No. 689,712. Patented Dec. 24, 1901.

W. EMERY.

BARBED WIRE MACHINE.

(Application filed July 10, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

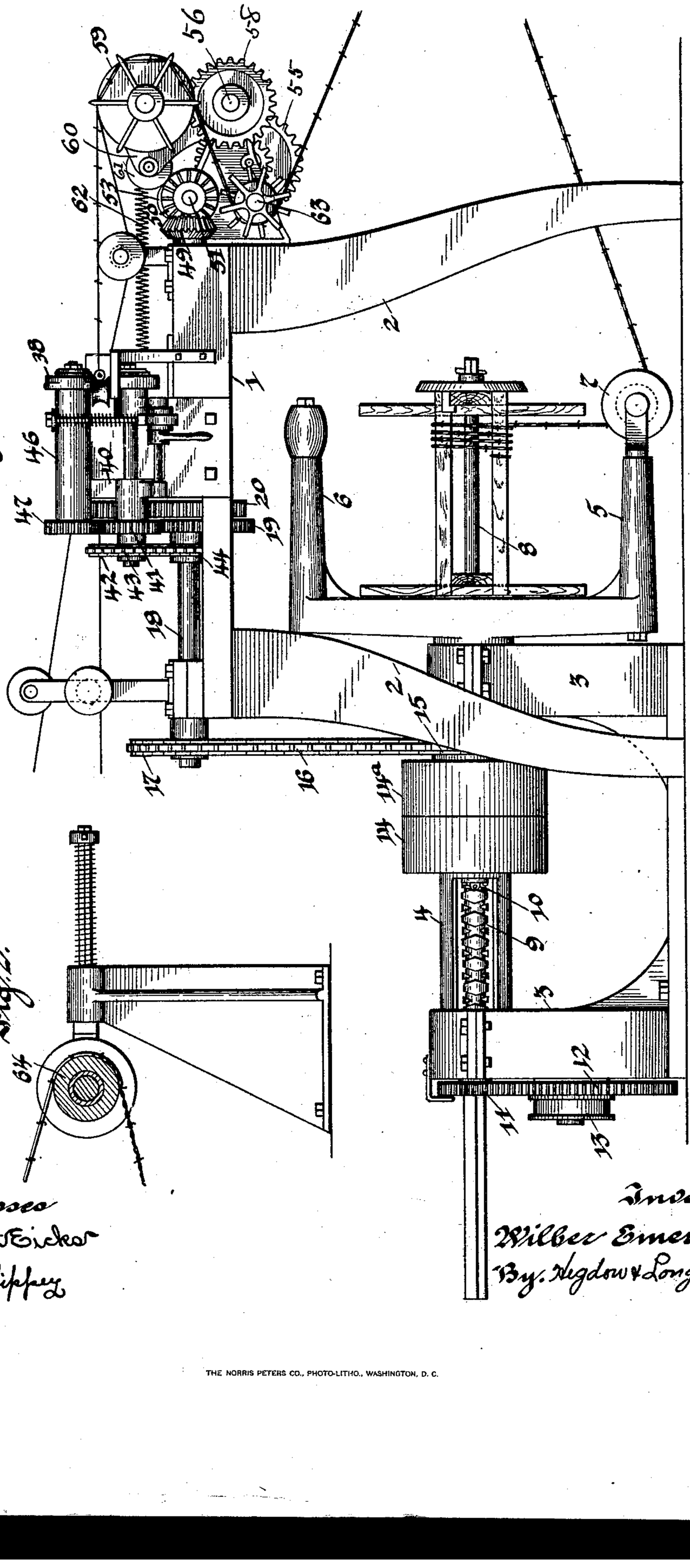

Fig. 2.

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Fig. 3.

