

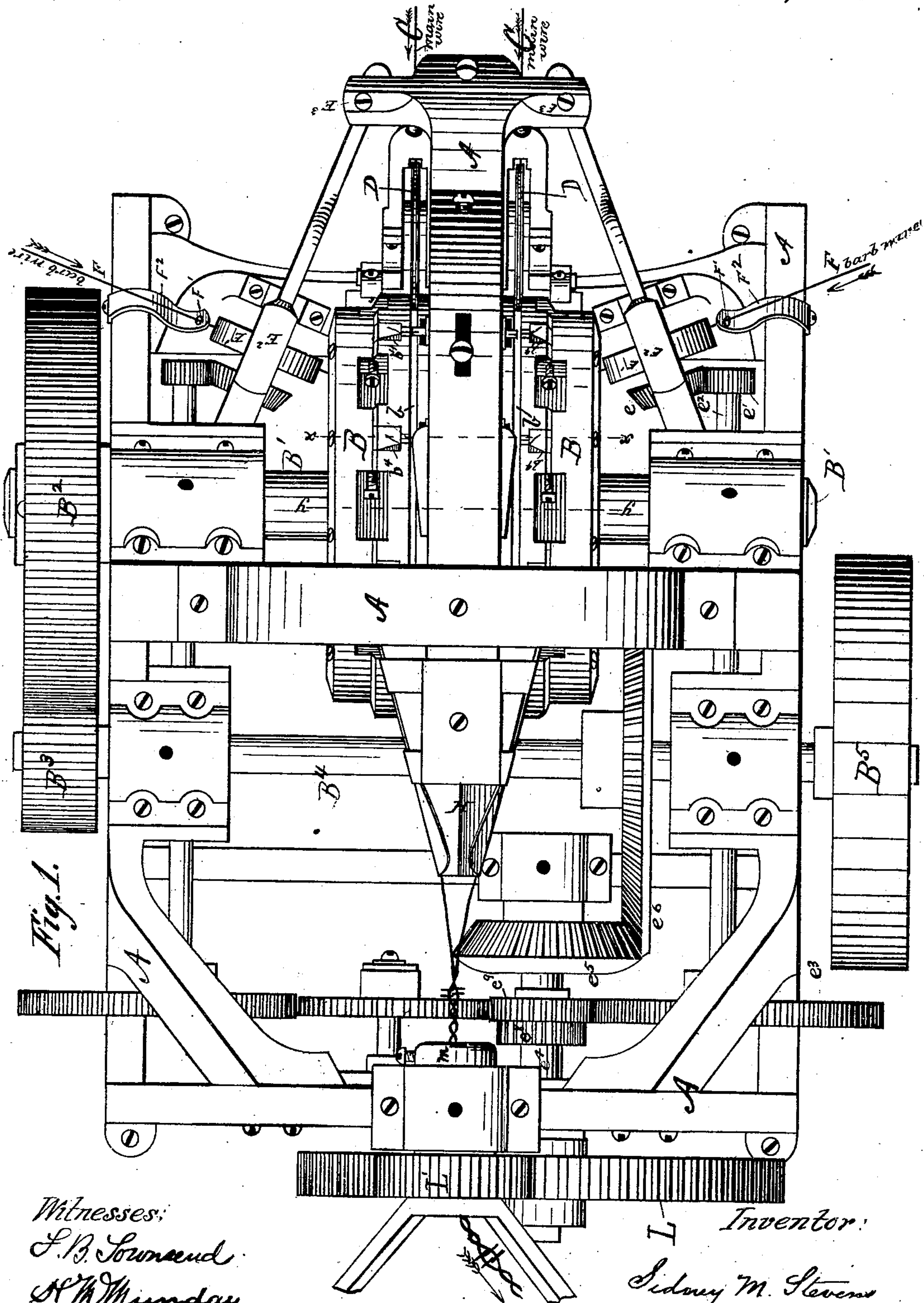
4 Sheets—Sheet I.

S. M. STEVENS.

Machine for Making Barbed Fence Wire.

No. 243,170.

Patented June 21, 1881.



