(No Model.) 4 Sheets—Sheet 1.

W. EDENBORN.

MACHINE FOR MAKING WIRE FENCING.

No. 558,787. Patented Apr. 21, 1896.

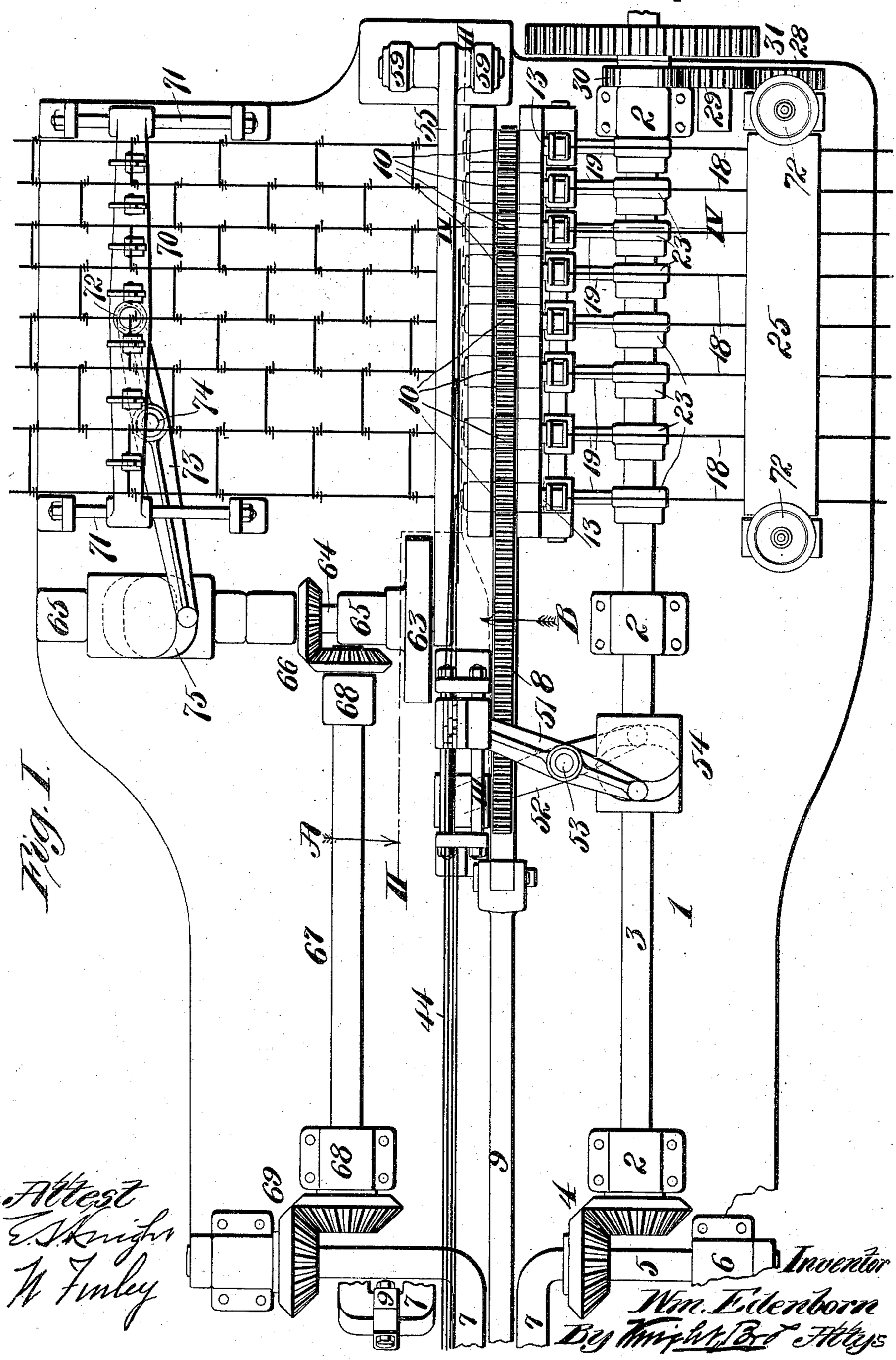

Fig. 1.