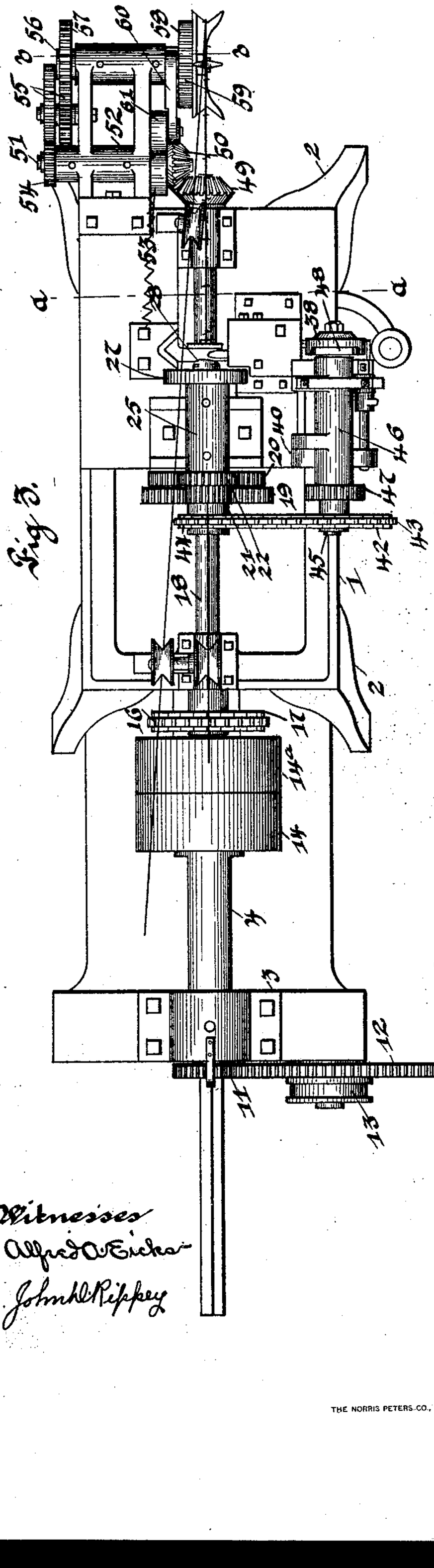


Fig. 5.

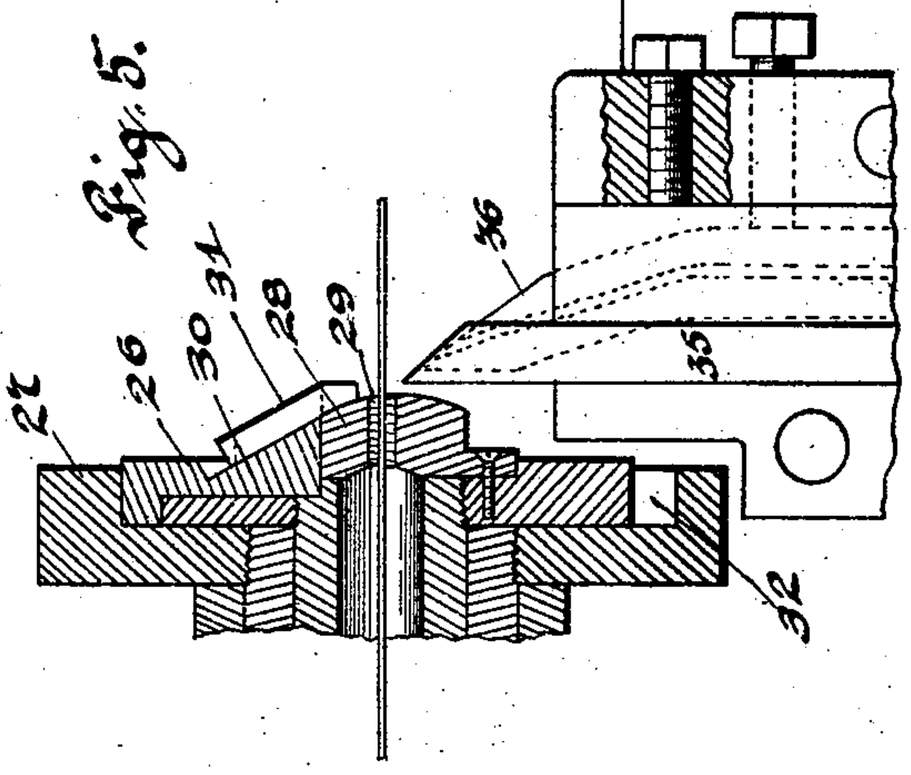
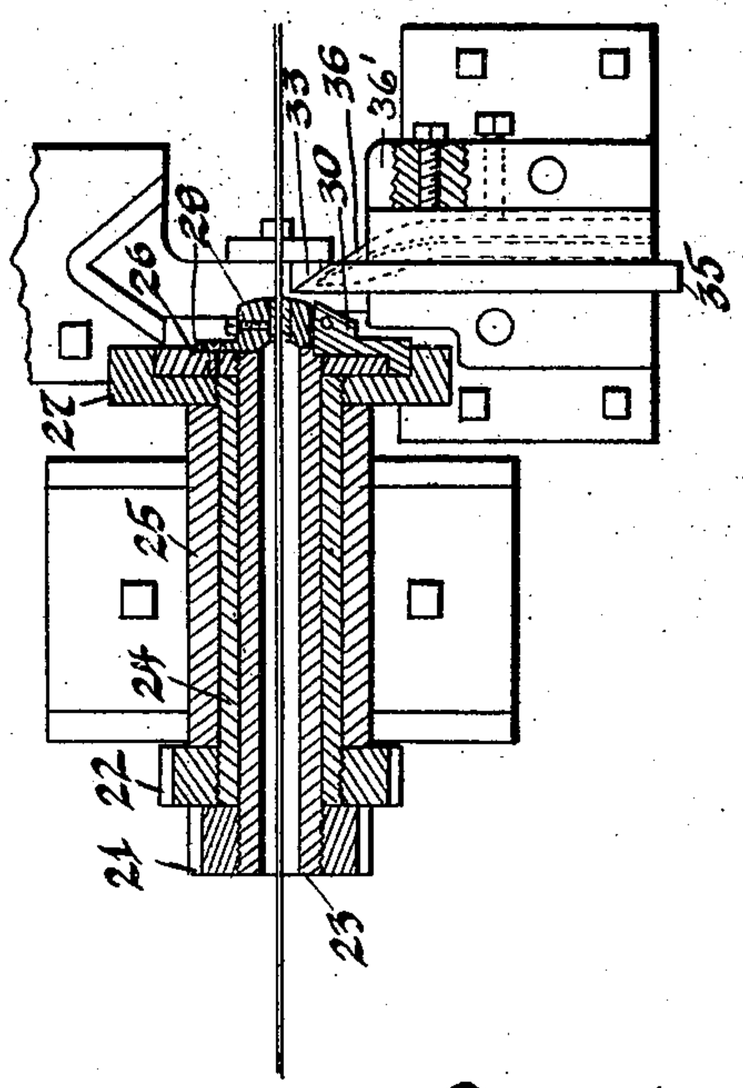


