(No Model.) 4 Sheets—Sheet 1.

A. JOHNSTON.

MACHINE FOR BARBING WIRE.

No. 273,286. Patented Mar. 6, 1883.

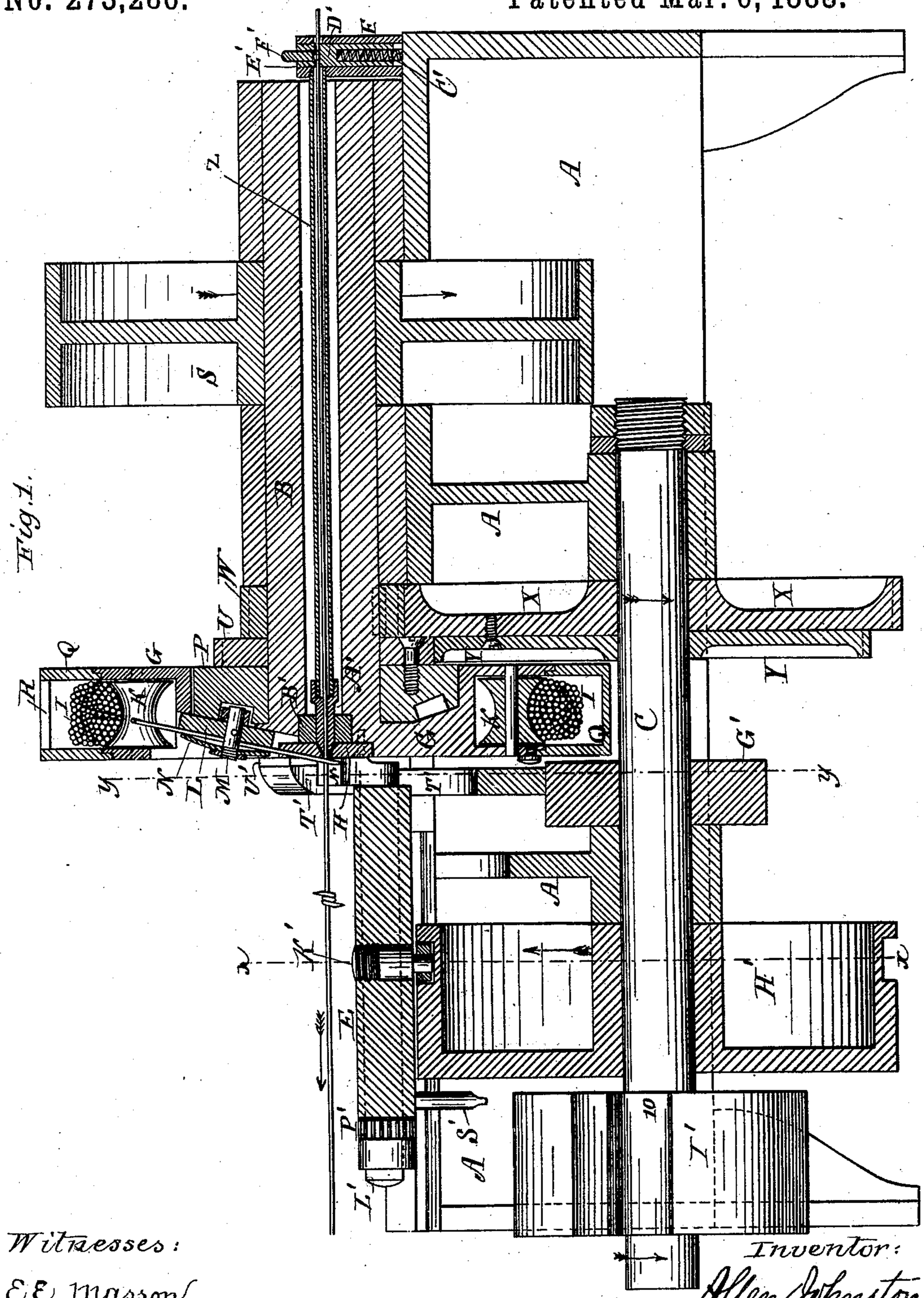

Fig. 1.

Witnesses:

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Philip Hamer

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his attorney

(No Model.) 4 Sheets—Sheet 2.