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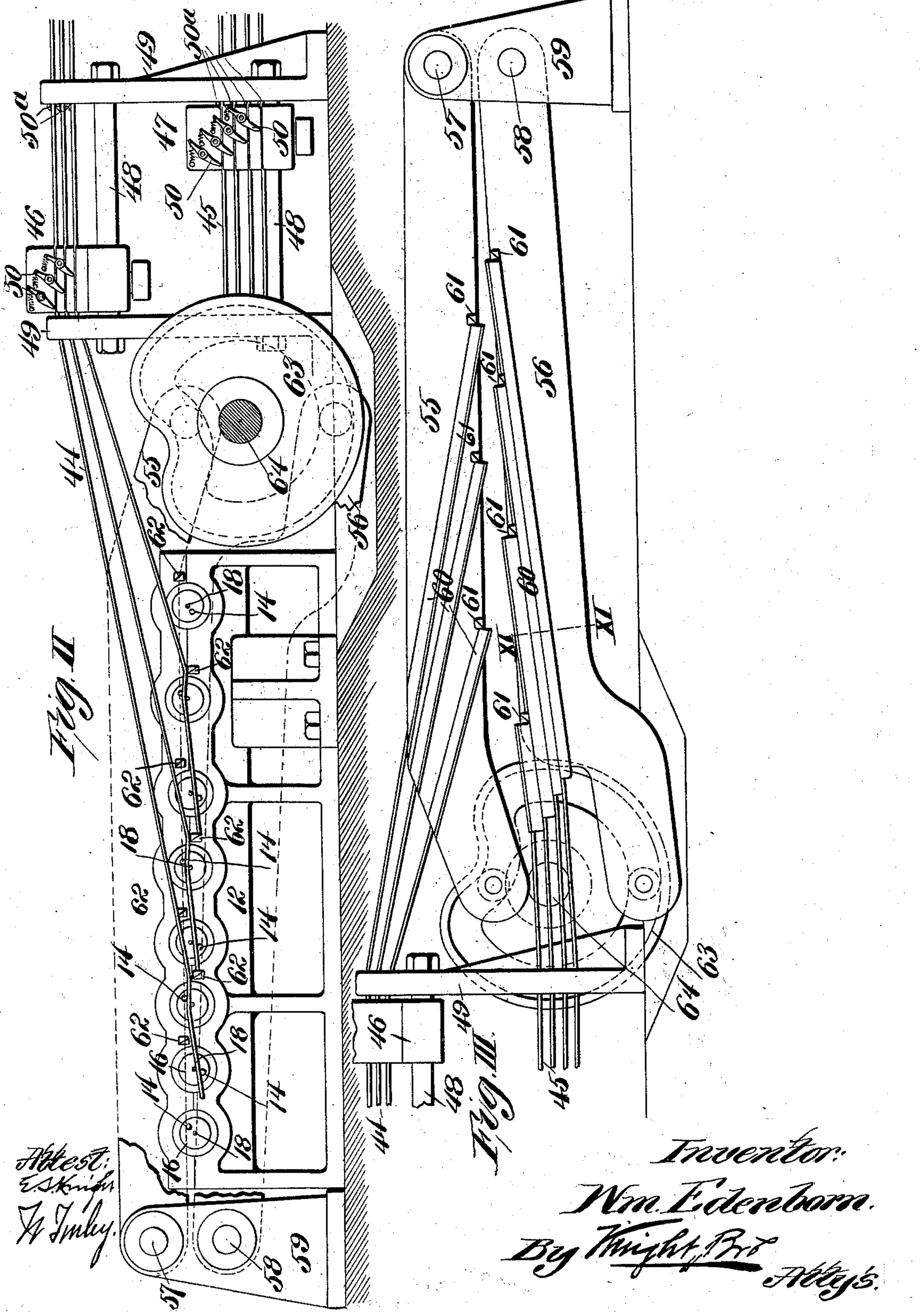

