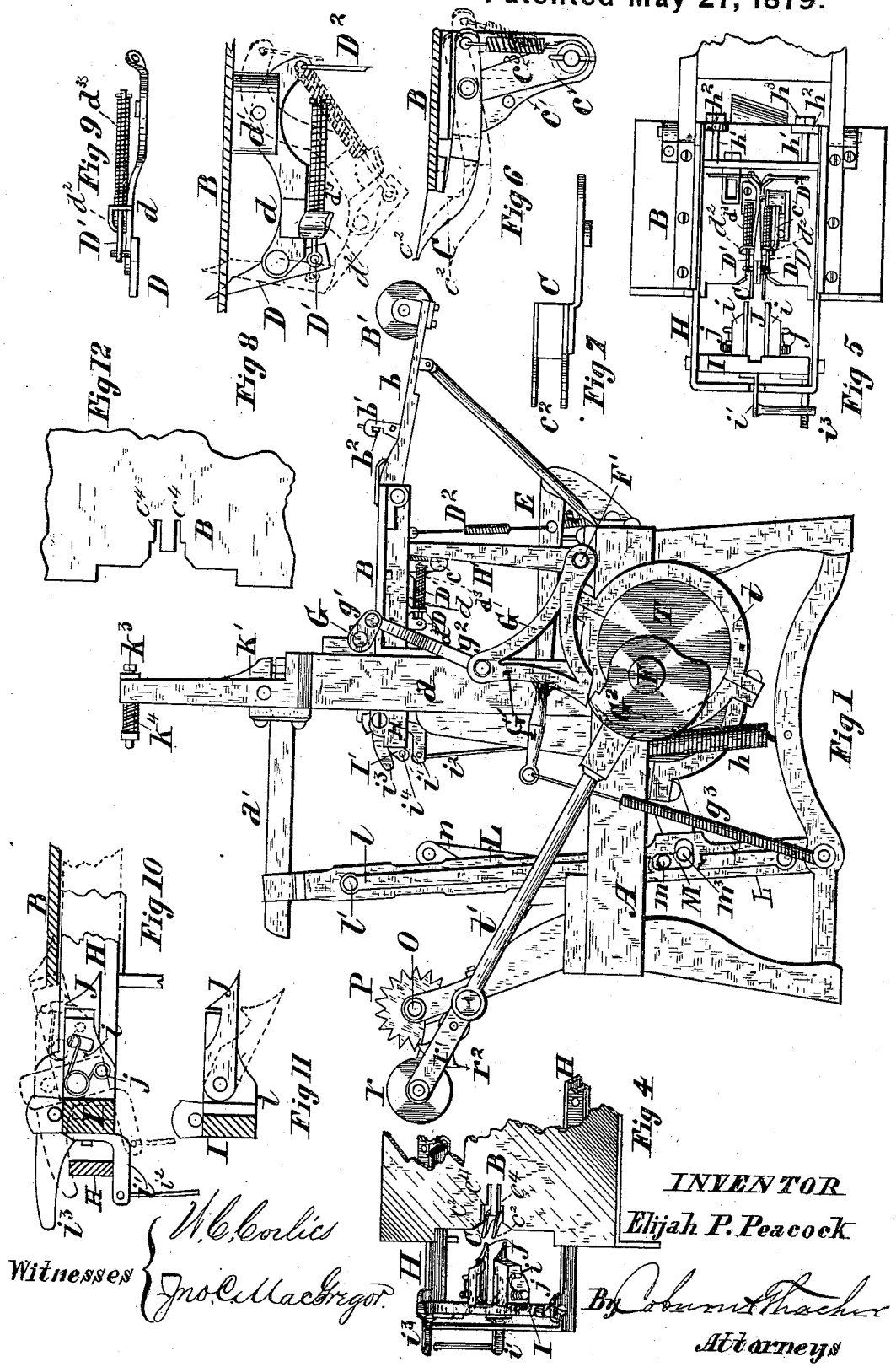
3 Sheets—Sheet 1.

E. P. PEACOCK.

Machine for Barbing Fence-Wire.

No. 215,769. Patented May 27, 1879.



Witnesses
W. C. Conlies
Jno. C. MacGregor.

