

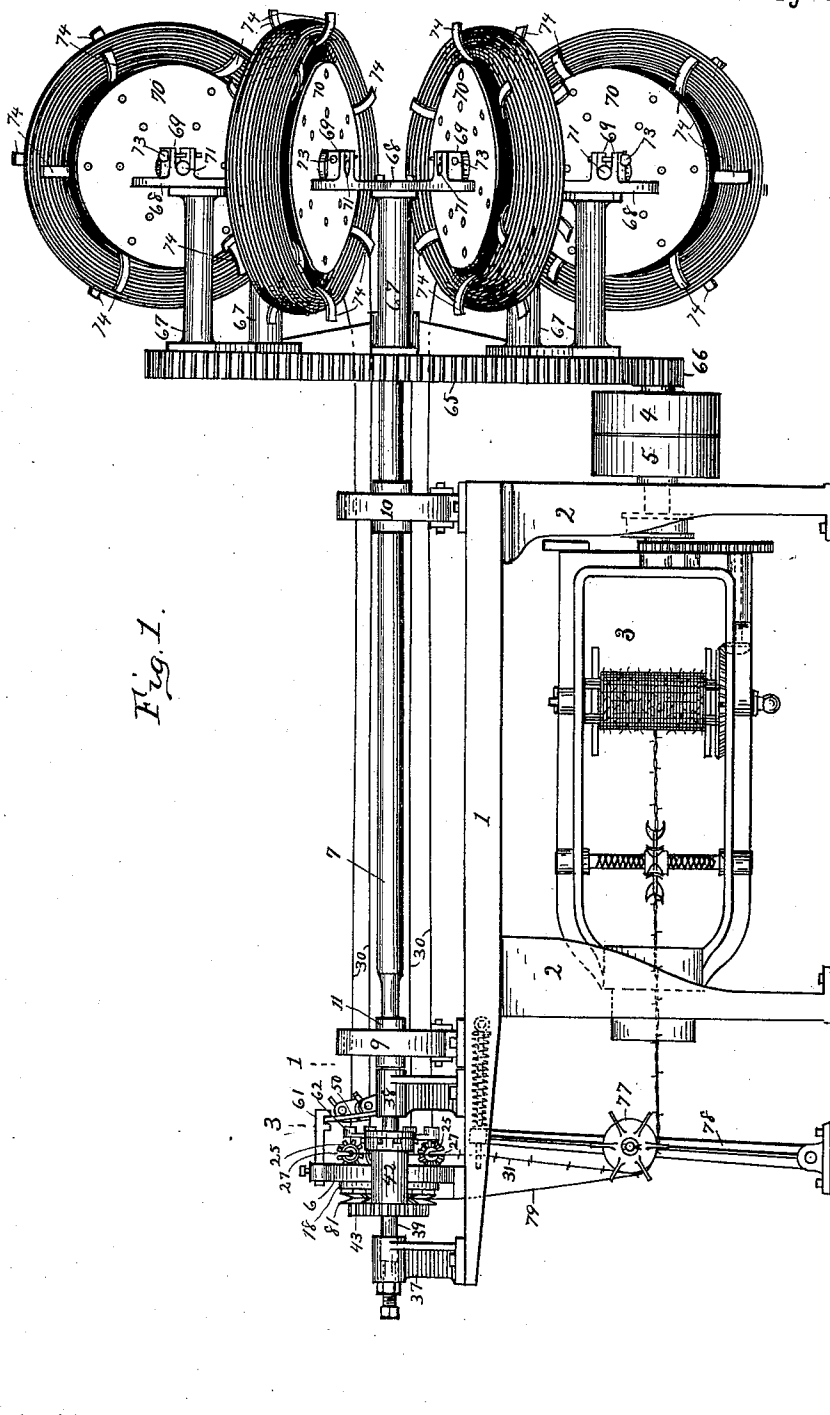
(No Model.)

5 Sheets—Sheet 1.

A. J. BATES.
WIRE BARBING MACHINE.

No. 586,945.

Patented July 20 1897.



Witnesses,

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Wm. J. Hutchins

Inventor

Albert J. Bates.

(No Model.)

5 Sheets—Sheet 2.

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Fig. 3.

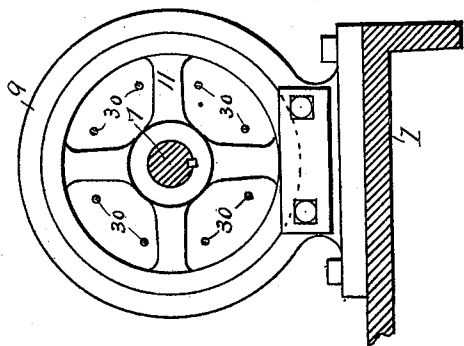


Fig. 2.