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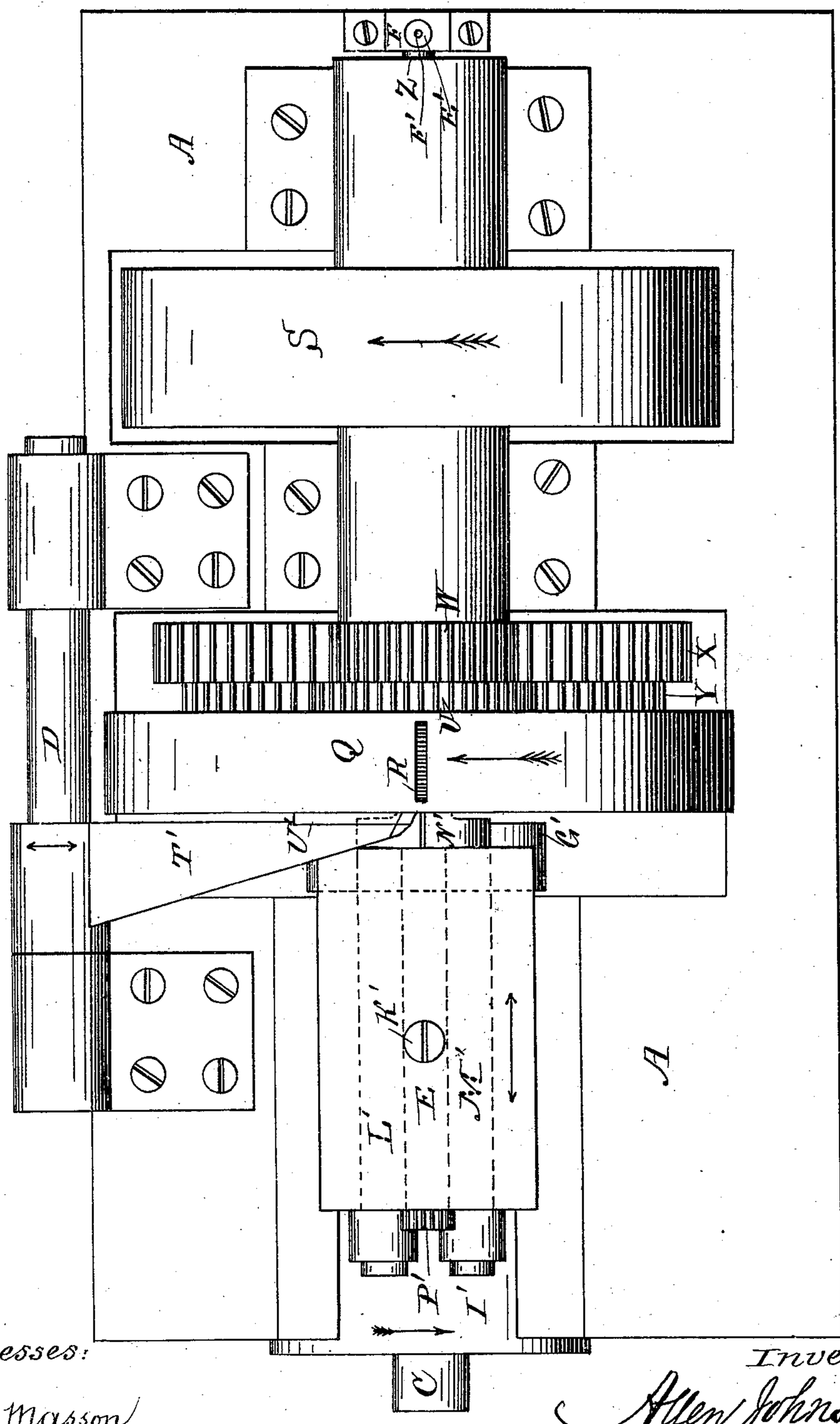

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

A. JOHNSTON.

MACHINE FOR BARBING WIRE.

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Fig. 1.