INVENTOR
Elijah P. Peacock
By Coburn & Thacher
Attorneys

3 Sheets—Sheet 2.

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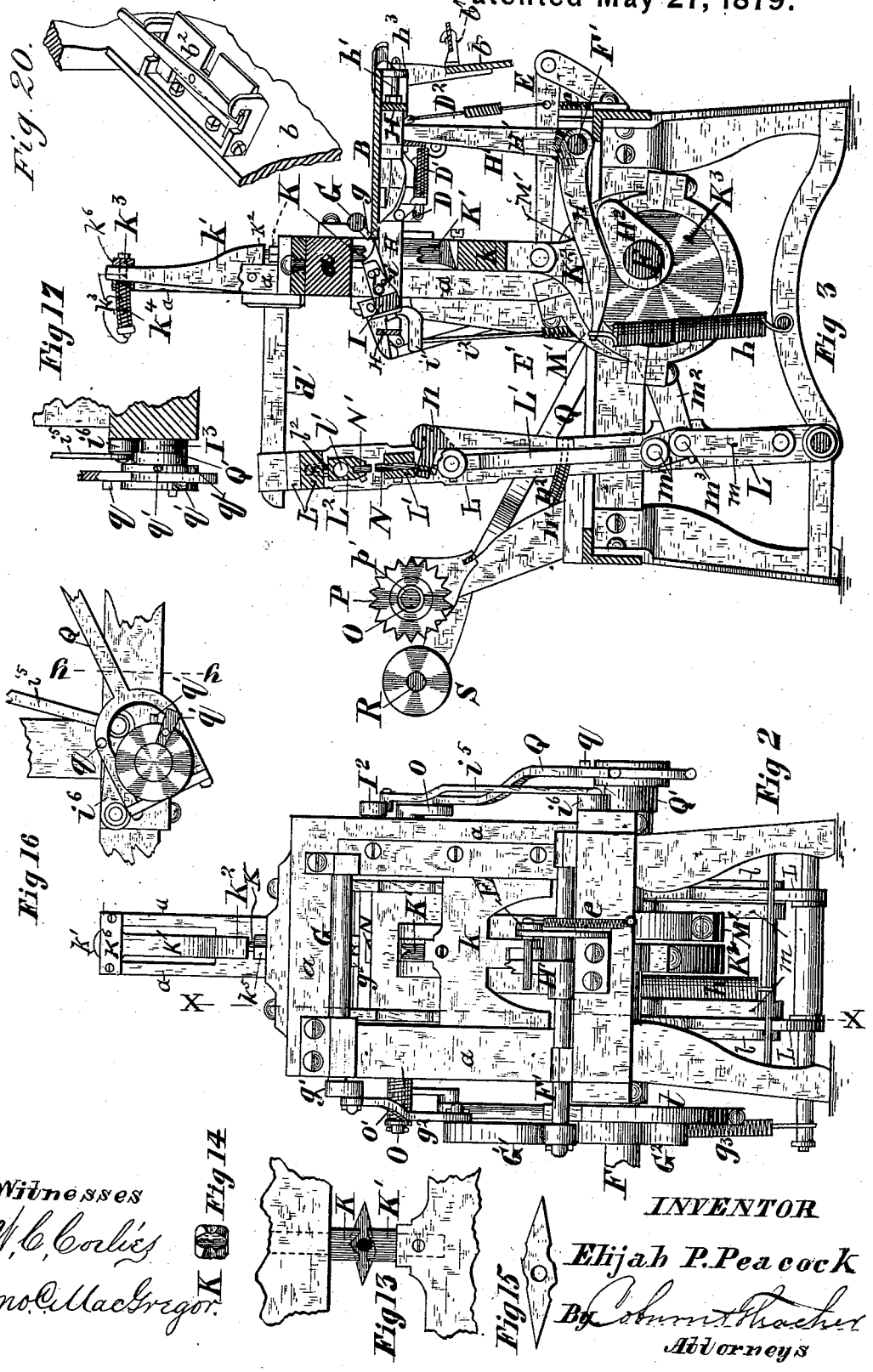

Witnesses
W. C. Curtis
Jno. C. MacGregor.

INVENTOR
Elijah P. Peacock
By Johnson & Dunham
Attorneys

3 Sheets—Sheet 3.

E. P. PEACOCK.

Machine for Barbing Fence-Wire.

