(No Model.) 2 Sheets--Sheet 1.

A. HENLEY.

Machine for Barbing Fence Wire.

No. 232,819. **Patented Oct. 5, 1880.**

Fig. 1.

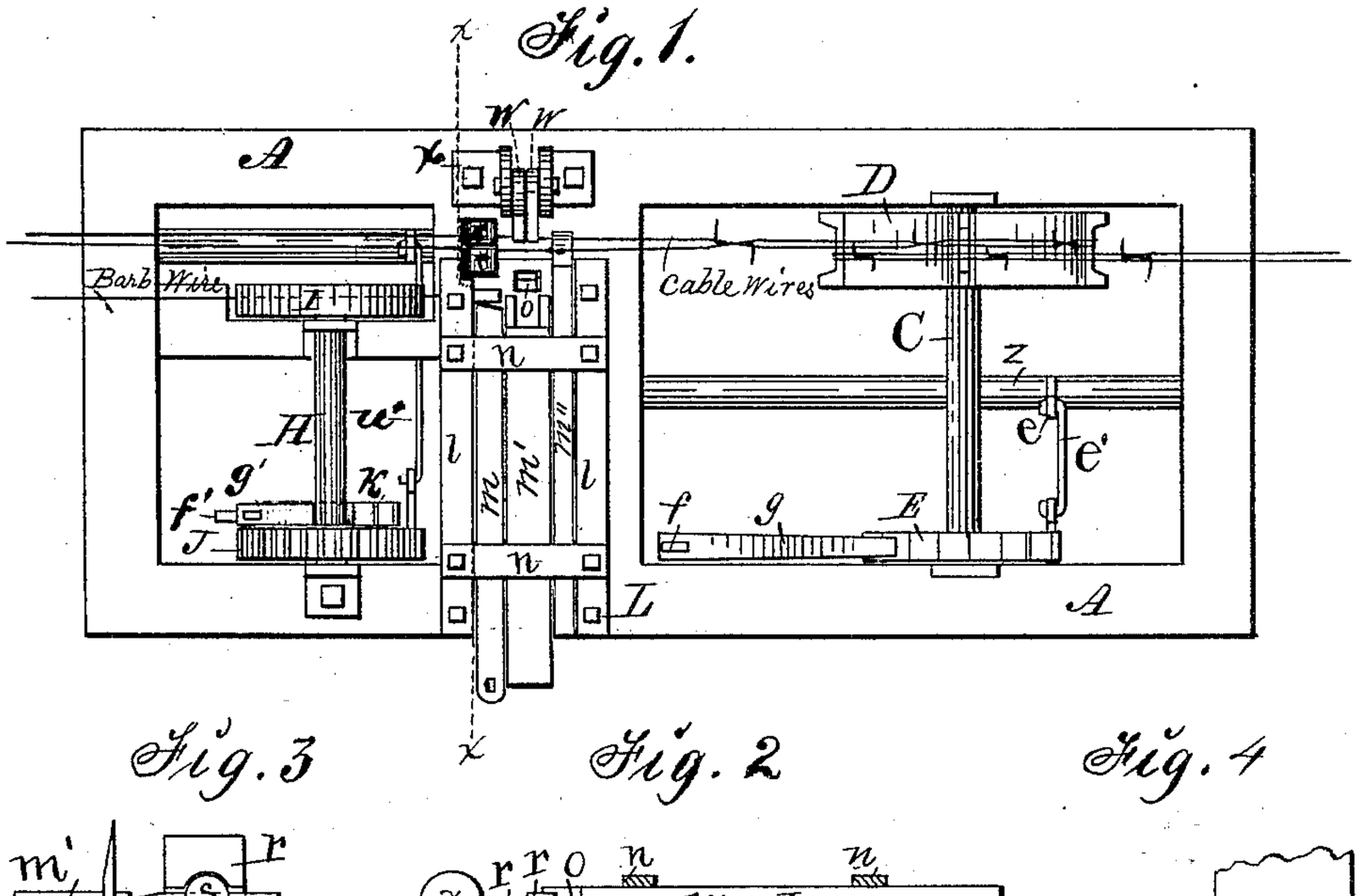
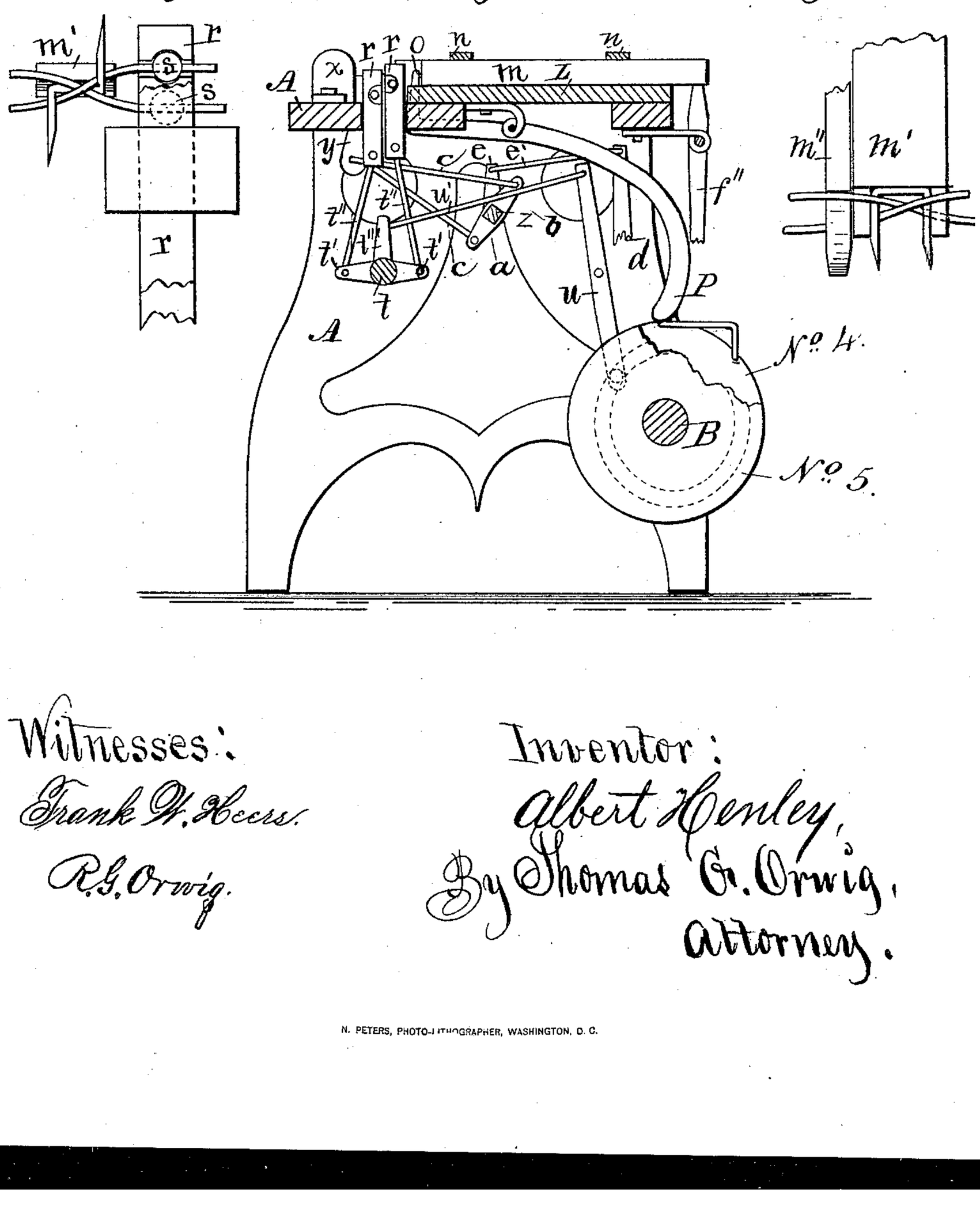


