(No Model.) 3 Sheets—Sheet 1.

W. A. ROOT.

Machine for Barbing Fence Wire.

No. 237,129. Patented Feb. 1, 1881.

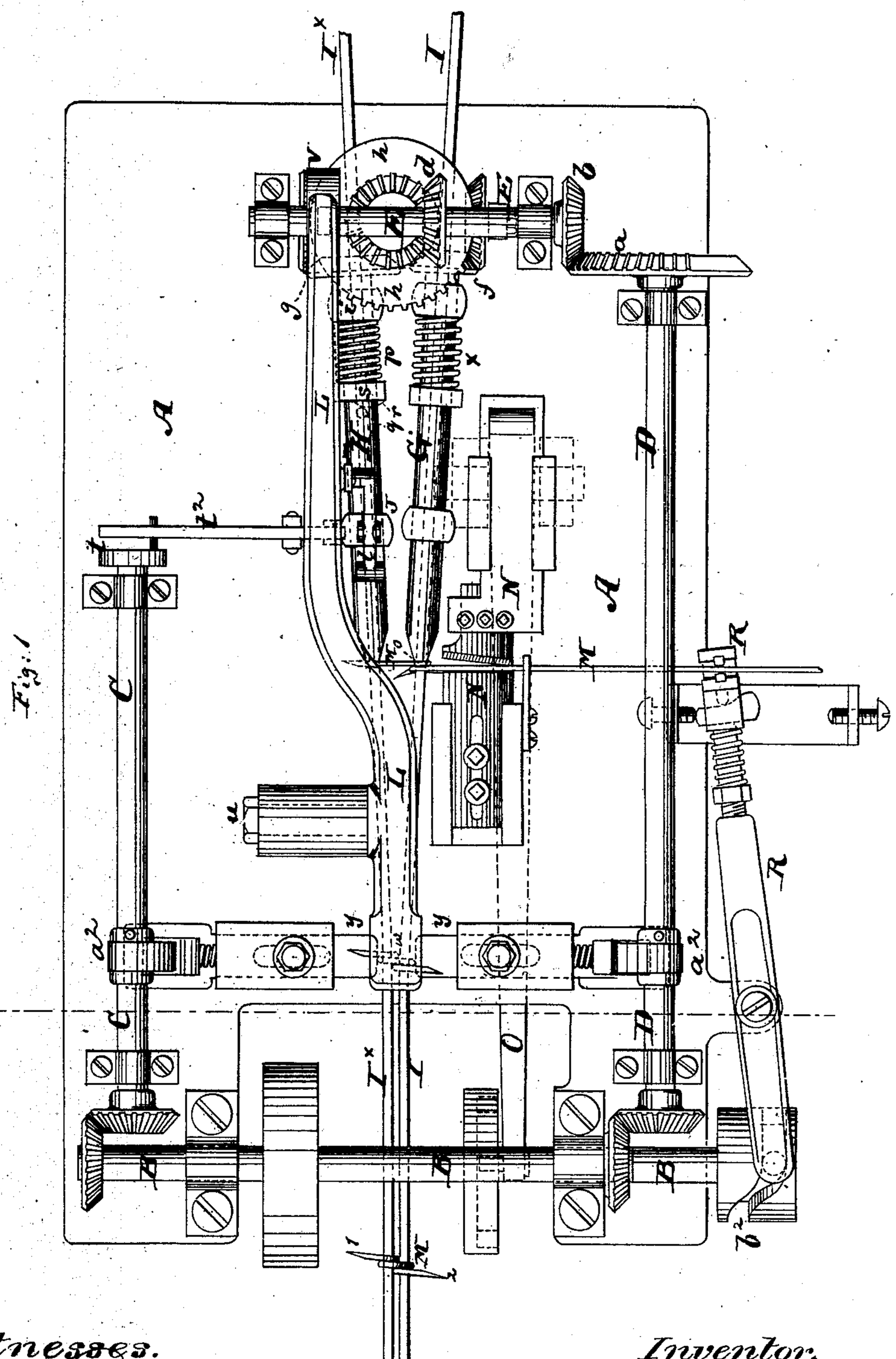

Fig. 1.