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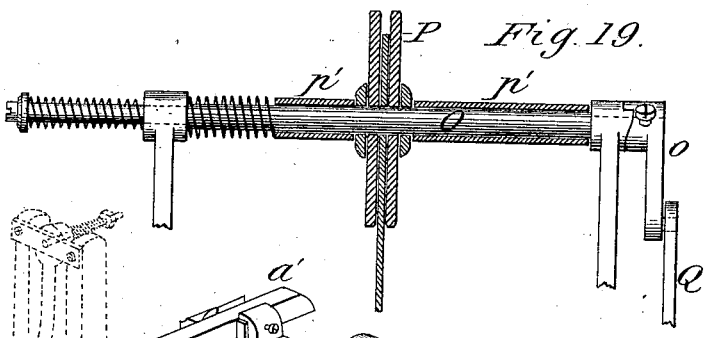

Fig. 19.

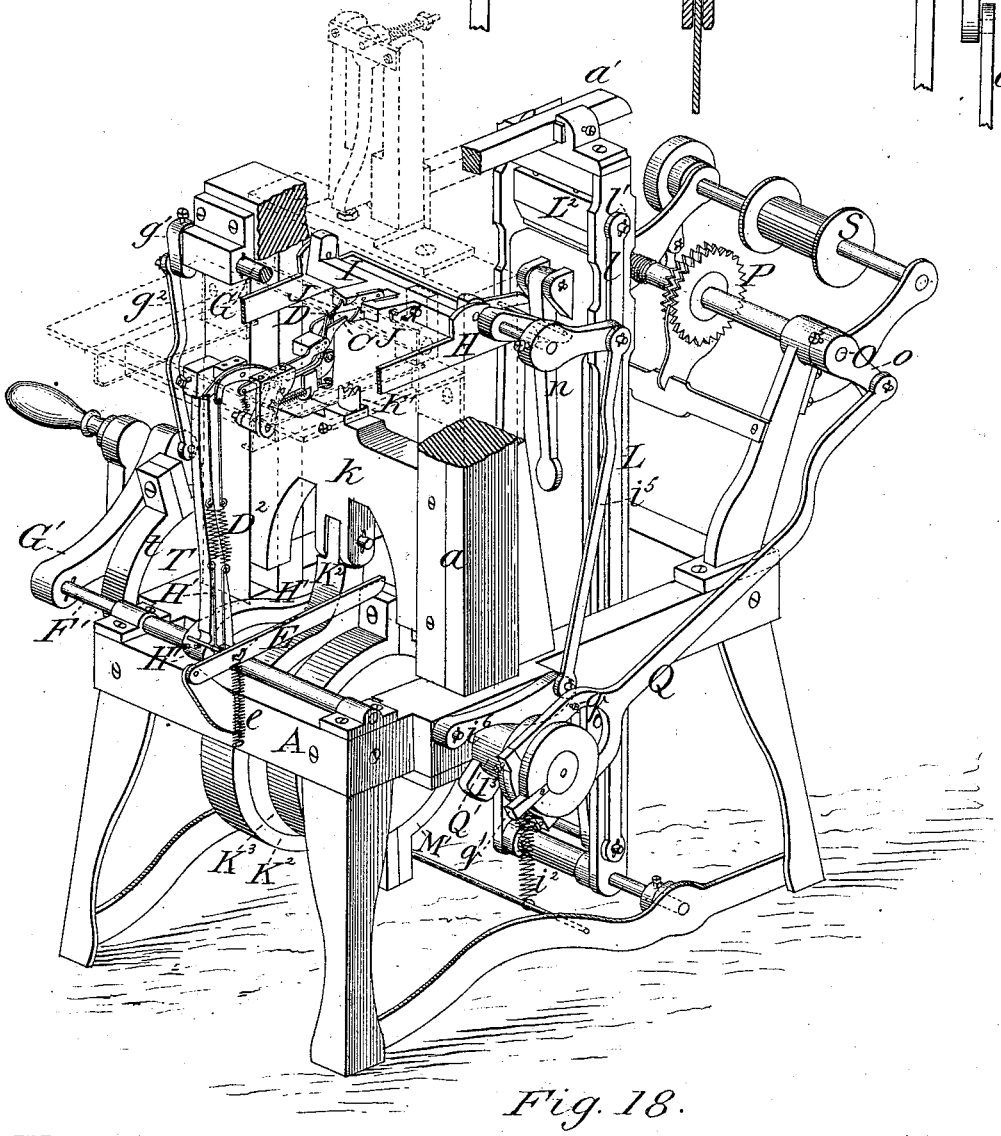

Fig. 18.

