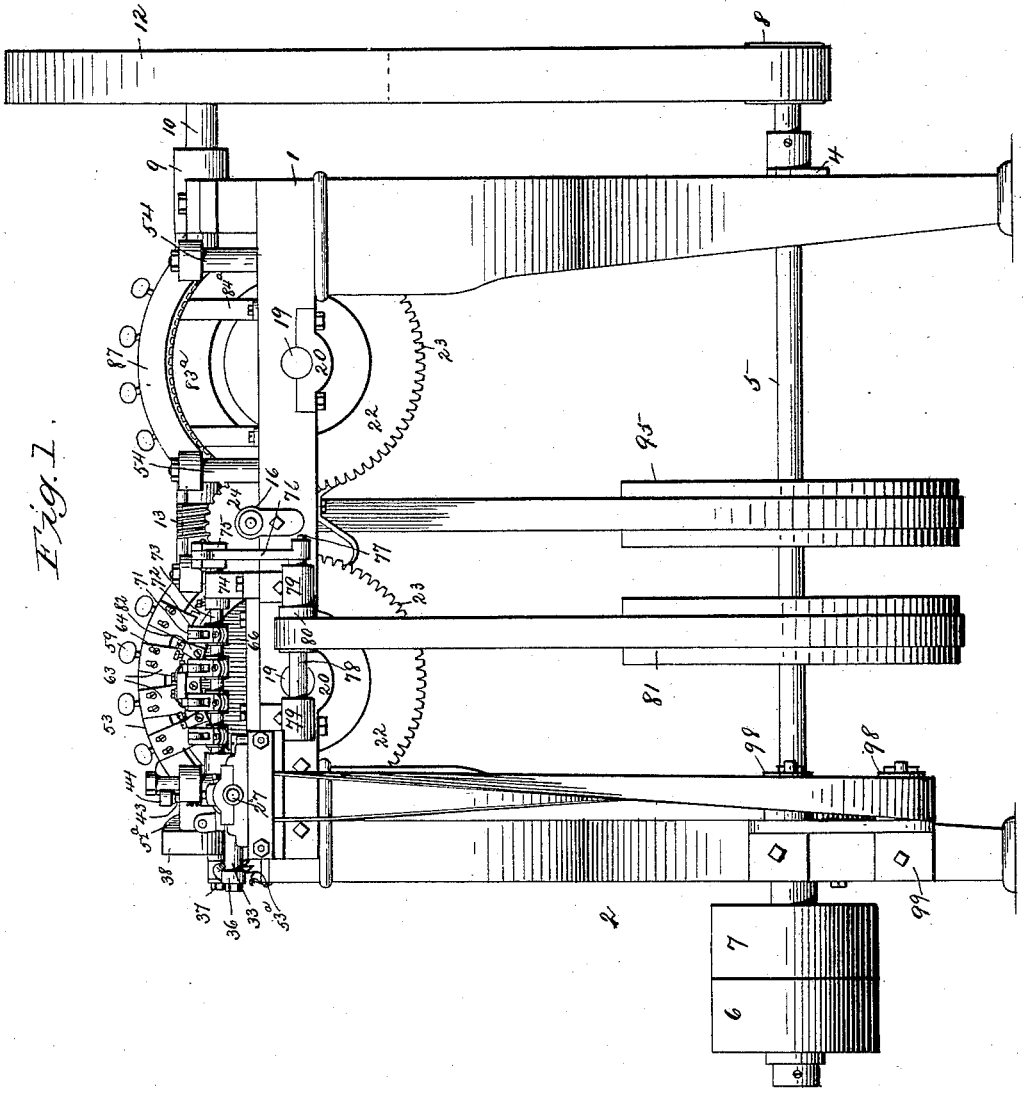
(No Model.) 7 Sheets—Sheet 1.

J. H. BAIRD

MACHINE FOR MAKING PINS FOR PIN FASTENERS.

No. 418,486. Patented Dec. 31, 1889.

Fig. 1.