Witnesses.
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William A. Root
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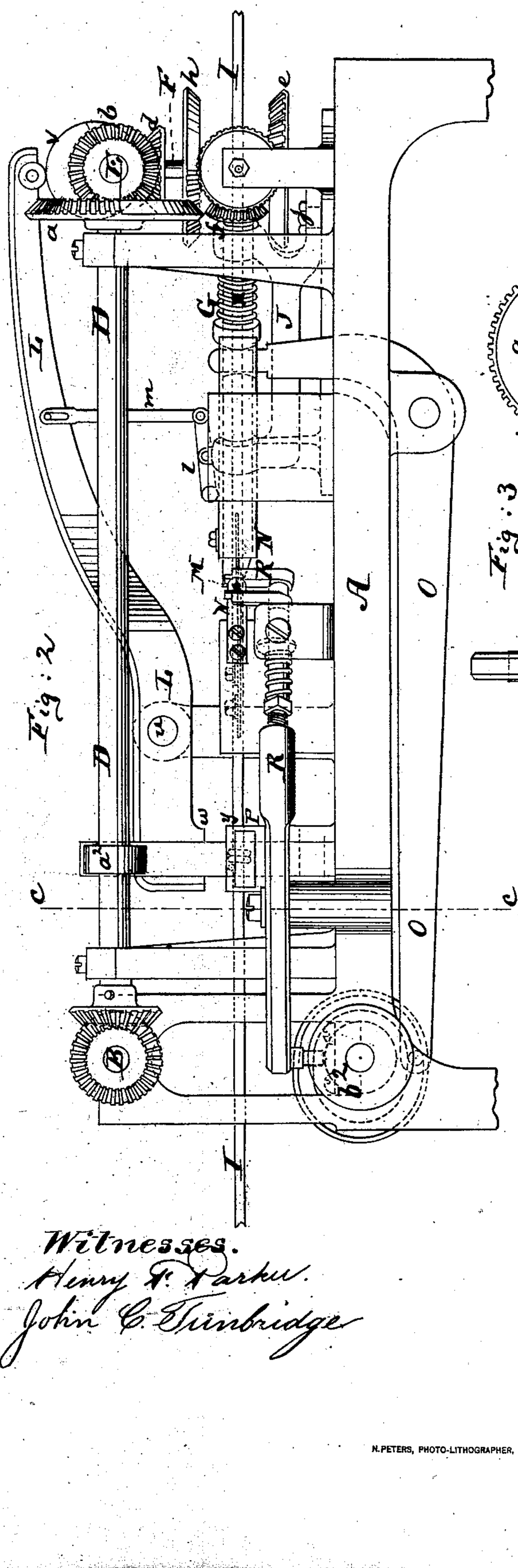