Attest:

L. A. Bunting
W. C. Corlies

Inventor.

Elijah P Peacock

UNITED STATES PATENT OFFICE

ELIJAH P. PEACOCK, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE THORN WIRE HEDGE COMPANY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR BARBING FENCE-WIRES.

Specification forming part of Letters Patent No. **215,769**, dated May 27, 1879; application filed July 12, 1878.

To all whom it may concern:

Be it known that I, ELIJAH P. PEACOCK, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Machines for Fastening Barbs on Fence-Wires, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of a machine embodying my invention; Fig. 2, a front-end elevation of the same, the feed-table and its support, the reel and its support having been removed; Fig. 3, a longitudinal section of the same, taken on the line *x x*, Fig. 2; Fig. 4, a detail perspective, showing a portion of the feed-table, supports, and sliding carriage provided with grappling-hooks; Fig. 5, a plan view of the under side of the same; Fig. 6, a detail elevation, showing the attachment of the barb-supports; Fig. 7, a plan view of a single support detached; Fig. 8, a detail elevation of the barb-separating device; Fig. 9, a plan view of a single barb-separator detached; Fig. 10, a section of the reciprocating carrier; Fig. 11, a detail section of the same, showing the attachment of the grappling-hooks; Fig. 12, a plan view of the inner portion of the feed-table; Fig. 13, a detail elevation of the compressing-dies; Fig. 14, an end elevation of one of said dies; Fig. 15, a barb after the operation of the dies; Fig. 16, a detail elevation of mechanism for operating certain parts; and Fig. 17, a section of the same, taken on the line *y y*, Fig. 16. Fig. 18 is a perspective view of the machine, with the feed-table and upper die in dotted lines; Fig. 19, a detail view, partly in section, of the clutch to prevent back-lash; and Fig. 20 is a detail perspective view of the gate on the feed-table.

My invention relates to a machine for automatically fastening barbs on fence-wire, the barbs being first punched and strung upon the wire in any suitable manner.

The invention consists in various devices for separating the barbs singly, placing them in proper position under compressing-dies, and feeding the wire along at proper intervals; in mechanisms for operating these devices, and in special combinations of parts, all of which will be hereinafter more fully described, and specifically pointed out in the claims.

The machine is intended for use in fastening barbs, substantially of the form shown in Fig. 15 of the drawings, without the notches therein. These barbs are made by any process suitable for the purpose, and punched through the central portion thereof, and then strung in quantities upon the wire.

In the drawings, A represents the main supporting-frame of the machine, from which arises an upright portion, *a*, consisting of standards and top cross-beam. A horizontal feed-table, B, is attached to the upper part of the frame *a*, from which a frame-work, *b*, extends back, on which the wire is strung as it is fed off from a spool, B′, mounted at the extreme end of the frame. Only a section of this frame is shown in the drawings, and is represented as hinged to the table, which construction is unnecessary, however, in a full-sized machine.

On the frame *b* are mounted, at suitable intervals, gates b^1, pivoted to supports and provided with notches in their upper edges, in which the wire is placed as it runs forward from the spool. These gates are held in an upright position by means of a lever, b^2, which locks in the supports, but may be released at will, so as to permit the gates, or any one of them, to be turned down forward. These gates are to hold the barbs back and prevent them from accumulating in one mass, which I have found will prevent the successful feeding of the wire. When, however, they are divided up into sections by means of the gates, no difficulty is experienced in drawing the wire forward to produce the necessary feed; and when the section of barbs on the feed-table is used up one of the gates is turned down and another section of barbs slipped forward onto the table.

The front edge of the feed-table is provided with slots, as shown in Fig. 12 of the drawings, to accommodate the movement of the devices for separating and supporting the barbs.

An arm or rod, C, is pivoted to a crank-arm, *c*, mounted on a bearing on a pendant, c^1, attached to the lower side of the feed-table, as shown in Fig. 6 of the drawings. This arm projects forward underneath the table, and has at its forward end two points, c^2, which enter the slots c^4 in the rear edge of the table and pro-

ject rearward therefrom somewhat about on a level with or a little above the surface of the table. The inner end of the arm is extended a little back of its pivot, and is connected by a spring, c^3, to the lower or journal end of the crank-arm c.