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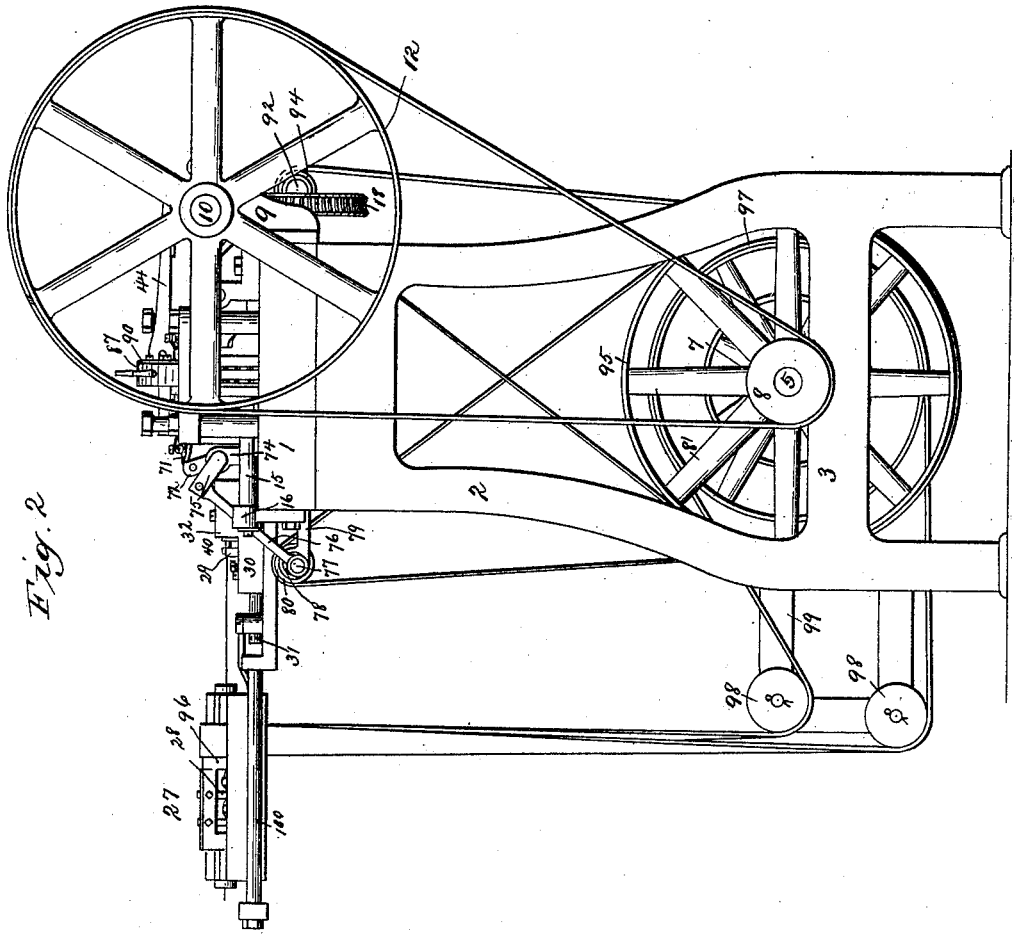

Fig. 2.

