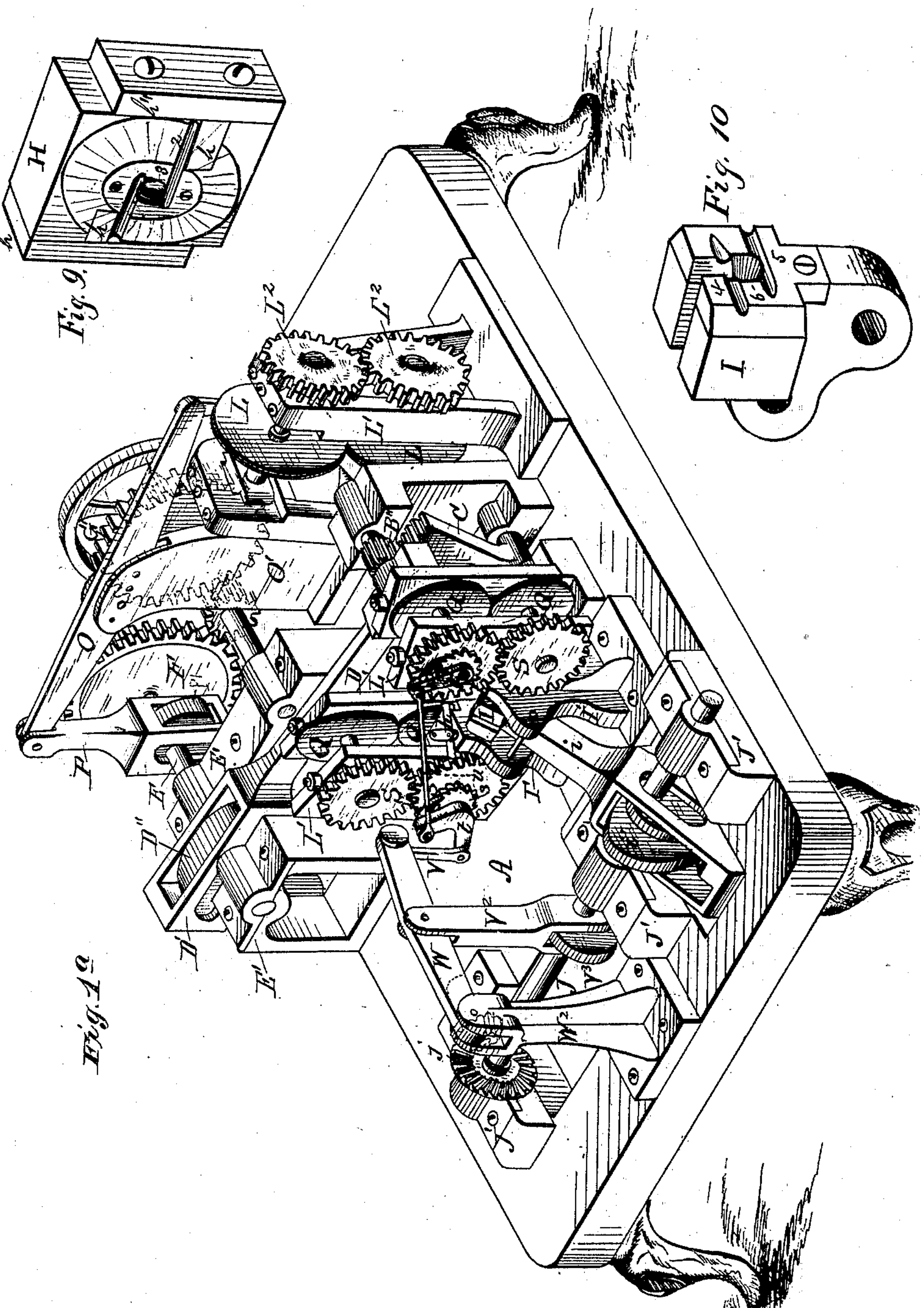
5 Sheets—Sheet 1.

F. BILLINGS.

Wire-Barbing Machine.