Fig. 3 Fig. 2 Fig. 4



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(No Model.) 2 Sheets--Sheet 2.

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Fig. 5.

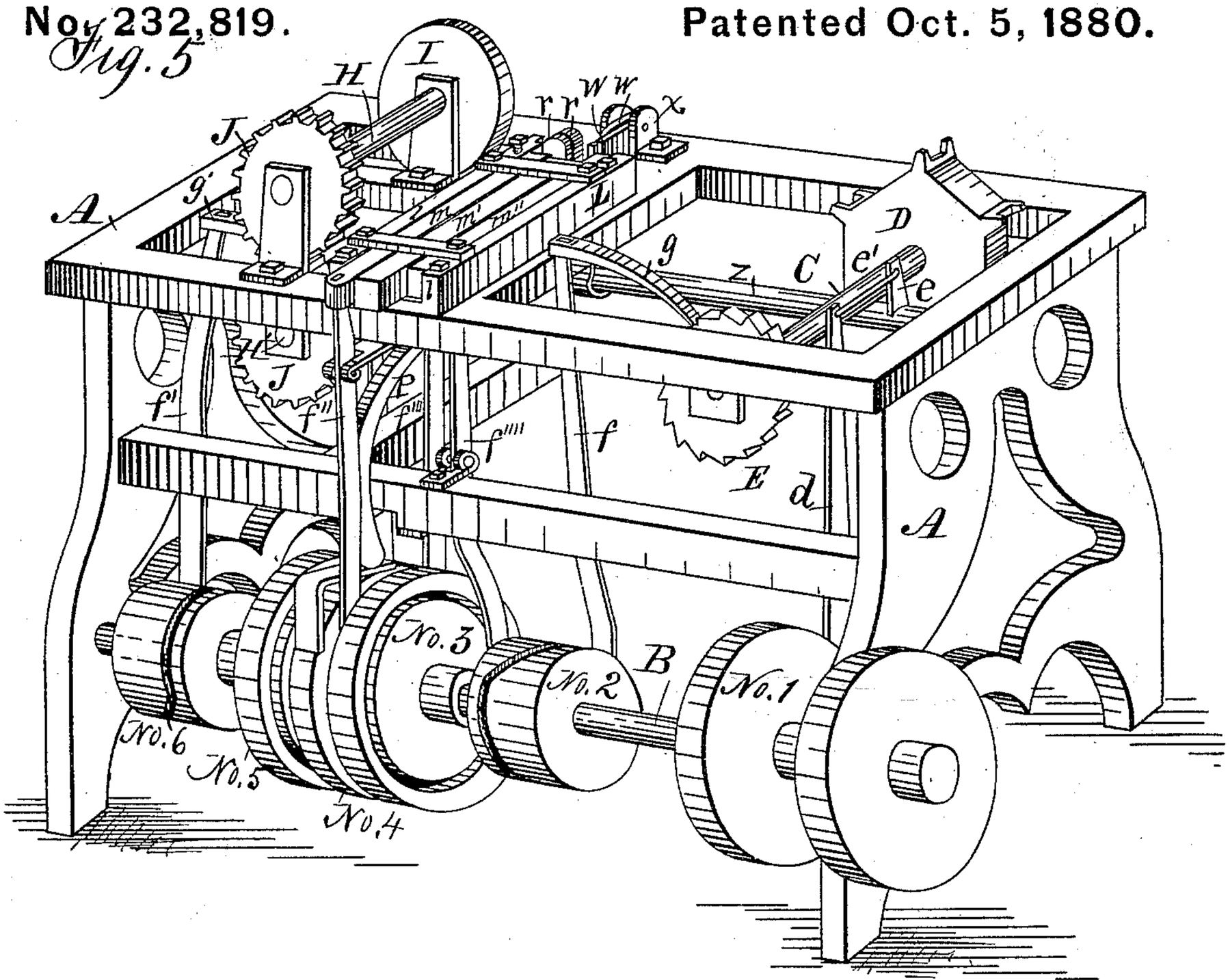
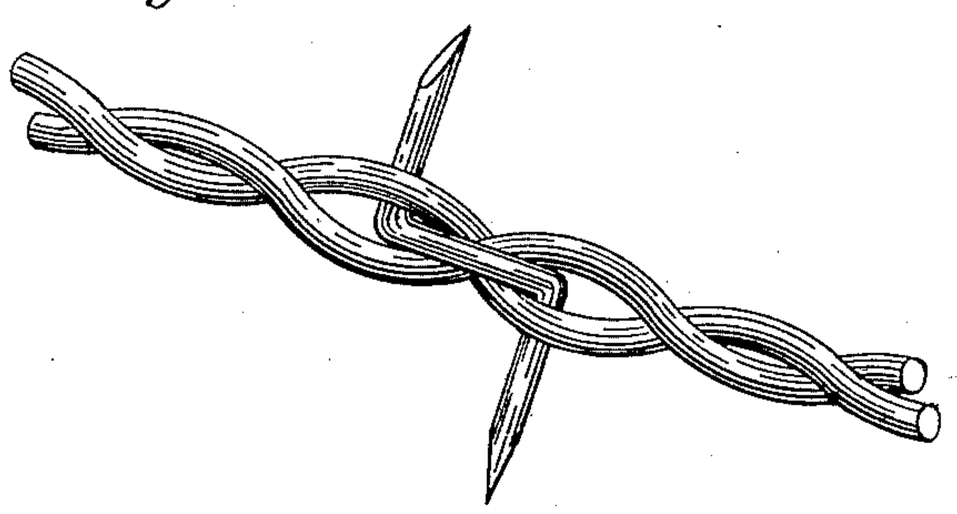


Fig. 6.