Fig. 4.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 8.

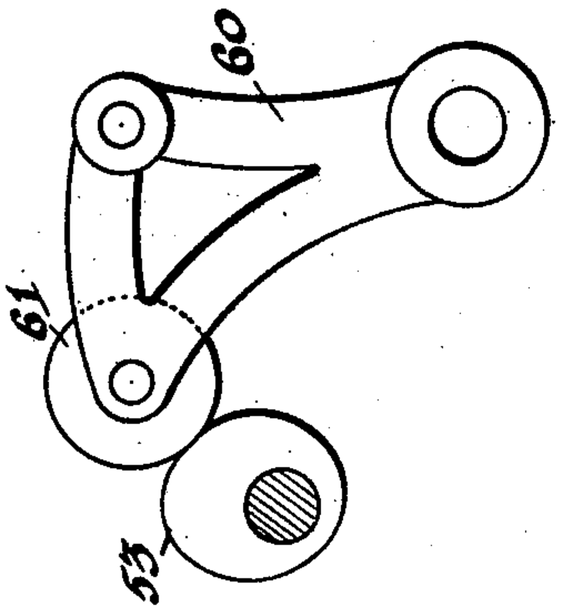


Fig. 9.

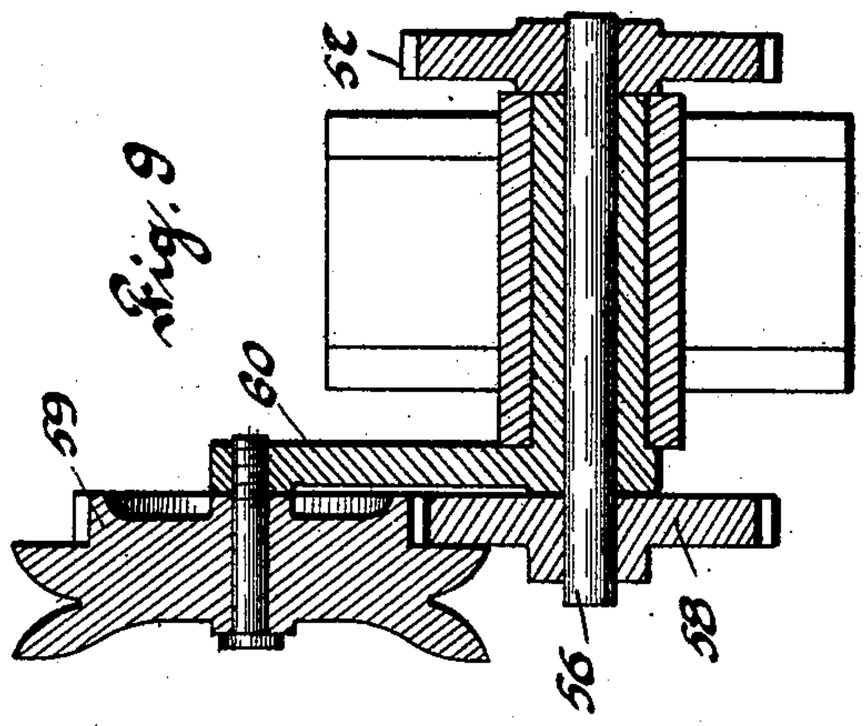


Fig. 6.