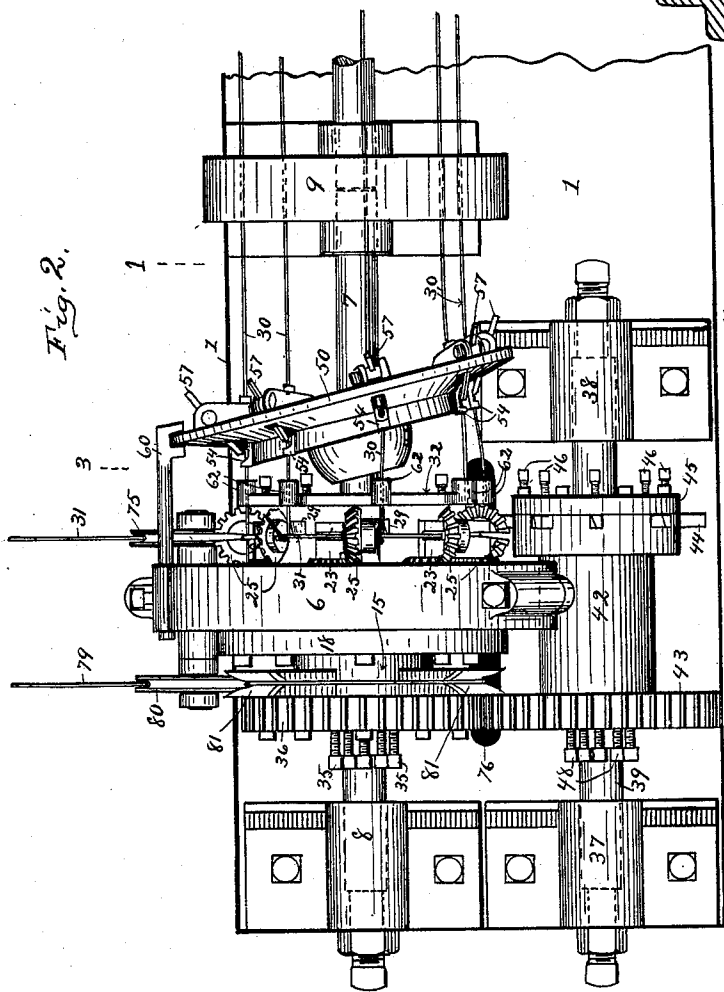


Fig. 4.

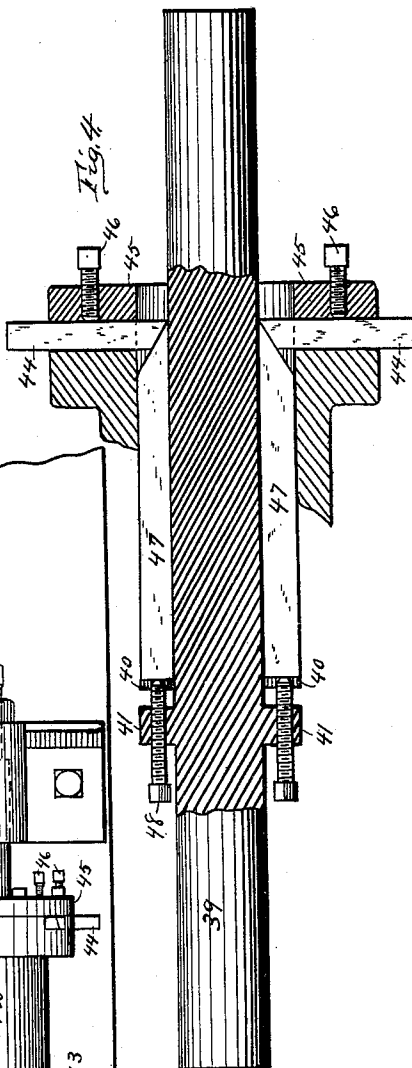
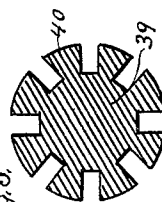


Fig. 5.