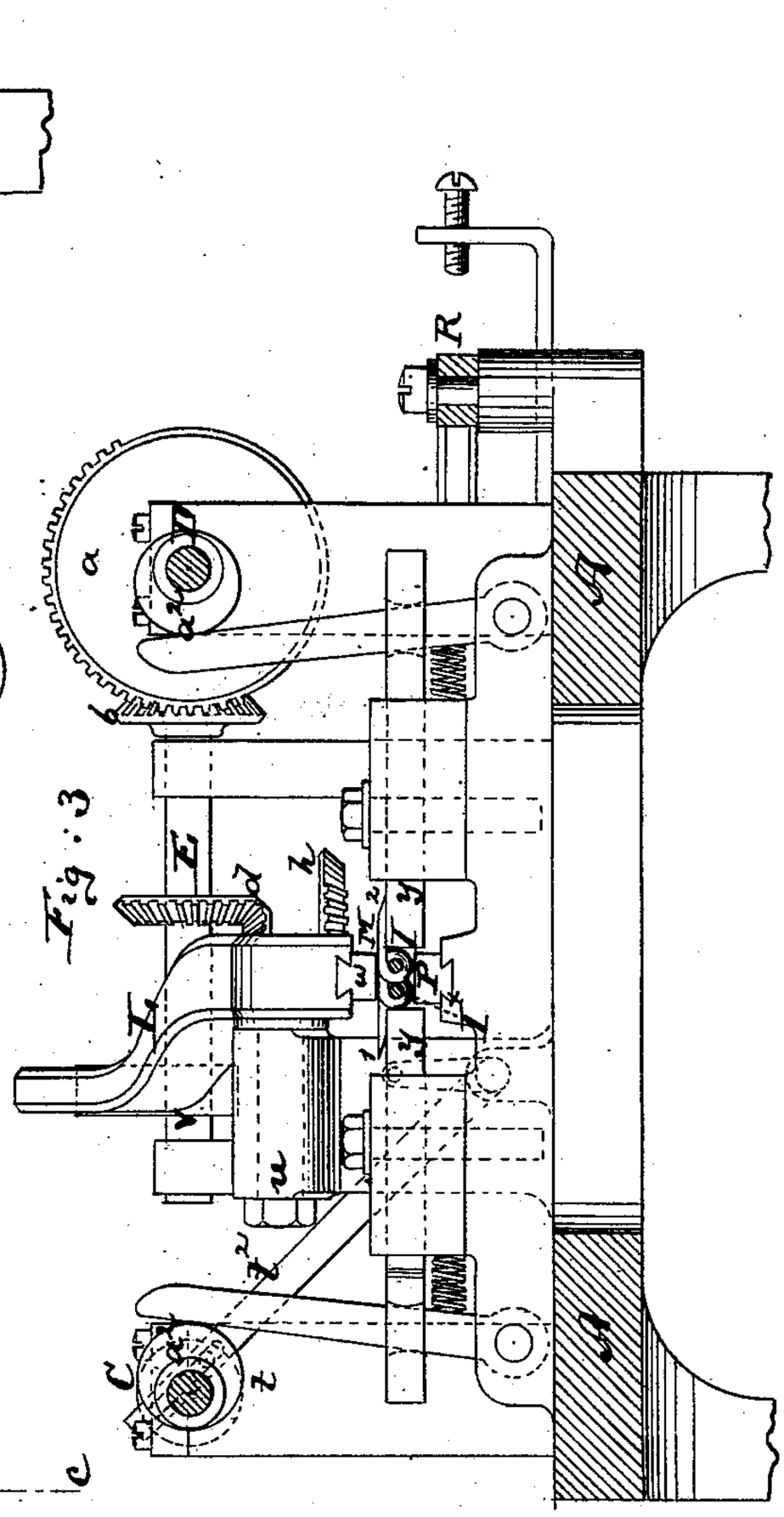

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(No Model.) 3 Sheets—Sheet 3.