Witnesses:

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Inventor:

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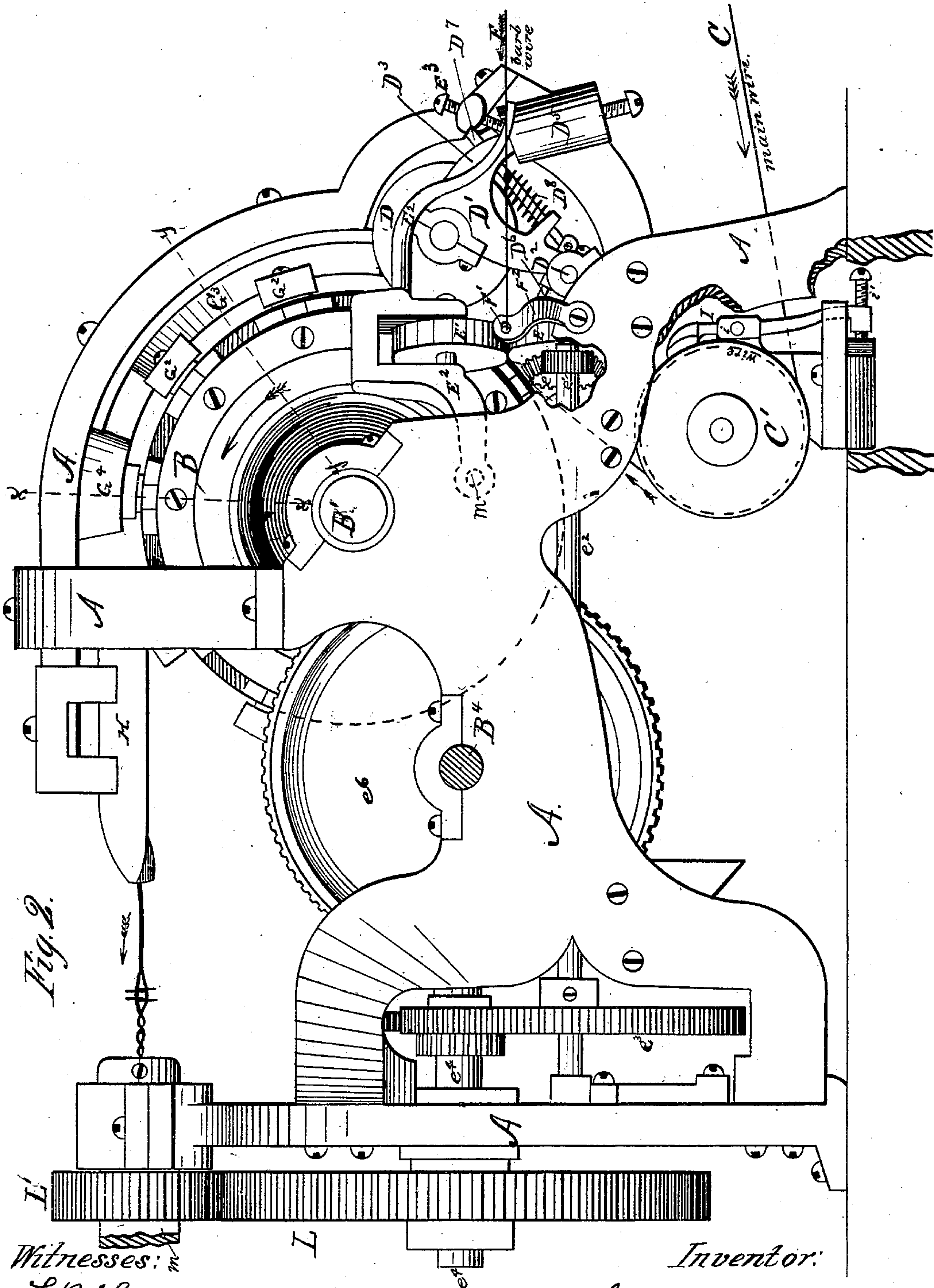


Fig. 2.

