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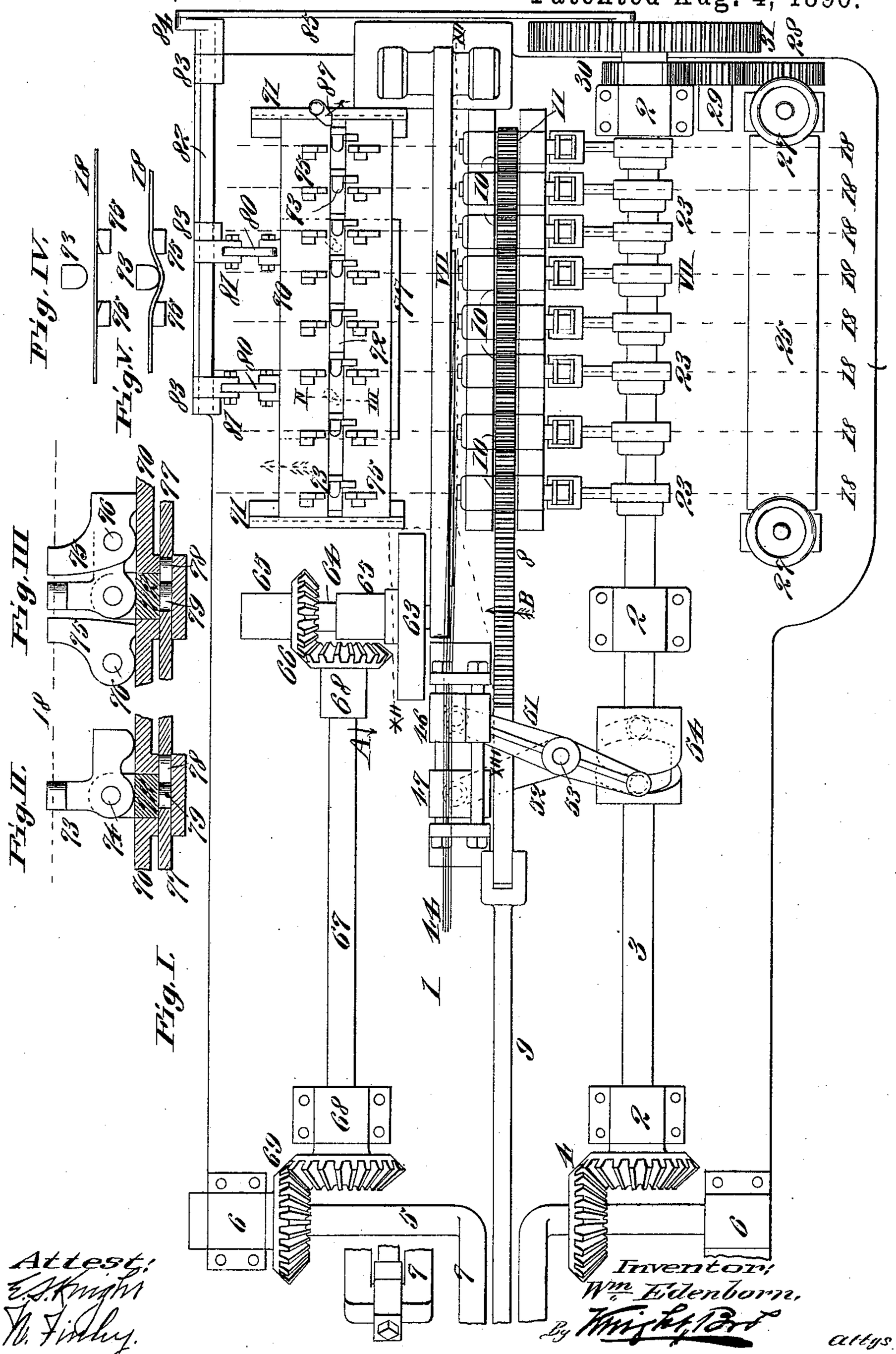
W. EDENBORN.

MACHINE FOR MAKING WIRE FENCING.

No. 565,380. Patented Aug. 4, 1896.



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MACHINE FOR MAKING WIRE FENCING.

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Fig. VI.