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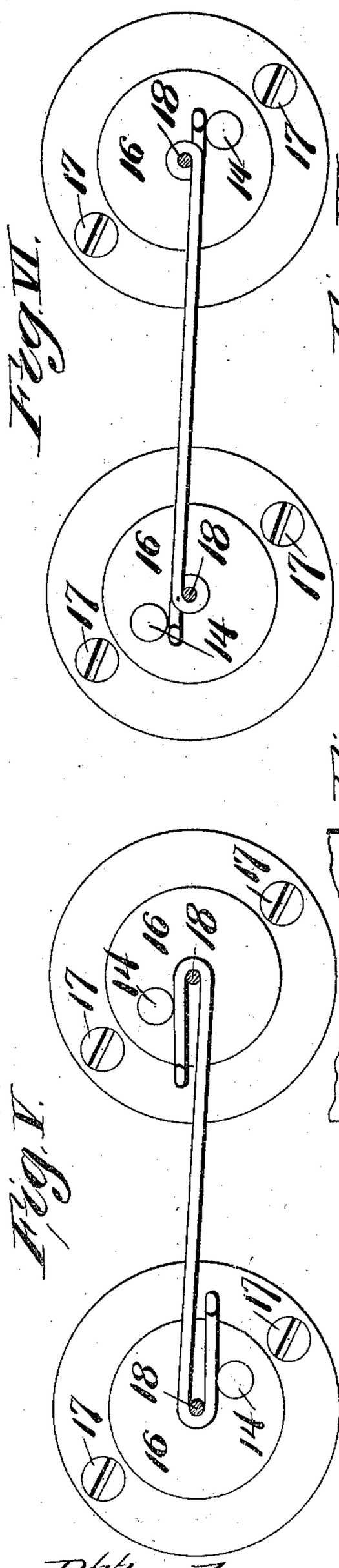

Fig. V.

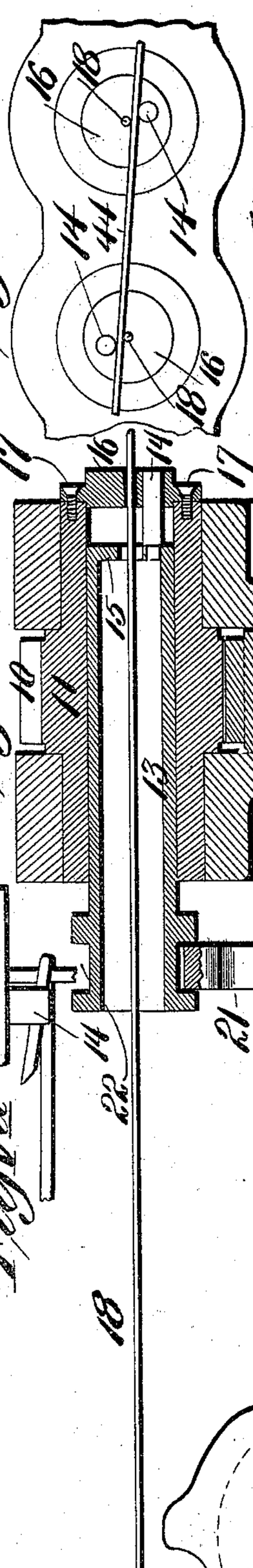

Fig. VIII.

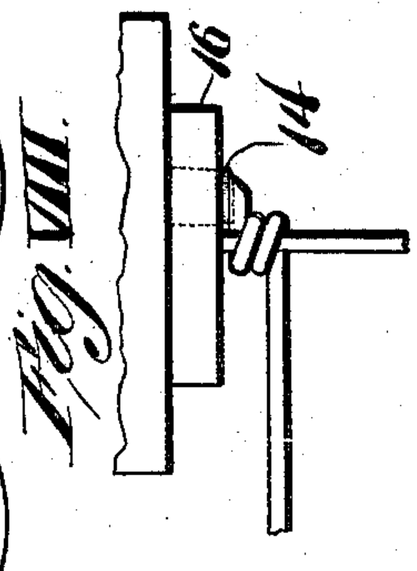

Fig. VI.

Fig. IV.

Fig. IVa.

Fig. I.

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MACHINE FOR MAKING WIRE FENCING.

