(No Model.) 2 Sheets—Sheet 1.

C. D. ROGERS.

MACHINE FOR MAKING BARBED WIRE.

No. 343,154. Patented June 1, 1886.

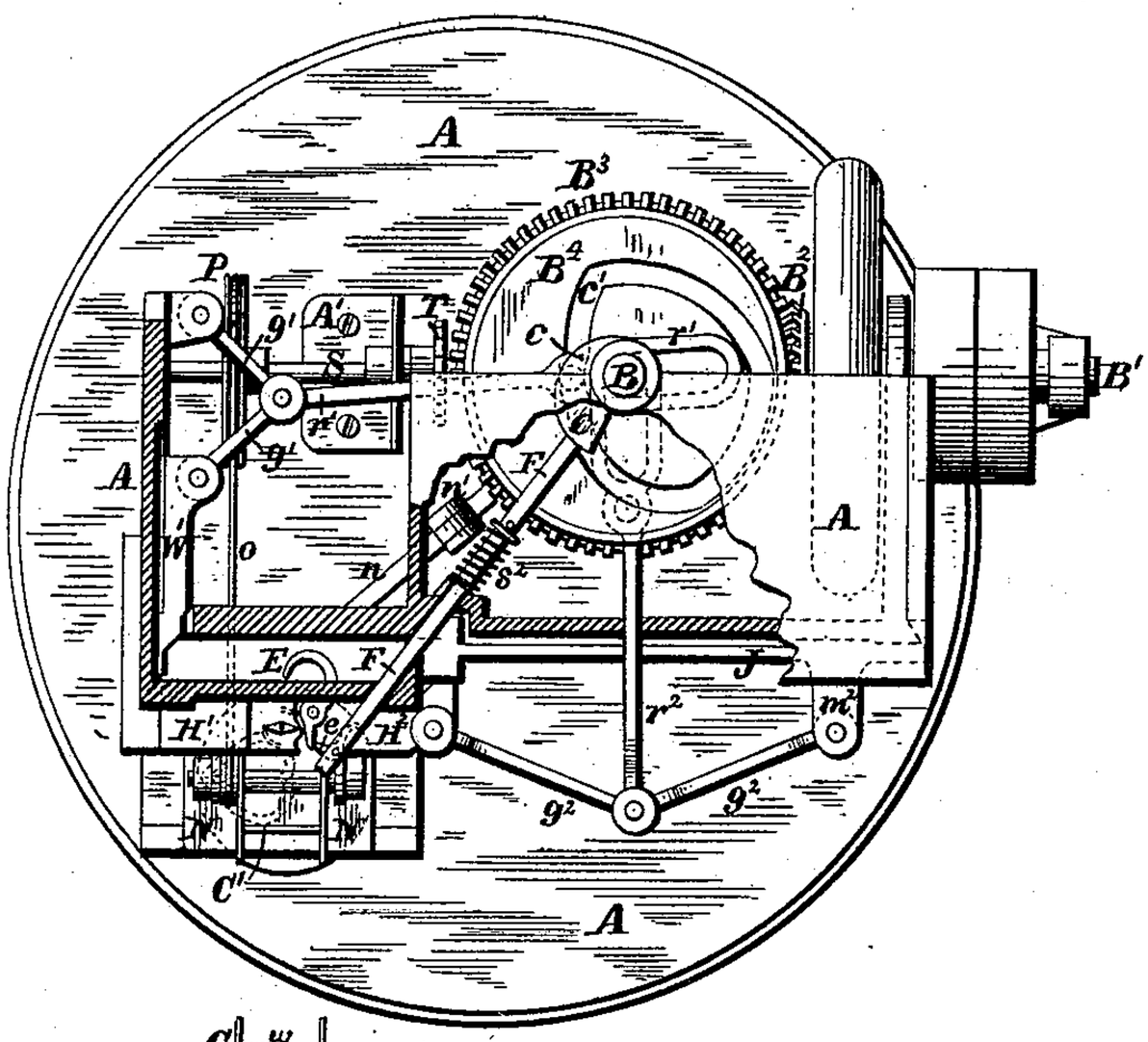

FIG. 1.