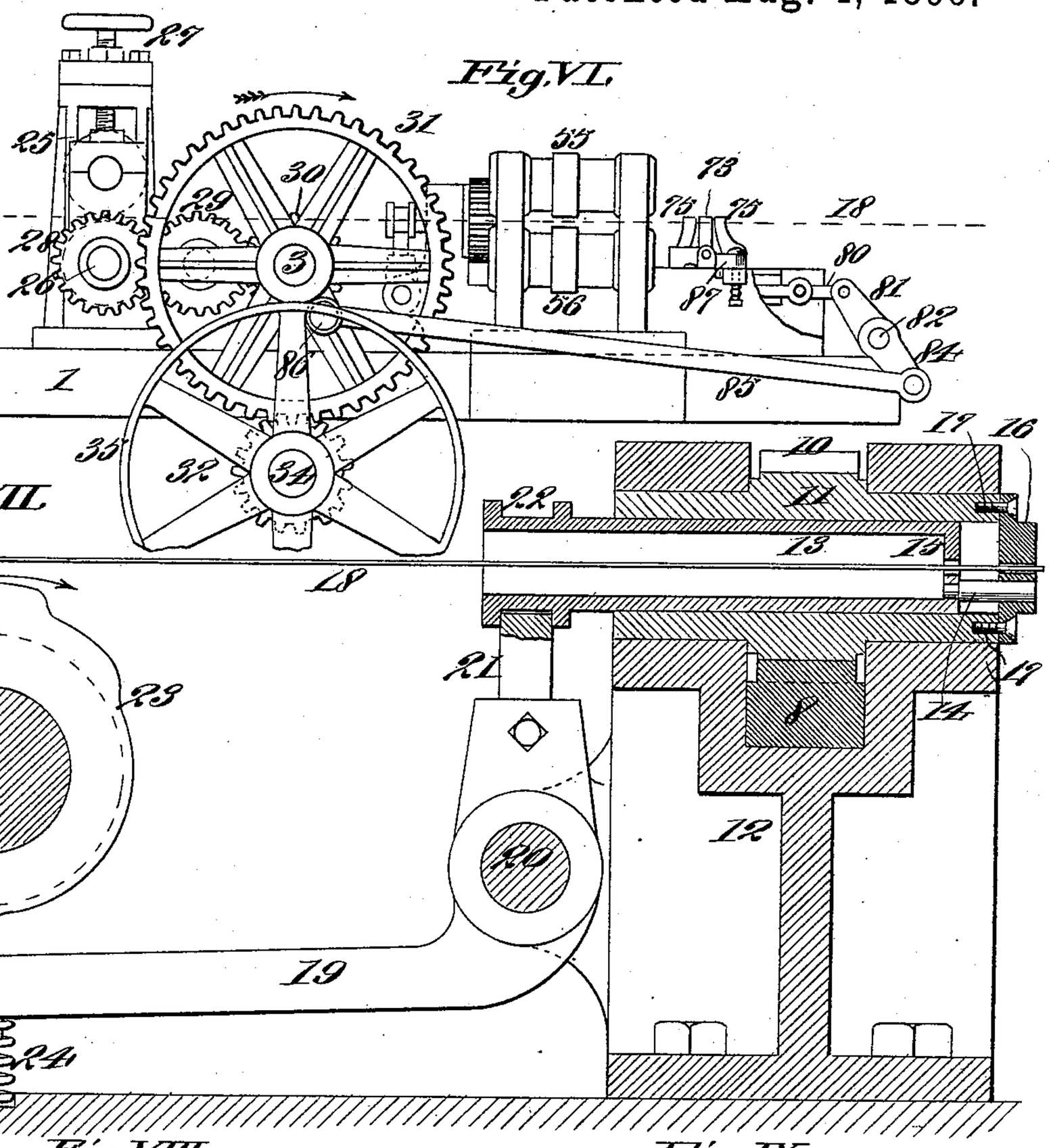

Fig. VII.

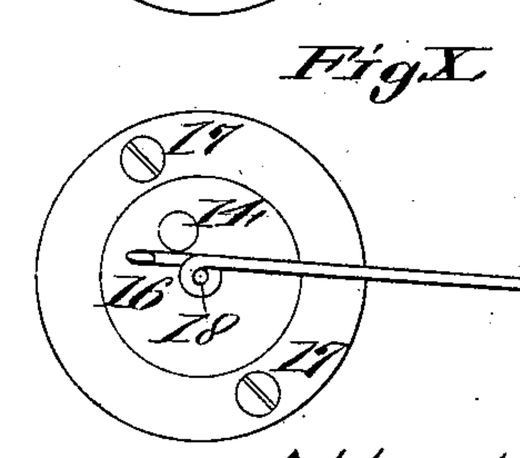

Fig. VIII.

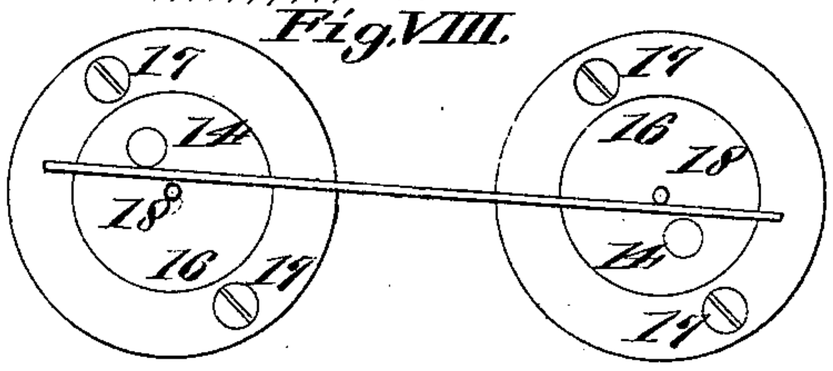

Fig. IX.