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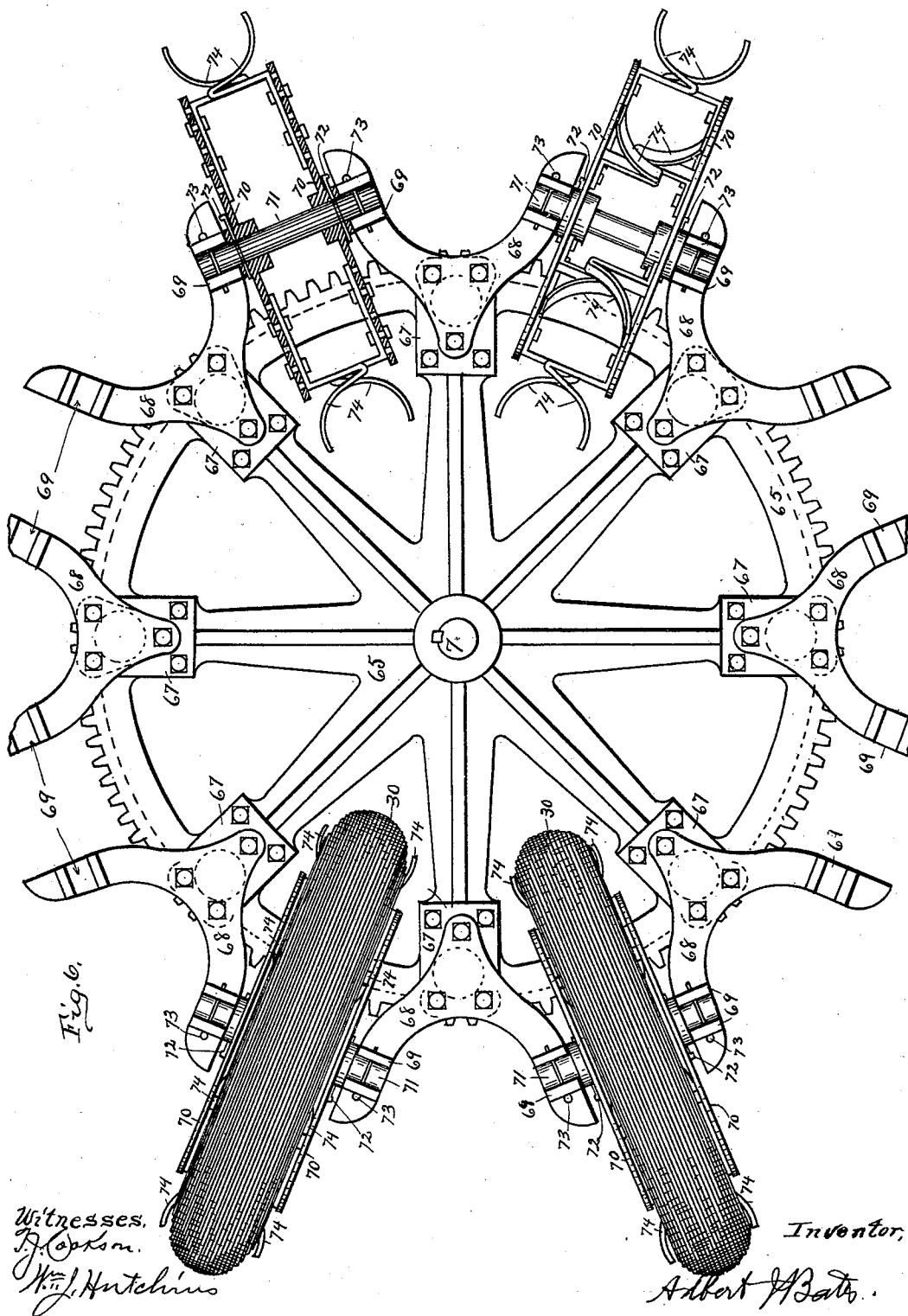
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5 Sheets—Sheet 3.

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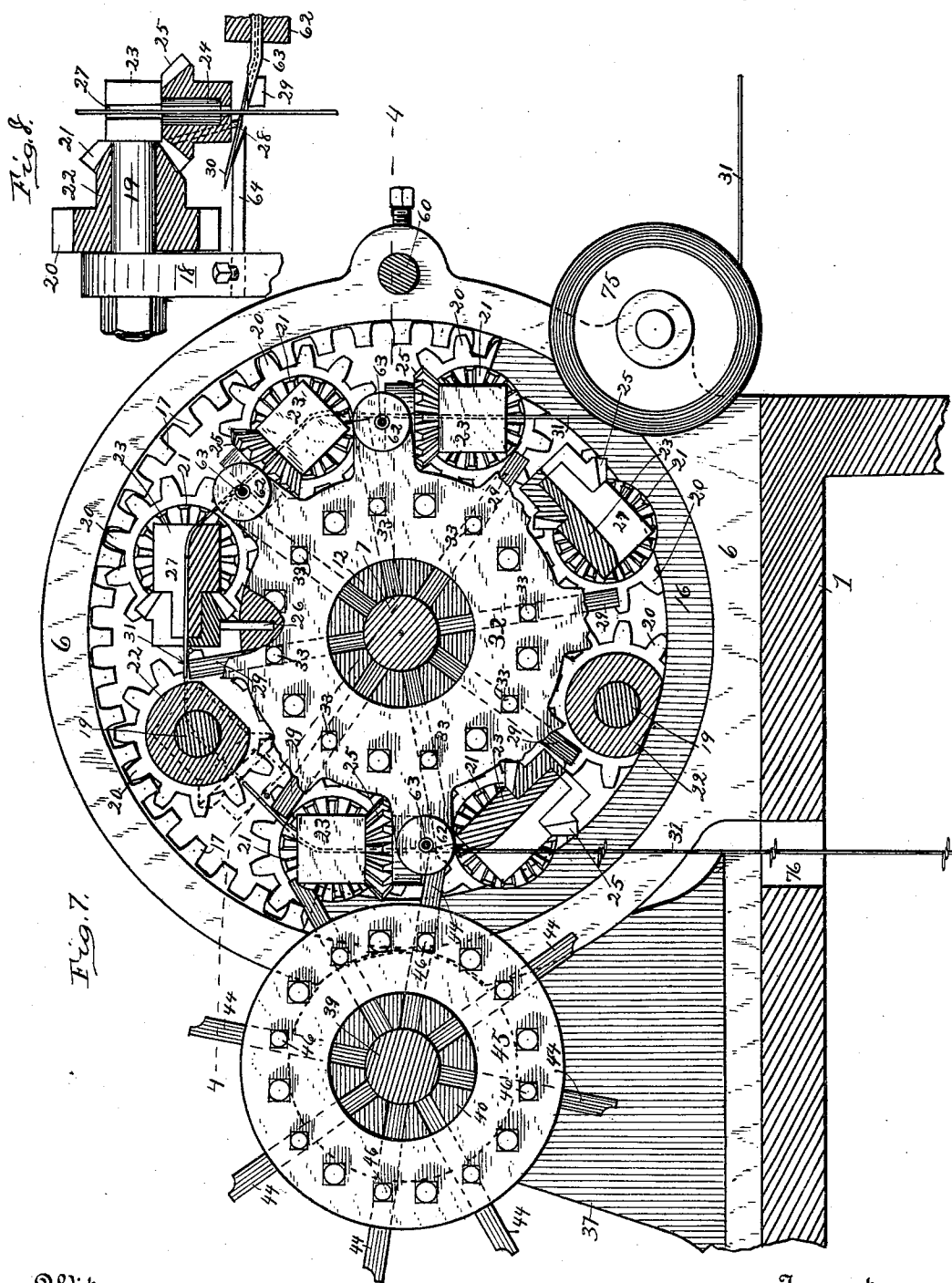
(No Model.)