From this construction and mode of supporting the arms C it is evident that they are yielding and may be forced back a short distance, as shown in dotted lines in Fig. 6 of the drawings; but when released the action of the spring, arranged as it is behind the pivot, will immediately throw the arm forward again.

The mechanism for separating the barbs—that is, singling out the first barb from those behind it—consists of upright arms or levers D, which are arranged to be projected up between the ends c^2 of the supporting-arms C, just in front of the feed-table. Below the table they are pivoted to the forward ends of levers d, which in turn are pivoted to a pendant, d^1, on the under side of the table.

The lower ends of the levers D extend below their pivots, and to their extremities are attached rods D^1, which extend back through keepers d^2, as shown in Figs. 8 and 9 of the drawings, and are surrounded by spiral springs d^3, which are held between the keepers and pins in the outer ends of the rods. It is evident, therefore, that the separators will be yielding on their pivots, and that the vibration of the levers d will thrust these separators up above the surface of the table and withdraw them below it.

The separators D are arranged side by side and their upper ends are pointed, being beveled on their front edges, as shown in Fig. 8 of the drawings. Their extreme upper ends diverge slightly, and they are arranged in the line of the wire as it is drawn through the machine, so that one will pass up on each side of the wire. The separators D and levers d, being arranged almost wholly in front of their pivotal supports, will, of course, drop of their own weight, so as to withdraw the separators below the table, unless held up. The rear ends of the levers d, which extend slightly behind their pivots, are connected by spring rods or links D^2 to a lever, E, pivoted at its rear end and projecting forward, with its extreme forward end resting upon an eccentric ring, M^1, fitted to an eccentric on the main shaft F of the machine. This lever E is held down by a spring, e, and the springs are so arranged that when in its lowest position the springs in the links D^2 will operate to throw up the separators D; but when the lever is lifted by the action of the eccentric, the tension of these spring-rods D^2 is relieved, and the separators will drop of their own weight.

A rock-shaft, G, is arranged just over the front edge of the feed-table, being mounted in bearings attached to the upright portion a of the frame. This shaft is provided with a forked or slotted projection, g, near the center of its length, and on one end is fixed a crank-arm, g^1, connected by a link, g^2, to a T-headed crank-arm, G^1, mounted loosely on a rock-shaft, F′, on the frame A below the feed-table B.

The lower end of the T-head on this crank-arm G^1 rests on a cam, G^2, mounted on the main shaft F. A spring, g^3, attached to the crank-arm G^1, holds it down to the cam, and it is evident that the vibration of the crank-arm will rock the shaft G. The cam G^2 is made of such shape as to give a vibration to the rock-shaft G of about a quarter of a turn, and the projection g is arranged on said shaft so that it is thrown down in a vertical position, and then backward and upward out of the way.

A rectangular frame, H, is arranged to slide back and forth on suitable ways on the under side of the feed-table. The front end of this frame is connected to the upright arm of the bell-crank lever H^1, the other arm of which projects into the machine over the main shaft, and is held down by a spring, h, attached to its extremity. A cam, H^2, on the main shaft is arranged below this horizontal arm, the rotation of which will evidently vibrate the bell-crank, thereby reciprocating the carrier-frame H.

At the extreme rear end of this frame are projecting rods h^1, sliding through guides h^2 on the table, and provided with nuts h^3 on their outer ends, by means of which the movement of the table rearward is limited and regulated. The frame H extends forward into the machine beyond the table B, and in its forward end is mounted a rocking shaft or frame, I, from the main portion of which arms i project backward toward the feed-table. Hooks or catches J are pivoted to these arms, being provided with springs j, arranged in a well-known way, to hold the hooks, as shown in Fig. 10 of the drawings. These hooks project slightly to the rear of the ends of the arms i, so that there is a narrow space between the tooth on the upper edge of the hook and the end of the arm, as shown in Fig. 11 of the drawings. The springs on these hooks permit them to yield independently of the frame by which they are carried, and with which they are vibrated up and down.