Witnesses:
F. B. Townsend
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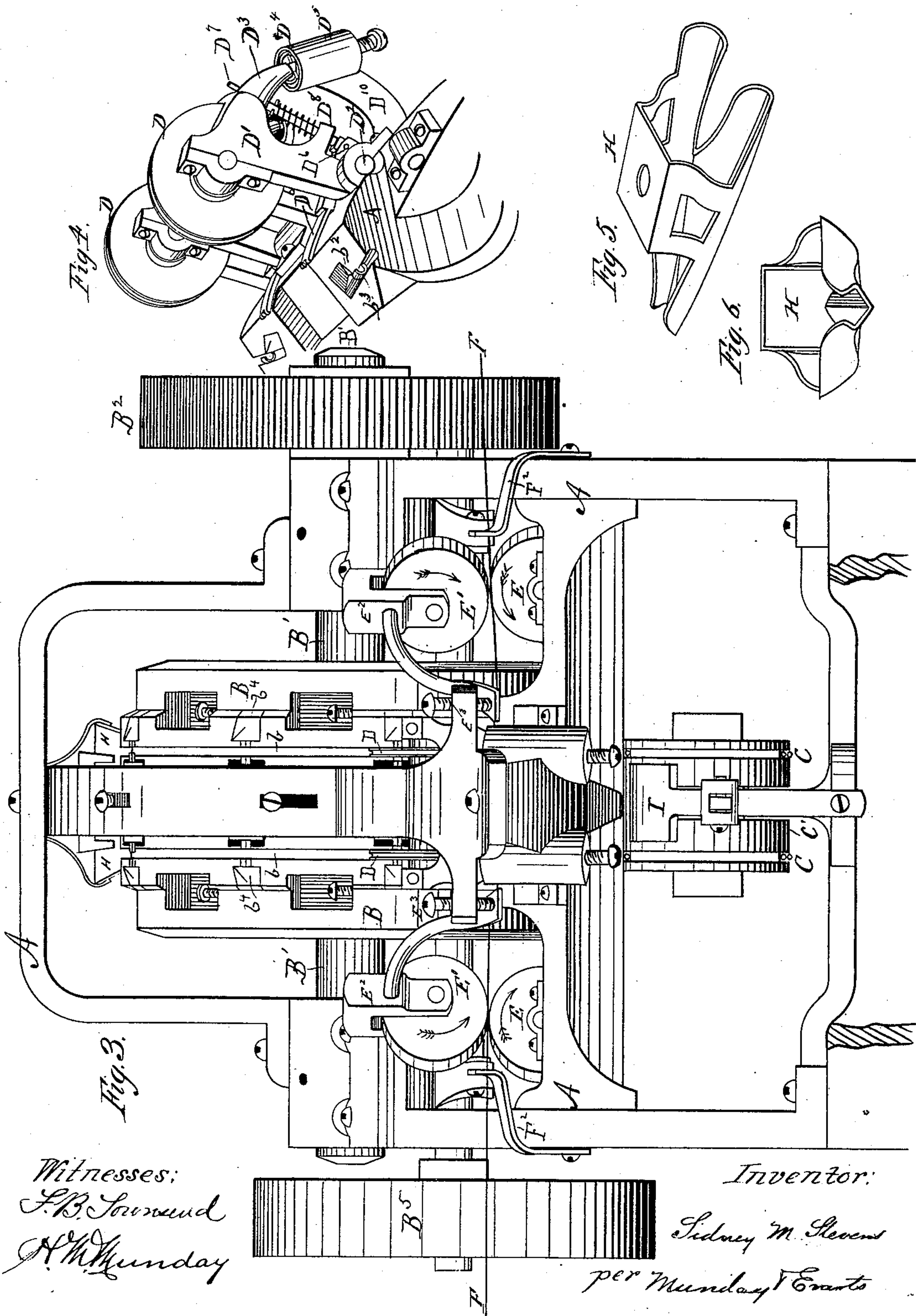
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S. M. STEVENS.