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Fig. IX

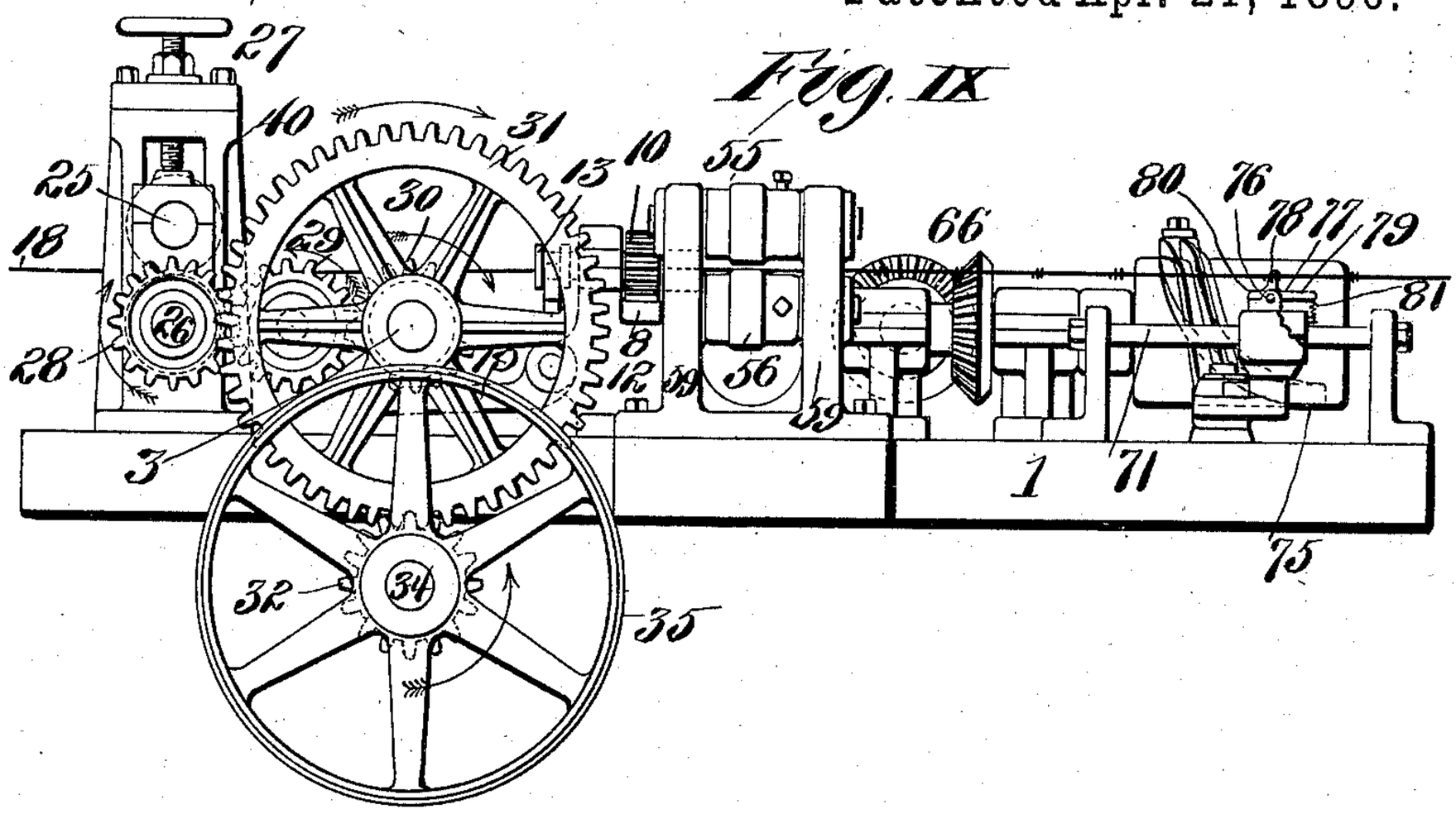


Fig. X.