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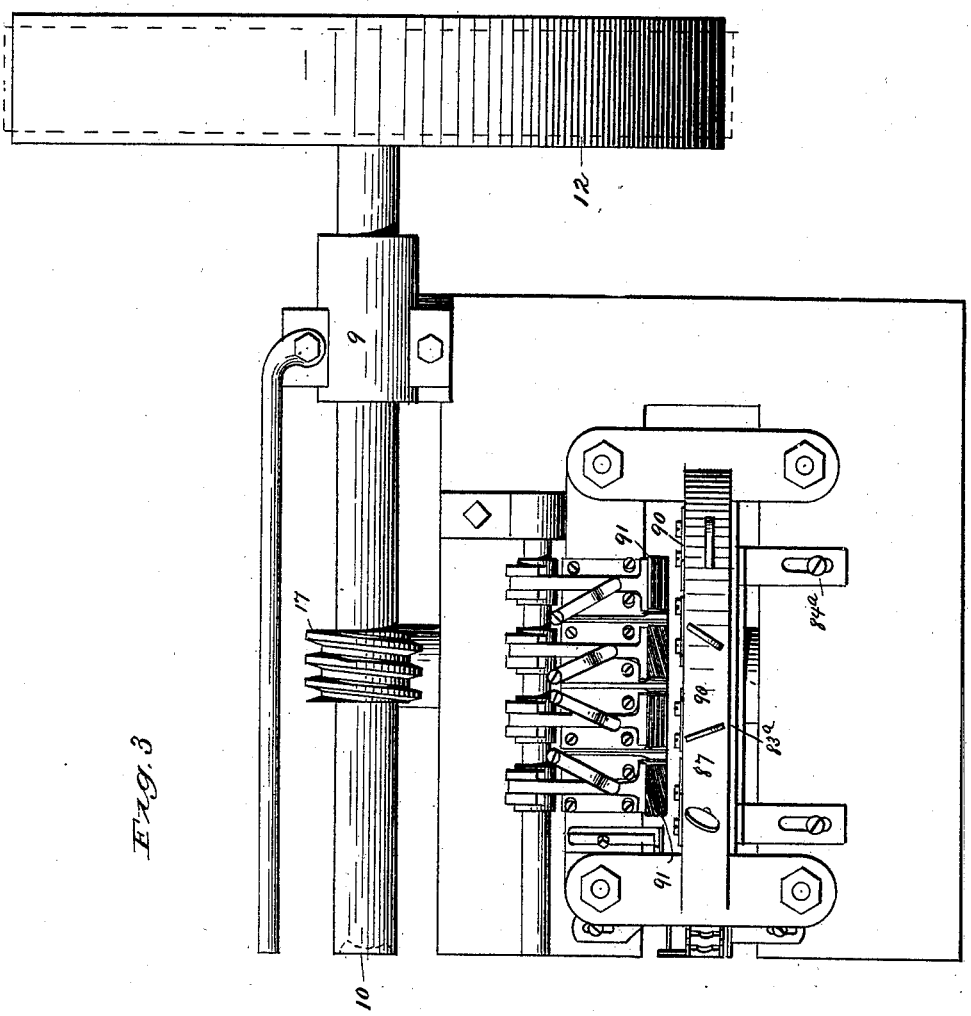

Fig. 3

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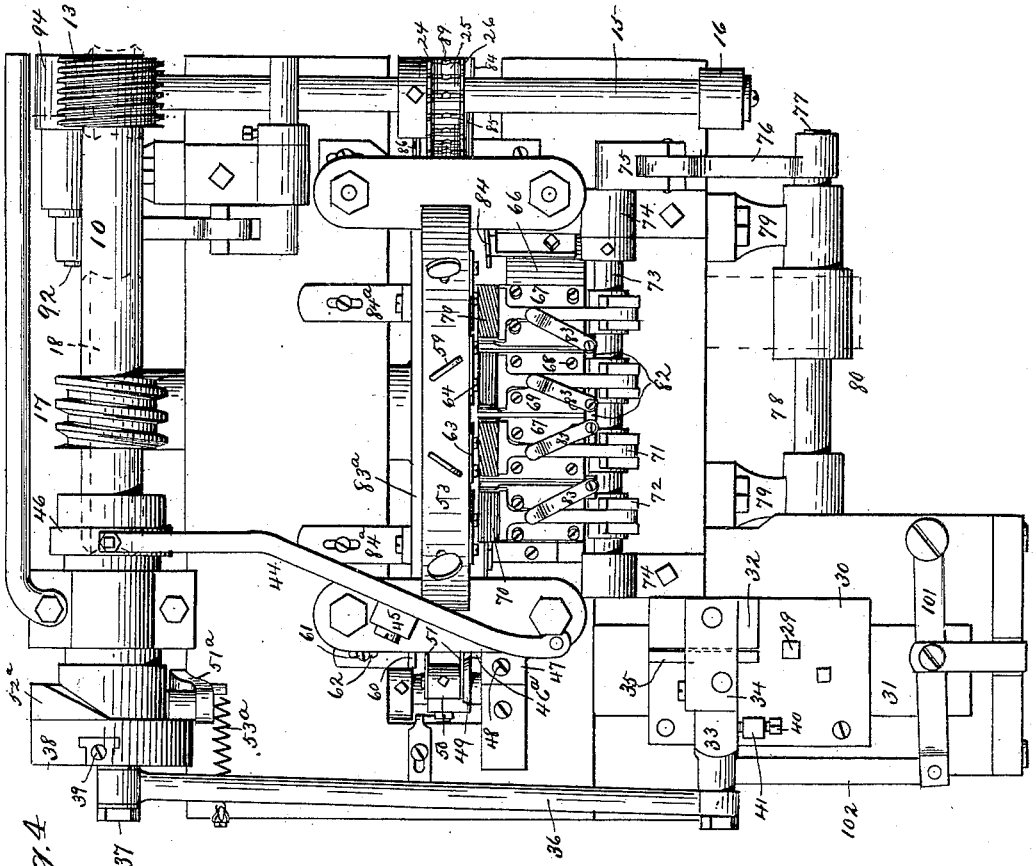