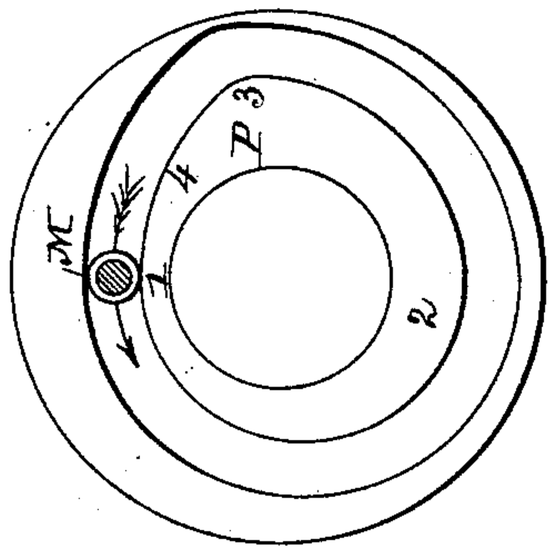


Fig. 3

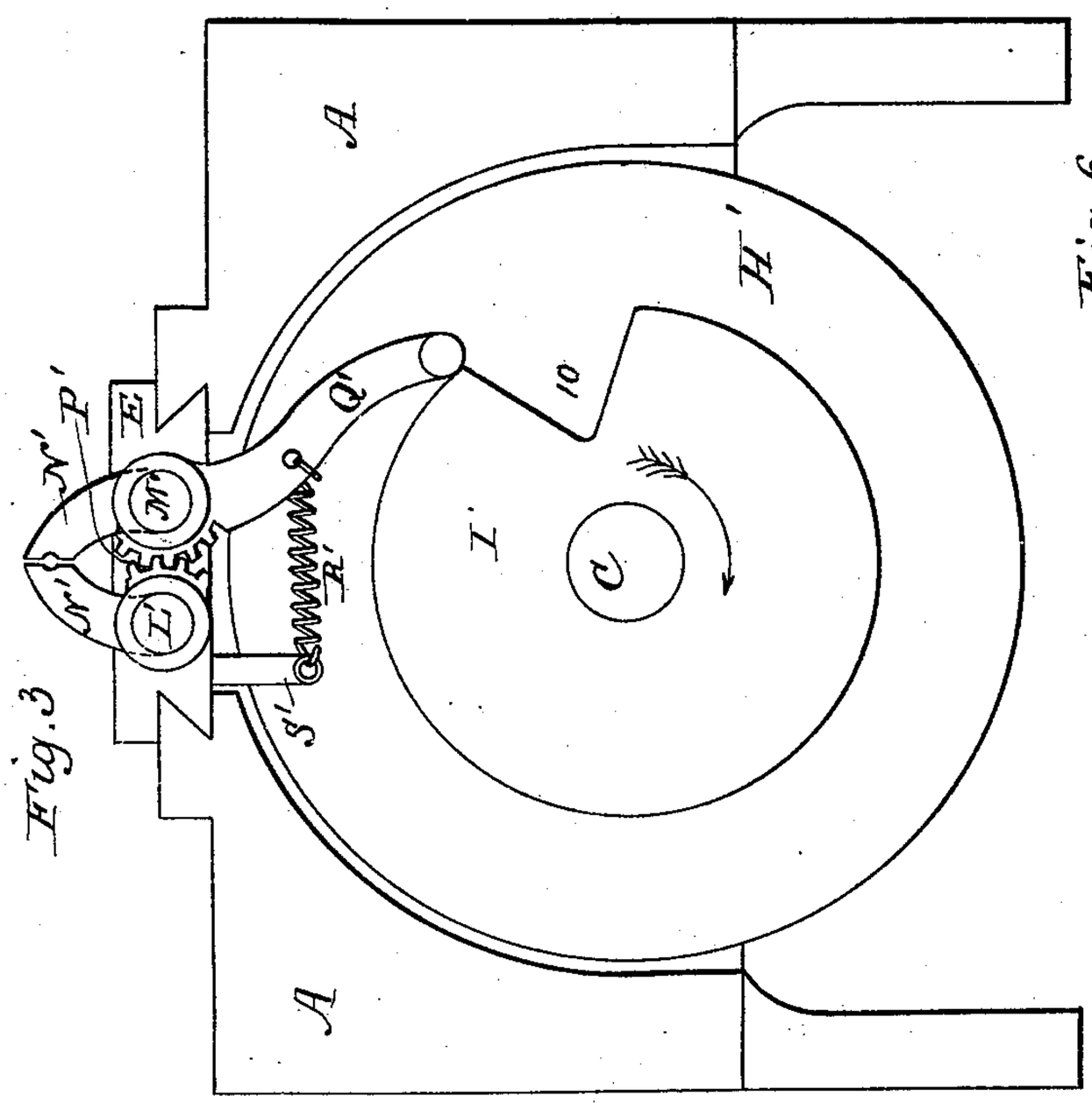
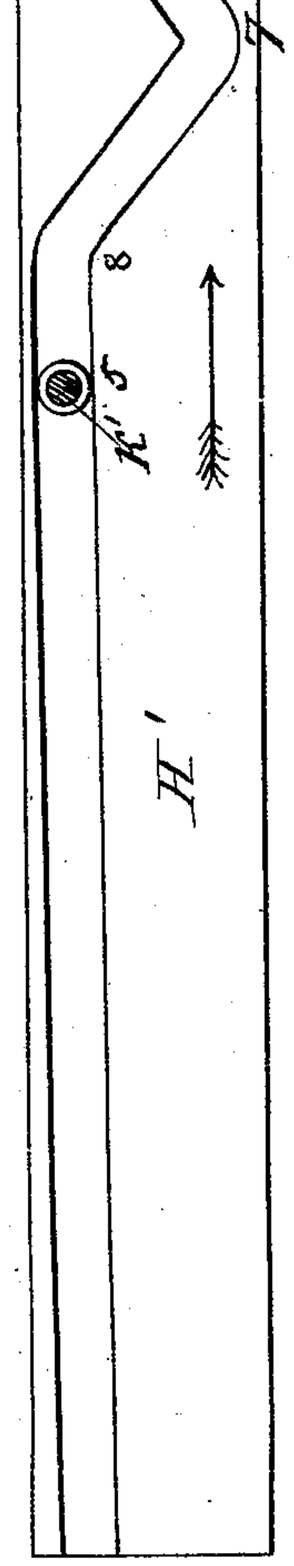


Fig. 6.