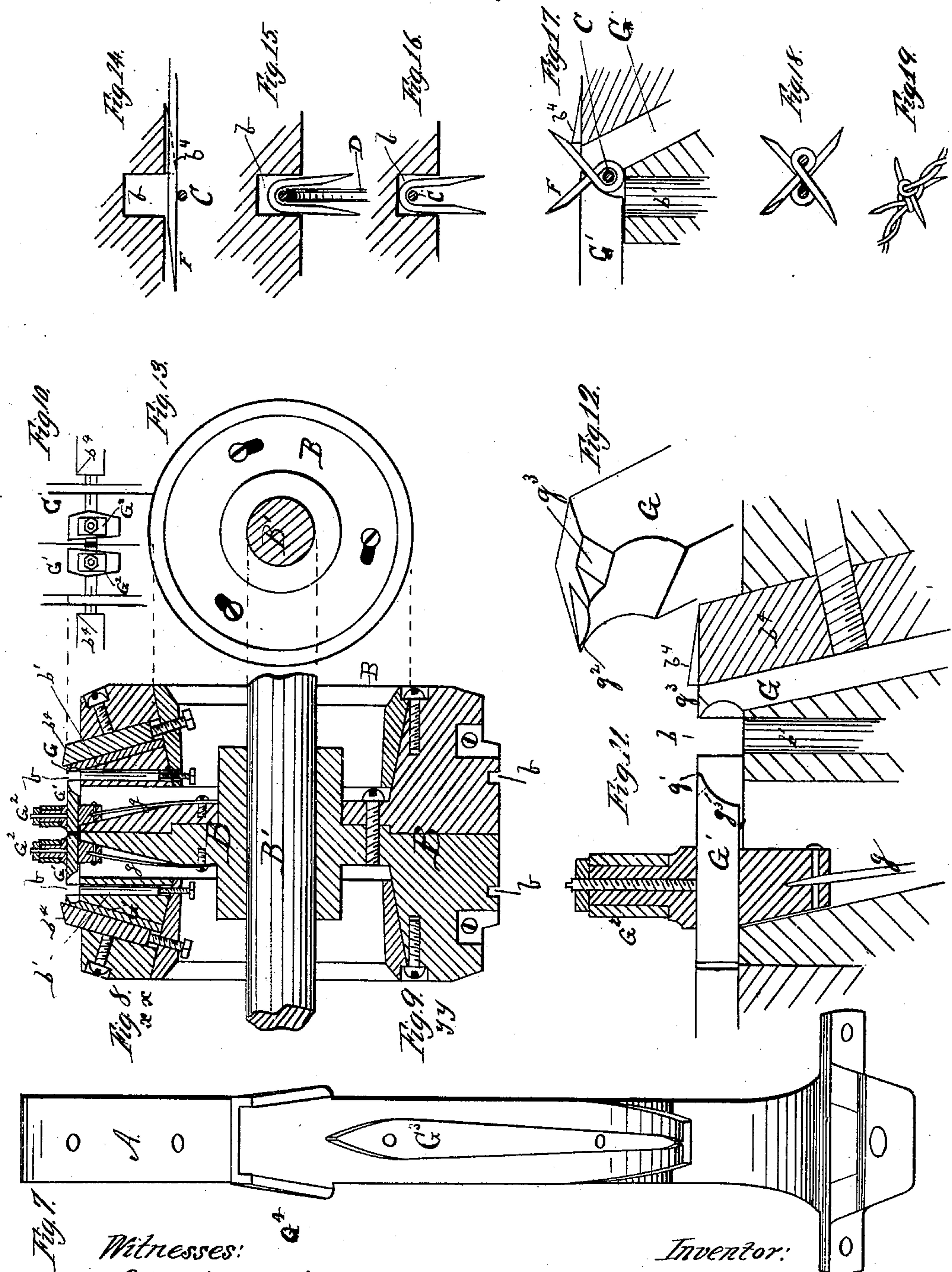
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UNITED STATES PATENT OFFICE.

SIDNEY M. STEVENS, OF DE KALB, ILLINOIS, ASSIGNOR OF ONE-HALF TO
JACOB HAISH, OF SAME PLACE.

MACHINE FOR MAKING BARBED FENCE-WIRES.

SPECIFICATION forming part of Letters Patent No. 243,170, dated June 21, 1881.

Application filed September 16, 1879.

To all whom it may concern:

Be it known that I, SIDNEY M. STEVENS, of De Kalb, in the county of De Kalb and State of Illinois, have invented a new and useful
5 Machine for Making Barbed Fence-Wires, of which the following is a specification.