Fig. 4.

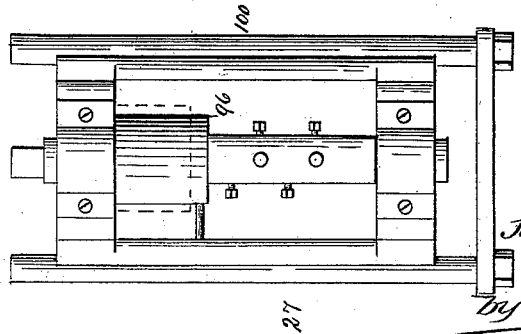

Fig. 4a.

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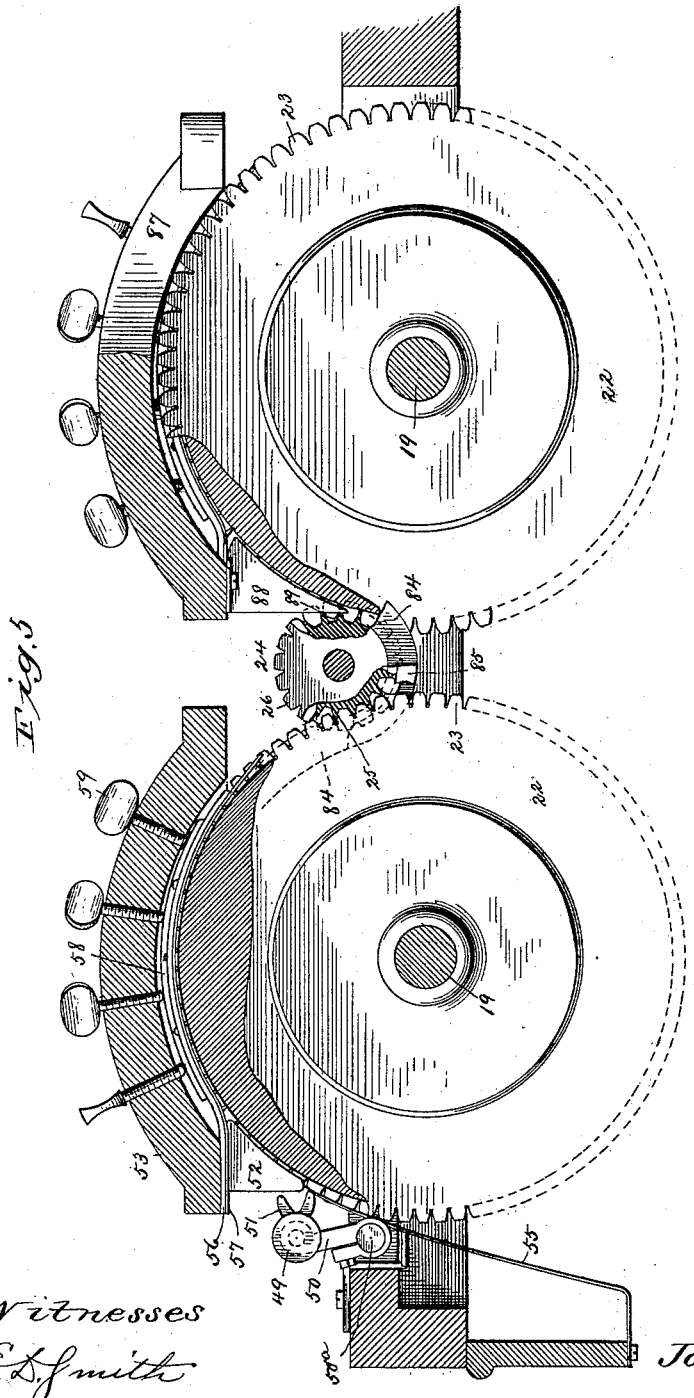