5 Sheets—Sheet 4.

A. J. BATES.
WIRE BARBING MACHINE.

No. 586,945.

Patented July 20, 1897.



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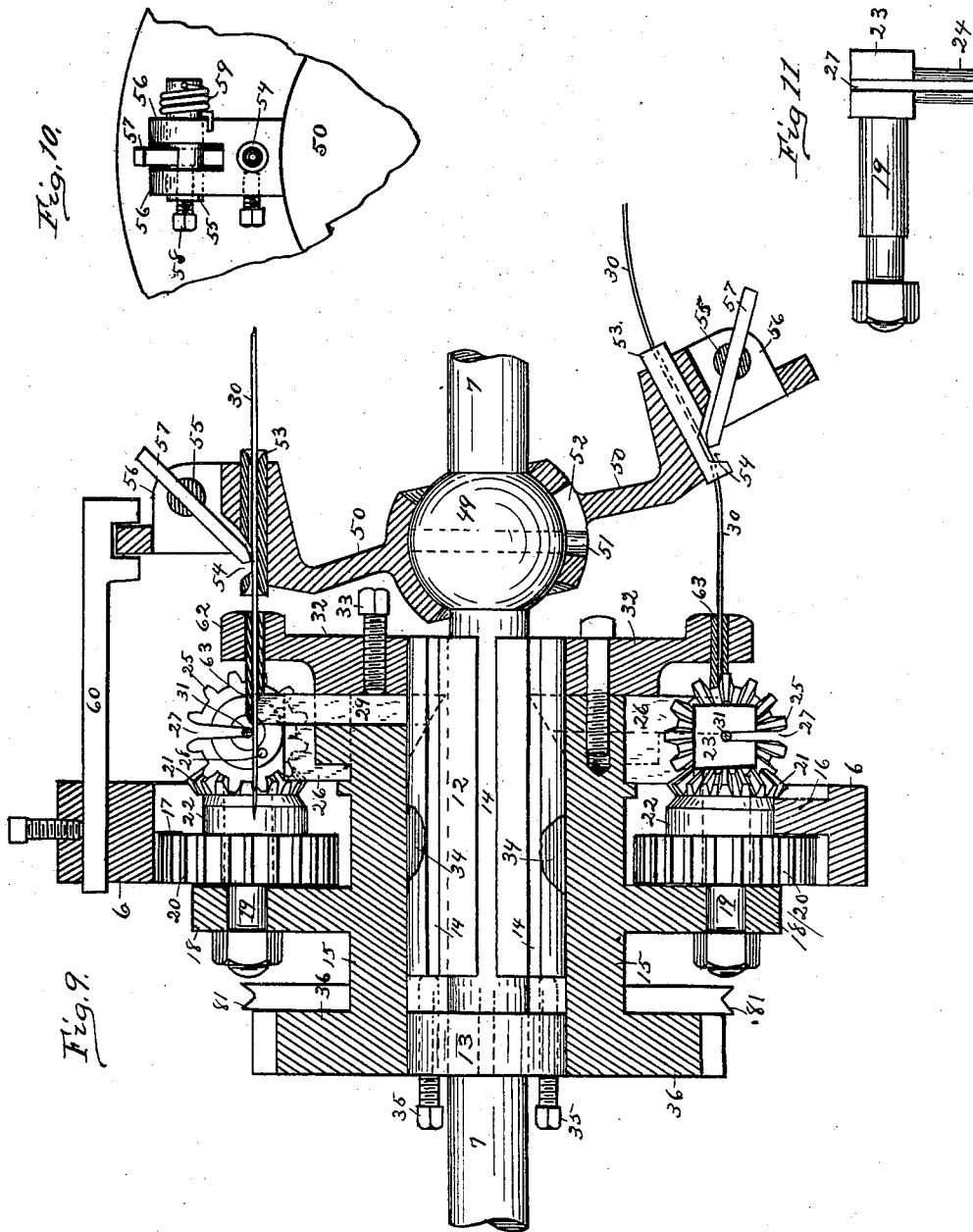
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5 Sheets—Sheet 5.

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No. 586,945.

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UNITED STATES PATENT OFFICE.

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WIRE-BARBING MACHINE.

SPECIFICATION forming part of Letters Patent No. 586,945, dated July 20, 1897.