No. 204,877. **Patented June 18, 1878.**



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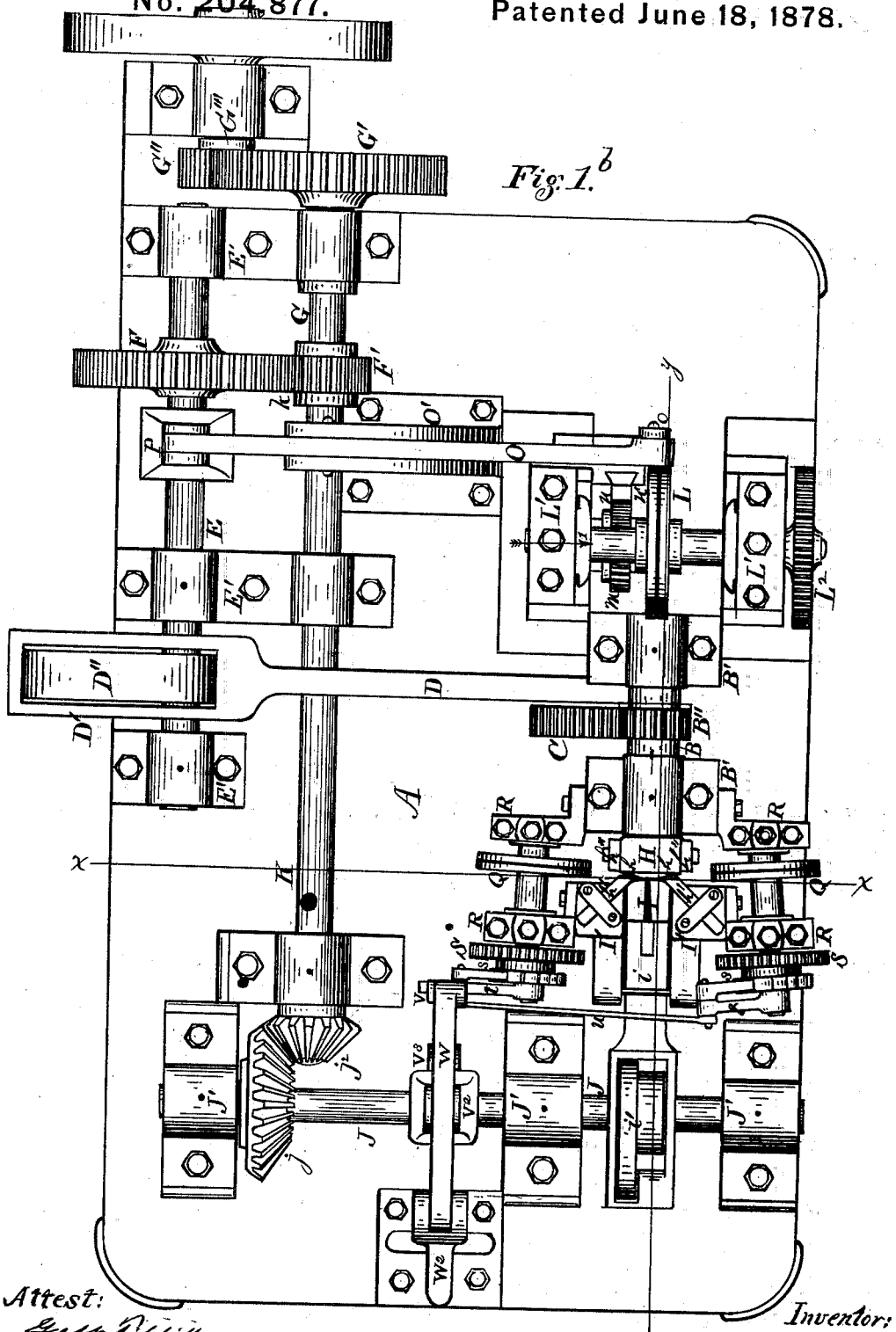
F. BILLINGS.

Wire-Barbing Machine.

No. 204,877. Patented June 18, 1878.

Fig. 1.



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F. BILLINGS.

Wire-Barbing Machine.