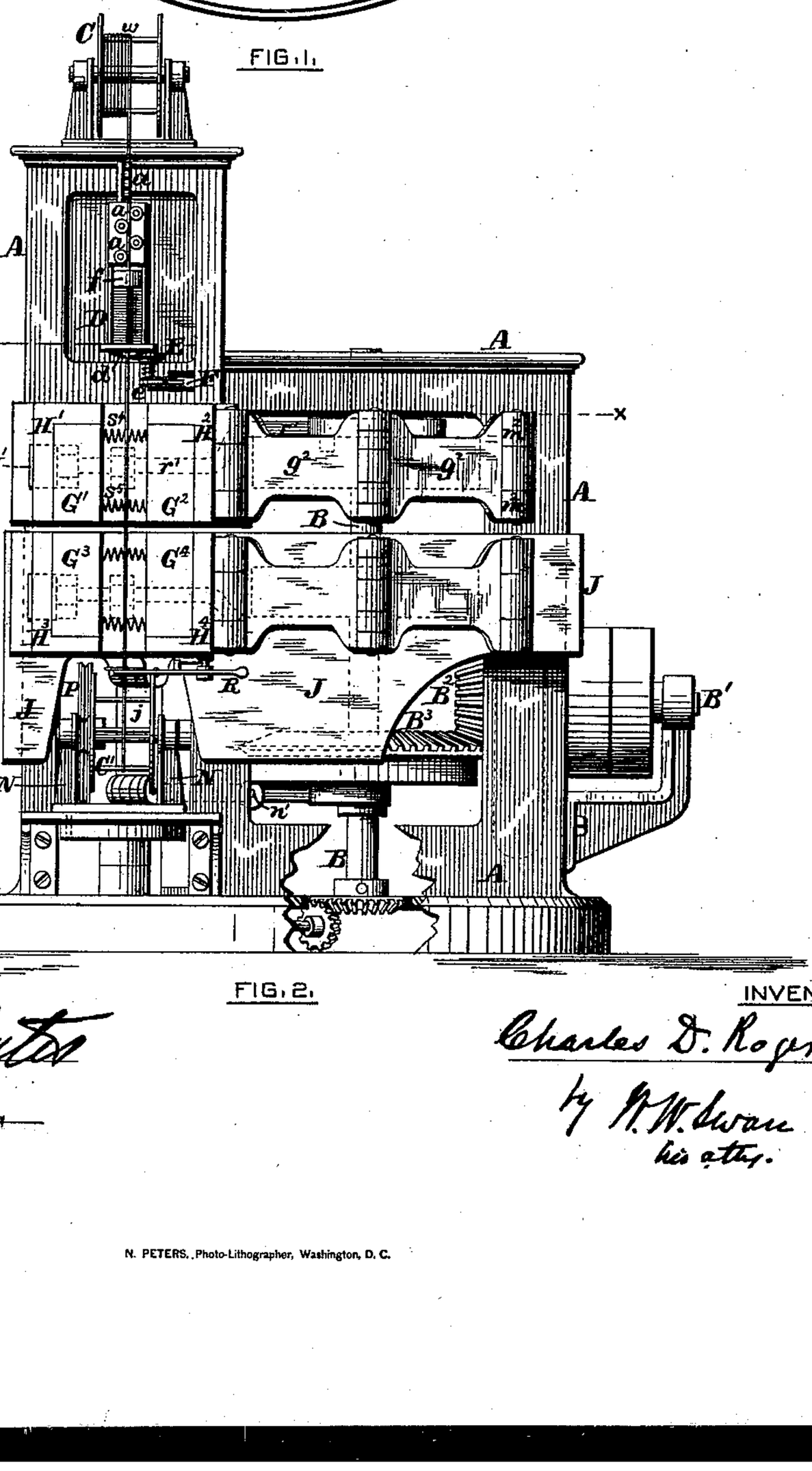

FIG. 2.