Application filed July 6, 1896. Serial No. 598,136. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. BATES, a citizen of the United States of America, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Wire-Barbing Machines, of which the following is a specification, reference being had therein to the accompanying drawings, and the figures of reference thereon, forming a part of this specification, in which—

Figure 1 is a side elevation of the machine; Fig. 2, a top plan of one end portion of the same, being that portion shown to the left in Fig. 1; Fig. 3, a detailed side elevation of one of the journal-bearings of the main shaft of the machine, showing said shaft in cross-section as on line 1 of Figs. 1 and 2; Fig. 4, a detailed sectional view of the cutter-head of the machine; Fig. 5, a cross-section of the hub or shaft of said head; Fig. 6, an end view of the compound barbing-wire reel of the machine, looking thereat from the right in Fig. 1; Fig. 7, a cross-sectional view of the machine on line 3 of Figs. 1 and 2, looking toward the left, having portions of parts broken away and shown in variable sections to more clearly illustrate the mechanism; Fig. 8, a detailed section of one pair of the barb-coiling pinions of the machine, a side view of their support, and of the guides for conducting the barbing-wire into proper position with relation to the strand-wire and coiling-pin of the coiling-pinion; Fig. 9, a horizontal sectional view of the feeding and barb-coiling mechanism of the machine, taken on a line represented at 4 4 in Fig. 7; Fig. 10, a rear view of one section of the barbing-wire-feed head of the machine, and Fig. 11 a side view of one of the studs employed in the machine construction for supporting the barbing-wire-coiling pinions.

This invention relates to certain improvements in machines for barbing the strands of wire utilized for fence purposes; and it consists in certain novel construction and combination of mechanism wherein the passage of the wire which receives the barbs is continuous through the machine, and duplicate barbing-wire reels, feeding, coiling, and cutting de-

vices rotate in the direction of, and equal speed of travel with, the strand-wire to feed, coil, and cut the barbs loose from their infeeding wire portions in continual consecutive order, which improvements are fully set forth and explained in the following specification, and pointed out in the claims.

The object of this invention is to produce a machine adapted to apply barbs to a continuously-advancing strand-wire, to maintain complete control of both the strand and barbing wires during the time of feeding, coiling, and completing the coiling of the barbs on the strand-wire, and to carry a second like-advancing strand-wire controlled in its advancement so as to be brought in contact and cabled with the barbed strand-wire; and as a means of attaining said object I have devised the machine represented in the accompanying drawings, which in its construction may be modified in many respects and not affect the object or nature of my invention, so long as the principal features therein are maintained.

Referring to said drawings, 1 represents the main body or bed of the machine, mounted on standards 2, which suitably support a common wire twisting and spooling device 3, having placed on its spindle a loose pulley 4 and a tight pulley 5, about which a belt may be passed to operate the said twister and spooler, and, further, to drive the barbing-machine, as will hereinafter be described.

Fixed upon one end portion of bed 1 to one side from the center line thereof is an upright circular frame 6, which is made with a pedestal stepped upon the bed 1, with a semicircular interior flange 16 and a semicircular row of interior gear-teeth 17, as represented in Fig. 7, which teeth are placed so as to be to one side from the side line of said flange, as represented in Fig. 9, and centrally arranged through said head is a longitudinally-placed shaft 7, (see Figs. 1 and 2,) which is supported in bearings 8, 9, and 10, the bearings 9 and 10 being much longer than the said shaft, and at said bearings the said shaft is provided with enlarged attached journals, as shown at 11 in Fig. 3, the peripheral portions of said journals being connected with their hub portions by means of arms, so as to provide ways

between said arms for the passage of the barbing-wire strands, as represented.

At the junction of head 6 shaft 7 is made with two enlarged sections 12 and 13, the section 12 being made with longitudinal channels 14, as represented in Fig. 9, and in cross-section like unto that shown in Fig. 5, and fixed upon said enlarged sections 12 and 13 is an annular head 15, having an annular flange 18, arranged so one side thereof is on a plane with that side of head 6 having the teeth 17, which side of said head I term the "rear" side, (see Fig. 9;) and fixed in holes of said flange is a plurality of studs 19, each of which is sleeved thereon a spur-pinion 20 and a miter-pinion 21, integrally connected by a neck portion 22, as shown in Figs. 8 and 9, which pinions are held thereon by means of the head-pieces 23 of said studs; and made integral with said head-piece of each said stud is a stem 24, upon which are placed miter-pinions 25, thereby being brought in mesh with pinions 21 and held thereon by means of plates 26, which are fixed in the forward end portion of head 15 and placed radially extending, so as to bear against the back of the rim of said pinions 25, as represented in Figs. 7 and 9.

The stud head-pieces 23, their stems 24, and the pinions 25 and their hub portions are slotted longitudinally with and to a line of the axis of said pinions, as represented at 27.