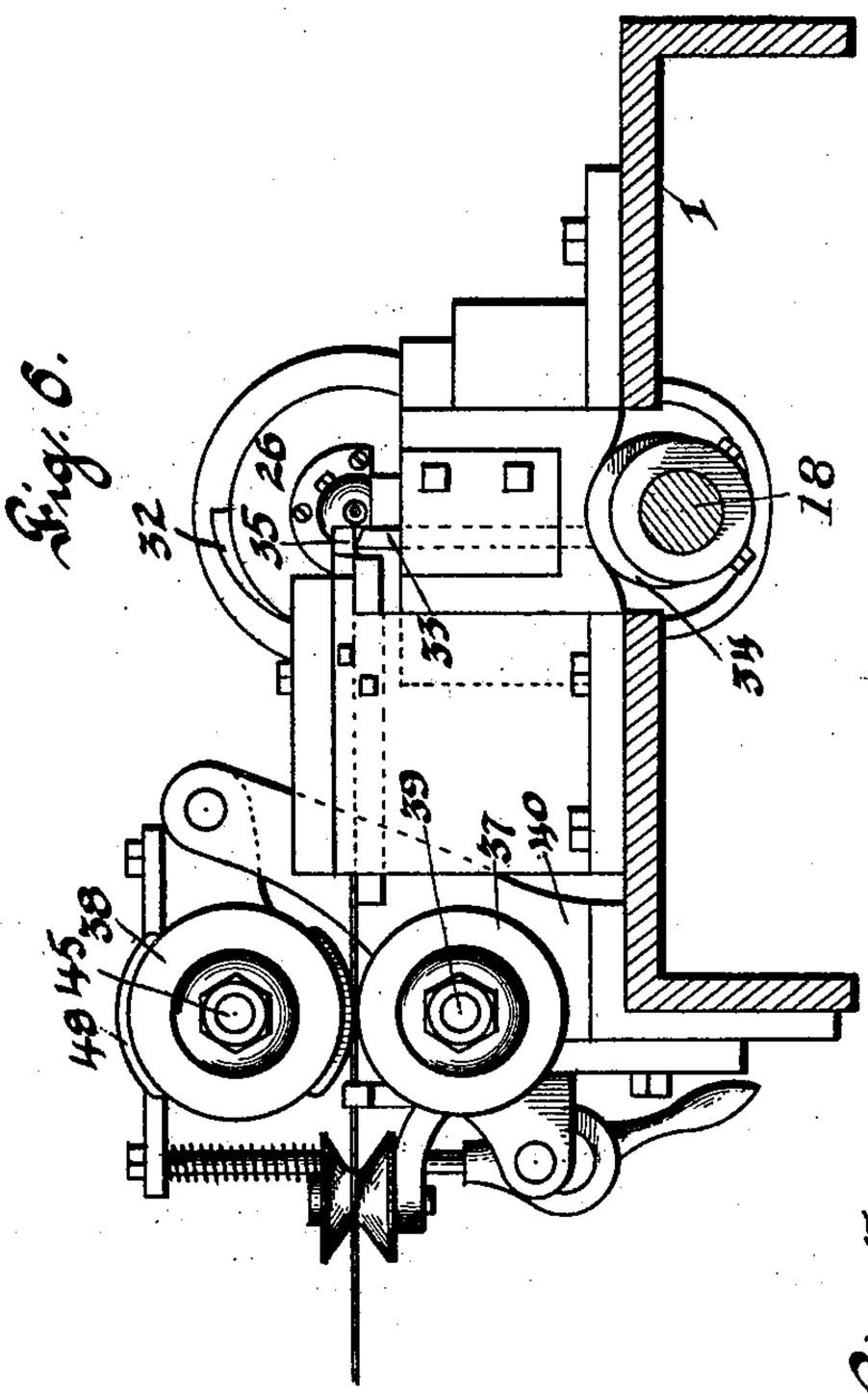
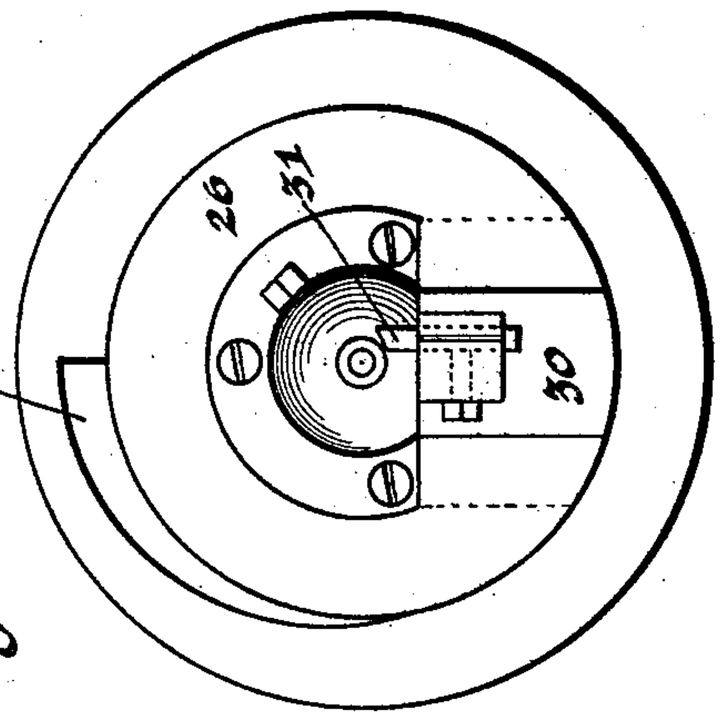


Fig. 7.