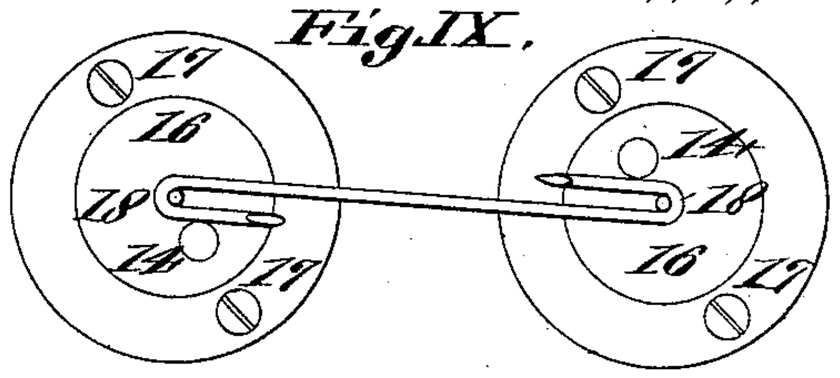

Fig. X.

Fig. XI.

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MACHINE FOR MAKING WIRE FENCING.

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FIG. XII.

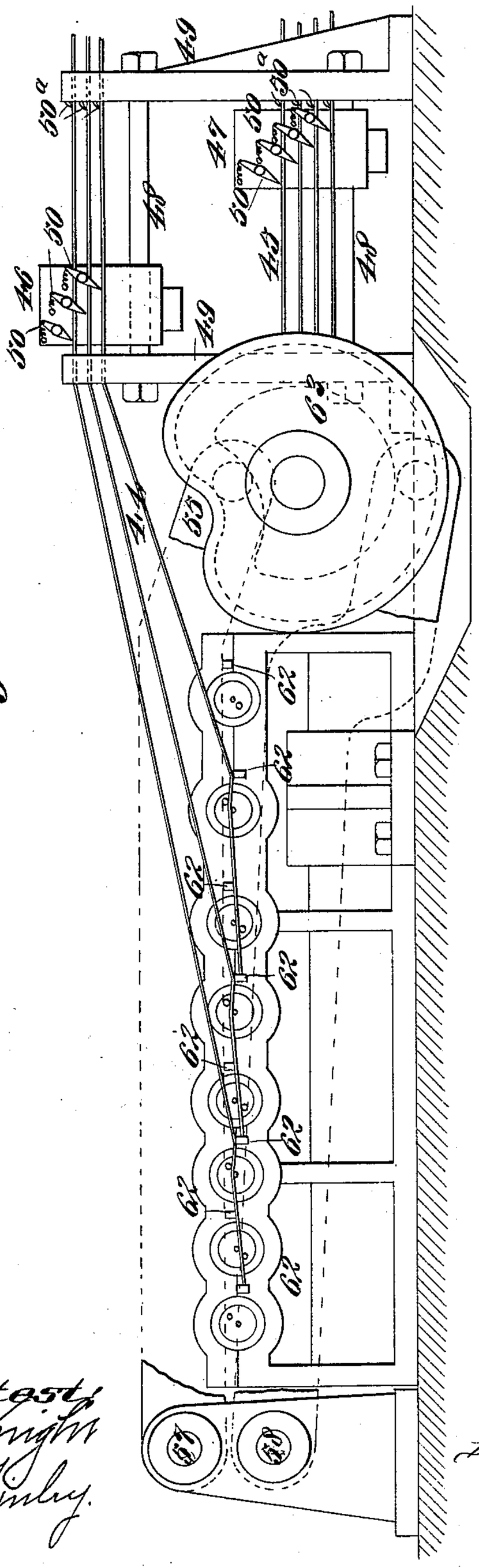
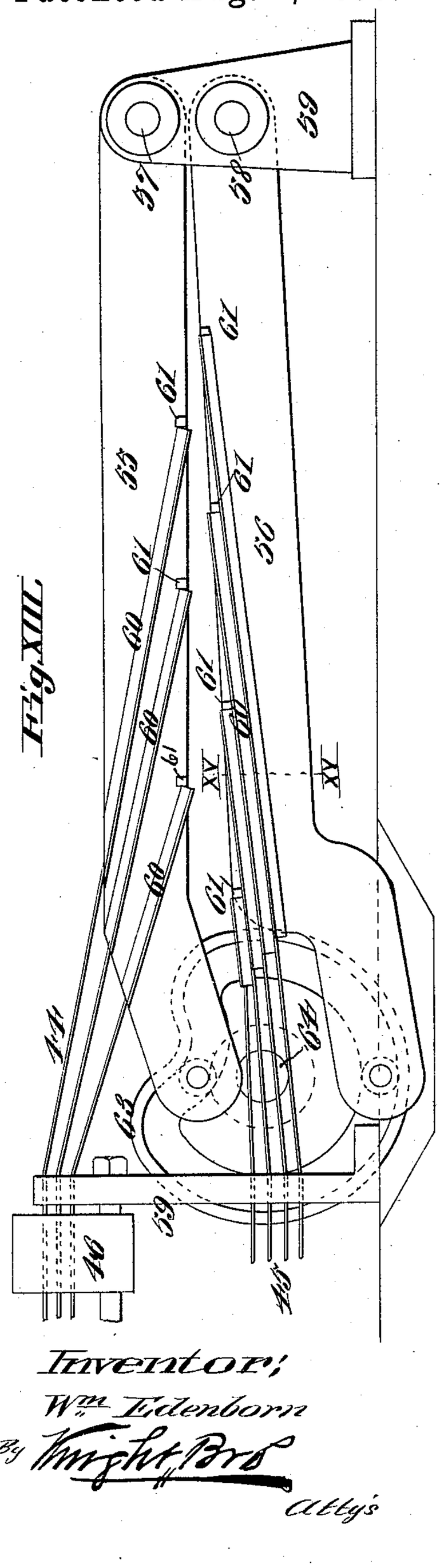