A bent rod, i^1, projects from the under side of the frame I, to which is attached a spring-link, i^2, which will evidently operate to throw the forward end of the frame up, and hold it in this position. A short arm, i^3, also projects from the upper side of the frame, underneath which projects the pin i^4 of a crank-arm, I^1, on a double-cranked shaft, the crank I^2 of which is connected by a link-rod, i^5, to a pivoted lever, i^6, beneath which is a cam, I^3, on the main shaft, the operation of which will at certain intervals throw up the crank-pin i^4, thereby vibrating the frame I, so as to throw the hooks downward.

In the upper part of the frame-work a a die, K, is mounted, the face of which is notched or grooved in both directions, as shown in Fig. 14 of the drawings, and a similar die, K^1, is mounted in a block, k, arranged to slide up

and down in the frame a, thereby making the lower die movable. This block k is reciprocated by means of a yoke, K^2, on an eccentric, K^3, on the main shaft, the yoke being provided with a projection extending upward, which is hinged to the block k. The upper die is arranged to have a little vertical movement, the shank for this purpose being permitted to slide in its seat, and being provided with a nut, k^5, on its upper end, by means of which the extent of movement may be limited.

A lever, k^1, is pivoted at its lower end to the upright frame a, and is provided with a square-faced projection, k^2, which extends over and rests upon the upper end of the shank of the upper die. The upper end of this lever is permitted to move back and forth on a rod, k^3, which is provided with a tension-spring, k^4, regulated in the usual way by a nut, so that the yielding pressure upon the upper die may be regulated as desired.

An upright frame, L, is arranged in rear of the upright portion, a, of the main frame, and is pivoted at its lower end so as to vibrate back and forth. A projecting arm, a', serves as a guide to the upper end of this frame, being fitted in a guiding-slot thereon, which traverses the arm. At the lower end of this frame is a toggle-joint, M. The pivot m^3 of the lower link, m, of this joint has a slight vertical movement in the frame. The upper link, m^1, is connected to a sliding block, L^1, mounted in the frame L, in the upper end of which is a sliding jaw, N, attached to a pivoted bell-crank lever, n, the lower end of which is provided with a pin, n^1, which passes through the block L^1, and is surrounded by a spring, n^2, having bearings against a cross-pin through n^1, and against the side of block L opposite to that in which is the lever n, so as to permit the clamping-jaw to yield, and at the same time give it the proper tension, by reason of the compression or the expansion of the coiled spring, permitting the lower end of lever n to recede from the block L^1, and causing it to advance toward the block.

Another block, L^2, is mounted in the upper part of the frame, and has a slight vertical movement. At its lower edge is a stationary jaw or clamp, N′, extending its whole length. The bearing-pins l^1 of this upper block pass through the sides of the frame, and are connected by link-rods l to the pivot of the lower link of the toggle-joint at the bottom of the frame.

Pins l^2 are fixed in the upper edge of the block L^2, which enter holes in the top of the frame L, to hold and guide the block in proper position.

The toggle-joint is connected to an eccentric-ring, M^1, fitted to an eccentric, M^2, of the main shaft of the machine, the eccentric-ring M^1 being provided with a projecting arm, m^2, which is linked at its outer end to the toggle-joint, as shown in Fig. 3 of the drawings. By this device not only is the frame L vibrated back and forth, but the toggle-joint is also operated to pinch and hold the wire between the clamping-jaws, as will be hereinafter described.

At the rear end of the machine is mounted a shaft, O, provided at one end with a crank-arm, o, and projecting at the other end beyond its bearing and surrounded by a tension-spring, o', which permits the shaft to slide in its bearings.

The inner face of the crank-arm is notched like a clutch, and the outer face of the shaft-bearing on the same side is similarly notched, so that when the shaft is rocked by means of the crank-arm the beveled faces of this clutch arrangement will force it to slide outward a little, while the spring at its other end will bring it back when released.

Two toothed wheels or disks, P, are mounted loosely on the shaft O, being placed close together; and outside thereof, on the shaft, are loose sleeves p, one of which about fills the space between the wheels and the shaft-bearing on that side, while the other is cut shorter, leaving a portion of the space between it and the bearing to be filled by a spring, p', which is wound around the shaft and is fastened in place, so that when the shaft is drawn out by the vibration of the crank-arm the spring will be compressed, thereby clamping the toothed wheels and fixing them on the shaft; but when the latter is in its normal position the clamp will be released and the wheels permitted to revolve.