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(No Model.) 4 Sheets—Sheet 4.

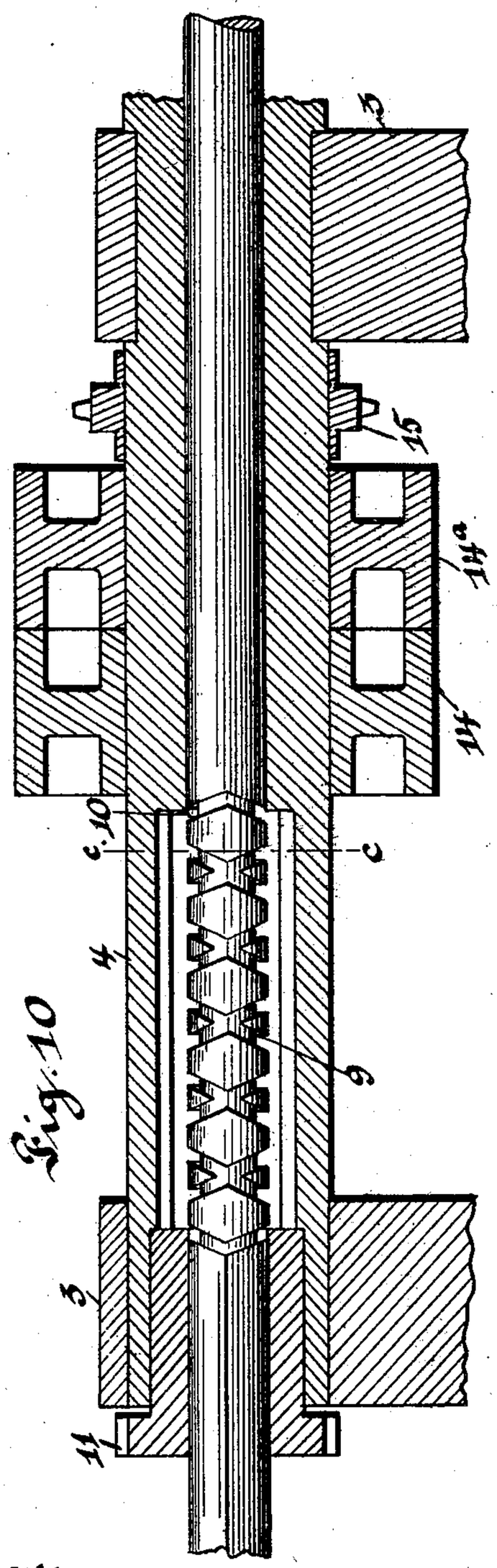

Fig. 10

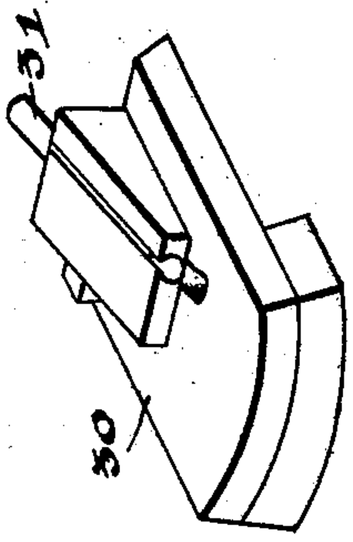

Fig. 13.

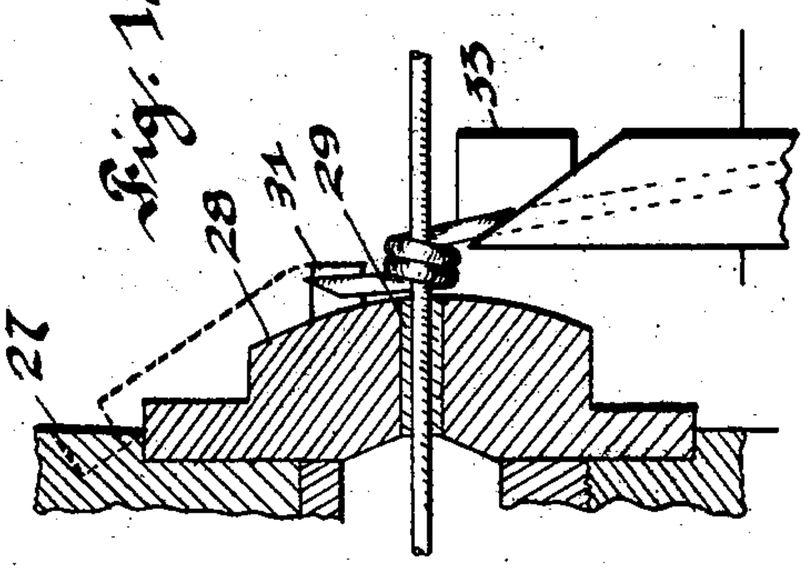

Fig. 12.