W. A. ROOT.

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Fig: 4

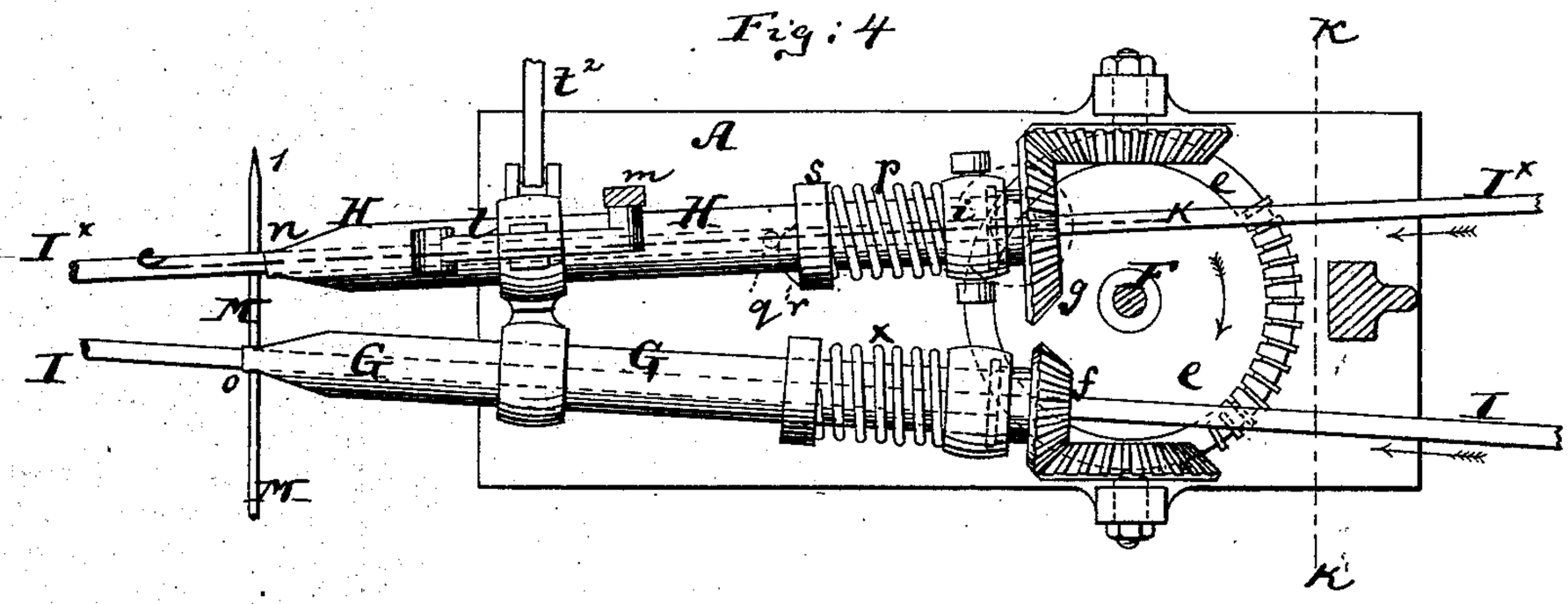


Fig: 5

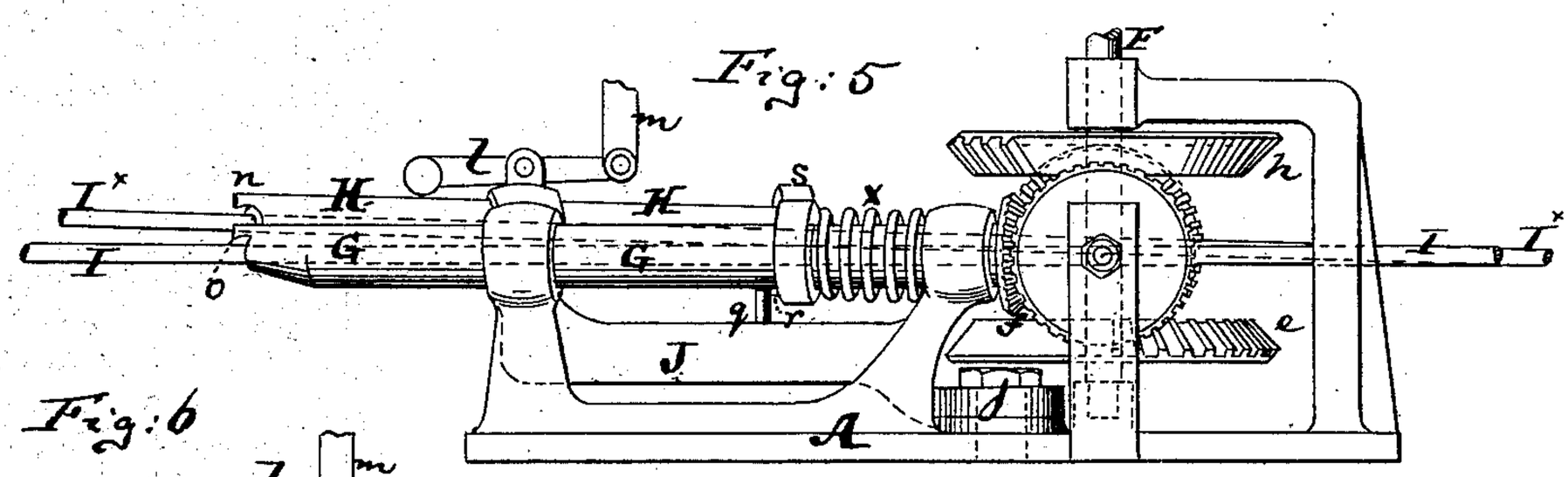


Fig: 6

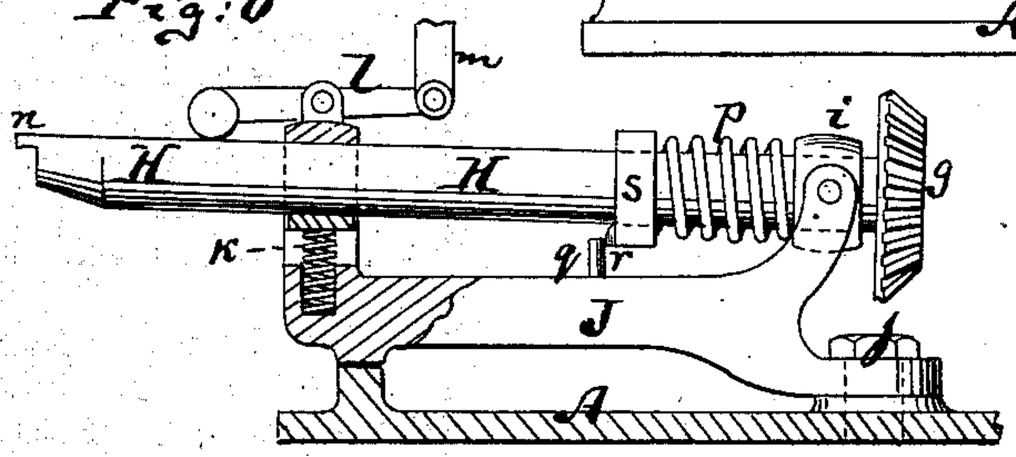


Fig: 7

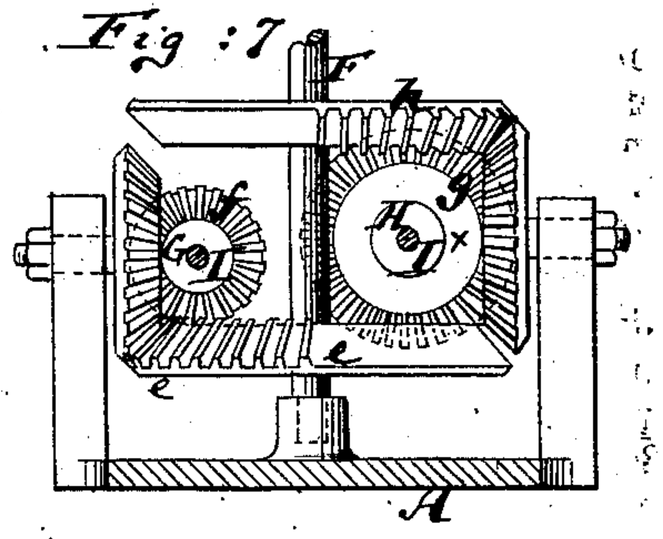


Fig: 8

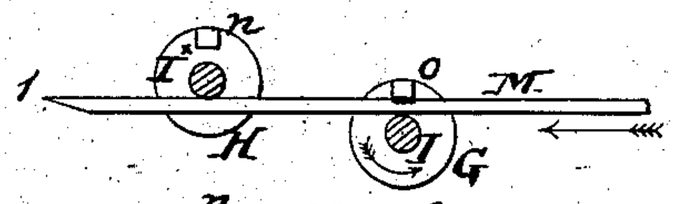
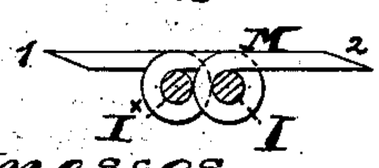


Fig: 9

Fig: 10

Fig: 11



Witnesses.
Henry R. Parker
John C. Dumbridge

Inventor.
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UNITED STATES PATENT OFFICE.