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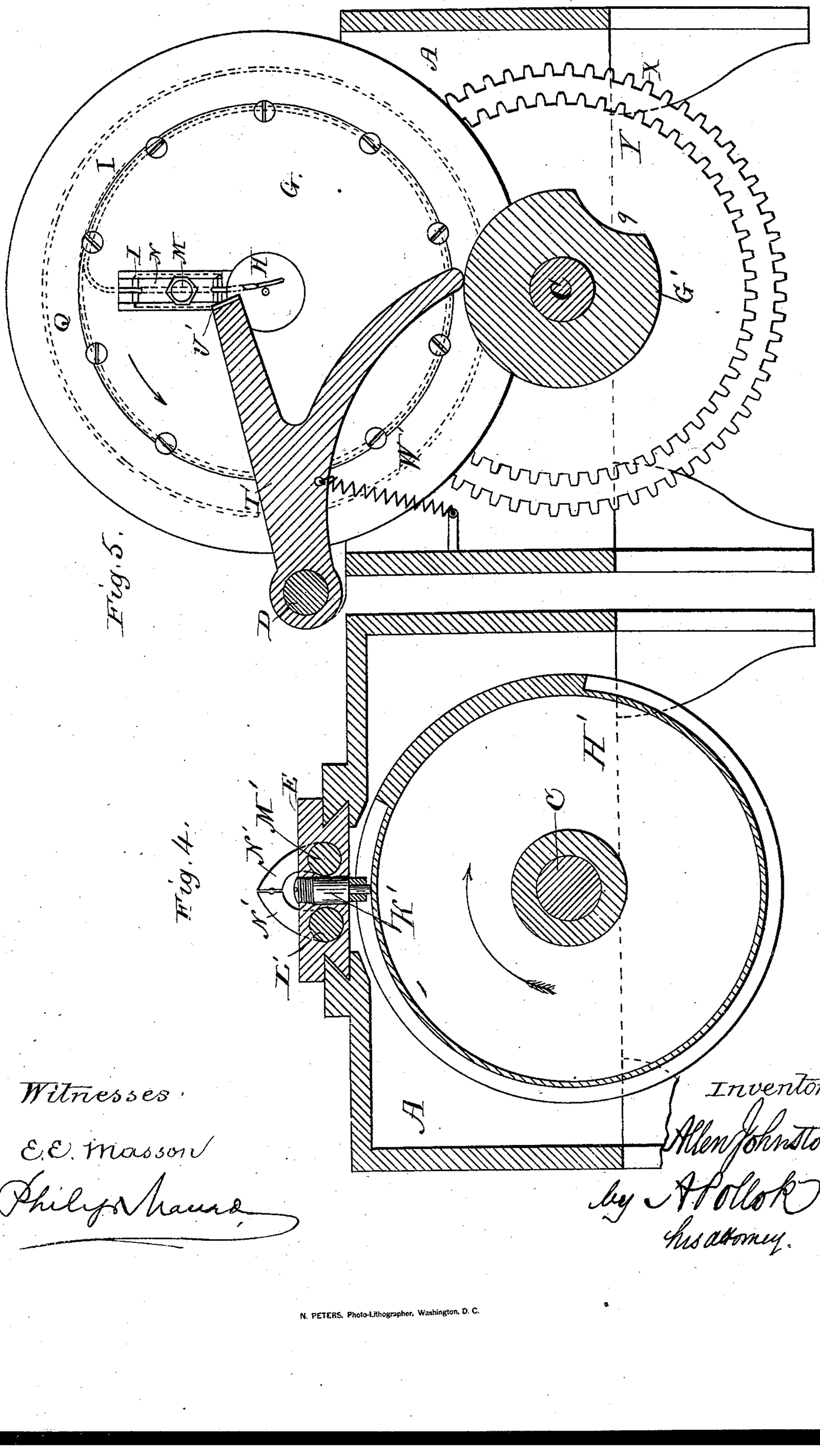
(No Model.) 4 Sheets—Sheet 4.

A. JOHNSTON.

MACHINE FOR BARBING WIRE.

No. 273,286. Patented Mar. 6, 1883.



Witnesses:

E. E. Masson

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Allen Johnston

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UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

MACHINE FOR BARBING WIRE.

SPECIFICATION forming part of Letters Patent No. 273,286, dated March 6, 1883.

Application filed December 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALLEN JOHNSTON, of Ottumwa, Wapello county, Iowa, have invented a new and useful Improvement in Machines for Making Barbed Wire, which improvement is fully set forth in following specification.