FIG. XIII.



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W. EDENBORN.

MACHINE FOR MAKING WIRE FENCING.

No. 565,380. Patented Aug. 4, 1896.

Fig. XIV.

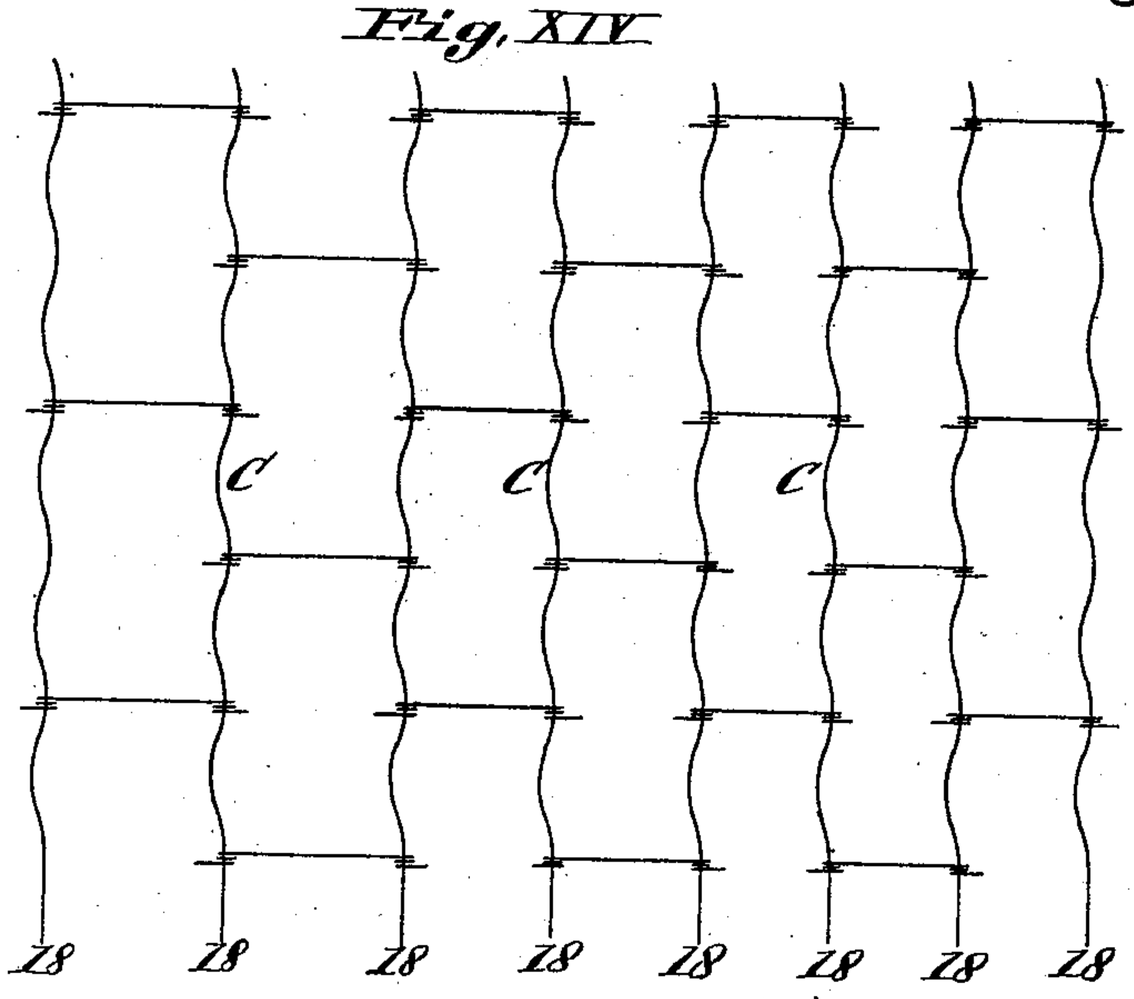


Fig. XV

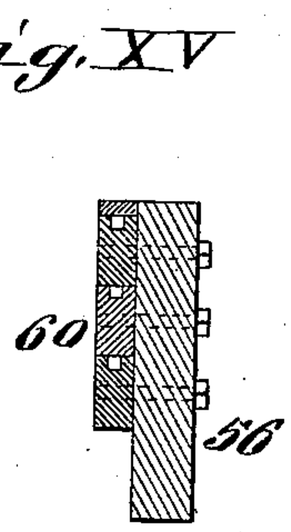


Fig. XVII

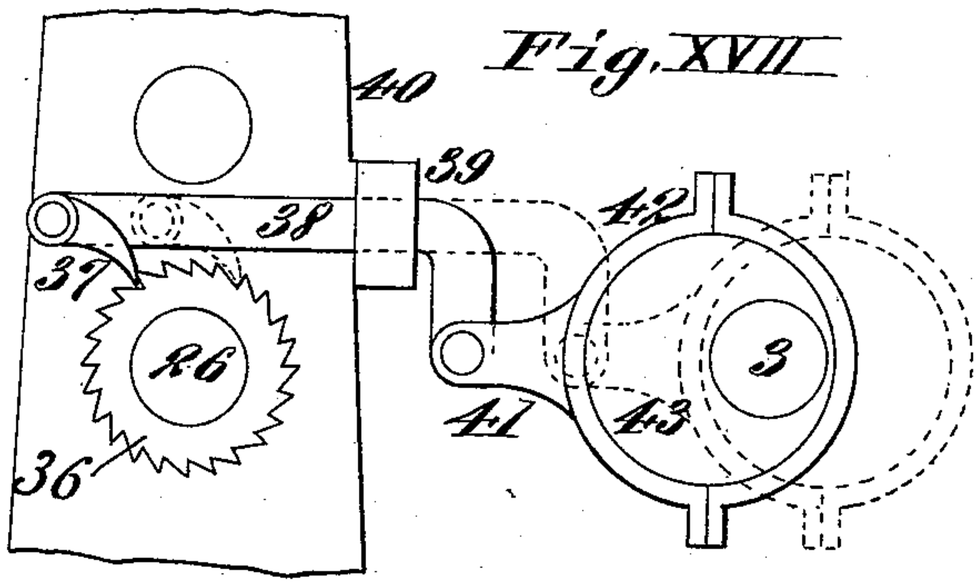
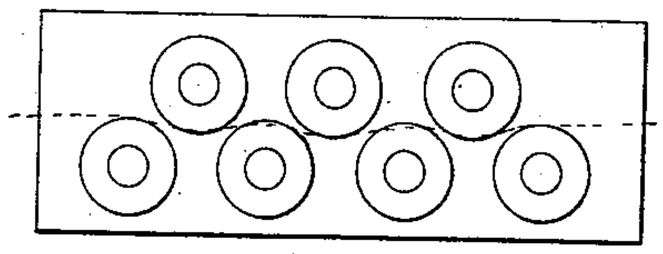


Fig. XVI.



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UNITED STATES PATENT OFFICE.

WILLIAM EDENBORN, OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING WIRE FENCING.

SPECIFICATION forming part of Letters Patent No. 565,380, dated August 4, 1896.

Application filed March 28, 1896. Serial No. 585,255. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDENBORN, of the city of Chicago, Cook county, State of Illinois, have invented a certain new and useful Improvement in Machines for Making Wire Fencing, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention relates to an improved machine for making a fencing consisting of longitudinal strands of wire provided with crimps and tied together in pairs by transverse strands that are wound at their ends about two of the longitudinal strands, these transverse strands being arranged in break-joint fashion, those connecting the second and third wires from the top of the fencing being located in the spaces between those connecting the two top wires, and so on down the fencing.