WILLIAM A. ROOT, OF NEW YORK, N. Y.

MACHINE FOR BARBING FENCE-WIRE.

SPECIFICATION forming part of Letters Patent No. 237,129, dated February 1, 1881.

Application filed September 25, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. ROOT, of New York, in the county and State of New York, have invented a new and Improved Machine for Winding Barbed Fence-Wire, of which the following is a specification.

Figure 1 is a plan or top view of my improved machine; Fig. 2, a side view of the same. Fig. 3 is a vertical cross-section of the same taken on the line *c c*, Fig. 2. Fig. 4 is a detailed top view of the two winding-shafts, on a somewhat enlarged scale; Fig. 5, a detailed side view of the same; Fig. 6, a side view, partly in section, on the line *c k*, Fig. 4. Fig. 7 is a cross-section on the line *k k*, Fig. 4. Figs. 8, 9, 10, and 11 are detailed sectional views of the wires in their successive stages of formation.

This invention relates to a new machine for applying the barbs to the double strands of fence-wire; and it consists in the combination, with each other, of two peculiarly-actuated winding-shafts that embrace the strands, and with mechanism for feeding the strands, for cutting the barbs, and for compressing, finally, and in a perfect form, the coiled portions of the barbs.

The machine is intended to produce an improved barb, which is described in an application for a patent filed by me on the 21st day of June, 1880, which barb, briefly described, consists, when completed, of two projecting prongs and of an inner looped portion, all placed in the same horizontal plane on top of the strands, as is more clearly indicated in Figs. 1 and 11.

The invention also consists in a new process of coiling the barb by first winding one loop, then part of the next loop, then detaching the barb from the coil or feed-wire, and, finally, compressing it in such a way as to complete [illegible]mation, all as hereinafter described.

In the accompanying drawings the letter A represents the frame-work of the machine, which frame-work carries a suitable driving-shaft, B, that imparts motion, by gearing or otherwise, to shafts C and D. The shaft D, which is clearly shown in Fig. 1, transmits motion, by gearings *a b* or otherwise, to the shaft E; but the gear-wheel *a* has part of its edge left smooth, so that it will not rotate the wheel *b* and shaft E continuously, but intermittently.

The shaft E, by a gear-wheel, *d*, revolves a vertical shaft, F, (see Figs. 4, 5, and 7,) which carries a toothed disk, *e*, that gears alternately into pinions which mesh into beveled pinions *f g*. The pinion *f* is smaller than the pinion *g*, and the toothed portion of the disk *e* is of such extent that it will first revolve the pinion *f* one entire revolution, and afterward revolve the pinion *g* about two-thirds of a revolution. Another partly-toothed disk, *h*, gears into a pinion that meshes into pinion *g*, as shown in Fig. 7, and has for its object to bring said pinion *g* back to its normal position at or before the time the disk *e* turns the pinion *f*. The pinion *f* is fitted upon one of the winding-shafts, G, and the pinion *g* upon the other winding-shaft, H. Both these winding-shafts are tubular, and through them are passed lengthwise, and gradually fed forward, the strands I I[×] of the fence-wire, and around portions of the said strands the two said winding-shafts are turned, each in its proper ratio, as hereinafter described.

The shaft G is hung and revolves in suitable bearings that project from the frame A; but the shaft H is hung in a swiveled frame, J, (see Fig. 6,) in bearings *i*, that are pivoted horizontally in frame J, so that on said pivots the shaft H may vibrate vertically, and the frame J, moreover, is, by a vertical pivot, *j*, pivoted to the frame A, to be capable of horizontal vibration on its said vertical pivot.