The invention has reference more particularly to machines for making barbed-wire fencing, in which the wire for making the barbs is carried by and delivered from a revolving support turning around the strand-wire, instead of from a stationary support at the side of the strand-wire, although it is in part applicable to other kinds of machines.

It comprises a barb-applying mechanism operating on a new principle, an improved feeder for the wire for making the barbs, or the "barb-wire," as it will be hereinafter called, a new barbing-clamp, and a strand-wire feeder for aiding in the application of the barbs and for advancing the strand-wire, and also certain special constructions, combinations, and arrangements of parts in the machine.

The object of the invention is to make a simple rapidly-operating machine, not liable to get out of order, and efficient in the application of the barbs.

The new principle of operation in barbing is the holding of the free end of the barb-wire and the wrapping of the said wire from its crossing with the strand-wire inward toward the body of the wire by the revolution of the spool or body of barb-wire around the strand-wire. After the wrapping, the barb is severed from the body of the wire. Heretofore the barbs have been severed from the body of the barb-wire after application to the strand-wire, but in all such cases, so far as I am aware, the free end of the barb has been wrapped around the strand-wire, so that the wrapping proceeds from the crossing with the strand-wire outward or toward the free end of the barb instead of inward, as in the present invention.

The improved barb-wire feeder comprises a feed-clamp or its equivalent, its support, and operating-cam or equivalent, in combination with mechanism for revolving said support and cam at different speeds, so that the said feed-clamp will be operated in any desired number of revolutions of its support, according to difference in velocity of said support and the said cam.

The new barbing-clamp comprises jaws arranged to hold the end of the barb-wire and to clamp it against the strand-wire. The strand-wire feeder comprises jaws mounted on a slide and adapted to clamp the strand-wires and advance the same. By mounting the jaws of the barbing-clamp upon the slide they will serve the double purpose of holding the barb-wire in barbing and advancing the strand-wire after the application and severance of the barb.

The other improvements, including the manner of combining the foregoing into one machine, will be hereinafter specified.

The accompanying drawings, which form a part of this specification, represent a barbed-fence machine constructed in accordance with the invention.

Figure 1 is a central longitudinal vertical section, partly in elevation; Fig. 2, a plan; Fig. 3, an end elevation; and Figs. 4 and 5, vertical cross-sections of the machine on lines *x x* and *y y*, Fig. 1, respectively. Fig. 6 is a development of the cylindrical cam for advancing the strand-wire, and Fig. 7 an elevation of the cam for feeding the barb-wire.

A is the machine-frame, by which the other parts are supported directly or indirectly. The hollow spindle B, the cam-shaft C, and the rock-shaft D are journaled in bearings, and the slide E is mounted in ways in or on said frame, and the bracket F is bolted thereto. The barbing-head G is made in one piece with the spindle B by casting or otherwise, or it is fastened thereto. It revolves with said spindle. It is provided with a barb-wire holder and guide, H, through which the barb-wire is delivered, and by which the said wire is carried around the strand-wire. As shown, the holder and guide is formed by a ring or washer bolted to the head; but it may be otherwise formed. The ring or washer has a hole drilled obliquely through it for the passage of the barb-wire. Near its circumference the head is made hollow to receive the coil I of barb-wire, which is wound in the space circumferentially—that is, it is wound upon the body of the head as on a spool. The coil is supported upon anti-friction rollers K, to allow it to be

drawn around independently of the head, so as to deliver up the barb-wire.

Between the coil I and the holder and guide H is placed the barb-wire feeder, comprising the slide L, mounted in nearly radial ways of the head, the pin M, fixed in said slide, the spring-plate N, fitting over the pin, and bearing at the ends against the slide, and the nut engaging the outer end of the pin M and holding down the spring-plate N. The barb-wire from the inside of the coil I is passed between the spring-plate N and slide L, which form the jaws of a clamp, through a hole in the pin M, and thence through the holder and guide H. The slide L being moved by the cam P, as explained below, toward the center or axis of the head, the clamp holds the barb-wire and draws a certain length of it from the coil I, and feeds the same length through the holder and guide H. When it is moved back away from the center the end of the barb-wire is held stationary by means described below, and the clamp slips over the wire. The ends of the spring-plate N are preferably notched to fit over the wire, as shown in Fig. 5. The barb-wire is either placed on the head, as a coil already made, or it is wound into the head. The construction of head shown admits of either mode of proceeding. The annular rim Q is separate from the body of the head, and is held in place by overlapping flanges and screws. The flanges hold the rim from movement in one direction and the screw-heads from movement in the other, while at the same time the rim is left free to turn on the body of the head.