WITNESSES.

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INVENTOR.

Charles D. Rogers

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his atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. D. ROGERS.

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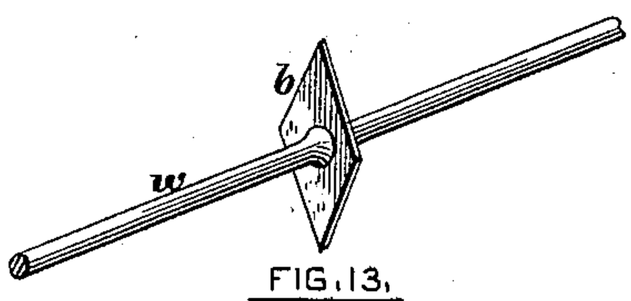
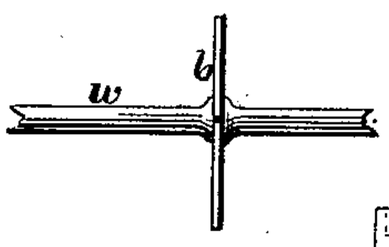


FIG. 13.



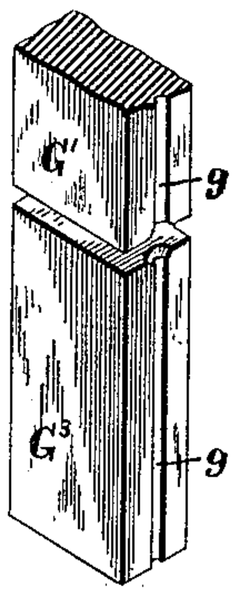


FIG. 12.

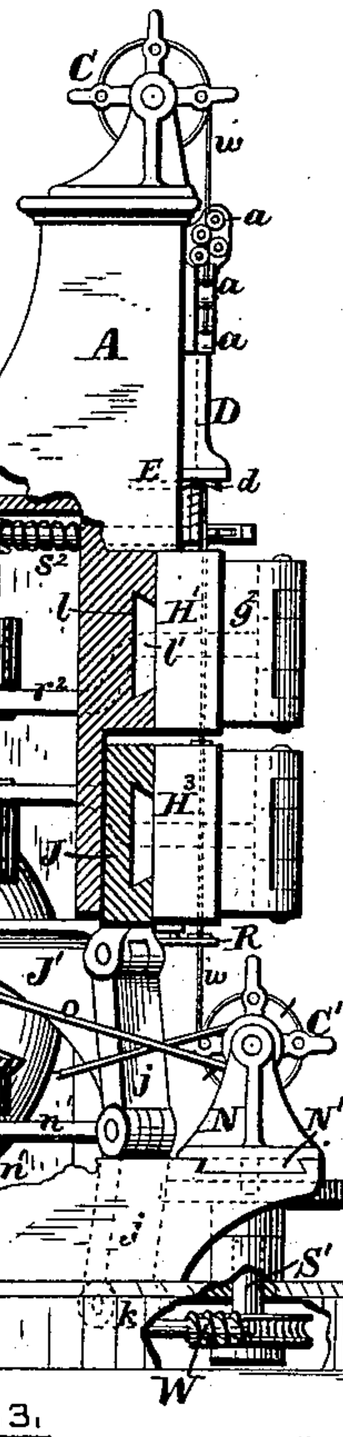


FIG. 3.

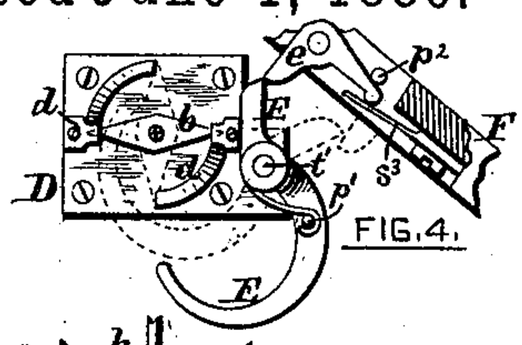


FIG. 4.