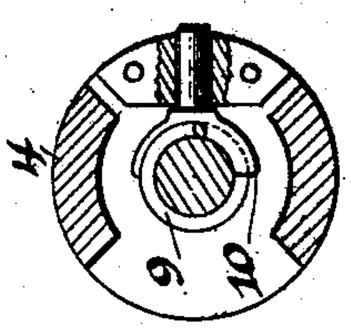

Fig. 11

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UNITED STATES PATENT OFFICE.

WILBER EMERY, OF EAST ST. LOUIS, ILLINOIS.

BARBED-WIRE MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,712, dated December 24, 1901.

Application filed July 10, 1901. Serial No. 67,728. (No model.)

To all whom it may concern:

Be it known that I, WILBER EMERY, of the city of East St. Louis, St. Clair county, State of Illinois, have invented certain new and useful Improvements in Barbed-Wire Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to barbed-wire machines; and it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

One object of this invention is to provide an improved machine for making barbed wire, composed of suitable devices for intermittently moving the wire and for coiling the barbs thereon, in combination with means for twisting the wire and for winding the same upon a reel.

Another object is to construct a machine of the class mentioned so that the wire will be moved intermittently through the coiling-head and will move continuously through the twister and onto the reel.

Another object is to provide an improved machine of the class mentioned consisting of the coiling-head and the twister operating around a reciprocating reel upon which the wire is continuously wound, in combination with a pull-out mechanism interposed between the coiling-head and the twister and constructed to move the wire intermittently through the coiling-head, but permit it to be drawn continuously through the twister.

Figure 1 is a side elevation of the machine. Fig. 2 is a portion of the machine removed from the front end. Fig. 3 is a plan view. Fig. 4 is a view, partly in section, of the barb coiling and shearing devices. Fig. 5 is an enlarged view of a portion of the coiling and shearing mechanism. Fig. 6 is a cross-sectional view of the machine on the line *a a* of Fig. 3. Fig. 7 is an end view of the coiling-head. Fig. 8 shows the devices by which the pull-out mechanism is oscillated to move the wire intermittently through the barbing mechanism and to permit it to be delivered continuously onto the reel by the twister. Fig. 9 is a cross-sectional view on the line *b b* of Fig. 3. Fig. 10 is a detail view of the reel-shaft and shows the means by which it is reciprocated. Fig. 11 is a sectional view of the same on the line *c c* of Fig. 10. Fig. 12 is an enlarged detail view showing a barb being coiled upon the wire. Fig. 13 is a perspective view of the reciprocating plate and the coiling-pin carried thereby.

1 denotes the bed of the machine constructed in suitable form and mounted upon the supports 2. Standards 3 are located in suitable position relative to the supports 2 and have bearings formed in their upper ends, in which is mounted the shell or sleeve 4, which carries on its forward end a large fork consisting of the arms 5 and 6. Said arm 5 carries an idler 7, over which the wire is passed and by the rotation of the shell 4 and the arms 5 and 6 is wound upon the reel, the location of which will presently be described. The arm 6 serves as a counterbalance for the arm 5. If desirable, the idler 7 may be arranged so that it may change its inclination to compensate for the movement of the wire on the reel.

8 indicates a reciprocating shaft which is mounted in the shell 4 and projects forwardly between the forks 5 and 6 and is adapted to support the reel, as shown in Fig. 1. The shaft 8 is cut to form a threaded arbor 9, and the fork 10 operates within the threads, and thereby reciprocates the reel, so that the wire will be distributed uniformly upon it. A gear 11 is connected to the rear end of the shell 4 and has a rectangular opening formed in its center, and the shaft 8 projects through the said opening and reciprocates therethrough. From this it follows that when the shell 4 is rotated the shaft 8 will also be rotated and will be permitted to reciprocate, for the reason that it is free to move through the gear 11. The said gear 11 meshes with a gear 12, which is attached to a friction-wheel 13, to which any known form of friction-brake may be applied. The shell 4 carries two pulleys 14 and 14^a, one of which is loose and the other fast, to which power is applied to drive the machine.