No. 204,877. Patented June 18, 1878.

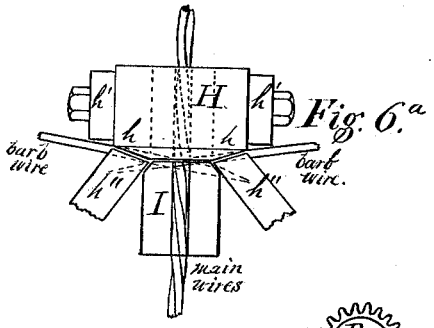


Fig. 6.a

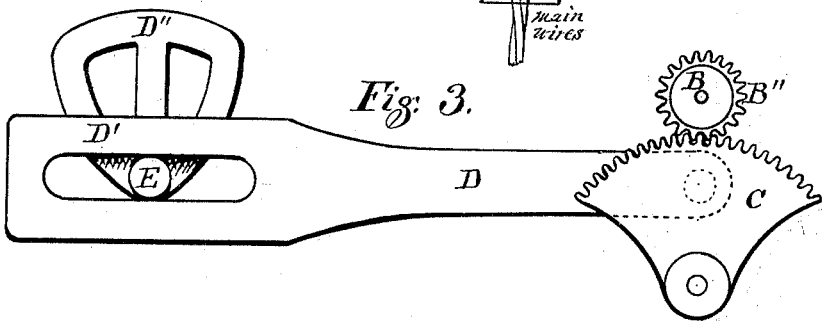
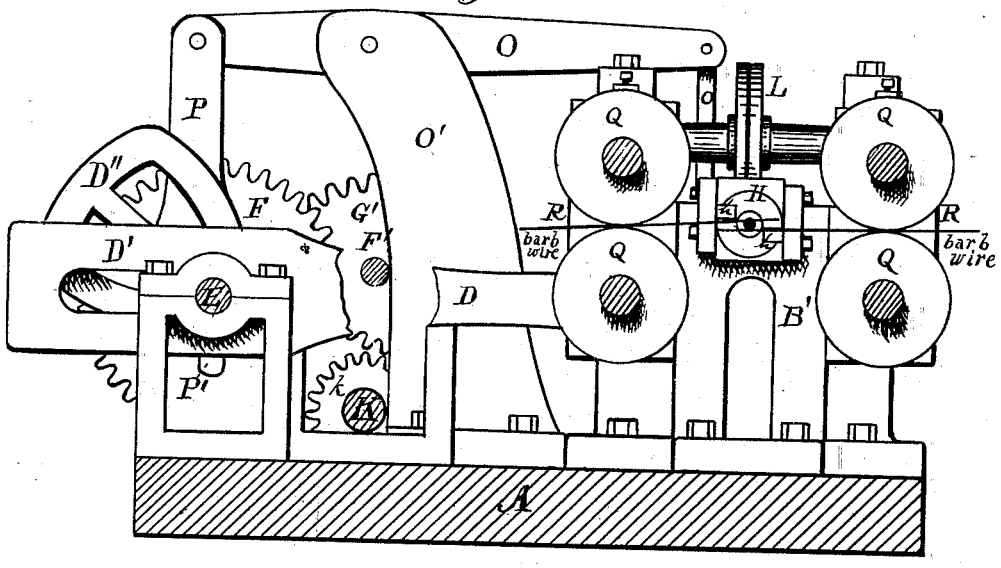


Fig. 3.

Fig. 2.



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Wire-Barbing Machine.

No. 204,877. Patented June 18, 1878.

Fig. 5.