In placing the connected gears and neck 20, 21, and 22 on studs 19 the pinions are arranged in line with teeth 17 of frame 6, and as head 15 rotates with the shaft upon which it is fixed said pinions are brought to mesh with said teeth and thereby caused to rotate on their studs 19, which action takes place during the circuitous travel of said pinions, commencing at a point at the outer side of head 6, continuing up and over the upper one-half of said frame and terminating at a point at the inner side of said frame, said pinions 20 taking up such rotary movement in consecutive order, and the number of their teeth and the number of teeth 17 being such as to give two complete rotations to said pinions, thereby equally rotating pinions 21, which in turn equally rotate pinions 25, starting the rotation of said pinions 25 from a position with their slots 27 extending radially and terminating their rotation with said slots brought to a radially-extending position, so that a strand-wire may be entered into the slots 27 prior to the commencement of rotation of said pinions and also move from said slots at the conclusion of said rotation. At the conclusion of the rotary action of said pinions, which occurs at the terminal of teeth 17, the neck portions, connecting pinions 20 and 21, which are flatted on one side, as represented in Fig. 7, ride with their flatted side portion upon flange 16 of frame 6, which prevents further rotary action of said pinions during their circuitous travel down and about the lower one-half portion of frame 6 and un-

til the pinions 20 again come into mesh with teeth 17 at the terminal of said flange. (See Fig. 7.)

Set in the hub of each pinion 25 is a coiling-pin 28, so stationed that a barbing-wire 30 may be fed horizontally between it and a strand-wire 31, resting in slot 27, (see Fig. 9,) and by the action of pinion 25 be rotated to wrap the barbing-wire about the said strand-wire.

Placed in radial recesses of head 15 are a series of barb-prod cutters 29, equal in number to the number of coiling-pinions 25 brought into service, there being eight represented in the drawings, and so arranged as to come immediately within the line of the infeeding barbing-wires 30 (see Figs. 7 and 9) and confined within said recesses by means of a ring 32, attached to the end of head 15, and held adjusted by means of set-screws 33, turned through said ring against them and adjustably stepped on the inclined end of wedge-blocks 34, (for a like construction see Fig. 4,) which are placed in the longitudinal channels 14 of the shaft-section 12 (see dotted lines in Fig. 9) and longitudinally adjusted to radially adjust said cutters by means of set-screws 35, turned through shaft-section 13. The opposite or rear end of head 15 is made with a spur gear-wheel 36, as shown in Figs. 2 and 9.

Stationed at the opposite side of bed 1 from head 6 and supported by bearings 37 and 38 is a shaft 39, made with enlarged sections 40 and 41, which section 40 is longitudinally channeled, as described of shaft-section 12, and fixed upon said sections 40 and 41 is an annular head 42, made with a spur gear-wheel 43 at one end, arranged in mesh with and driven by gear 36, and radially channeled at its opposite end and provided in said channels with radially-extending barb-prod cutters 44, confined by means of a ring 45, attached to the end of head 42 and adjustably held by means of set-screws 46, turned through said ring against them and radially adjusted by means of wedge-blocks 47, placed in the channels of shaft-section 40, which blocks are longitudinally adjusted by means of screws 48, turned through shaft-section 41. (See Fig. 4.)

By reason of gears 36 and 43 being of equal size, head 42 is rotated at equal speed with head 15, and hence cutters 44 rotate at equal speed with cutters 29, and the arrangement of said cutters is such that they register at their shearing edges in consecutive order and cut the barb-prods, making the cut at a junction adjacent to the inner side of head 6 at a point and time immediately after the completion of the wrapping of the barbs about the strand-wire and immediately before the strand-wire moves from the slots 27 of the coiling mechanism, thereby severing the barbs from the infeeding barbing-wire.

Socketed on a ball 49, turned on shaft 7, is a circular feed-head 50, which is caused to ro-

tate with shaft 7 by means of a pin 51, set in ball 49 and operating at its end portion in a slot 52 of the head-socket, and is provided with a plurality of barbing-wire-feeding devices and guides equal in number to the number of barb-coiling devices, each said feeding device comprising a guide 53, cut away at one end portion so as to expose the wire therein, as represented at 54, and fixed in holes of the head, a grip tool-holder 55, rotatably boxed in a pair of ear-lugs 56, and wire-grip tool 57, placed through a cross-hole of said holder, adjustably held therein by means of a set-screw 58 and yieldingly held with its grip end in contact with the barbing-wire 30 by means of a coil-spring 59, applied to holder 55, as represented in Fig. 10.

In starting the machine the head 50 is adjusted so its side will be at an angle across the machine-bed at a station a short distance in front of head 15 (see Fig. 9) with the outer portion of its rim nearest the coiling mechanism and thus held, so that side will maintain such position when rotated, by means of a forked holding-arm 60, which forks over the rim of said head and is adjustably fixed in a bearing of head 6, as shown, and if desired a second like holding-fork may be used, likewise fixed in the upper part of frame 6, as represented at 61 in Fig. 1, for maintaining a more steady operation of the head 50, or said second fork may be stationed under said head and fixed to bed 1. By such arrangement of head 50 the gripping devices thereof are, on their upper one-half circuit, moved from the nearest to the farthest point from their relative coiling device, and hence back over the barbing-wire 30 a distance equal to the length of wire required for forming a barb, and on their under one-half circuit move from said farthest point to said nearest point to the coilers, and thus by means of their tools 57 gripping the wire 30 cause the said barbing-wires to be fed forward to the coilers in consecutive order.