A spring, *k*, Fig. 6, placed into the frame J under the shaft H, holds the latter normally at a higher plane than the shaft G, as indicated in Fig. 5; but a lever, *l*, which is actuated by a rod, *m*, that joins the compression-lever L, serves, at the proper moment, to depress the shaft H level with the shaft G. Thus by the joints on which the shaft H is capable of moving I am able to have it normally in the position shown in Fig. 8; but to depress it, when desired, into level with the shaft G, as shown in Fig. 9, and to swing it while so on level with the shaft G nearer to the same, as shown in Fig. 10, and yet meanwhile throughout all these movements, and even while both said shafts are being revolved,

the strands I I^{x} pass undisturbed through said two winding-shafts. Each of the winding-shafts has at its front end a projecting tooth, as shown at *n* and *o*, Figs. 8, 9, and 10, and also in Fig. 5.

In addition to the movement which can be imparted to the shaft H, the said shaft has also a slight reciprocating longitudinal movement, which is imparted to it in one direction by a spring, *p*, and in the opposite direction by a pin, *q*, coming into contact with a cam, *r*, on a collar, *s*, of said shaft H, so that when the spring *p* is compressed, at the time *q* and *r* are in contact with each other, as shown in Figs. 4 and 6, the front end of the shaft H will be thrown behind the line of the front end of the shaft G; but when the cam *r* has no longer contact with the pin *q* the two ends of the said two shafts G and H will be in line with each other. A suitable crank, *t*, or eccentric on the shaft C serves, by a rod, t^{2}, or otherwise, to impart lateral motion to the shaft H, carrying it, at proper intervals, nearer to or farther away from the shaft G. The lever L, which has already been mentioned as moving the lever *l*, is pivoted at *u*, and derives its vibratory movement from a cam, *r*, on shaft E, and has at its lower front end a compressing-block, *w*, for finally shaping the barb, and the lever L acts so that at the time the block *w* is brought down on the barb the rod *m* is raised and lever *l* moved, and the shaft H depressed to be level with the shaft G; but at the time the block *w* is elevated the spring *k* is thereby liberated to raise the shaft H to its former plane.

Now, assuming that the strands I I^{x} had been drawn through the hollow shafts G H and properly stretched and sufficiently fed forward, the barb is applied by placing the undetached end portion of the barb-wire M over the strand I that passes through the shaft G, and under the strand I^{x} that passes through the shaft H, as shown in Fig. 8; for in its normal position the shaft H is at a higher plane, and holds its strand I^{x} at a higher plane, than the shaft G, and in said normal position both teeth *n* and *o* are vertically above said strands, as clearly shown in Fig. 8. It will be remembered that when the barb is thus placed, as shown in Fig. 8, it is beneath the tooth *o*, whereas the tooth *n* is drawn back; and also that when the parts are in this position one end, 1, of the barb-wire is cut off to form the prong, but the other end is not yet detached. Now, the first thing to do is to revolve the shaft G once around its axis. This will cause its tooth *o* to lap the pronged end 1 of the wire M around the strand I that passes through the shaft G, and to place the extreme pronged end 1 upon or on top of the other strand, I^{x}, that passes through the shaft H, so that now the position shown in Fig. 9 is attained, in which position one loop of the barb-wire is already formed around the strand I that passes through the shaft G. The shaft G has a slight rectilinear motion, permitted by a suitable spring, *x*, which enables the spiral loop formed on wire M to bring the two straight parts of the barb-wire out of the same vertical plane, and to crowd shaft G back in coiling, and in this position the pronged end 1 of the barb is on top of the strand I^{x}, whereas originally it was below the same. The shaft H now begins to turn and the shaft G remains stationary. Upon beginning to turn the shaft H is first liberated from the effect of the pin *q* and cam *r*, and its tooth pushed forward over the wire M. At the same time, by the action of the eccentric *t*, the shaft H is moved nearer to the shaft G, and now as it makes two-thirds of a revolution, or thereabout, in direction of arrow shown in Fig. 9, it coils the pronged end of the wire partly around the strand I^{x}, bringing the parts into the position shown in Fig. 10, which figure shows the position of the tooth *n* after it has completed its two-thirds revolution. The tooth *n*, with shaft H, is now again turned back by the action of the toothed wheel *h*, and thereby relieved from contact with the wire M, and the barb-wire is now detached by suitable shearing mechanism N, that is actuated by a cam-lever, O, from the body or main coil of said wire. The feed mechanism of the strands I I^{x} is next set in motion, and the strands carrying the partly-finished barb are moved ahead until the partly-finished barb arrives under the block *w* and between two compression-jaws, *y y*, and over a fixed anvil, P. The compression-jaws, by suitable eccentrics a^{2} on the shafts C and D, are now moved toward each other against the coiled parts of the barb-wire, and then the block *w* is brought down, so that between said jaws, and between the block *w* and the anvil P, the partly-finished coil is compressed laterally, so as thereby to roll that end portion 1 of the wire M which remains between and above the two strands I I^{x}, as in Fig. 10, more completely around the strand I^{x} until the original prong 1 is horizontally on a plane with the newly-formed prong 2, produced by the shears, and the finished barb assumes the shape shown in Figs. 1 and 11. The barb-wire is now, from its coil, fed again into the machine by suitable griping apparatus R, actuated by suitable cam b^{2}, to bring another portion of it in front the ends of the shafts G and H, in the manner shown in Fig. 8, and the above-mentioned operation is again continued, and so forth, *ad infinitum*.