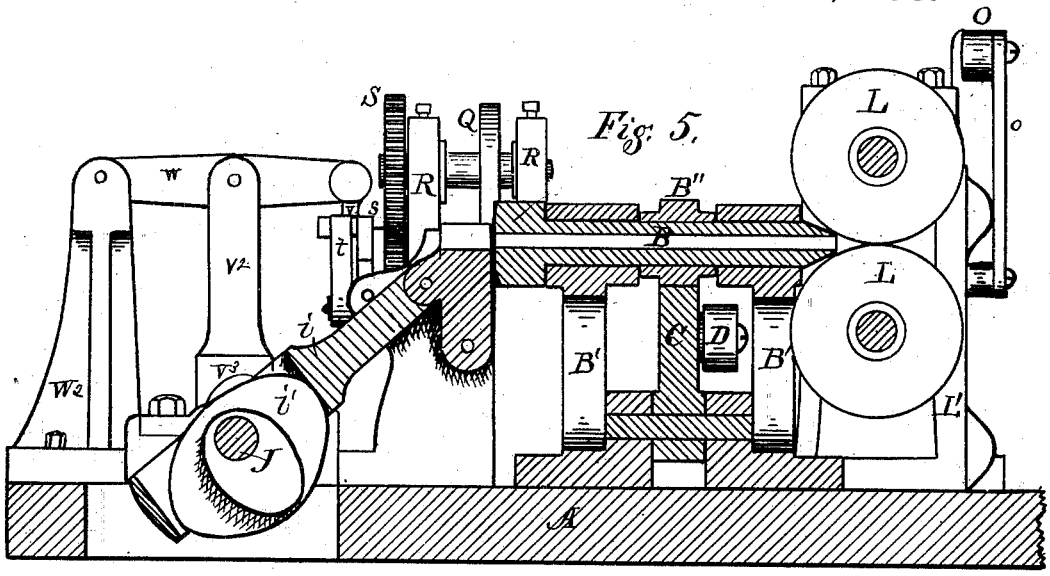
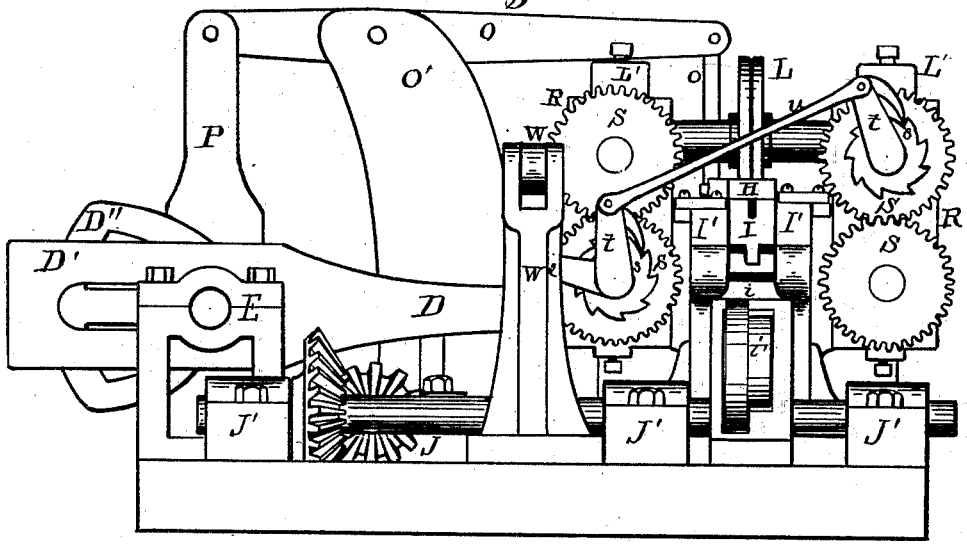


Fig. 4.



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Frank Billings

F. BILLINGS.

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Fig. 7.