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Inventor:
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UNITED STATES PATENT OFFICE.

ALBERT HENLEY, OF LAWRENCE, KANSAS.

MACHINE FOR BARBING FENCE-WIRE.

SPECIFICATION forming part of Letters Patent No. 232,819, dated October 5, 1880.

Application filed April 12, 1880. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HENLEY, of Lawrence, in the county of Douglas and State of Kansas, have invented a Machine for Barbing Fence-Wire, of which the following is a specification.

The object of my invention is to provide a machine that is specially adapted for making and applying the fence-barb patented in the United States April 2, 1878, No. 201,889, and barbs of similar form.

It consists in forming, arranging, and combining upon a suitable fixed frame or portable stand cable-moving mechanism, barb-feeding mechanism, and barb-forming mechanism, in such a manner that intermittent motions will be applied at regular intervals of time to the various operative parts from a single drive-shaft to automatically move and actuate the parts successively, as required, to coact in forming, cutting, and fixing barbs to the cable-strands as the cable passes through the machine, all as hereinafter fully set forth.

Figure 1 of my accompanying drawings, on Sheet No. 1, is a top-plan view of my machine. Fig. 2 is a transverse section through the line *x x* of Fig. 1. Figs. 3 and 4 are enlarged detail views, showing the manner in which the cable-strands are held in a crossed position, and the ends of the barb passed through between the crossed strands. Fig. 5 is a perspective view of the complete machine. Fig. 6 is a perspective view of a section of the complete barbed cable. Jointly considered they illustrate the construction and operation of my complete invention.

A A represents a frame or stand of oblong form, that may be made of wood or iron and vary in dimensions, as desired.

B is a horizontal driving-shaft, mounted in bearings formed in or attached to the lower portions of the ends of the frame, to transmit power and motion from a suitable motor to the various parts of my operative mechanism. Nos. 1, 2, 3, 4, 5, and 6 are grooved cam-wheels fixed on the shaft B.

C is a horizontal shaft of my cable-moving mechanism, mounted in a transverse position near the top and end of the stand. It has a sprocket-wheel, D, for moving the cable-wires, fixed near one end, and a ratchet-wheel, E, at its opposite end.

f is a vibrating lever, pivoted to the frame A in a vertical position. It carries a pawl, *g*, at its top end to engage the ratchet-wheel E, and has a pin or stud at its lower end to engage the cam-groove of the cam-wheel No. 2, fixed on the driving-shaft B. Every revolution of the shaft B causes the cam-wheel No. 2 to vibrate the lever *f*, and, by means of its pawl *g* and the ratchet-wheel E, to rotate the sprocket-wheel D, and thereby move the cable-wires a certain distance at regular intervals of time, as required, to regulate the intervals of space between the barbs fixed thereon by my barb-forming mechanism.

H and H′ are the uniform shafts of my barb-feeding mechanism. They are mounted in a horizontal position, and one immediately over the other, in the top portion of the frame A, and at the end opposite from my cable-moving mechanism. Each shaft H has a feed-roller, I, on its inner end, to engage and move a wire toward the barb-forming mechanism at regular intervals.

J J are mating gear-wheels on the outer ends of the shafts H.

k is a ratchet-wheel on the lower shaft, H.

f′ is a lever pivoted in a vertical position to the frame A. It carries a pawl, *g′*, at its top end, that engages the ratchet-wheel *k*, and a pin at its lower end, that engages the cam-wheel No. 6 on the shaft B. Every revolution of the driving-shaft B causes the grooved cam-wheel No. 6 to vibrate the lever *f′*, and by means of its pawl *g′* and the ratchet-wheel *k* to rotate the mating gear-wheels J and the mating feed-rollers I on the shafts H and H′, and thereby move the wire from which the barbs are cut a certain distance at regular intervals of time, as required, to supply the barb-forming mechanism.