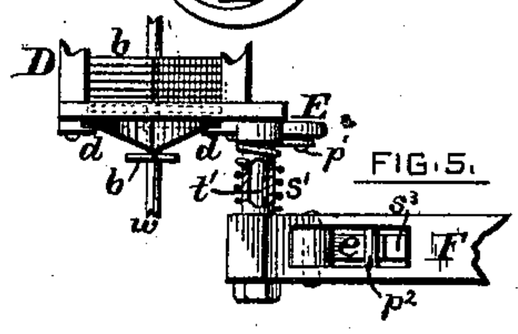


FIG. 5.

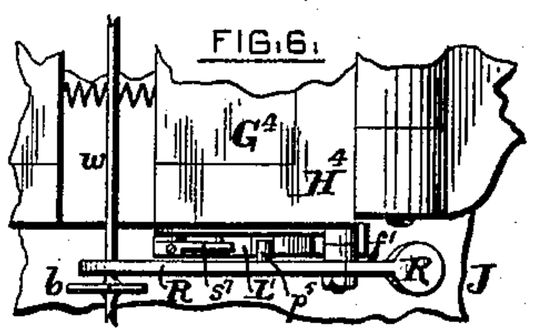


FIG. 6.

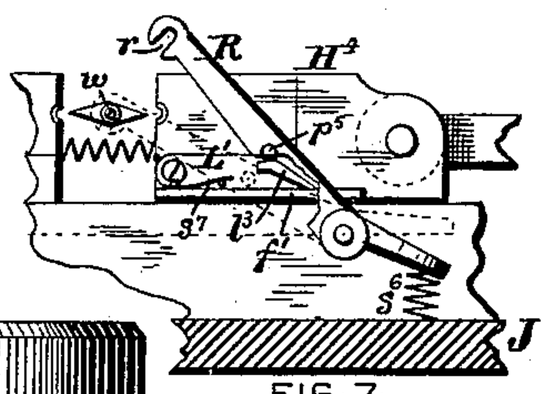


FIG. 7.

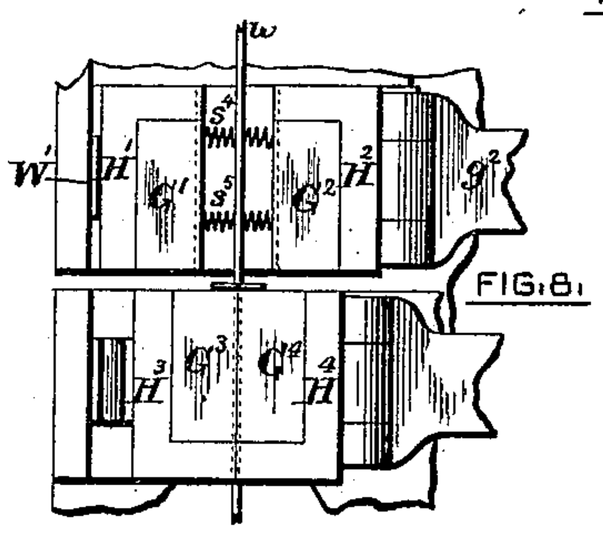


FIG. 8.