By removing the screws, the rim can be taken off, a coil of wire put in, and the rim then replaced. It may be said, however, that, as shown, the other parts of the machine are not adapted to permit the removal of the rim. It is, in fact, deemed more advantageous to wind the wire into the head. For this purpose the periphery of the rim has a hole or preferably a cross-slot, R, through which the wire is passed, one end of the barb-wire being held, say, between the spring-plate N and slide L. The revolution of the head G will wind the wire thereon. During the winding the rim is kept stationary, but when all the wire has been drawn into the rim it is allowed to revolve with the head. The periphery of the rim, being closed, prevents the last end of the wire being thrown out by the centrifugal force. If the wire end were otherwise secured, there would be no need of closing the periphery, and the periphery being open across the entire width or partially there would be no need of a separate rim. Flanges integral with the body of the head could be used to retain the wire in position. The wire can be wound into the head before the barbing commences or while the barbing is progressing. The barbing-head and its spindle are revolved by a belt on the pulley S, or by other appropriate means.

The slide L is reciprocated by the grooved cam P, the pin M fitting into the groove in the inner face of said cam, or face adjacent to the barbing-head. To the outer face of the cam a spur-gear, U, is fastened by screws. Both cam P and gear U are mounted loosely on the spindle B. The spur-gear W is keyed to the spindle and engages the gear X, to which is fastened the gear Y, and this engages the gear U. Through these gears the cam P is driven in the same direction as the barbing-head and its spindle, but at a different speed. As shown, the gears reduce the velocity, so that the head and spindle outrun the cam; but accelerating gears could be substituted without altering the principle of operation. The difference in the relative velocities depends upon the number of turns the barbs are to have around the strand-wire and the shape of the cam P. In the machine represented, the cam makes two revolutions to three of the head, and has two reverse inclines—to wit, at 1 2 3 a gradual incline, and at 3 4 1 a sharp incline. Both the head G and the cam P revolve in the direction of the arrow, (see Fig. 7,) and the pin M, which is carried by the head, will therefore in each three revolutions of the said head make a complete circuit of the cam-groove in that direction, and will pass successively the points 1 2 3 4. The said pin and the slide L, in which it is fixed, will therefore by the incline 1 2 3 be moved gradually outward toward the periphery of the barbing-head during two and one-half revolutions, or thereabout, (which is while the barb-wire is wrapping around the strand-wire,) and will then in the remaining half-revolution be moved by the incline 3 4 1 rapidly toward the center to feed the wire, ready for wrapping a new barb.

It is obvious that the shape of the cam, the number of reverse inclines, and the differential velocity can be altered within wide limits. The slide could be made to pause at the end of its stroke in either direction by making the cam of the proper shape.

In the interior of the hollow spindle is a non-rotating strand-wire holder, Z. It comprises a tube screwed at its outer end (right hand, Fig. 1) into the bracket F, and a tip, A′, screwed to the inner end of the tube. The said tip A′ is supported and centered in the head G by the loose ring B′ and the barb-wire holder and guide H.

In the bracket F is a brake for applying friction to the strand-wire. It comprises the spring C′, the follower D′, and the nut E′. The spring presses the follower against the nut, so that they clamp the wire between them. The follower has a projection, F′, passing through the nut. By pressing upon said projection the follower may be moved down to release the wire. The nut E′ can be adjusted to center the wire in the tube.

The gear X is keyed or otherwise fastened to the cam-shaft C, so that the said shaft derives motion through it and the gear W from the spindle B. In the machine shown, the cam-shaft makes one revolution to three of the spindle; but this proportion may be varied.

On the shaft C are keyed or otherwise fast-

ened the cams G′ H′ I′. The cam H′ is a drum grooved on its periphery. The pin K′, tapped into the slide E, works in said groove, so that by the revolutions of the cam the said slide is reciprocated in its ways. The preferred shape of the cam-groove is shown in Fig. 6—that is to say, it has two reverse inclines and a straight portion—so that the slide is reciprocated once in each revolution, and is made to pause at the end of its stroke. Of the inclines one is composed of a member, 5 6, with gradual slope, (so as to move the slide slowly,) and a second member, 6 7, having a steep slope, (so as to move the slide rapidly,) while the second incline, 7 8, has a steep slope, (so as to return the slide rapidly.) Between 8 5 is the straight portion. The cam revolves in the direction of the arrow, and moves the slide outward, (to the left, Fig. 1,) slowly at first (while the barb is applying) and then rapidly, (to feed the strand-wire,) and then returns it quickly for a new operation.

Journaled in bearings in the slide E are two rock-shafts, L′ M′, carrying clamping-jaws N′ at their inner ends, and geared together by sectors P′ at their outer ends. A depending arm, Q′, on the rock-shaft M′, bears at its outer end upon the periphery of the cam I′, and it is also connected by the spiral tension-spring R′ with the pin S′, fixed in the slide. The cam I′ has its periphery notched at 10. (See Fig. 3.) When the notch comes opposite the end of the arm Q′ the spring R′ draws it into the notch and turns the rock-shafts L′ M′ so as to separate the jaws N′. The faces of the jaws should be slightly recessed to receive the strand-wire and the barb-wire, so that they take firm hold of them. The rock-shafts and their accessories are carried back and forth with the slide E.