My invention relates to machinery for automatically manufacturing barbed fence-wires, and is designed to greatly increase the speed
10 with which the operation may be performed.

In the accompanying drawings, Figure 1 is a top or plan view of the barb-applying mechanism, showing the machinery for barbing two strands of fence-wire simultaneously. Fig. 2
15 is a side elevation of the same. Fig. 3 is an end view of the same from the receiving end of the barbing mechanism. Fig. 4 is a perspective view of the stationary knives for cutting off the barb-wire, the guides for the barb-wire,
20 the grooved riding-wheel, to be hereinafter described, and their method of mounting. Fig. 5 is a perspective view of the guide for delivering the two strands of barb-wire to the twister, and Fig. 6 is an end view of the same.
25 Fig. 7 is an under-side view of the cam for operating the barb-clinching jaws. Fig. 8 is a section of the rim of the great wheel at the clinching-jaws upon line *x x* of Fig. 2. Fig. 9 is a continuation of the same section down
30 through the wheel. It also represents a section on the line *y y* of Fig. 2. Fig. 10 is a top view of the clinching-jaws and their heads. Fig. 11 is an enlarged section of the upper portion of a pair of the clinching-jaws. Fig. 12
35 is a perspective view, enlarged, of one of the clinching-jaws. Fig. 13 is a face view of a portion of the great wheel within the rim. Figs. 14, 15, 16, and 17 are diagrams of the positions of the fence-wire and barb-wire in
40 the groove at various stages of the operation. Fig. 18 is an end view of the completed double barb and strand, and Fig. 19 is a perspective of the same.

In the said drawings, A represents a suitable frame-work, preferably of metal, and very solid in structure, of such shape as to adapt it to support in proper relation to each other the various parts of the machine. The main feature of the machine is the great wheel B, which
50 I call the "barb-applying wheel." This wheel is fixed upon the shaft B', and is rotated in

the direction indicated by the arrow on Fig. 2, by means of the large gear-wheel B², rigidly attached to the shaft B', meshing into the pinion B³ on the shaft B⁴, which carries the band-wheel B⁵. This band-wheel is the drive-pulley from whence the whole mechanism receives its motive power.

The present machine is constructed to apply barbs to two wires, which are subsequently
60 twisted together to form a single cable, and hence the barb-applying wheel is furnished with two sets of barb-applying devices, only one set of which need be used in case a single wire is to be barbed, even where such single
65 wire is to be twisted with an unbarbed wire. Therefore, in describing the barb-applying mechanism, it will be sufficient to describe one set of the parts upon the wheel, with the explanation that these parts are duplicated on
70 the same wheel, there being in the periphery of the wheel two grooves for containing the main wire, two rider-pulleys for compressing the main wire into the grooves, two sets of feed-rolls, one at each side, for feeding in the
75 barb-wire, and two sets of pinching-jaws arranged at intervals for pinching the barbs on the main wire.

The wire-containing grooves in the great wheel are lettered *b*, and extend entirely around
80 the periphery of the wheel. Arranged within this groove, at intervals, are steel pins *b'*, having their upper ends flush with the bottom of the groove, and provided at their lower ends with a set-screw for setting them up as they wear
85 out by contact and friction with the barbs, which are applied at these points. In the machine shown in the drawings there are nine of these steel pins arranged at equal distances from each other around the wheel.
90

The main fence-wire C is brought into the machine in the direction indicated by the arrow on Fig. 2, is passed beneath the tension-pulley C' into a groove in said pulley, and, after being carried completely around said pulley, is
95 led from thence to the groove in the great wheel. A short distance above the point at which the main wire enters the groove in the great wheel is a rigid grooved rider-pulley, D, so mounted in a carriage, as will presently be explained, that
100 a kink or splice in the wire will throw it loose and permit the splice to pass. At all other

times, however, said rider sets firmly down upon the fence-wire.