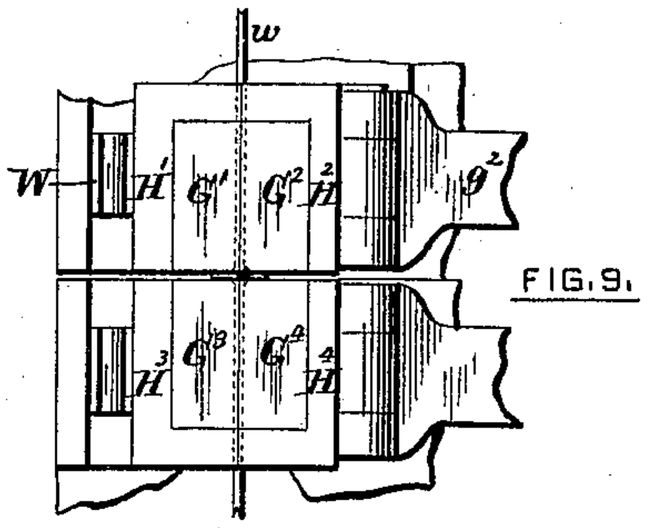


FIG. 9.

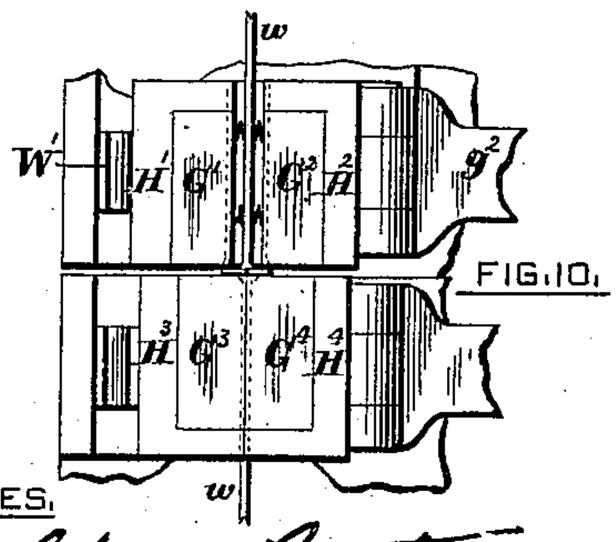


FIG. 10.

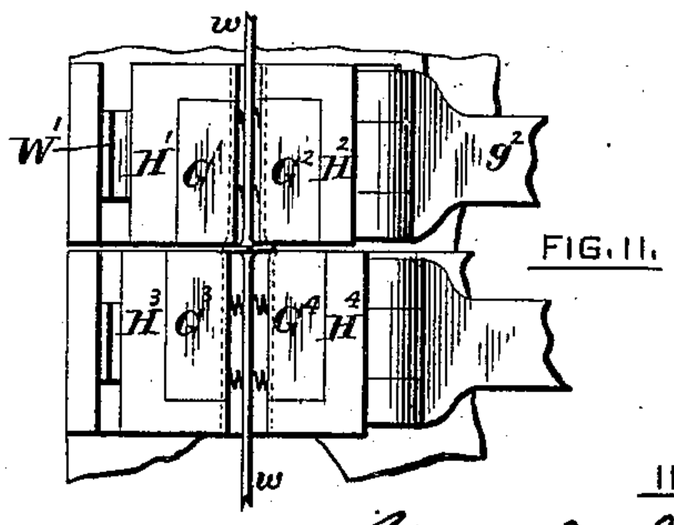


FIG. 11.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND.

MACHINE FOR MAKING BARBED WIRE.

SPECIFICATION forming part of Letters Patent No. 343,154, dated June 1, 1886.

Application filed August 3, 1882. Serial No. 68,428. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, of Providence, in the State of Rhode Island, have invented a new and useful Machine for Making Barbed Wire, of which the following is a specification.

A hopper near the top of the machine contains a stack of sheet-metal plates or barbs, each of which has a hole at the center. The wire to which the barbs are to be attached by the operation of the machine is unwound from a reel on the top of the machine, and passing through the holes of all the barbs is wound upon an intermittently-moving reel at the base of the machine, the intermittent pull of the winding-up reel turning the reel above. At each intermittent movement of the winding-up reel the lowermost barb is detached from the stack by a blow from a vibrating blade, and is rotated on the wire until it reaches and rests upon two dies, the lower pair of which have closed together laterally to clamp the wire. Two other dies, the upper pair, then close together laterally and clamp the wire upon the other side of the barb, after which the first pair, moving toward the second pair vertically, upsets the metal of the portion of the wire between them on both sides of the barb.