The cam I′ is made broad-faced, so that it is always under the arm Q′. The cams I′ H′ are so fixed in relation to each other that the notch 10 is under the arm Q′ while the incline 7 8 moves over the pin K′. The jaws have therefore the following four successive motions, to wit: Being closed, they are moved outward, (to the left, Fig. 1,) carrying the wire with them; they are opened, releasing the wire; they are returned inward without the wire, and they are closed to clamp the wire between them.

Upon the rock-shaft D is keyed or otherwise fastened the cutter-frame T′, one arm of which rests upon the cam G′, while the other arm carries the knife or cutter U′, which severs the barbs from the barb-wire. The cam G′ is notched at 9 to allow the cutter to come into contact with the barb-wire. The weight of the cutter-frame tends to make it drop when released by the cam G′, and, as shown, this tendency is assisted by the tension-spring W′.

The holder and guide H for the barb-wire co-operates with the knife or cutter U in severing the wire. The barb-wire being delivered through an oblique hole in said holder and guide, the edge of this hole which is farthest from the knife or cutter U at the time of severing the barb-wire acts as the second cutting-edge of a pair of shears, of which the edge of the knife or cutter U is the first.

Having thus explained in detail the construction and operation of the several parts of the machine, the operation as a whole will now be described.

The follower in bracket F being depressed, the strand-wire is inserted through the bracket F, tube Z, tip A′, and is thence passed between the jaws N′ and carried to a spooler (not shown) of any ordinary or suitable construction. The end of the barb-wire is passed downward between the spring-plate N and slide L. This may be done before or after the head has been filled with the barb-wire, as before indicated. If before, then the barb-wire will be wound into the head as the barbing proceeds. Power being applied to the pulley S, the spindle B and cam-shaft C, with their cams and gears, are rotated in the direction of the arrows. As shown, the slide is at its inmost point, having fed down the barb-wire across the strand-wire, and slightly oblique thereto. The slide E is at the inner end of its stroke. The jaws N′ are closed upon the strand-wire and the projecting end of the barb-wire and press them together. The cutter or knife U′ is raised away from the barb-wire. The continued revolution of the barbing-head wraps the barb-wire around the strand-wire, the winding proceeding from the point of crossing with the strand-wire toward the body of the wire. As the wrapping advances the slide E is withdrawn enough to allow the several coils to be laid closely side by side. The supply of barb-wire for wrapping is drawn from the coil I between the spring-plate N and slide L. These parts act therefore as a tension upon the barb-wire and cause it to be wrapped evenly and tightly upon the strand-wire. Just before the barbing-head has finished wrapping the barb-wire around the strand-wire the cutter-frame is released by the cam G′ and drops, bringing the knife or cutter U′ in the path of the barb-wire. The latter, by further revolutions of the head, is carried against and across the knife's edge and is severed diagonally, leaving the barb attached to the strand-wire, while the body of the barb-wire continues its revolution with the barbing-head. While this has been happening the slide has been drawn back or outward, ready for a new feed. Immediately upon this severance of the barb-wire the slide E, with the strand-wire and attached barb, is moved rapidly away from the barbing-head, drawing a new length of strand-wire through the bracket F and strand-wire holder Z A′. Simultaneously the slide L begins to move inward to feed the end of the barb-wire across the strand-wire, the jaws N′ are opened, they, with the slide E, are returned, and so soon as the feed of the barb-wire is complete they resume their hold upon the wires, the slide E being for the time stationary. The same cycle of operations is then repeated indefinitely.

The machine shown barbs a single strand-wire. By introducing two or more strand-

wires, twisted or otherwise, through the holder Z A′ it will apply barbs thereto in the same manner. No material alteration will be necessary. If it be desired to have one end of the barb thrust between two strand-wires, the strand-wire holder may have two separate openings in the tip for the two strand-wires. The strand-wires might be relied upon to hold fast the end of the barb-wire. The machine may be adapted to apply two or more barbs simultaneously. Various other modifications could be made without departing from the spirit of the invention. Those just indicated are not claimed herein, except as the modified machines embody principles of operation or of structure in common with that shown.

The specific modifications may form the subject of separate patents.

The single-strand fencing shown in Fig. 1 may be used with or without other wires. It is designed, however, to twist with the barbed strand a plain strand in the manner and by the means well known to those skilled in the art, or by any suitable means.

Portions of the invention may be used separately. Parts of the machine shown without materially altering their construction or individual operation could be used in machines having as a whole a different operation from that described, and similarly the parts of the machine may be altered without material change in the general principle of the machine. A revolving support for the barb could be obtained without employing the barbing-head as a spool—as, for example, a spool mounted on some other part of the spindle.