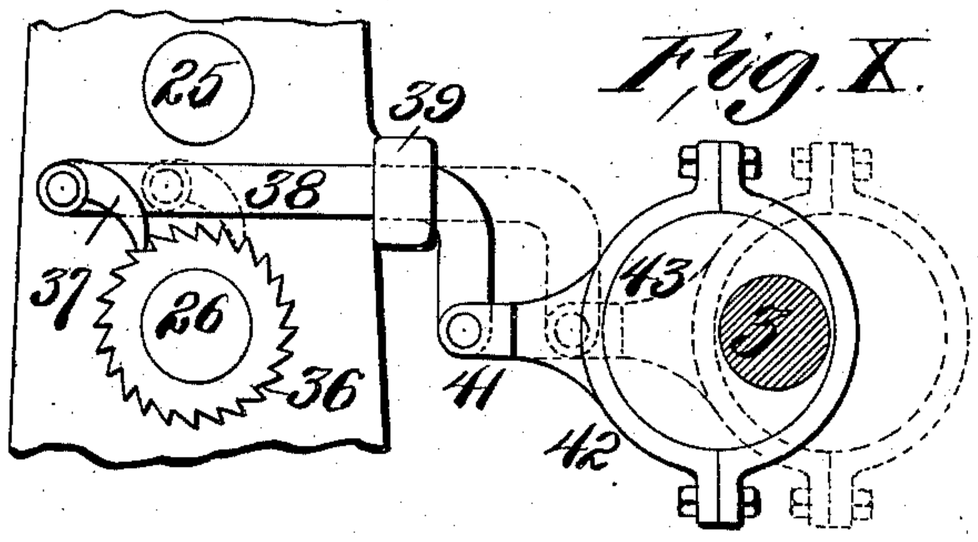
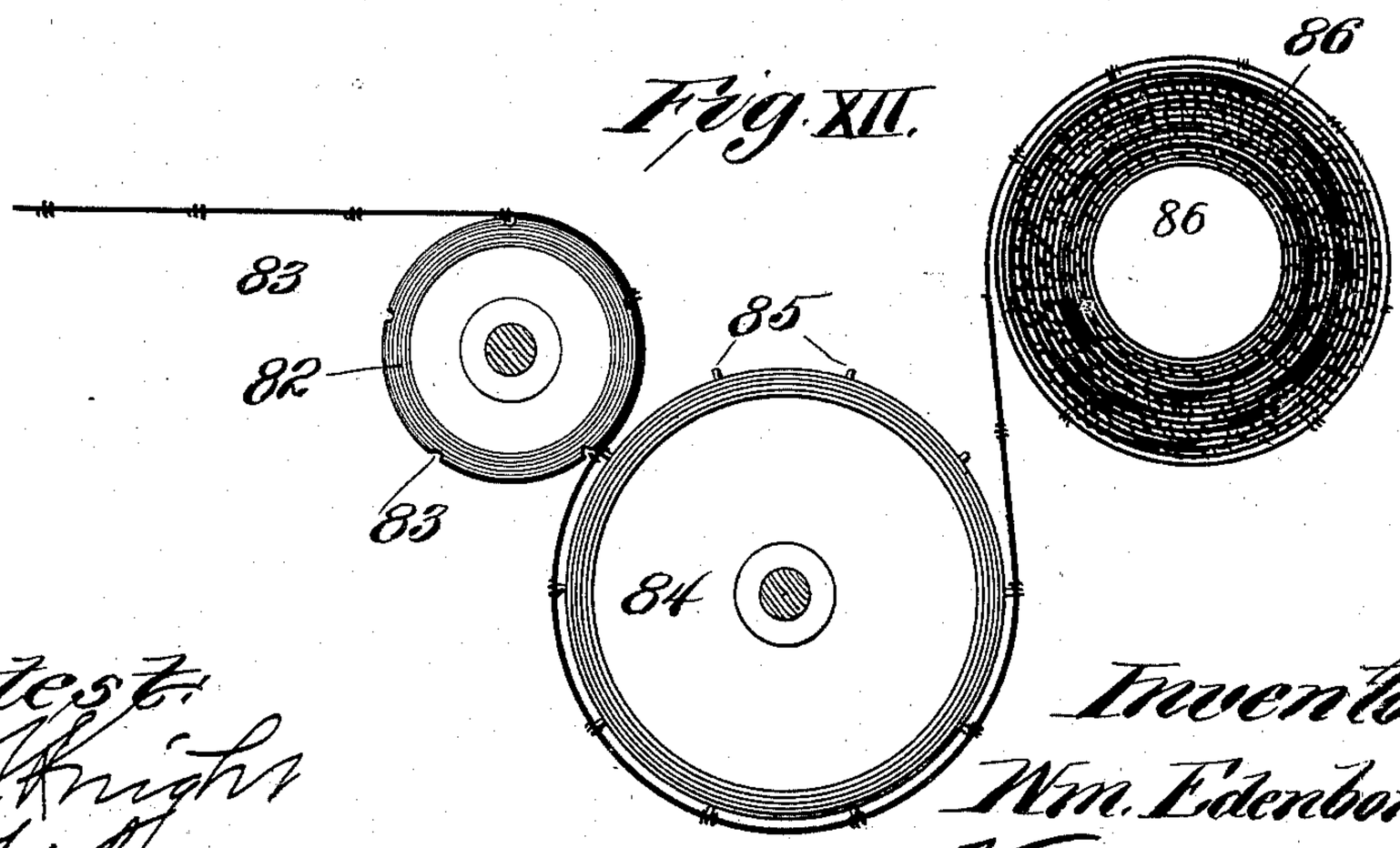