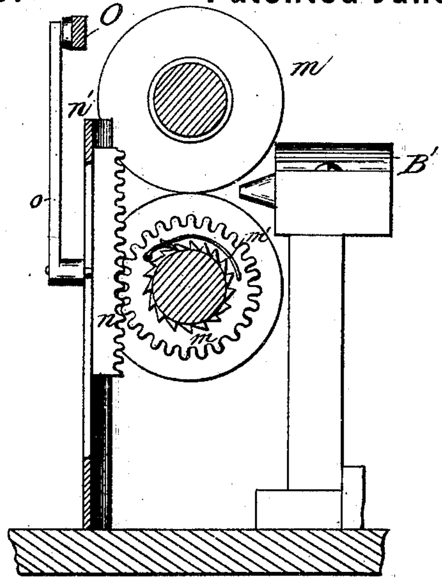


Fig 8

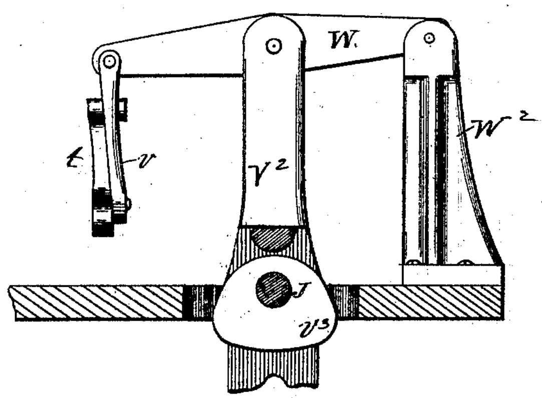
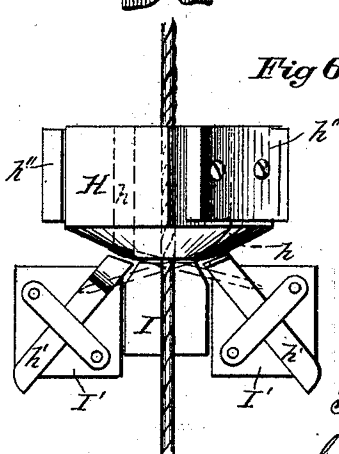


Fig 6³



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Inventor:
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UNITED STATES PATENT OFFICE.

FRANK BILLINGS, OF CLEVELAND, OHIO.

IMPROVEMENT IN WIRE-BARBING MACHINES.

Specification forming part of Letters Patent No. **204,877**, dated June 18, 1878; application filed April 12, 1878.

To all whom it may concern:

Be it known that I, FRANK BILLINGS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Machine for Making Barb Fence-Wire, which is fully set forth in the following specification and accompanying drawings, in which—

Figure 1ª is a perspective view of my machine. Fig. 1ᵇ is a top or plan view. Fig. 2 is a vertical section in line *x x* of Fig. 1ᵇ. Fig. 3 is a detached view of the cam, connecting-rod, and segment for operating the barb-twister. Fig. 4 is an end view of the machine, showing the mechanism for feeding the barb-wire. Fig. 5 is a longitudinal section in line *y y* of Fig. 1ᵇ. Fig. 6ª is a detached plan view of cutting and twisting head, showing relative position of the parts and wires at the beginning of the operation of cutting. Fig. 6ᵇ is a top-plan view of the head and block and barbs in place, showing the head while in process of securing the barbs to the main wire. Fig. 7 is a partially-sectional elevation of the main-wire feed, looking in the direction of arrow 1, Fig. 1; and Fig. 8 is a side elevation of the cam and levers for operating the barb-wire feed. Fig. 9 is a perspective view of the head, and Fig. 10 a perspective view of the block, both enlarged, and hereinafter fully described.

The object of this machine is the rapid manufacture of barbed wires for fencing, taking the main wires from the reel, feeding them through a hollow shaft, and taking the barb-wires from reels, feeding them to the main wires, cutting therefrom the barb-blanks, and twisting them onto and around the main wires at suitable intervals, said machine being constructed and operating substantially as hereinafter described and claimed.

In the drawings, A is a bed-plate, supported by suitable legs, and upon which are arranged all the working parts of the machine. B is a hollow shaft, set in bearings on the blocks B′ B′, and has a pinion, B″. Beneath said shaft B is a segment-gear, C, also having its bearings in the lower part of said blocks B′. D is a pitman attached to the segment-gear, provided at its opposite end with a slotted frame, D′, in which a cam, D″, plays, and by means of which motion is imparted to the said segment-gear. The cam D″ is fixed on a shaft, E, having its bearings in the three blocks E′ E′ E′. This shaft E has a gear-wheel, F, connected with a pinion, F′, on a parallel shaft, G, which also has a gear-wheel, G′, outside of the block E′, at the end of the machine. This gear G′ connects with a pinion, G″, on a short shaft, G‴, and upon which are the driving-pulleys, from which the whole machine derives its motion.