My machine is automatic in its operation, and produces the finished article from coils of wire.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a top or plan view of my improved machine. Figs. II and III are enlarged detail transverse sections taken on line II III, Fig. I, the dogs pivoted to the cross-head not being shown in Fig. II. Fig. IV is a top view of the crimping-dogs in open position. Fig. V is a top view of the crimping-dogs closed. Fig. VI is a side elevation. Fig. VII is an enlarged vertical transverse section taken on line VII VII, Fig. I. Figs. VIII, IX, and X are diagrams illustrating the operation of the coiling-spindles. Fig. XI is a detail top view of same. Fig. XII is an enlarged detail vertical section taken on line XII XII, Fig. I, looking in the direction of the arrow A. Fig. XIII is a similar view taken on line XII XIII, Fig. I, looking in the direction of the arrow B. Fig. XIV is a diagram showing a section of the fencing made by my improved machine. Fig. XV is an enlarged transverse section taken on line XV XV, Fig. XIII. Fig. XVI is a side view of a series of rollers to straighten the wire from which the transverse wires are cut before it enters the machine. Fig. XVII represents a modification of the means for feeding the strand-wires.

Referring to the drawings, 1 represents a bed-plate, that may have suitable supporting-legs. (Not shown.) Secured to this bed-plate by boxes 2 is a shaft 3, having bevel-gear connection 4 with the shaft 5, journaled in boxes 6, by which it is supported on the bed-plate. The shaft 5 is bent to form a crank 7. (The end of the crank is shown removed or broken off in Fig. I.)

8 represents a long rack connected to the crank 7 by means of a pitman 9. This rack lies beneath and meshes into a number of pinions 10, formed upon or secured to sleeves 11, (see Figs. I and VII,) these sleeves being supported by a bracket or stand 12, secured to the bed-plate 1, and in which the sleeves are journaled, this bracket also serving to support the rack 8, as shown in Fig. VII. It will be observed that as the rack is moved back and forth by the crank-shaft 7 there will be imparted to the sleeves 11 a back-and-forth rotary movement.

Within each sleeve 11 is a spindle 13, having an eccentrically-arranged finger or pin 14, the inner end of the pin fitting in the head 15 of the spindle, as clearly shown in Fig. VII. The spindles are loose within the sleeves and are caused to turn therewith by virtue of the pins 14 passing through caps or heads 16, secured to the sleeves by screws 17 or otherwise.

18 represents the strand or longitudinal wires of the fencing. There is a spindle 13 for each strand-wire, and each wire passes through a central perforation in the head 15 of its spindle and also through a perforation in the cap 16. As stated, the spindles 13 fit loosely within their sleeves, and they have end movement therein, so as to cause the fingers 14 to be protruded from the face of the cap 16 at the proper time and then to cause the fingers 14 to recede until their outer ends are substantially flush with the outer faces of the caps. This end movement is imparted to the spindles 13 by means of bell-crank levers 19, fulcrumed on a rod 20. The upper ends of the levers are provided with yokes 21, fitting in grooves 22 in the ends of the spindles 13. The levers are operated to re-

tract the spindles by means of the cams 23 on the shaft 3, and the levers are moved in the other direction to cause the fingers 14 to be protruded by means of springs 24.

The strand-wires are fed forward intermittently by passing between rollers 25 and 26, (see Figs. I and VI,) set-screws 27 being provided for the purpose of causing the upper roller to bear with more or less pressure upon the lower roller. The lower roller 26 is provided with a pinion 28, engaged by a pinion 29, meshing into a pinion 30 on the shaft 3. The shaft 3 is provided with a gear-wheel 31, engaging a pinion 32 on a driving-shaft 34, provided with a pulley 35. The pinion 30 may be termed a "mutilated" pinion, that is to say, two of its sides or quarters are provided with cogs, and the other two sides or quarters have no cogs, the result of which is that the roller 26 is moved intermittently. When the cogs of the pinion 30 engage the pinion 29, the roller 26 will be turned, and then while the cogless portions of the pinion 30 are passing the pinion 29 the roller 26 will remain idle. This results in the strand-wires receiving an intermittent movement and allows them to remain stationary while the transverse wires are being wrapped about the strand-wires.

In Fig. XVII, I have shown a modification of the mechanism for imparting an intermittent movement to the strand-wires, in which the roller 26 is provided with a ratchet-wheel 36, engaged by a pawl 37 on a sliding bar 38, supported by a lug 39 on the housing 40 of the rollers 25 and 26. This bar 38 is connected to an extension 41 on a ring 42, that fits over an eccentric 43 on the shaft 3. As the parts move from the position shown in full lines, Fig. XVII, to the position shown in dotted lines the roller 26 is turned and remains idle while the parts are moving back from the position shown in dotted lines to the position shown in full lines.