L is the bed-plate of my barb-forming mechanism. It is fixed across the top of the frame or stand A, and in an intermediate position relative to the cable-moving mechanism and the barb-feeding mechanism.

l l are flanges rising vertically from the sides of the bed-plate to form an inclosure within which to confine a barb-cutter, a barb-pusher, and a cable-opener in such a manner that independent reciprocal motions can be imparted to them at regular intervals. *m* is the barb-cutter. *m′* is the barb-pusher. *m″*

is the cable-opener. *n n* are bars fixed across the top of the flanged bed-plate to retain the parts *m m' m''* in their inclosure.

f'' is a lever, pivoted in a vertical position to the frame A in such a manner that its top end will be connected with the rear end of the barb-cutter *m*, and a pin on its lower end will engage the groove in the side face of the cam-wheel No. 4 on the driving-shaft B.

The revolution of the shaft and cam-wheel will vibrate the lever, and thereby transform rotary motion into rectilinear motion and impart a reciprocating motion to the barb-cutter at regular intervals of time, as required, to cut barb-pieces from the continuous wire that is moved to the cutter at regular intervals by means of my barb-feeding mechanism.

O is a movable form, over which the barb-pieces are bent by means of the barb-pusher *m'*. It consists in shaping the top end of a lever, P, that is pivoted to a suitable bearing on the under side of the bed-plate L, in such a manner that it will engage the central portion of the barb-piece, and allow the ends of the barb-piece to be bent around the sides of the form to produce a staple-form barb. A suitable opening in the bed-plate allows the form O to rise and descend at intervals, as required, to act in concert with the barb-pusher *m'*, which has an opening in its front end corresponding with the form O. A cam projecting from the periphery of the grooved cam-wheel No. 4 engages the lower end of the lever P at every revolution of the driving-shaft B, and vibrates the lever P at regular intervals, as required, to withdraw its top end and form O, to allow the staple-shaped barb to be moved by the barb-pusher and inserted between the crossed cable-strands, as shown in Fig. 4.

f''' is a lever, pivoted in a vertical position to the frame A, and connected at its top end with the barb-pusher *m'* and at its bottom end with the cam-wheel No. 3 on the shaft B, by means of a pin that enters a cam-groove in the side face of the wheel, in such a manner that the revolution of the driving-shaft and cam-wheel will vibrate the lever and impart reciprocating rectilinear motion to the pusher-bar at regular intervals, as required, to form and move and place the staple-shaped barb between the crossed cable-wires.

f'''' is a lever corresponding with lever *f'''*, and connected at its lower end with the opposite side of the cam-wheel No. 3, and connected at its top with the cable-opener *m''*, to impart a reciprocating rectilinear motion thereto at regular intervals of time, as required, to separate the cable-wires, and, in combination with vertical moving guides, place and retain the cable-strands in crossed positions, as shown in Figs. 3 and 4, for the purpose of admitting the pointed ends of the staple-shaped barbs.

The front end of the cable-opener is pointed, and adapted in form to readily slip between the contiguous cable-wires.

r r represent the wire-guides. They are bars of uniform size and shape, and slide in a suitable bearing formed in or attached to the frame A at a point contiguous to the barb-forming mechanism and in direct line with the moving cable. Each bar and guide has a transverse slot in its inside face, near its top, and a cavity connected with the slot, into which cavity a perforated roller, *s*, is placed. The cable-strands are passed through the slots of the bars, and also through the perforated rollers. When the guides move the cable-strands up and down to separate and cross them, as shown in Figs. 3 and 4, the rollers *s* revolve in their cavities and prevent the cable-strands from binding in the transverse slots of the guide-bars *r*.

t is a rock-shaft, mounted in suitable bearings attached to the frame A, immediately underneath the guide-bars *r*. It has two cranks, *t'*, extending laterally from its opposite sides. These cranks are flexibly connected with the lower ends of the bars *r* by means of rods *t''*.

t''' is a crank extending vertically from the rock-shaft *t*. *u* is a lever pivoted to the frame A or a suitable support attached to said frame. The upper end of this lever is connected with the crank *t'''* by means of a rod, *u'*, and the lower end with the cam-groove of the wheel No. 5 on the driving-shaft B, by means of a pin or stud. The revolution of the shaft and cam-wheel vibrates the lever and thereby rocks the shaft *t*, which shaft, by means of its cranks *t'* and connecting-rods *t''*, imparts reciprocating motions to the guide-bars *r* and moves them up and down diversely at regular intervals of time, as required, to guide the cable-strands and place them in crossed positions, as shown in Figs. 3 and 4.