EE' are feed-rolls for feeding in the barb-wire F. These feed-rolls, or rather the lower one of the pair, is rotated by the gearing $e e'$, e' being on the shaft e^2 , which receives motion by the gearing e^3 and e^9 from the shaft e^4 , which in turn receives its motion by the bevel-gearing $e^5 e^6$ from the shaft B⁴. The barb-wire F, led through an aperture, F', in the guide-piece F², is passed between the aforesaid feed-rolls E E', and by their action is fed across the face of the periphery of the great wheel B into the angle formed by the periphery of the great wheel and the main wire C as it enters the groove b , passing just in front of the knife b^2 , through the guide b^3 , (shown at Fig. 4,) where it remains until one of the knives, b^4 , in the periphery of the great wheel, of which there are nine, comes around and severs the barb-wire diagonally. The severed portion is caught by the main wire in the further revolution of the great wheel, and held against the periphery of said wheel by the pressure of the main wire upon it. The wire leading from the tension-pulley to the groove bears such a relation to the contour of the great wheel that at the moment the knife on the great wheel encounters the barb-wire and severs it by contact with the stationary knife, the fence-wire has commenced to exert a pressure upon the barb, so that by reason of the barb resting against the knife which has just severed it, and being subject to the pressure of the main wire, it cannot fall back or escape from being carried around by the great wheel. The barb lies now across the groove and is held from slipping in a direction reverse to the revolution of the great wheel by the knife b^4 , which has just severed it and which lies behind it. In order to insure the retention of the barb, the other end of the straight piece of barb-wire from which it is intended to form the barb lies in a hollow or depression in the clinching-jaw, presently to be described, located on the other side of the groove. Thus firmly held under the main wire and athwart the groove, in the position shown in Fig. 14, the barb is carried forward by the further rotation of the great wheel until it comes between the grooved rider-pulley and the great wheel, whereupon the pressure of the said rider-pulley forces the main wire and the barb-wire into the groove, in the manner indicated in Fig. 15, forming of the short piece of barb-wire a staple. This staple, held in the groove by the main wire, as indicated in Fig. 16, is carried on by the further revolution of the great wheel until the clinching-jaw, which has been lying idle thus far by the side of it, is brought into action, and the two ends of the staple thereby forced past each other into the shape shown in Fig. 17, which shows the position of the clinching-jaws at the moment the barb is formed.

The clinching-jaws referred to are arranged in pairs, one at each side of the groove and at the same place in the wheel as the steel-pins b' heretofore referred to. One of these jaws—

the one marked G—is stationary except so far as it moves with the wheel. The other one, G', is movable, being pivoted within the wheel in some cases, but in the instance shown in the drawings upon the spring g , the action of which is to keep it away from the groove. The top of this movable jaw G' is provided with a cam-head, G², which may, if preferred, be a roller. This head G², in the rotation of the great wheel, encounters a wedge-cam, G³, borne in the frame-work of the machine just above the great wheel. A bottom view of this cam is given at Fig. 7. The operation of this cam is to force the jaw G' out into the groove b against one limb of the staple. The edge, g' , of the jaw G' striking the staple close above the fence-wire, crowds the fence-wire across the groove b under the stationary-jaw G. The edge, g^2 , of the jaw G, in the meantime holds the other limb of the staple in such a manner that it is turned diagonally across the groove b into the inclined depression g^3 of jaw G'. The two points of the barb now stand in the position shown in Fig. 17. The further rotation of the great wheel beyond the influence of the wedge-cam G³ releases the barb by allowing the spring to throw the clamping-jaw back into its original position. In order, however, to insure this action if the spring should fail, I provide a returning-cam, G⁴, which strikes the head upon the other side and forces it back to the required position.

Of course it will be understood that the operation just described is repeated for each pair of clamping-jaws, so that the machine shown in the drawings will put on nine barbs at each revolution of the great wheel, and there being two grooves, it will in fact put on eighteen single, or two pointed barbs, or nine four-pointed barbs at each revolution. From the two grooves the two single wires, now duly barbed, are led out into the trough-shaped double guide H, the sides of which being inclined and acting upon the barbs as upon a lever, turn each of the wires so that when the two wires meet each other the points of the barb upon each of the wires will straddle the other wire in the manner indicated at Fig. 18; and the barbing devices in one of the grooves of the great wheel, arranged to operate an instant later than the devices in the other groove, will prevent the barbs from interfering with one another when the wires are brought together—that is to say, the barbs are thereby caused to lie adjacent to instead of exactly opposite each other, whereby neither interferes with the crotching within its points of the wire carrying the other barb; or, by adjusting and timing properly the operation of the devices in the two grooves, so that they shall operate simultaneously, and properly adapting the guide H, the points of the barb may be made to interlock. I prefer, however, the other method. The two wires thus barbed are brought together preparatory to being twisted, as shown at Fig. 19. The forward feed of the wires is accomplished by the

friction thereon while they lie in the great wheel, principally that caused by the rider-wheel. When released from the great wheel they pass to a suitable reeling device, which may also twist them. I will now return and describe some of the details which were omitted for the sake of continuity.