Fig. XI.

Fig. XII.



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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. 558,787, dated April 21, 1896.

Application filed January 27, 1896. Serial No. 576,978. (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 a Machine 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 invention relates to an improved machine for making a fencing, consisting of longitudinal strands of wire 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. Fig. II is an enlarged detail vertical section taken on line II II, Fig. I, and looking in the direction of the arrow A. Fig. III is a similar view taken on line III III, Fig. I, and looking in the direction of arrow B. Fig. IV is an enlarged vertical transverse section taken on line IV IV, Fig. I. Figs. V, VI, and VII are diagrams illustrating the operation of the coiling-spindles. Fig. VIII is a detail top view of same. Fig. IX is a side elevation of the machine. Fig. X represents a modification of the means for feeding the strand-wires. Fig. XI is an enlarged transverse section taken on line XI XI, Fig. III. Fig. XII represents a modification of the take-up.

Referring to the drawings, 1 represents a bed-plate that may have suitable supporting-legs. (Not shown.) Secured to this table by boxes 2 is a shaft 3, having bevel-gear connection 4 with a 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, part of which is shown removed in Fig. I.

8 represents a long rack, connected to the crank 7 by means of a pitman or rod 9. This rack lies beneath and meshes into a number of pinions 10, formed upon or secured to sleeves 11, (see Figs. I and IV,) 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 or stand also serving to support the rack 8, as shown in Fig. IV. 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. 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 11 by screws 17 or otherwise.

18 represents the strands 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 retract the spindles 13 by means of 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. (See Fig. IV.)

The strand-wires are fed forward with intermittent movement by passing between rollers 25 and 26, (see Figs. I and IX,) 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 driv-

ing-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 at rest. 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. X I have shown a modification of the mechanism for imparting an intermittent movement to the strand-wires and 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 are moved from the position shown in full lines, Fig. X, 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. I comprises eight strand or longitudinal 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 at 44, Fig. II. 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 feeding 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, (see Fig. II,) 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 which hold 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 being moved 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. II. This guiding of the transverse wires is effected by two levers 55 and 56, pivoted at 57 and 58 to a standard 59. To the levers are secured guide tubes or boxes 60, one for each transverse wire. (See Fig. III.) A transverse section of these tubes is shown in Fig. XI. 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.

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. II,) 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 II,) the shaft 64 being journaled in boxes 65 and having a bevel-gear connection 66 with a 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. V to VIII, inclusive, and as the wrapping progresses the fingers are gradually withdrawn 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. VIII.

As the fencing is formed it is taken up or moved along intermittently by means of a bar 70, supported at its ends by stationary rods 71. (See Fig. I.) This bar is pivoted at 72 to one end of a lever 73, pivoted at 74 to the bed-plate 1. The other end of the lever 73 is engaged by a cam 75 on the shaft 64. To the bar 70 is pivoted at 76 a number of catches 77, (see Fig. IX,) having upwardly-extending ends 78, downwardly-extending ends 79,

and inwardly-extending ends 80. 81 represents springs beneath the ends 79 of the catches, which press upwardly against the catches and hold them normally in the position shown in Fig. IX, the ends 80 of the catches preventing the springs from moving the catches farther than is shown in Fig. IX, these ends coming against the upper face of the bar 70. When the bar is moved forward by the cam 75, the ends 78 of the catches engage the transverse wires and cause the fencing to be moved forward. As the bar recedes the springs 81 permit the catches to slide past the next set of transverse wires, behind which the catches again engage when the bar moves forward. As a modification of this take-up mechanism just described I have shown in Fig. XII a roller 82, having grooves 83. This roller is driven intermittently by any suitable means, and as it revolves the grooves 83 receive the transverse wires, causing the movement or taking up of the fencing at the proper time.