w w are barb-benders, pivoted by means of a suitable auxiliary frame or bracket, *x*, to the stand and contiguous to the barb-forming mechanism. Each bender *w* has a knuckle extending laterally toward the cable, and an arm, *y*, extending downward to connect with a rock-shaft.

z is a rock-shaft, mounted in suitable bearings formed in or attached to the frame A. It has cranks *a b* extending vertically in diverse ways. *c c* are rods that connect the arms *y* of the barb-benders *w* with the cranks of the rock-shaft *z*. *d* is a lever, pivoted in a vertical position to the frame A, and connected at its top end with a third crank, *e*, that extends upward from the rock-shaft *z* by means of a rod, *e'*. Its lower end is connected with the groove of the cam-wheel No. 1 by means of a pin or stud. The revolution of the wheel No. 1 on the driving-shaft B vibrates the lever *d* and thereby rocks the shaft *z*; and the cranks *a b*, extending from the shaft and connected with the barb-benders *w*, actuate the said benders at regular intervals of time, and cause their knuckles to engage the pointed ends of the staple-shaped barbs that project laterally from between the crossed cable-strands, and bend them in diverse ways, as indicated in Fig. 3.

From the manner of construction, and ar-

rangements and combinations of the various actuating parts and their functions thus set forth, it is obvious that intermittent motions of the different parts will be at regular intervals of time by power transmitted from the driving-shaft to move the cable, and feed and form and fix barbs thereon at regular intervals of space as the cable is passed through the machine from one reel to another, and after the barbs are applied the cable may be twisted in any suitable way.

I claim as my invention—

1. In a machine for barbing wire, the combination of the cable-moving mechanism B C D E *f g*, and the wire guiding and separating mechanism composed of the reciprocating bars *r*, having perforated valves *s*, the rock-shaft *t*, having three cranks, the pivoted lever *u*, and their connecting-rods, and the cam-wheels Nos. 2 and 5, on a driving-shaft, substantially as and for the purposes specified.

2. The combination of the barb-feeding mechanism H H′, I I, J J, *k*, *f′*, and *g′*, the barb-cutter *m*, and the barb-pushing mechanism composed of the bar *m′*, having a forked front end, the levers *f″ f‴*, and the grooved cam-wheels Nos. 2, 3, 4, and 6, on the driving-shaft B, substantially as shown and described, for the purposes specified.

3. The combination of the movable form O on the end of the pivoted lever P, the barb-pusher *m′* in the bed L, the lever *f‴*, and the cam-wheels Nos. 3 and 4, on a driving-shaft, substantially as shown and described, for the purposes specified.

4. The cable-opening device *m″* in the bed L, and its operating-lever *f⁗*, in combination with the barb-pusher *m′*, the lever *f‴*, and the cam-wheel No. 3 on the shaft B, substantially as shown and described, for the purposes specified.

5. The combination of the barb-pusher *m′* and its operating-lever *f‴*, the cable-opening device *m″* and its operating-lever *f⁗*, and the wire guiding and separating devices *r s* and their operating mechanism *t t′ t″ t‴ u w′*, and the cam-wheels Nos. 3 and 5, on the shaft B, substantially as shown and described, for the purposes specified.

6. The barb-benders *w w*, having arms *y*, the rock-shaft *z*, having cranks *a*, *b*, and *e*, the pivoted lever *d*, connected with the crank *e* at its upper end, and with the cam-wheel No. 1 at its lower end, arranged and combined relative to the barb-forming mechanism, substantially as shown and described, to operate in the manner set forth, for the purposes specified.

7. The barb-forming and cable-making machine composed of the following elements, to wit: the frame or stand A, the driving-shaft B, the cable-moving mechanism C D E *f g*, and its operating devices, the barb-feeding mechanism H H′, I I, J J, *k*, *f′*, and *g′*, and its operating devices, the barb-cutter *m* and its operating mechanism, the barb-pusher *m′* and its operating mechanism, the cable-opener *m″* and its operating mechanism, the movable barb form O and its operating mechanism, the wire-guiding devices *r s* and their operating mechanism, the barb-benders *w y* and their operating mechanism, substantially as shown and described, to operate in a unitary manner, as set forth, for the purposes specified.

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