The tension-roller C' is provided with a pressure tension-lever, I, pivoted at *i* and provided with a set-screw, *i'*, producing greater or less friction upon the roller, and thus regulating the tension upon the main wire.

The upper feed-roller, E', is pivoted in a hinged lever, E², hinged at *m*, Fig. 1, one end of which rests under a screw, E³, whereby the tension of the feed-rolls may be regulated.

The grooved rider-pulley D is mounted in a frame, D', pivoted at D² to the main frame of the machine. This frame D' is furnished with a horn, D³, which rests against a spiral spring, D⁴, contained in the barrel D⁵, attached to an arm, D¹⁰, on the main frame of the machine. A small notched lever, D⁶, projects out below the riding-pulley D, and encounters with its notch the main fence-wire, not, however, coming in contact with the main fence-wire except in case of a splice or knot in the wire. The lever D⁶ is centrally pivoted, and at the other end from the notch is jointed to an upright rod, D⁷, held up by a spring, D⁸, which rests on the carriage D'. This upright rod D⁷ constitutes a latch, which, resting against the main frame of the machine, holds the rider-pulley and its frame rigidly against the fence-wire at all times except when a splice or knot in the fence-wire strikes against the under side of the lever D⁶, and by raising said lever releases the latch, thus permitting the rider and its carriage to yield backward against the spring D⁴ as the splice or knot passes under the lever D⁶. After the splice or other obstruction has passed, the spring D⁴ returns the carriage and pulley to its normal position, where it is latched rigidly by the latch until another obstruction presents itself. This contrivance avoids the strain of running the splices of the fence-wire under the rider-pulley, and prevents the difficulty which might occur if it were attempted to apply a barb at the splice, as the loosening of the fence-wire, or, rather, the absence of the pressure of the rider-pulley, would cause the straight piece of barb-wire to ride over the great wheel unformed.

In order that the two sets of barbing devices upon the great wheel may be adjusted to operate either simultaneously or at a slight interval from each other, I make said wheel preferably in two parts, the line of separation of the two parts being indicated in Figs. 8 and 9, there being a groove and barbing appliances in each part. These two parts I secure together by bolts passing through slotted apertures, as indicated at Fig. 13, the slots being circular and concentric with the wheel, so that by loosening the bolts one of the halves of the wheel may be turned and adjusted. One of the parts

is, of course, rigidly attached to the shaft, in order that both may be carried by it.

The stationary clamping-jaws and the knives are all preferably provided with set-screws, whereby they may be adjusted.

It will be understood from the above description that the feed of both the fence-wire and the barb-wire is continuous, the great wheel cutting off and applying the barbs as fast as the feed-rolls feed the barb-wire in, the only timing necessary being the relative speeding of the barb-feed with that of the fence-wire. If the relative speed of the feed-roll E is increased, the result will be a longer barb; if diminished, it will result in a shorter barb. When any change in this particular is desired, I move the gears by which the feed-rolls are operated so that they are actuated by the gear e⁸, which may be either larger or smaller than the gear e⁹, shown as actuating them.

Of course, it will be understood that both the fence and the barb wire, before being led into the machine, may be wound upon suitable spools or reels, which, however, are not shown.

It will be understood by those skilled in the art that, by the mechanism hereinbefore described, barbs may be applied at a much greater rate of speed than in any of the machines thus far in use.

I claim—

1. A barb-fence machine wherein mechanisms for closing the barb upon the wire are mounted upon a wheel rotating in the direction of the feed of the fence-wire, substantially as specified.