A sprocket-wheel 15 is fixed upon the shell 4 and is connected by means of a chain 16 to the sprocket-wheel 17, fixed upon the rear end of the shaft 18, carried by the bed of the machine, as shown in Fig. 1. Two gears 19 20 are mounted upon the shaft 18 and by means of the gears 21 and 22 operate the coil-

ing mechanism, which will now be described. The gear 21 is fixed to a shell 23, contained within the outer shell 24, to which the gear 22 is attached, and the said outer shell 24 has bearing in the standard 25, fixed to the upper side of the bed 1. The shell 23 carries on its forward end a coiling-head 26, which revolves within the casing 27, attached to the forward end of the shell 24. The face-plate 28 is connected to the coiling-head 26 and is provided with a removable center 29, held in place by means of a set-screw and bored out for the passage of a strand of wire, as clearly shown in Fig. 5. The coiling-head 26 is provided with a channel in which is located a sliding plate 30, which carries a coiling-pin 31, the latter projecting toward the center of the coiling-head adjacent to the opening through the removable center 29. The casing 27 is provided with a recess 32, which allows the plate 30 to be thrown outwardly by centrifugal force at certain times in the revolution of the coiling-head 26, the revolution of the head 26 and the casing 27 being so timed that this outward movement occurs when the barb is fully formed, the plate 30 being thrown outwardly and the coiling-pin 31 being removed from the end of the barb, thus releasing the barb and being carried around its lower point.

33 indicates a sliding knife mounted in a suitable support or guide and having its lower end resting upon a cam 34, the same being fixed upon the shaft 18, above referred to. The said knife 33 operates against the fixed knife 35, and thereby cuts or shears the wire, forming the barbs with points, as shown in Fig. 12. A wire-guide 36 is arranged in the support 36', which upholds the knife 35, and the inner end of the said guide terminates adjacent to and under the inner end of the fixed knife 35, so that when the cam 34 forces the knife 33 upwardly the wire which is passed through the guide 36 and has previously been coiled upon the strand of wire passing through the removable center 29 will be cut at an angle, as shown in Fig. 12, forming the barb with points at each end.

37 and 38 are the feed-rolls for intermittently feeding the barb-strand toward the strand passing through the coiling-head. The roll 37 is secured upon a shaft 39, mounted in the standard 40. A gear-wheel 41 is secured to the opposite end of the shaft 39, and a sprocket-wheel 42, driven by a chain 43, passes around a similar sprocket 44, fixed upon the shaft 18 and drives the said shaft 39. The upper roll 38 is mounted on the end of a shaft 45, supported in bearings 46 and having the usual mechanism for raising it and keeping it in contact with the other roll. It is driven by means of the gear-wheel 47, meshing with the gear 41. The said roll 38 is provided with shoulders 48, by which it is raised at intervals out of contact with the barb-strand, thus giving an intermittent feed to the barb-strand, while permitting a constant rotary motion to the feed-roll mechanism.

Upon the forward end of the shaft 18 is mounted a gear 49, which meshes with a gear 50, secured to the end of a shaft 51, which is mounted in bearings formed in the bracket 52, the said bracket being attached in any known manner to the bed 1. A cam 53 is rigid with the gear 50, and the purpose of said cam will hereinafter appear. A gear 54 is fixed upon the outer end of the shaft 51 and drives the double gears 55, carried upon a stud fixed to the bracket 52. A shaft 56 is carried at the outer end of the bracket 52, and a gear-wheel 57 is rigid with the said shaft and meshes with one of the gears 55. The shaft 56 carries on its opposite end a gear 58, which meshes with and drives the combined gear and drag wheel 59. The said wheel 59 is supported by an arm 60, which is oscillated on the shaft 56 as an axis by means of the cam 53 on the shaft 51 and the roller 61, connected to the arm 60. A spring 62 or any other suitable device may be made use of to actuate the arm 60 and parts carried thereby toward the bed 1. From this it will appear that as the shaft 51 is rotated the cam 53 will at intervals force the arm 60 and the wheel 59 outwardly in opposition to the power of the spring 62, and this vibratory motion of the said wheel 59 around the rotating wheel 58 causes a variable rotation of the said wheel 59, faster when being forced outwardly and the strand-wire is being drawn through the coiling-head and slower while the barb is being formed and the strand-wire stationary at the coiling-head and the wheel 59 is moving toward the barbing mechanism to take up the slack wire. These results are obtained by the proper ratio of gearing, figured so that the wire will be moving constantly over the wheel 59, but will be moving intermittently through the coiling-head. It follows from this that while the wire moves intermittently, as described, through the coiling-head, yet it may be wound continuously upon the reel carried by the reciprocating shaft 8.

63 indicates an idler carried by the bracket 52 and around which the wire is passed after leaving the wheel 59. 64 indicates a second idler (see Fig. 2) yieldingly supported adjacent to the spooler and twister, so that the wire may be constantly and uniformly delivered to the twister to be twisted and wound upon the reel. The idler 64 prevents the wire from turning, and the rotation of the arm 5, carrying the wire around the reel, will twist the wire between the idler 7 and the idler 64.