Fig. 5

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(No Model.) 7 Sheets—Sheet 6.

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MACHINE FOR MAKING PINS FOR PIN FASTENERS.

No. 418,486. Patented Dec. 31, 1889.

Fig. 7

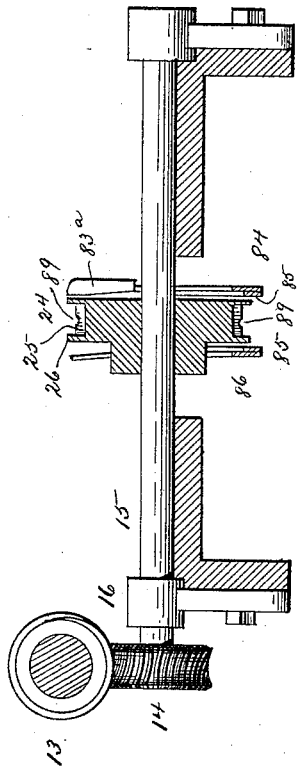
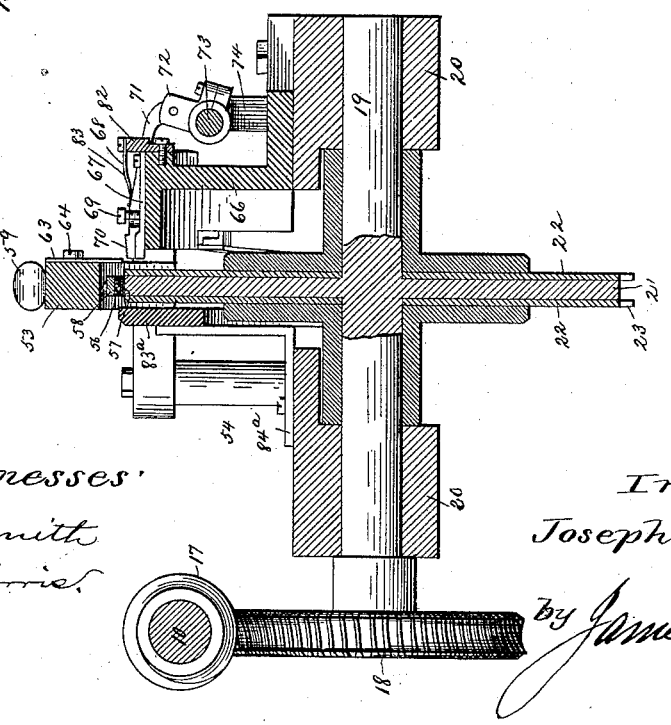


Fig. 6



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(No Model.) 7 Sheets—Sheet 7.

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MACHINE FOR MAKING PINS FOR PIN FASTENERS.

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Fig. 8.