A connecting-rod, Q, is attached to the crank o, the lower end of which is provided with a yoke fitted in the groove of a wheel or hub, Q′, on the outer end of the main shaft. On the inside and outside of the yoke are pins q, and on the hub, on each side of the yoke, are pins q', these several pins being arranged so that one set will operate to move the connecting-rod in one direction, and the other set to move it in the other, thereby producing the required vibrating movement of the crank on the shaft O.

In rear of the shaft O is mounted another shaft, R, on which is placed the spool S, temporarily fastened thereto. The necessary rotation is given to this shaft and spool by means of a friction-wheel, r, on one end thereof, and a vibrating arm, r^1, fitted loosely on the shaft, and provided with a friction-clutch, r^2, which is arranged to bite the wheel and rotate the shaft with every backward vibration of the swinging arm, while it is released on the forward stroke.

The arm is vibrated by means of an eccentric, T, fitted with a ring, t, connected by a rod, t', to the free end of the arm. Of course, some other clutch arrangement would give the same movement; but I prefer the device described, as it will give slightly to accommodate the change in motion required as the spool fills.

The operation of this machine is as follows: The cams and other mechanism for driving the several parts being turned to produce the

movements in their necessary relation to each other, the wire with barbs strung thereon is placed upon the supporting-frame, and one section of the barbs arranged upon the feed-table and the end of the wire drawn through to the rear of the machine between the clamps in the frame L.

As the main shaft rotates the rock-shaft G is turned so as to throw the projection *g* down in a vertical position, the wire being received in the fork or slot thereof. Immediately the separators D are thrust up, and enter behind the first barb, thereby separating it from the others. The shaft then rocks back, throwing the projection up out of the way, and the sliding frame H moves up, so that the hooks J pass underneath the barb, which is received in the space between the hooks and the ends of the arms *i*. The frame then moves back toward the rear end of the machine, pulling the barb along with it underneath into position between the dies K K¹, which then move toward each other, and compress the edges of the barb between them, as shown in Fig. 13 of the drawings, thereby fastening it to the wire. While this is being done the frame L swings forward, the toggle-joint being loose, so that the clamps do not bite the wire. The friction of the slide is intended to be sufficient, however, to effect the straightening of the toggle-links upon the first backward movement of the arm connected thereto, so that the wire is tightly clamped between the jaws in the frame L. Just as the latter is about to start on its backward vibration the frame I is tilted, so as to throw the hooks downward and release the barb. The frame L now swings back, pulling the wire and barb along with it, the projection on the shaft G, which is now turned down, preventing the loose barbs from being pulled through.

When the frame L starts forward again the toggle-joint is first broken, so that the clamps on the wire are separated wide enough to permit a barb to pass between them.

The feeding of the wire is done entirely by the vibration of the frame L; but at the same time that it swings backward the spool-shaft R is rotated to wind up the barbed wire.

The movement of the parts is so timed that when the frame L swings forward the toothed wheels P are clamped together and fixed, but are loose when the frame moves back, and they are so arranged that a barb will be caught and held by the toothed wheels during the forward movement of the frame, so as to prevent any backward feed of the wire. These movements being repeated, it is evident that with every rotation of the main shaft a barb will be fixed upon the wire, the distance between the barbs being determined by the swing of the frame L. c^2 of the arms C hold the barbs from tilting or rocking to one side until the hooks grapple them, and they are made yielding, so as to move out of the way before the projection on the shaft G.

As already stated, when the section of barbs on the feed-table is used up one of the gates is turned down and another section slipped forward, it being understood, of course, that a sufficient number of barbs are strung upon the wire in the first place to supply its entire length.

It will be noticed that all through the machine the operating devices are made yielding by the use of springs, so that all danger of breaking any of the parts or stopping the machine is avoided, even though by accident one of the barbs should become misplaced in passing through the mechanism, or should there be a material difference in size.

The manner in which the separators, supporting-arms, and hooks yield when opposed by any obstacle is shown in dotted lines in Figs. 6, 8, and 11 of the drawings, the said lines indicating the movement of these parts before obstructions, and not their positions in the ordinary working of the machine.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The rock-shaft G, provided with a projection, *g*, which is thrown down in front of the barbs to prevent their slipping forward with the feed of the wire, substantially as described.

2. The rock-shaft G, provided with a projection, *g*, and crank-arm g^1, in combination with the pivoted T-head G^1, link-rods g^2, and cam G^2, substantially as described.