44 and 45 represent the transverse wires. The fencing shown in Fig. XIV comprises eight strand-wires. When this number of strand-wires is used, it requires seven transverse wires to connect the strand-wires. It requires four of these transverse wires to connect the first and second, the third and fourth, the fifth and sixth, and the seventh and eighth strand-wires together, and it requires three to connect the second and third, the fourth and fifth, and the sixth and seventh strand-wires. The first set of wires is indicated at 45, and the second set at 44, Figs. XII and XIII. These wires are fed forward intermittently, time being given after they are fed forward for the transverse wires to be cut, and for the fingers 14 to wrap their ends about two of the strand-wires, and also for the strand-wires to be moved forward again after the wrapping and the cutting of the transverse wires. This intermittent movement of the transverse wires is effected by a head 46 for the wires 44 and a head 47 for the wires 45. Each head is mounted loosely on a rod 48, supported by standards 49 on the bed-plate 1, the heads having spring-actuated dogs 50, that engage the wires on the forward movement of the heads and that slip over the wires as the heads move back. To prevent the wires being carried back by the heads, one of the standards 49 is provided with dogs 50^a, that do not interfere with the forward movement of the wires, but prevent the wires from moving backward.

The heads 46 and 47 are moved by means of levers 51 and 52, (see Fig. I,) pivoted at 53 to the bed-plate, their inner ends being pivoted to the heads 46 and 47, respectively, and their outer ends being engaged by a cam 54 on the shaft 3. It will thus be seen that as the shaft 3 is turned the heads 46 and 47 will be moved, and that the head 46 will move forward while the head 47 is moving backward, and vice versa, and the parts are so disposed that first one set and then the other set of the wires 44 45 are fed forward, and each set is fed forward at the proper time.

As the transverse wires are fed forward they are guided so that each will pass over one and under the other of two of the strand-wires, as seen in Fig. XII. This guiding of the transverse wires is effected by two levers 55 and 56, pivoted, respectively, at 57 and 58 to a standard 59. To the levers are secured guide tubes or boxes 60, one for each transverse wire. (See Figs. XIII and XV.) The tubes are so arranged on the levers 55 and 56 as to cause the transverse wires to be projected in the proper direction to cause them to be fed to the strand-wires as stated. Secured to the levers 55 and 56, close up against the ends of the tubes 60, are knives or cutters 61, that operate in conjunction with stationary knives or cutters 62, made fast to the bracket or standard 12, (see Fig. XII,) to sever the transverse wires, the levers 55 and 56 being moved for this purpose by means of a cam 63 on a shaft 64, (see Figs. I and XIII,) the shaft 64 being journaled in boxes 65 and having bevel-gear connection 66 with the shaft 67, journaled in boxes 68, the other end of the shaft 67 having a bevel-gear connection 69 with the shaft 5.

The cam 63 is so formed as to cause the levers 55 and 56 to be moved immediately after the transverse wires move forward, the movement of the levers effecting the cutting of the transverse wires into proper lengths. As these wires are cut the spindles 13 move endwise, protruding the fingers 14, so as to bring them into a position that will cause them to engage the transverse wires as the spindles revolve, one finger engaging beneath one end of each transverse wire and another finger engaging the other end of this transverse wire from above. As the spindles revolve the fingers wrap the transverse wires about the strand-wires, as shown in Figs. VIII to XI, inclusive, and as the wrapping progresses the fingers are gradually with-

drawn by the retraction of the spindles 13, and just at the time the wrapping is completed the fingers 14 finally leave the wires, this condition of the parts being represented in Fig. XI.

As the fencing is formed it is taken up and moved along intermittently. I do this by the use of a mechanism that will form crimps (see Fig. XIV) in the strand-wires to provide for expansion and contraction of the fencing when in service without danger of the strand-wires being broken. The mechanism that I have shown for thus taking up the fencing as it is made, and also for forming crimps in the strand-wires, is represented in Figs. I to V, inclusive, and consists of a cross-head 70, held in guides 71, secured to the bed-plate of the machine, and which carries a slide 72. The slide 72 is capable of moving endwise with relation to the cross-head, and it carries a number of dogs 73, pivoted at 74 to the slide above the cross-head. The strand-wires are shown in dotted lines in Figs. I, II, and III, and also in Fig. VI, and there is a dog 73 for each strand-wire.

75 represents dogs pivoted at 76 to the upper face of the cross-head. There is a pair of these dogs for each dog 73, as shown in Fig. I. Beneath the cross-head 70 is a plate 77, that has oblique slots 78, in which fit pins 79, projecting from the under face of the slide 72. The plate 77 is connected by links 80 to cranks 81 on a rock-shaft 82, secured to the bed-plate 1 by means of boxes 83. The shaft 82 has a crank 84, connected by a rod 85 to an eccentrically-located wrist-pin 86 on the wheel 31. (See Figs. I and VI.) As the wheel 31 revolves it imparts a rocking movement to the shaft 82, causing the movement of the cross-head 70, and the parts which it carries, back and forth in the direction of the length of the strand-wires.