Ring 32, which is attached to head 15, is made with radially-extending arms 62, into which wire-guides 63 are placed for guiding the wire 30 from the feed-head 50 to and across the cutting end of cutters 29 and to the coilers, being the hubs of pinions 25, between the strand-wire 31 and coiling-pins 28, (see Fig. 9,) and as a means of directing the wires 30 across the cutting end of cutters 28 at a proper angle, so the joint action of said cutters 29 and the fellow operating-cutters 44 of head 42 will shear to cut sharp prods, and so the end portion of said wires, which is engaged by the coiling-pins 28, will extend at an angle across the path of said coiling-pins to be properly engaged and coiled about the strand-wire, the guide 63 is curved at its end portion, as represented in Fig. 8, and is cut away at its under side at the nose thereof, so as to permit the wires 30 to pass immediately over the end of cutters 29, and, further, beveled end guides, as shown at 64 in Fig. 8,

set in holes of flange 18 of head 15, are employed, which extend toward the infeeding wires 30 and are engaged at their beveled ends by said wires, which prevent deflection of said wires from their proper course at their extreme end portion prior to the commencement of their being coiled about the strand-wire 31.

Fixed on the end portion of shaft 7, at the machine end opposite the described barbing mechanism, is a spur gear-wheel 65, arranged in mesh with and driven by a pinion 66, which is fixed to the end of the twister and spooler yoke spindle, as shown in Fig. 1. Attached to the side of wheel 65 are arms 67, disposed in concentric order, as represented in Figs. 1 and 6, which have attached to their extending end forked reel-holding arms 68, made with side-extending forked-reel spindle-bearings 69, so arranged that a bearing 69 of adjacent branches of adjoining arms 68 will be disposed in pairs, so as to support a wire-reel between each said pair of bearings, as represented in Fig. 6, wherein eight pairs of said bearings are shown for supporting eight wire-reels, corresponding in number with the number of barb-coiling devices of the machine. Each of said wire-reels consists of a pair of oppositely-arranged disk heads 70, removably fixed on a spindle 71 by means of cross-pins 72, in such manner as to leave each end portion of the spindle projecting sufficiently to form a journal for placing in bearings 69, where they are removably confined by means of cross-pins 73, through the extremities of the forks of said bearings 69, and of a plurality of pairs of oppositely-arranged curved wire-holding arms 74, attached to disk 70, as shown in Fig. 6, so said pairs of holding-arms register at their side to form a hollowed recess between their curves and so they will separate by the removal of one disk 70 from spindle 71 to permit the placing of coils of wire thereon, as represented in Fig. 1 and to the left in Fig. 6. When the machine is in service, each said reel is loaded with a coil of barbing-wire 30, which is paid off therefrom from their inner side and directed through wheel 65, between the arms thereof, thence through the journals of bearings 9 and 10, between the arms of said journals, as represented in Fig. 3, and thence to the gripping devices of feed-head 50, as before described, and therefore by such construction of compound wire-reel and shaft-journals the barbing-wires 30 are rotated jointly with the feeding and coiling mechanism of the machine, so that each individual feeding and coiling device constantly manipulates the same barbing-wire.

The strand-wire 31 enters the machine from the side thereof, as shown in Figs. 2 and 7, first passing under a sheave-wheel 75, studded to frame 6, thence passing up and about the several uppermost coiling devices in the slots 27 thereof, as described, and thence down and through a slot 76 of bed 1, thence to and

quartering about a butterfly-wheel 77, studied to the side of an upright arm 78, which is pivotally attached to the floor and yieldingly held at its upper end, as represented in Fig. 1, and thence to the twister and spooler 3 in the usual manner.

A second plain wire 79 is passed through the machine at equal speed as that of wire 31, first passing under a sheave-wheel 80, thence up and over forks 81, which are attached to the side of gear 36 of head 15, (see Fig. 2,) thence down through the bed-slot 76 and to the butterfly-wheel 77, thus meeting wire 31 and from which junction said two wires 31 and 79 are by the action of the twisting and spooling mechanism cabled and wound on a spool held in the twister and spooler yoke in the usual manner.

The machine being provided with wire the operation is as follows: The barb coiling, cutting, and feeding devices being provided and arranged as described and the barbing-wire fed forward to the coilers, as stated, the action of coiling the barbs about the strand-wire 31 commences at the side of head 6, where the wire 31 enters the coiler-slots 27, being approximately on a horizontal plane with the axis of head 15, at which junction the coilers are started to rotate by the pinions 20 coming into mesh with the teeth 17 of frame 6, as before stated, and as the coilers, cutters, feeding devices, and wire-reels advance their rotation at equal speed the operation of coiling the end portion of the barbing-wire advances during the one-half of their circuit made above the plane of their axes, completing the said coiling at the opposite side of head 6 from the place of commencement and at said junction, which is likewise on a horizontal plane with the axis of head 15 and also of head 42. The barb-prod cutters 29 and 44 register at their cutting edges, thereby cutting the barbing-wires as they rest at the end of the cutters 29, and thus form their prods and sever the barbs from the barbing-wire, so the barbs may be free to move from their coilers with the strand-wire 31. Thus it will be observed that the passage of the strand-wire is continuous and the application of the barbs made thereto is in continual consecutive order; also, that each set of barbing-wire holding, feeding, coiling, and cutting devices move jointly, and hence carry the barbing-wires bodily about with the coilers, thereby maintaining complete control of the end portions of the barbing-wire from which the barbs are formed until the completion of the coiling thereof about the advancing strand-wire.