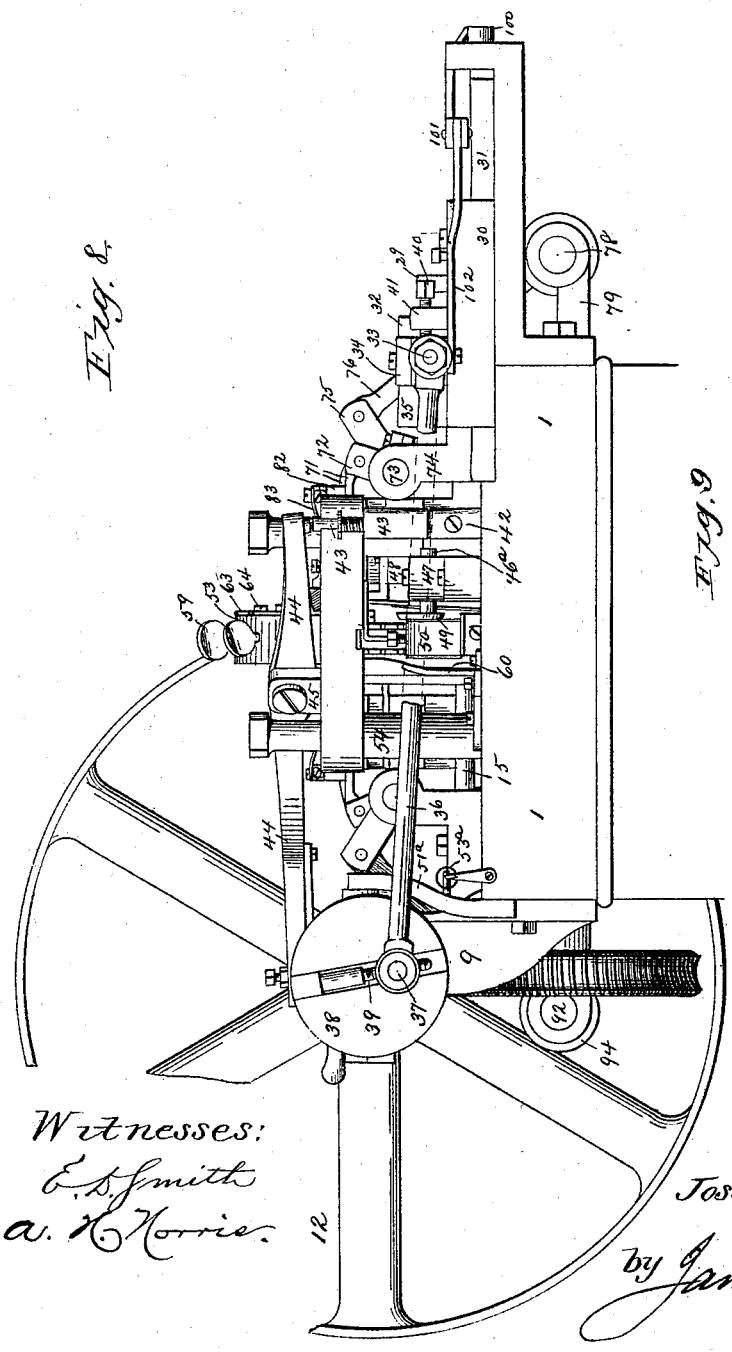
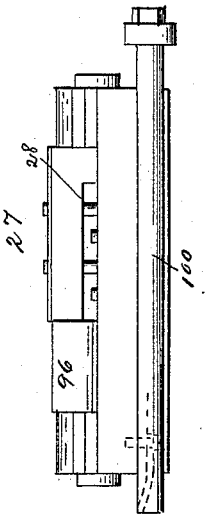


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOSEPH H. BAIRD, OF OAKVILLE, CONNECTICUT, ASSIGNOR TO GEORGE W. McGILL, OF RIVERDALE, NEW YORK.

MACHINE FOR MAKING PINS FOR PIN-FASTENERS.

SPECIFICATION forming part of Letters Patent No. 418,486, dated December 31, 1889.

Application filed October 22, 1889. Serial No. 327,848. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. BAIRD, a citizen of the United States, residing at Oakville, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Machines for Manufacturing Pins for Pin-Fasteners, of which the following is a specification.