To the hollow shaft B is fixed a head, H, having a face slightly cone-shaped, and is provided with two cutters, *h h*, one located on each side of the opening through which the main wire passes. These cutters are set in slots in the sides of the head, and are held in place by plates *h″ h″*, bolted to the said head. This is for the convenience of removing for sharpening, &c. Opposed to the head H is a block, I, pivoted between two posts, I′ I′. This block has a reciprocatory movement imparted to it by a pitman, *i*, connected therewith, and operated by a double cam, *i′*, playing in a slotted frame on its opposite end. Said cam is fixed on a counter-shaft, J, having its bearings in the boxes J′ J′ J′ on the bed-plate A. This shaft J derives its motion through a bevel-gear, *j*, connected with a bevel-pinion, *j′*, on a shaft, K, driven by a pinion, *k*, connecting it with the gear F on the shaft E.

In connection with the hollow shaft B is a feed mechanism, consisting of a pair of feed-wheels, L L, whose shafts have their bearings in the blocks L¹ L¹. Said shafts are geared to run together by gears L² L² outside of the bearings. The bearings for the upper shaft are set in adjustable boxes, which are regulated by set-screws for regulating the tension of said wheels upon the wire. The lower shaft is provided with a loose pinion, *m*, having a dog, *m′*, which plays in a ratchet on the said shaft. By the side of said ratchet and pinion is arranged a rack, *n*, (see Fig. 7,) playing in slides *n′*, attached to the side of one of the blocks L¹. This rack meshes with the aforesaid loose pinion *m*, and is operated by a connecting-rod, *o*, connecting it with a rocking lever, O, pivoted in a post, O′. The other end of said lever O is connected with a pitman, P, having a slotted frame on its lower end, in which a cam, P′, on shaft E plays, and from

which the said feed mechanism derives its movements.

In connection with the revolving cutter and twisting-head H is also a feed mechanism for feeding the barb-wires to the said head, consisting of two sets of feed-wheels, Q Q Q Q, one pair located on each side of the head H. The bearings for the shafts of the said feed-wheels are fixed in frames R R R R, secured to the posts and blocks at both sides of the head H, the bearings consisting of adjustable boxes, regulated by set-screws for regulating the tension. Each pair of shafts of the said feed-wheels are geared to run together with gears S S S S, and are provided with ratchet-wheels and dogs *s s*, the said dogs being attached to loose cranks *t t*, and said cranks being connected by a connecting-rod, *u*, by means of which the two pairs of feed-wheels work in concert. This feed mechanism derives its movements by means of a pitman, *v*, connecting one of the said cranks *t* with a rocking lever, W, pivoted at the opposite end in the top of a post, W^2, and operated by a pitman, V^2, having a slotted frame on its lower end, and operated by a cam, V^3, on the counter-shaft J. (See Fig. 8.)

On the top of the two posts I′ I′ are fixed knives or cutters *h′ h′*, which work in conjunction with the two cutters *h h* in the head H, in cutting off the barb-wires.

Let it be observed that the two pairs of feed-wheels are not set parallel to the sides of the head H, but are at a slight angle thereto. This is for the purpose of feeding the barb-wires in a slight diagonal line across the head, whereby the wires shall be cut off in a diagonal line, and thus give the barbs a sharp point. It also causes the barb-blank to lie with one end in the slot in the face of the head H and the other end in the slot in the face of the block I, so that when the head revolves it will wind the blank around the main wire.