Having thus described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is as follows:

1. In a wire-barbing machine, in combination with a stationary circular frame provided with a semicircular row of internal gear-teeth, and with a semicircular internally-extending flange; an annular rotary head ar-

ranged within said frame and provided with a plurality of geared barb-coiling devices adapted to be rotated to coil barbs about a strand-wire when brought into engagement with said frame-teeth, and to be held from such rotation when brought into engagement with said frame-flange, substantially as specified.

2. In a wire-barbing machine, in combination with continuously-rotating mechanism whereby barbs are coiled about a strand-wire and severed from the infeeding barbing-wire; a rotary feed-head provided with a plurality of wire-feeding devices, and controlled in its movement so as to assume a fixed angle to its drive-shaft, thereby causing said feeding devices to be operated sidewise to consecutively grip and feed forward sections of barbing-wire, substantially as specified.

3. In a wire-barbing machine, an annular rotary head, provided with a plurality of barb-prod cutters, and a plurality of geared barb-coiling devices arranged to engage stationary gear-teeth during a portion of their circuit for operating their barb-coilers, and to engage a stationary flange during another portion of their circuit for preventing operation of said coilers, and slotted longitudinally to the axis of said coilers to admit a strand-wire to said axis and discharge the same therefrom; rotary mechanism for feeding barbing-wires across said cutters and to said coilers in continual consecutive order; an annular guideway fixed to said rotary head for conducting a plain strand-wire thereabout; and a cutter-head geared to said rotary head and provided with barb-prod cutters arranged to register with said former cutters in continual consecutive order, substantially as and for the purpose specified.

4. In the wire-barbing machine described, the combination with the annular head provided with the barbing-wire-coiling devices equidistantly arranged on a common circle about the axis of said head; the barb-prod cutters radially and adjustably seated in said head; the ring fixed to said head and provided with the radially-extending guide-holders; and the guides fixed in said holders and head and adapted to guide the barbing-wires across said cutters and to said coiling devices, substantially as specified.

5. In the wire-barbing machine described, in combination with the stationary frame provided with the internally-arranged teeth and flange, and with the rotatable annular head arranged within, and provided with the flange at the side of said frame; the studs fixed in the side of said flange, extending within said frame and provided with the slotted heads and laterally-extending stems as shown; the combined spur and miter gears, provided with the side-flatted necks and sleeved on said studs; and the slotted miter-gears, provided with the extending coiling-pins, and placed on said stud-stems in mesh with said former miter-gears; wherein said spur-gears

and flatted necks are respectively arranged in line with the teeth and flange of said stationary frame, substantially as and for the purpose specified.

5 6. In the wire-barbing machine described, in combination with the shaft 7 provided with the ball-bearing; the barbing-wire-feed head socketed on said ball and provided with a plurality of wire-feeding devices equidistantly
10 arranged on a common circle about its axis; and the stationary holding fork, or forks, for controlling the movement of, and causing a side motion to be assumed by, feeding devices, substantially as and for the purpose
15 set forth.

7. In the machine described, in combination with the compound rotary reel mechanism, and the plurality of rotary barbing-wire feeding, coiling, and cutting devices; the shaft 7
20 provided with the enlarged journals between said reel and barbing mechanism; and the bearings in which said journals rotate; wherein the barbing-wires are conducted from said reel mechanism to the feeding devices through
25 openings of said journals, substantially as set forth.

8. In the wire-barbing machine, in combination with the stationary frame 6 and the rotatable annular head provided with the plurality of coiling devices slotted to take in and
30 discharge a strand-wire passing up and over said head, and with forked or crotched arms for conducting a second strand-wire up and over said head; and sheaves studded to said
35 frame for guiding said strand-wires to a position to be taken up over said head; substantially as set forth.

9. In the wire-barbing machine described, in combination with the compound rotary
40 reel-frame; the reels each comprising a pair of oppositely-arranged disk heads removably fixed on a spindle; and a plurality of pairs

of oppositely attached and facing curved wire-holding arms, substantially as set forth.

10. In the wire-barbing machine described, 45 in combination with the plurality of barbing-wire reels; the compound rotatable reel-supporting frame provided with the plurality of pairs of side-extending forked reel-spindle bearings, and with pins placed through said
50 forks for removably confining said spindles, substantially as set forth.

11. In the wire-barbing machine described, in combination with the annular rotary head, and the slotted coiling-pinions arranged on
55 laterally-extending stems studded to the flange of said head, the radially-extending holding-plates arranged bearing against the rim of said pinions; substantially as and for the purpose specified. 60

12. In the wire-barbing machine described, in combination with the rotary heads, and the radially-extending barb-prod cutters seated therein and beveled at their inner end as set
65 forth; the longitudinally-adjustable wedge-blocks seated in channels of enlargements of said head-shafts, and the set-screws for adjusting said blocks to radially adjust said cutters, substantially as and for the purpose
70 specified.

13. In the wire-barbing machine described, the combination with the coiler-supporting studs provided with the slotted heads and laterally-extending slotted stems; the combined
75 spur and miter pinions sleeved on said studs, and the slotted miter-pinions placed on said stems, in mesh with said combined miter-pinions, and provided with coiling-pins, substantially as and for the purposes specified.

ALBERT J. BATES.

In presence of—

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T. J. COOKSON.