An important detail of the invention relates to the clamping and upsetting by linear compression of a wire intermittingly fed through the machine at each movement of the feeding mechanism.

Another important detail of the invention relates to a device for separating one barb from a stack of barbs strung upon a wire and carrying it to a place in the wire where the metal of the wire is to be upset.

Another part of the invention relates to a device for gaging the feed of the wire and insuring the central position of the wire between the dies.

The invention consists, further, in certain details of construction, which are sufficiently set forth in claims.

In the drawings, Figure 1 represents a top view of the machine, with portions of the frame removed, on line *x x* of Fig. 2. Fig. 2 shows a front elevation of the machine, the clamping-dies being separated both laterally and vertically, and the wire fed downward in readiness to receive a metal plate or barb. Fig. 3 represents a side elevation of the machine, portions of the frame having been removed. Figs. 4 and 5 show, respectively, a bottom view and an elevation of the mechanism for liberating the lowermost barb of the stack and causing it to move spirally along the wire to a position to be secured thereon. Figs. 6 and 7 represent, respectively, an elevation and a bottom view of mechanism for gaging the feed of the wire and insuring its central position between the dies. Figs. 8, 9, 10, and 11 show the dies in various positions, (8, lower dies clamping the wire, upper dies separated laterally to the fullest extent; 9, both sets of dies in position when upsetting has been performed and before dies back off; 10, upper dies separated laterally to release wire; 11, lower dies also separated laterally to release wire.) Fig. 12 represents in perspective portion of an upper die and a lower die. Fig. 13 shows a piece of barbed wire in perspective and in elevation.

A is the frame.

B is the main shaft, taking its motion from the driving-shaft B′ through bevel gear-wheels B^2 and B^3.

C is a reel from which the wire *w* to be barbed is unwound during the process of applying the barbs.

C′ is a reel, upon which the wire *w* is wound as it is barbed. The winding-up reel C′ derives an intermittent motion from the main shaft B, as will hereinafter be described. The reel C is turned intermittingly by the draft of the wire *w*, as it is wound upon reel C′. Near the top of the frame are guide or straightening rolls *a*, through which the wire *w* passes, as shown.

D is a hopper or box containing the metal plates or barbs *b* to be secured to the wire. Each of these plates has a hole at its center, through which the wire *w* passes freely. The hopper in cross-section corresponds to the shape of the barbs. The bottom or bed plate of the hopper has a hole of a shape corresponding to that of the barbs, through which the barbs pass freely. Underneath the bed-plate of the hopper are two lugs, *d*, each an arc of about forty-five degrees, and each having a

shoulder, and upon these two shoulders rest the points of the undermost barb. A spring or weighted follower, *f*, insures the passage of the barbs successively to the lugs. The shoulders of the lugs *d*, however, are not parallel with the bed-plate of the hopper, but are inclined planes dropping spirally after the fashion of the lead of a screw or the rifling of a gun in the direction in which the barb is to be moved, as will presently be described. The upper ends of the shoulders, upon which lies the undermost barb, are so adjusted that but a single barb of the stack lies below the bed-plate of the hopper. The spiral form given to the lugs is to insure the speedy passage of the barb down the wire, by overcoming the resistance of the air when the barb is of light weight. Indeed, so far as relates to this feature of the invention, the machine might be worked when turned upon one side, since the spiral form of the lugs would give to a barb receiving a sharp blow from the separator a movement along the wire.