In operation the power is applied to the shell 4, which drives the coiling mechanism, through the connections above described. The strand upon which the barbs are placed is passed through the coiling-head and the barb-strand is fed through the guide 36 below the stationary knife 35. The shell 23 being rotated as described, brings the coiling-pin 31 around

against the end of the barb-strand which is fed through the guide 36, and thereby twists the end of the wire around the strand which extends through the coiling-head. On account of the difference of rotation between the inner and outer shells 23 and 24 the coiling-pin will at the required time be thrown outwardly by centrifugal force and release the end of the barb, and at the same time the cam 34 operates the knife 33 upwardly against the end of the stationary knife 35, thereby severing the barb-strand an angle, as shown in Fig. 12. While the barb is being coiled upon the strand, as described, the wheel 59 is being moved inwardly toward the coiling-head, thereby permitting the strands of wire to remain stationary at the coiling-head while being continuously delivered to the twister and wound on the reel. As soon as the barb is coiled and the barb-strand is cut by the operation of the knife 33 the wheel 59 has reached the limit of its inward movement, and hence starts the wire again through the coiling-head, and the wire only stops again after it has moved the distance required between the barbs. The inward-and-outward movement of the drag-wheel 59 permits the wire to be wound continuously upon the reel by the twister, so that while the wire is continuously being wound and twisted it is passed intermittently through the coiling-head, the stops being at such intervals as to permit the application of the barbs.

I claim—

1. A barbed-wire machine, consisting of suitable devices for moving the wire intermittently, and means for coiling the barbs on the wire, in combination with a constantly-rotating twister for twisting the wire and for winding the same upon a reel, and means for transforming the intermittent movement of the wire into a continuous movement through the twister, substantially as described.

2. A barbed-wire machine, comprising a constantly-rotating head, means for moving the wire through the coiling-head intermittently, means for coiling the barbs thereon, a twister revolving around a reel, means for reciprocating the reel to distribute the wire thereon, and means for transforming the intermittent movement of the wire through the coiling-head into a continuous movement through the twister and onto the reel.

3. A barbed-wire machine, consisting of a coiling-head and a twister operating around a reciprocating reel, in combination with suitable mechanism interposed between the twister and the coiling-head whereby the wire will be drawn through the coiling-head intermittently and continuously passed through the twister and wound upon the reel and means for coiling barbs around the wire.

4. In a barbed-wire machine, a coiling-head, a drag having a variable motion, and means for driving and vibrating the drag so that the wire will be drawn intermittently through the coiling-head, and means for continuously winding the wire onto a reel.

5. In a barbed-wire machine, a constantly-rotating coiling-head and a sliding plate carrying a coiling-pin, fixed in said coiling-head and adapted to be moved outwardly when the barb is coiled and carry the coiling-pin around away from the end of the barb, substantially as specified.

6. In a barbed-wire machine, a coiling-head consisting of an inner and outer shell rotated at different speeds, a movable coiling-pin carried by the inner shell, means whereby the coiling-pin will be moved outwardly at intervals to release the barb, and means whereby the barb-strand will be cut when the coiling-pin is so moved.

7. In a barbed-wire machine, a coiling-head through which the wire is adapted to pass, means for coiling the barbs upon the wire and for severing the same from the wire, an oscillatory drag-wheel mounted adjacent to the coiling-head and adapted to be moved inwardly and outwardly at intervals so that the wire will be moved intermittently through the coiling-head and a continuously-rotating twister for winding the wire onto a reel.

8. In a barbed-wire machine, a coiling-head through which the wire is adapted to pass, means for coiling the barbs upon the wire and for severing the same from the wire, and an oscillatory drag-wheel mounted adjacent to the coiling-head and adapted to be moved inwardly and outwardly at intervals so that the wire will be moved intermittently through the coiling-head, in combination with a constantly-rotating combined spooler and twister, whereby the adjacent wires will be twisted together and wound upon a reel.

9. In a barbed-wire machine, the combination with suitable devices for coiling the barbs upon the wire, of a twister and spooler, consisting of a rotary shell, an arm carried by said shell and adapted to be moved around therewith, a reel-shaft, means for mounting a reel upon said shaft, means for reciprocating said shaft centrally relative to the rotation of the said arm, means for rotating the shaft at a speed slower than the movement of the arm, and means for twisting the wire when the arm is rotated and for winding the same upon the reel.

10. In a barbed-wire machine, a coiling-head, a guide leading thereto through which the barb-strand is adapted to be conveyed, rolls operating upon each other for feeding the barb-strand through the guide, shoulders formed upon one of said rolls and adapted to elevate the said roll at intervals so that the barb-strand will be fed intermittently to the coiling-head, substantially as specified.

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

WILBER EMERY.

Witnesses:

ALFRED A. EICKS,

JOHN C. HIGDON.