In Fig. XII I have shown in addition to the roller 82 a second roller 84, around which the fencing passes, and which is provided with pins 85 to receive the transverse wires, and from this roller 84 the fencing passes to a spindle 86, upon which it is wound ready for shipment. The rollers 82 and 84 need not be themselves driven, but the movement of the fencing may be effected by the turning of the spindle. No means is shown for turning the spindle, as any well-known mechanism, such as is common on barb-wire machines, may be utilized for this purpose.

It is evident that one of the mechanisms shown and described for taking up the fencing may be depended upon to produce the forward movement of the strand or longitudinal 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.

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 intermittently feeding a series of transverse wires, mechanism for guiding and cutting the transverse wires, and mechanism for winding the ends of each section of the transverse wires about two of the strand-wires, substantially as set forth.

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

3. In a machine for making wire fencing, the combination of mechanism for intermittently feeding a series of strand-wires, mechanism for intermittently 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 intermittently taking up the fencing after it is formed, 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, and mechanism for cutting said transverse wires, substantially as set forth.

5. In a machine for making wire fencing, the combination of a series of spindles, each provided with a wire-coiling finger, means for causing the movement of a series of strand-wires through said spindles, means for feeding a series of transverse wires across said strand-wires, means for guiding and cutting off said transverse wires, and mechanism for turning said spindles to cause said fingers to wind the ends of each section of the transverse wires about two of the strand-wires, substantially as set forth.

6. In a machine for making wire fencing, the combination of a series of spindles provided with fingers, a series of sleeves inclosing said spindles, a rack for turning said sleeves and spindles, bell-crank levers for imparting a longitudinal movement to said spindles, mechanism for feeding a series of transverse wires across a series of strand-wires that pass through said spindles, and means for guiding and cutting off said transverse wires, substantially as set forth.

7. In a machine for making wire fencing, the combination of mechanism for intermittently feeding a series of strand-wires, mechanism for intermittently feeding a series of transverse wires, mechanism for winding the ends of each section of the transverse wires about the strand-wires, and mechanism for guiding and cutting said transverse wires; said last mechanism consisting of levers 55 and 56 provided with guide-tubes 60 and knives 61, said knives being arranged to coact with stationary knives, substantially as and for the purpose set forth.

8. In a machine for making wire fencing, the combination of mechanism for intermittently feeding a series of strand-wires, mechanism for intermittently feeding a series of transverse wires, mechanism for winding the ends of each section of the transverse wires about two of the strand-wires, and mechanism for guiding and cutting said transverse wires; said last mechanism consisting of pivoted levers 55 and 56 provided with guide-tubes 60 and knives 61, and a cam 63, substantially as and for the purpose set forth.

9. In a machine for making wire fencing, the combination of mechanism for feeding a series of strand-wires, mechanism for feeding a series of transverse wires, mechanism for

cutting the transverse wires, and mechanism for winding the ends of each section of the transverse wires about two of the strand-wires; said mechanism for feeding the transverse wires being in duplicate, one of which feeds a set of said wires for connecting the first and second and the third and fourth strand-wires together, and the other of which feeds a set of said wires for connecting the second and third and the fourth and fifth of said strand-wires, substantially as set forth.

10. In a machine for making wire fencing, the combination of a series of spindles provided with fingers, 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 turning said spindles consisting of pinions, one for each spindle, a rack engaging all of the pinions, and means for moving the rack, substantially as set forth.

In testimony whereof I have hereunto set my hand this 23d day of January, 1896.

WM. EDENBORN.

In presence of—
E. S. KNIGHT,
W. FINLEY.