The operation of this machine is as follows: The main wire is fed through the hollow shaft by the feed mechanism at the end of said shaft by intermittent movements caused by the cam P′ on shaft E. Then the barb-wires are fed by the feed mechanism at the opposite end of said hollow shaft. When this is done, during the intervals of movements of the aforesaid feed mechanisms, the hollow shaft makes its revolutions, and the barbs are cut off and wound around said main wires by the movements of said shaft B. This cutting off of the barbs will more plainly appear by reference to Fig. 2, where the wires, of which there are two to make a four-point barb, are shown in position upon the face of the head H. One wire is beneath the edge of one of the knives *h*, and the other is just above the edge of the opposite knife. The cutting-edges of these knives are then in line with those of the stationary knives *h′ h′*, so that when the head is rotated the knives act to cut off the barbs. At this time the block I is held in close contact with the head H, with the barb-blanks between them, the said blanks being held in the slots in the face of the block I at one end, and their other ends resting in the slots in the head H. The rotating head H carries its ends of the barbs about the main wire, interlocks them, and secures the barbs by about a three-fourths turn to the main wire.

As soon as the shaft B has performed its revolution for twisting the barbs the block I recedes from the head H by means of the cams *i* on the counter-shaft J. At the same time the shaft B is revolved back again through the medium of the segment-gear C, operated by the pitman D and the cam D″ on the shaft E. One of the cams *i′* has a complete half-circle, for the purpose of retaining the block I in place up against the head during its revolution of twisting the barb. The cams are so arranged on their shafts and in their relation to each other as to operate and perform the several movements of different parts of the machine at the successive intervals stated and for producing the results described.

The machine is automatic, for it takes the main wires from the reels, passes them through the hollow shaft and head, takes the barb-wires also from the reels, feeds them to the revolving cutting and twisting head, cuts off the barb-blanks, twists them onto the main wires, and passes the finished barbed wire to the spools, where it is wound, ready for use or shipment.

I do not claim in this application the combination of the head H and block I. Nor do I herein broadly claim the combination of mechanism constructed and arranged to automatically feed forward the fence or main wire at stated intervals, with mechanism to secure the barb about the fence-wire, and mechanism to feed forward the barb-wires at stated intervals across the fence-wire, and mechanism for cutting off the barb-wires; but I reserve to myself the right and intend to embody such combinations in future applications.

In Figs. 9 and 10 the details of the construction of the head H and block I are more fully represented. Grooves or slots 1 and 2 are made partly across the face of the head to receive the barb-wires, and a cavity or recess, 3, is made between these grooves or slots, and surrounds the opening continuous of the hollow shaft or spindle, in which cavity the protuberance upon the main wire resulting from the winding of the barbs upon it is received, one half of such protuberance lying within said cavity 3 and the other portion within a cavity, 6, in the block I. This block is provided with slots or grooves 4 and 5, that register with the grooves or slots 1 and 2 of the head H, to hold the barbs while they are being secured to the fence-wire, as hereinbefore described.

Having now described my invention, I claim—

1. In a machine for making barb fence-wire, the rotating cutting and twisting head, for cut-

ting off and twisting the barbs onto the main wire at one and the same operation, substantially as and for the purpose specified.

2. The hollow shaft B, having the head H and pinion B″, the segment-gear C, and the pitman D, operated by the cam D″, by means of which the said shaft is given a reciprocatory rotary movement, substantially in the manner and for the purpose stated.

3. The head H, having conical slotted face, and provided with the adjustable cutters *h h*, as and for the purpose set forth.

4. In combination with the head H, provided with the cutters *h h*, the cutters *h″ h″*, for cutting off the barbs, as and for the purpose specified.

5. The block I, pivoted in the posts I′ I′, and having the reciprocatory movements imparted to it by means of the pitman *i* and the cam *i′*, as described.

6. The feed mechanism for passing the main wires through the hollow shaft B, consisting of the grooved wheels L L, gears L^2 set in the posts L^1 L^1, loose ratchet and pinion *m*, rack and slides *n n′*, operated by the pitman *o*, rocking lever O, pitman P, and cam P′, substantially as and for the purpose specified.

7. The feed mechanism for feeding the barb-wires, consisting of the feed-wheels Q Q, gears S S set in the frames R R, the ratchets and dogs *s s*, loose cranks *t t*, and connecting-rod *u*, operated by the pitman V, rocking lever W, pivoted in the post W^2, and the pitman V^2 and cam V^3, substantially as and for the purpose specified.

FRANK BILLINGS.

Witnesses:
SETH J. WHEELER,
GEO. W. TIBBITTS.