E is the separator, being a sickle-shaped blade, so pivoted to a stud, t', underneath the hopper that its point has a sweep beneath the hopper between the lugs *d* in the plane of the undermost barb. A spring, s', wound around the stud t', and pressing against a pin, p', in the separator, tends to push the point of the separator against the undermost barb, and the force of the spring and length of movement of the separator are such that the separator, at each forward movement, whirls the undermost barb out of the spirally-shouldered lugs *d d*, and causes it to spin down the wire. The separator E is controlled by a spring-dog, *e*, which is pivoted, as shown, to the under side of a sliding bar, F, which, mounted in suitable ways in the frame, has by means of a cam, *c*, upon the main shaft and a spring, s^2, a longitudinal reciprocal motion out and in once at each revolution of the main shaft. The rear end of the separator and the dog lie in one plane and the blade of the separator in another, as shown at Fig. 5. In its normal condition the dog *e* is held against a pin, p^2, by a spring, s^3, and when the bar F comes inward the dog strikes the separator to draw the point of the latter back from the barb. The forward motion of the bar F and dog *e* is of sufficient length, however, to allow the dog to pass beyond the separator, when the latter, under the force of the spring s', will operate, as before described, to throw out another barb from the stack. The spring s^3 allows the dog to slip over the rear end of the separator on the outward motion of the bar F.

G′, G^2, G^3, and G^4 are a set of clamping and upsetting dies fixed, respectively, in the die-holders H′, H^2, H^3, and H^4. Of these G′ and G^2 act together laterally at certain stages of the operation as a pair of clamps to hold or release the wire, as the case may be, as do also G^3 and G^4, each pair independently of or separately from the other pair, while the two pairs act together vertically, the lower pair, G^3 and G^4, acting against the upper pair, G′ and G^2, to upset the wire. Each die has a groove, *g*, on its inner face, of half the diameter of the wire, as shown, and each is countersunk at the angle where it meets the other dies to form a shoulder in the wire when the latter is upset. The upper and lower pairs of dies get their lateral motions from the main shaft in substantially the same manner, and a description of the operating mechanism of one pair will be sufficient for both. To begin with the right-hand upper die, G^2, its holder H^2 has a dovetail (not shown) sliding in a corresponding way, *l*, in the frame A, and upon this holder H^2 is hinged one arm of a toggle, g^2, the other arm of which is hinged to a lug, m^2, on the frame, while the two arms of the toggle are connected by a connecting-rod, r^2, with a suitable cam (not shown) upon the main shaft. In like manner, the die-holder H′ of the die G′ has a dovetail, l', sliding in the way *l* in the frame; but this die-holder, instead of getting its motion directly from a toggle, gets it in one direction from a wedge, W′, which is operated by a toggle, g', connecting-rod r', and a suitable cam, c', upon the main shaft; and since the wedge W′ exerts its force in but one direction, springs s^4 and s^5 are inserted between the die holders H′ and H^2.

The cams for working these toggles may be of any suitable description. Those employed by me are cam-grooves in plates which are sunk in the upper and lower surfaces of the wheel B^4, the said grooves being of the general shape of the one shown at c', Fig. 1. As before stated, the lower dies, G^3 and G^4, have similar lateral movements; but the dovetails of their holders H^3 and H^4, instead of sliding in a way in the frame, slide in a way cut in a carriage, J, which is jibbed to the frame and has a vertical movement imparted to it by a toggle, *j*, one arm of which is hinged to the carriage, while the other is hinged to a lug, K, upon the frame. This toggle *j* is operated positively in both directions by a connecting-rod, *n*, and a suitable cam upon the main shaft. This last-mentioned cam is sunk in the lower face of the bevel-wheel B^3 upon the main shaft. The connecting-rod *n* has a joint at n' to permit the vertical movement of the carriage J. The carriage J supports not only the die-holders H^3 and H^4 with their dies G^3 and G^4, but also the mechanism operated by the main shaft for giving these die-holders their lateral movements. A projection, J′, from the carriage has a hole in it, through which passes the main shaft, and in this projection is supported the hub of the wheel B^5, which carries the operating-cams of the lower dies. The several cams for moving the dies G′ G^2 and G^3 G^4 laterally and G^3 G^4 also vertically are so timed relatively to each other and to the other mechanism that when a barb, *b*, is discharged from the hopper the upper pair, G′ G^2, are open and the lower pair, G^3 G^4, are closed, so that the barb falls between G′ G^2 and rests upon the pair G^3 G^4, which are not only closed, but at