Instead of a cam and clamp for feeding the barb-wire, other devices, equivalents thereof, could be used—such, for example, as mutilated gears and feed-wheels.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim is—

1. In a barbed-fence machine, and in combination with strand-wire supporting means, barbing mechanism for thrusting the barb-wire across the strand-wire, leaving the end thereof projecting beyond the strand-wire, and for wrapping around the strand-wire that portion of the barb-wire which is between the crossing of the barb and strand wires and the barb-wire coil or spool while such portion is still connected with the barb coil or spool, in contradistinction to barbing mechanism for wrapping the free end of the barb-wire or free ends of loose barbs around the strand-wire, substantially as described.

2. The combination, with strand-wire-supporting means, of barbing mechanism for feeding the barb-wire across the strand-wire, and for wrapping around the latter the portion of the barb-wire between said crossing and the body or coil of said barb-wire, and cutting means for severing the barbs from the barb-wire after wrapping, substantially as described.

3. The combination of strand-wire supports, an automatic feeder for the strand-wire, an automatic barbing mechanism for wrapping the barb-wire around the strand-wire, beginning at the crossing with said strand-wire and proceeding toward the body or coil of the barb-wire, and automatic mechanism for severing the barb-wire after wrapping, substantially as described.

4. The combination of a revolving barbing-head and support for the barb-wire, with means for holding the end of the barb-wire, and with strand-wire supports for upholding without rotating the strand-wire, substantially as described.

5. The combination, with a revolving barbing-head, of a barb-wire feeder carried by said head and a cam revolving in the same direction as said head and at a different speed for operating said feeder, substantially as described.

6. The combination of a revolving barbing-head, a slide supported in ways of said head, a barb-wire feed-clamp carried by said slide, a cam for reciprocating said slide, and mechanism for revolving the cam in the same direction as the head and at a different speed, substantially as described.

7. The combination, with strand-wire supports and barbing mechanism for drawing the barb-wire from a spool or coil and wrapping the said barb-wire around the strand-wire, of means for applying tension to the barb-wire aforesaid during said wrapping, substantially as described.

8. A barbing-head constructed to form a spool to receive the barb-wire, so that the said wire may be supported thereon as a circumferential coil, substantially as described.

9. A barbing-head and barb-wire spool, in combination with a barb-wire holder and guide and a feeder placed between the circumference of said spool and the said holder and guide, substantially as described.

10. The barbing-head having a separate rim movable independently of the body of said head, substantially as described.

11. The barbing-head having near its periphery a ring of rollers upon which the coil of barb-wire may be supported, substantially as described.

12. The combination of a revolving barbing-head constructed to support the coil of barb-wire, a sliding feed-clamp supported in the ways of said head, a barb-wire holder and guide, a cam for operating said slide, and mechanism for revolving said cam in the same direction as the head at a different speed, substantially as described.

13. In a barbed-fence machine, and in combination with strand-wire supports and a barbing-head, clamping-jaws arranged to receive between them both the strand-wire and the end of the barb-wire, and operating mechanism for closing said jaws at the beginning of the barbing operation, so as to clamp the barb-wire against the strand-wire, substantially as described.

14. In a barbed-fence machine, a barbing-

head and a four-motion-clamp feeder, in combination with operating mechanism for closing the jaws of the clamp upon the strand-wire during the barbing operation, for then advancing the jaws with the strand-wire and newly-applied barb, for opening the jaws and returning the same for a new feed, substantially as described.

15. In a barbed-fence machine, and in combination with the barb-wire feeding, barb-wrapping, and barb-severing mechanism thereof, feeding mechanism for gradually advancing the strand-wire during the wrapping, substantially as described.

16. The combination, with a barbing-head and strand-wire supports, of clamping-jaws for clamping the end of the barb-wire against the strand-wire, and mechanism for advancing said jaws for each coil of the barb-wire a distance equal to the pitch of the coil, substantially as described.

17. The combination, with a revolving barbing-head and barb-wire support, of non-rotating devices for holding the strand-wire and the end of a barb-wire, and a cutter for severing the barb, substantially as described.

18. A barbed-fence machine comprising in combination the following elements, to wit: machine-frame, hollow spindle, barbing-head, barb-wire support, and barb-wire feeder, all carried by said spindle, cam for operating said feeder, cam-shaft, gearing for imparting motion from said spindle to said cam and said shaft, non-rotating strand-wire holder, cams carried by said cam-shaft, and barbing-clamp and strand-wire feeder, and barb-wire cutter operated by said cams, substantially as described.

19. The method of barbing a strand-wire, by wrapping a barb-wire around the strand-wire, beginning at the crossing of the two wires, and proceeding toward the spool or coil of the barb-wire, and, after wrapping, severing the barb from the coil or body of the wire, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALLEN JOHNSTON.

Witnesses:

A. POLLOK,

PHILIP MAURO.