3. The pointed fingers D, arranged to vibrate vertically to separate the front barb from those behind it, substantially as described.

4. The barb-separators D, in combination with independent vibrating arms *d*, to which they are pivoted independently of each other, and mechanism for vibrating the arms *d*, substantially as described.

5. The separators D, pivoted independently of each other to vibrating arms *d*, in combination with the link-rods D^2, pivoted lever E, and eccentric E′, substantially as described.

6. The separators D, in combination with the vibrating arms *d*, to which they are pivoted, rods D^1, and springs d^3, substantially as described.

7. The rock-shaft G, provided with a projection, *g*, in combination with reciprocating separators D, substantially as described.

8. The pivoted arms C, forked at their front ends to support the barbs, substantially as described.

9. The feed-table B, slotted at its front edge, as specified, in combination with the forked barb-supports C, substantially as described.

10. The forked supports C, in combination with the vibrating cranks *c*, to which they are pivoted, and the springs c^3, substantially as described.

11. The forked supporting-arms C, in combination with the separators D and the vibrating stop *g*, arranged and operating substantially as described.

12. The notched pivoted gate b^1, mounted on the wire-supporting frame, in combination

with a fastening device for holding it up to divide the barbs strung on the wire into sections, substantially as described.

13. The reciprocating hooks J, arranged to move up and take the barb after it is separated from the rest, draw it back along the wire underneath the compressing-dies, and release it to permit the feed after the barb is fastened, substantially as described.

14. The reciprocating retracting-hooks J, mounted on a rocking frame, I, whereby the hooks are engaged with and released from the barb, substantially as described.

15. The reciprocating frame H, in combination with the rocking frame I, mounted therein, and the retracting-hook J, substantially as described.

16. The arms *i* of the frame I, in combination with the hook J, pivoted thereto, and the holding-spring *j*, substantially as described.

17. The compressing-dies K K^1, with their faces notched in both directions at right angles, as specified, whereby they are adapted to hold and compress the edges of the barbs to fasten the latter on the wire, substantially as described.

18. The movable die K, in combination with the lever k^1 and spring k^4, substantially as described.

19. The reciprocating frame H, carrying the rocking frame I, in combination with the bell-crank lever H^1 and cam H^2, and spring k^2, substantially as described.

20. The rocking frame I, provided with a rear projecting arm, i^3, in combination with the crank I^1 and reciprocating connecting-rod Q, operated from main shaft, substantially as described.

21. The rocking frame I, in combination with mechanism for tilting it downward and a spring-rod, i^2, for tilting it in the opposite direction when released, substantially as described.

22. An upright pivoted vibrating frame, L, provided with clamps between which the wire is held during the backward swing of the frame, thereby producing the necessary feed, substantially as described.

23. The vibrating frame L, in combination with the clamps N N′ and the toggle-joint M, for opening and closing the clamps, substantially as described.

24. The movable clamps N N′, mounted in the swinging frame L, in combination with the toggle-joint M and the connecting-rods *l*, substantially as described.

25. The clamp N, mounted loosely in its sliding block, in combination with the lever *n* and spring n^2, substantially as described.

26. The pivoted feeding-frame L, in combination with a clamping device, a toggle-joint for operating the clamps, and a connecting-rod, m^2, operated from the main shaft and arranged to both vibrate the frame and operate the toggle-joint, substantially as described.

27. The vibrating clamps for feeding the wire, in combination with mechanism for holding the wire after it is released by the clamps and during the return movement of the latter, substantially as described.

28. The notched wheels P, mounted loosely on the same shaft, in combination with mechanism whereby they are clamped at the proper time to hold the barb and wire during the return movement of the feeding-frame, substantially as described.

29. The toothed wheels P, mounted loosely on the sliding shaft O, in combination with the sleeves *p*, the springs *o′* and *p′*, and crank-arm *o*, with cam-faces between it and the bearing, whereby the shaft is moved longitudinally by the vibration of the crank to clamp the wheels, substantially as described.

30. The spool-shaft R, provided with a friction-wheel, *r*, in combination with the vibrating arm r^1, provided with a friction-clutch, r^2, and the reciprocating connecting-rod *t′*, substantially as described.

ELIJAH P. PEACOCK.

Witnesses:

L. A. BUNTING,

W. C. CORLIES.