87 represents a dog pivoted to one of the guides 71 (see Fig. I) and which is capable of moving only in the direction of the arrow. When the cross-head 70 is in its rear or inner position, (shown in Fig. I,) and before the rock-shaft 82 commences to move the plate 77, the end of the slide 72 is behind the dog 87. When the rock-shaft commences to move the plate 77, the cross-head 70 is held from forward movement until the slide 72 moves out from behind the dog 87. The slide is thus moved out from behind the dog 87 by means of the pins 79 on the slide fitting in the oblique slots 78 in the plate 77, and this end movement of the slide causes the dogs 73 to move from the position shown in Fig. IV to the position shown in Fig. V, thus crimping the strand-wires between the movable dogs 73 and the fixed dogs 75. By the time that the end of the slide passes the end of the dog 87 (in which position it is shown in Fig. I) the wires have been fully crimped, and now the further turning of the shaft 82 pulls the cross-head 70 with the parts attached to it in the direction of the dotted arrow, Fig. I, and the fencing is thus moved forward or taken up the distance apart of the transverse wires. When the fencing has been moved this distance, the shaft 82 rocks in the other direction, and the first action of the plate 77 is to move the slide 72 back, thus releasing the strand-wires by pulling the dogs 73 away from them, or from the position shown in Fig. V to the position shown in Fig. IV. The further movement of the shaft 82 in this direction carries the cross-head 70, with the parts that are attached to it, back to their inner position, and as the parts move back the dog 87 yields when pressed against by the slide, and as soon as the slide passes the dog springs back into the position shown in Fig. I, so that the next time the shaft 82 rocks forward the dog will keep the cross-head from moving until the slide has moved endwise to crimp the wires, as explained.

As stated, the dogs 73 and 75 are pivoted to their supports, so that as the cross-head moves back these dogs will turn on their pivots if they come against the transverse wires of the fencing, so as to pass under these transverse wires, and will then automatically assume an upright position.

It is evident that the mechanism shown and described for crimping and taking up the fencing may be depended upon to produce the forward movement of the strand-wires, instead of using the feed-rollers, in which case the feed-rollers would still be useful to maintain a tension on the strand-wires and keep them taut at the point of application of the transverse wires.

The wires from which the transverse wires are cut would ordinarily be taken from a reel, and it is desirable to have the natural coil taken out of these wires before they are fed, and this may be done by an ordinary system of straightening-rolls, such as is shown in Fig. XVI.

I claim as my invention—

1. In a machine for making wire fencing, the combination of mechanism for intermittently feeding a series of strand-wires, mechanism for feeding a series of transverse wires, mechanism for guiding and cutting the transverse wires, mechanism for winding the ends of each section of the transverse wires about two of the strand-wires, and mechanism for forming crimps in the strand-wires, substantially as set forth.

2. In a machine for making wire fencing, the combination of mechanism through which strand-wires pass, mechanism for feeding a series of transverse wires, mechanism for guiding and cutting the transverse wires, mechanism for winding the ends of each section of the transverse wires about two of the strand-wires, and mechanism for forming crimps in the strand-wires, substantially as set forth.

3. In a machine for making wire fencing, the combination of mechanism through which strand-wires pass, mechanism for feeding a

series of transverse wires, mechanism for guiding and cutting the transverse wires, mechanism for winding the ends of each section of the transverse wires about two of the strand-wires, and mechanism for crimping the strand-wires and taking up the fencing, substantially as set forth.

4. In a machine for making wire fencing, the combination of a series of spindles each provided with a wire-coiling finger, mechanism for moving strand-wires through said spindles, mechanism for feeding a series of transverse wires, mechanism for cutting said transverse wires, and mechanism for crimping said strand-wires, substantially as set forth.

5. In a machine for making wire fencing, the combination of a series of spindles through which strand-wires pass, and which are provided with wire-coiling fingers, mechanism for feeding a series of transverse wires, mechanism for cutting said transverse wires, and mechanism for crimping the strand-wires and taking up the fencing, substantially as set forth.

6. In a machine for making wire fencing, the combination of a series of spindles each provided with a wire-coiling finger and through which the strand-wires pass, mechanism for feeding a series of transverse wires, mechanism for cutting said transverse wires, and mechanism for crimping the strand-wires and taking up the fencing, consisting of a cross-head provided with dogs, a slide provided with dogs, mechanism for moving the slide and cross-head, and a dog for holding the cross-head from movement until the slide has been moved, substantially as and for the purpose set forth.

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In presence of—
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