprising a sliding frame arranged to move toward and from the twisters, and a series of dogs engaging two or more of the pickets that have been twisted into the fence and arranged to pass under the pickets as the frame is moved toward the twisters and capable of independent adjustment in the direction of the movement of said frame.

12. The combination, with the twisters, of a reciprocating frame arranged in front of said twisters, rods arranged upon said frame, a series of dogs secured adjustably upon said rods and arranged to be depressed by turning said rods upon their axes, and a spring arranged to hold said dogs in an elevated position.

13. The combination, with the twisters, of a sliding frame arranged in front of said twisters and provided with a series of yielding dogs engaging two or more of the pickets that have been twisted into the fence, independently adjustable in the direction of the movement of said frame, and adjustable mechanism for reciprocating said frame.

14. In a fence-machine, a reciprocating fence-advancing mechanism provided with a series of yielding dogs engaging two or more pickets that have been twisted into the fence and independently adjustable in the direction of the line of reciprocation of said mechanism.

15. The combination, in a machine of the class described, with the twisters, the fence-advancing mechanism, and the reel, of a clutch or similar device arranged to transmit power to said reel, and a follower arranged to bear against the fence between the twisters and the reel and automatically controlling said clutch.

16. The combination, in a machine of the class described, with the twisters, the fence-advancing mechanism, and the reel, of a friction-clutch arranged to transmit power to said reel, a lever controlling said clutch, and a plate or follower arranged to rest upon the fence between the twisters and the reel and connected with the lever controlling said clutch, substantially as described.

17. The combination, with the reel, of the hinged plate 105, arranged to rest upon the fence between the twisters and the reel, the bar 107, hinged to said plate and resting upon the top of the reel, the clutch arranged to transmit power to said reel, and the cord secured to said plate, passing over a pulley on the bar 107 and connected with said clutch, substantially as described.

18. The combination, with the reel-journal 96 and the square cup-shaped block 95, of the shaft 91, the arms 97, pivoted to said shaft, and the bar 94, secured to said arms, substantially as described.

19. The combination, with the reel-shaft, of the arms 97, pivoted thereto, and the bar 94, secured to said arms inside of the ends of the arms, whereby the ends of the arms project beyond the bar when turned out from the shaft, and means for holding said arms in position when the reel is in use, substantially as described.

20. The combination, with the journal 96, provided with the cup-shaped block 95, of the removable shaft 91, fitting in said block and provided at its opposite end with the journal 92, and with the collar 93, the arms 97, pivoted to said shaft, and the bar 94, pivoted to said arms, substantially as described.

21. The combination, in a machine of the class described, with the twisters and picket-feeding mechanism, of a stop mechanism for the machine, and a picket-receiver located in the path of the picket as it moved in front of the twister and arranged to throw said stop mechanism out of operative position each time a picket is brought against said picket-receiver.

22. The combination, in a machine of the class described, with the twisters and picket-feeding mechanism, and with the driving mechanism of the machine, of a picket-receiver located in the path of the picket as it is moved across the machine in front of the twister arranged to be encountered by the picket when it reaches its proper position in the machine, and a stop mechanism controlled by said picket-receiver.

23. The combination, with the picket-stop arranged to hold the picket and to release it at a predetermined time, of picket-feeding mechanism arranged to engage said picket and to feed it in front of the twisters.

24. The combination, with the picket-stop arranged to hold the picket and to release it at a predetermined time, of a spring-actuated picket-thrower arranged to engage said picket before it is released by said stop.

25. The combination, with the picket-carrier and the picket-thrower, of a revolving shaft provided with a series of plates, each having notches or openings arranged to receive a single picket and move it into position to be operated upon by said picket-thrower, substantially as described.

26. In a fence-machine, and in combination with the picket-thrower, a lever connected with said picket-thrower, and operating mechanism alternately engaging and missing said lever, for the purpose set forth.

27. The combination, with the picket-thrower, of the operating-lever, the revolving arm arranged to engage said lever, the rod connecting said lever and said picket-thrower, and the grooved collar engaging said lever and arranged to alternately move said lever into position where it will not be engaged by said arm, substantially as described.

28. The combination, with the picket-thrower and the fence-advancing mechanism consisting of a sliding frame provided with a series of pawls, of the grooved collar and mechanism connected therewith and arranged to alternately depress said pawls and disconnect said picket-thrower and its operating mechanism, substantially as described.

29. The combination, with the twisters, of the laterally-oscillating dogs arranged in front of said twisters and provided with springs arranged to hold them in an elevated position, substantially as described.

In testimony whereof I have hereunto set my hand this 26th day of March, 1889.

WILLIAM P. SHATTUCK.

In presence of—

A. C. PAUL,

A. M. GASKILL.