their lowest position. (See Fig. 8.) The upper pair, G′ G², then close upon the wire, and next the lower pair, G³ G⁴, are forced upward to upset the wire upon both sides of the barb. (See Fig. 9.) This having been done, the cams of the upper dies, G′ G², cause or allow those dies to slightly separate, the lower dies, G³ G⁴, at the same time remaining closed and preventing the wire from adhering to either of the upper dies. (See Fig. 10.) Next, the lower pair, G³ G⁴, open a little farther than G′ G² have opened, that they in turn may clear the wire, and now the corners of the upper dies present bearings or supports to assist in throwing the wire out of either groove to which it may have a tendency to adhere. Finally both upper and lower pairs of dies are thrown open to their full extent to admit of the feed of the wire.

P is a pulley on a shaft, S, having bearings in two uprights, A′ A′, secured to the frame. It has imparted to it an intermittent motion by means of a star-wheel, T, upon the same shaft, and a pin, p^3, in the smooth rim of the bevel-wheel B³ on the main shaft, and this intermittent motion is in turn transmitted to the winding-up reel C′ by a belt, *o*, as shown. A pawl and ratchet (not shown) prevent the reel from turning in but one direction. The winding-up reel is supported in uprights N N, which in turn are supported by a sliding bed, N′, to which a horizontal reciprocating motion across the direction of the feed of the wire is given by a heart-shaped cam (shown in dotted lines at Fig. 1) upon a shaft, S′, which has suitable bearings, and at its lower extremity a worm-gear into which takes a worm, W, driven from the main shaft by bevel-gearing, as shown. A continuous reciprocating motion is made intermittent by removing a portion of the cogs of the bevel-gear on driving-shaft.

R is an arm pivoted to the frame, as shown, and having a slot, *r*, to embrace the wire. A spring, s^6, pressing upon the rear end of the arm R, tends to throw the arm forward so that the slot *r* will embrace the wire. The arm R has a pin, p^5, upon its upper surface.

L′ is a latch pivoted to the under face of the die-holder H⁴. It has a cam projection, l^3, and a spring, s^7, which tends to hold the latch against a flange, *f′*, upon the die-holder H⁴, as shown.

In operation the top of the cam projection l^3 strikes the pin p^5 on the outward movement of the die-holder H⁴ and draws the arm R back from the wire, the force of the spring s^6 causing the arm to fly back as soon as cam projection l^3 has passed beyond pin p^5. This movement of the arm R is almost instantaneous, the normal position being such that the slot *r* embraces the wire and holds it in a central position relatively to the dies. The arm R serves also as a stop for the feed, since it is so located that at the end of each forward step of the feed a secured barb rests upon it. The arm R moves away at the commencement of the feed of the wire only to permit this barb to pass below it.

I claim—

1. The hopper H, having a perforated bottom and provided with lugs *d d*, so that each plate may be separated from a mass of plates strung upon the wire by turning the plate on the wire, substantially as described.

2. The mechanism for releasing a plate from a mass of plates strung upon a wire and carrying said released plate on said wire or facilitating its passage on said wire to a given point, substantially as described, the same consisting essentially of the hopper H, provided with a perforated bed-plate, the spirally-shouldered lugs *d*, and the intermittingly-vibrating blade E.

3. The rod R, provided with slot *r*, and mechanism for vibrating the same, substantially as described, to serve as a stop and insure the central position of the wire.

4. In combination with mechanism for intermittently feeding the wire, the dies G′ G² G³ G⁴, and mechanism, substantially as described, for imparting the requisite movements to said dies, whereby they work together in pairs, each pair separately to hold or release the wire, but the two pairs together to upset the wire, and the individual dies of each pair offering a resistance to prevent the wire from clinging to a die of the other pair.

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Witnesses:
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W. W. SWAN.