2. A barbing-machine wherein the devices for closing the barb upon the fence-wire are mounted upon a wheel rotating continuously in the direction of the feed of the fence-wire, substantially as specified.

3. A barbing-machine wherein the devices for closing the barb upon the wire are mounted upon a wheel rotating continuously in the direction of the passage of the fence-wire and at the same speed therewith, substantially as specified.

4. In a barbing mechanism, the combination of a grooved wheel for receiving the fence-wire provided with barbing-jaws for closing the barbs upon the wire or wires contained in said groove or grooves, substantially as specified.

5. In a barbing mechanism, the combination of a wheel grooved upon its periphery to receive the fence-wire and barb-applying devices, also mounted upon the periphery of said wheel, substantially as specified.

6. The combination, with a grooved barb-applying wheel, of a riding-wheel running in the groove and upon the fence-wire, and a barb-feeding device so located as to feed the barb-wire in the angle between the fence-wire and the barbing-wheel, so that the fence-wire shall clamp the barb-wire in place, substantially as specified.

7. The combination, with a grooved barb-applying wheel and a tension or other device for

guiding the fence-wire to said wheel, of a barb-feeding device located so as to feed the barb-wire into the angle between the wheel and the fence-wire, whereby the barb is caused to be clamped between the fence-wire and the wheel, substantially as specified.

8. A barbing-machine wherein the devices for closing the barb upon the wire are mounted upon a wheel rotating with the feed of the fence-wire and are actuated by stationary cams with which such applying devices come in contact by the rotation of said wheel, substantially as specified.

9. In combination with the grooved barbing-wheel, a tension-wheel for producing proper tension on the fence-wires and for keeping the wire in the groove, substantially as specified.

10. The rider-wheel provided with a trip connected with devices for releasing said wheel from its rigid holding and placed near the incoming wire, so that it will be operated by a splice or enlargement on the fence-wire, substantially as specified.

11. The rider-wheel mounted in a carriage which, when occasion requires, may yield to the passage of splices and other enlargements, in combination with a trip operated by the splice or other obstruction, and connected to the carriage-holding devices and causing such yield, substantially as specified.

12. In a machine for making barb-wire by a continuous operation, the combination of tension or other mechanism constructed to guide the main wire, mechanism constructed to continuously feed forward the barb-wire across the main wire, mechanism for cutting off the barb-wire, and mechanism for feeding forward the main wire continuously and for bending the barb-wire around the fence-wire, substantially as set forth.

13. A barb-fence machine wherein the fence-wires are passed over a wheel rotating in the direction said wires are fed, said wheel being provided with devices for closing the barb upon the wire, which are operated while the wire is riding upon the wheel, substantially as specified.

14. In a wire-barbing machine, the combina-

tion, with the great wheel, having a peripheral groove wherein the fence-wire lies while it is being barbed, and mechanism for feeding the barb-wire across said groove and for severing the barb, of the rider-wheel entering said groove and bending the barb into the same, substantially as set forth.

15. The combination of the grooved great wheel and a rider-wheel, the latter being rigid except when a splice or other enlargement is passing under it, substantially as specified.

16. The clinching-jaws, constructed as specified, in combination with their operating devices, substantially as set forth.

17. The combination, with the movable clinching-jaw, of the cam for forcing it out to its work and the cam for returning it to its normal position, substantially as specified.

18. The combination of the barbing-wheel having two series of barbing devices, and the trough-guide for bringing the barbed wires together in position for twisting, substantially as specified.

19. In a barbing mechanism wherein both the main fence-wire and the barb-wire are fed continuously, a device for changing the speed of the barb-feeding appliances, substantially as specified, so that the length of the barb may be changed.

20. The combination, with a barbing-machine, of a trough-shaped stationary guide for turning or rotating the barbs as they leave the barb-applying devices, substantially as specified.

21. The great wheel provided with two grooves and two sets of barbing appliances and made in two parts, adjustable upon each other, so that the two sets of barbing appliances may be made to work simultaneously or one after the other, substantially as specified.

In testimony that I claim the above I hereto set my hand this 6th day of September, A. D. 1879.

SIDNEY M. STEVENS.

Witnesses:

EDW. S. EVARTS,
H. M. MUNDAY.