It will, of course, be understood that whenever the shaft G begins a rotation the tooth *n* of shaft H is withdrawn from above the barbed wire, so that the return motion imparted to the shaft H by the upper disk, *h*, which is necessary in order to bring tooth *n* from its lower position (shown in Fig. 10) back into the upper position, (shown in Fig. 9,) may be effected without disturbing the action of the shaft G.

I claim—

1. In a machine for barbing fence-wires, the combination of the hollow winding-shaft G with the hollow winding-shaft H, which shaft

H is capable of horizontal and vertical vibration and of longitudinal movement, substantially as described.

2. The combination of the shaft G, having tooth *o*, with shaft H, having tooth *n*, and with mechanism for moving shaft H lengthwise, and alternately turning said shafts G and H, substantially as described.

3. The process herein described of winding the barb around the strands of the fence-wire, which process consists in first placing the barb-wire over one and under the other strand, then coiling it entirely around one of the strands, and then partly around the other, and finally compressing it laterally to complete the last coil, substantially as described.

4. The combination of the winding-shafts G and H with the lever L, having compression-block *w*, and with the lever *l* and rod *m*, for operation substantially as described.

5. The combination of the winding-shafts G H with the pinions *f* and *g* and actuating sectional gear *e* and intermediate gear-wheels, all arranged so that by said gear *e* one of the shafts shall be revolved entirely and the other but partly, substantially as described.

6. The tubular shaft H, provided with the tooth *n*, and combined with jointed bearings, pivoted frame J, rod t^2, spring *k*, pin *q*, cam *r*, and depressing-lever *l*, substantially as described.

7. In a machine for winding barbs on fence-wires, the combination of winding-shafts G H, which are placed one higher than the other, with each other and with mechanism for bringing the higher one of such shafts on a level with the other, substantially as described.

8. In a machine for winding barbs around fence-wires, the combination of the winding-shafts G and H, which are held at a certain distance apart when the operation begins, with mechanism for bringing them closer together before the operation is completed, substantially as described.

9. In a machine for winding barbs upon fence-wires, the combination of the rotating winding-shaft G with the rotating, vibrating, and reciprocating winding-shaft H, and with the shears N and forming mechanism *y y*, P, and *w*, substantially as described.

WILLIAM A. ROOT.

Witnesses:

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HARRY M. TURK.