My invention relates to the manufacture of double-ended pins adapted for use in connection with staple-fasteners of that class ordinarily known in the market as "McGill's Pin Fasteners," used for connecting tags to merchantable articles, for binding sheets together, and various other purposes.

It is the object of my invention to provide a simple automatic mechanism whereby double-ended pins may be produced from a continuous wire, which is fed into the machine, cut to the proper length by automatic devices, and the separate lengths delivered to a carrier, by which they are advanced and simultaneously rotated, during which movement they are acted upon at one end by a series of cutters, by which they are pointed and polished.

It is my further purpose to combine with such mechanism a transfer device, whereby the wires are removed from said carrier or conveyer and transferred to a separate and substantially similar carrier, in which they are gaged to project their unpointed ends to a uniform length, and by which they are advanced and rotated, during which movement the unpointed ends are operated upon by cutters or similar tools, whereby they are pointed and polished.

It is my purpose, also, to provide means whereby the pin-blanks may be automatically cut from a continuous wire, deposited separately and successively in a rotary carrier, advanced therein to the cutters or pointing-tools, and uniformly rotated and advanced during the time said tools are operating upon their points, the pin-blanks being held and guided by differentially-driven serrated disks inclosing a central plain or friction wheel, by which rotation is imparted to each of said blanks.

It is also my object to so construct and organize the parts of a machine of this type that while the pin-blanks are rotated they shall also be advanced over a series of tools, which are alternately cutting and polishing tools, acting successively upon the points of the pin-blanks.

It is my object, finally, to provide an automatic mechanism feeding a continuous wire to an automatic reciprocating cutter, a conveyer consisting of a plain disk inclosed by two serrated disks, all having continuous rotation in the same direction, but the serrated disks being driven faster than the plain disk, a friction-cushion adjustable toward the periphery of the plain disk, a series of alternately cutting and polishing tools over which the projecting ends of the pin-blanks are carried and rotated, means for transferring the pin-blanks from said conveyer and inserting them in a second and similar conveyer, means for projecting their blunt ends over a second series of alternately cutting and polishing tools, and adjustable supports sustaining the ends of the pin-blanks as they are acted upon by the tools, which lie upon supports adjustable toward and from the said pin-blanks, whereby the entire process of manufacture is rendered wholly automatic, as will be hereinafter more fully set forth.

The invention consists to these ends in the several novel features of construction and new combinations of parts hereinafter set forth and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a front elevation of the complete machine. Fig. 2 is an end elevation taken from the right-hand end, Fig. 1. Fig. 3 is a plan view of the right-hand portion of the machine shown in Fig. 1. Fig. 4 is a plan view of the left-hand portion of the machine shown in Fig. 1, the views being so arranged that by uniting Figs. 3 and 4 a complete plan is obtained, with the exception of the feed end. Fig. 4ª is a plan of the feed end of the machine. Fig. 5 is a detail longitudinal vertical section showing the conveyers and transferring-gear, part of the carriers being broken away. Fig. 6 is a transverse vertical section taken substantially in the line of one of the carrier-shafts. Fig. 7 is a similar section

taken in the line of the intermediate or transferring-shaft. Fig. 8 is an end elevation of the machine, taken from the farther side of Fig. 2. Fig. 9 is a detail side elevation of the wire-straightener.

In the said drawings, the reference-numeral 1 designates the frame of the machine, in which the operative parts are supported. This frame is sustained by legs 2, and upon cross-braces 3, connecting the legs at each end of the frame, are mounted boxes 4, in which a shaft 5 has bearing, extending beyond the legs and having upon one projecting end a tight and loose pulley 6 and 7. Upon the other projecting end is a small pulley 8.

Upon the bracket-bearings 9, placed at or near the angles of the frame on one side, is mounted a shaft 10, extending the whole length of the frame and having at one end a large pulley 12, which is belted to the small pulley 8. Upon the shaft, at a point opposite the middle portion of the frame 1, is a worm 13, of comparatively small pitch, and beneath said worm and meshing with it is a small worm-gear 14, carried by a shaft 15, which extends across the frame 1 and has support in bearings 16. Upon the same shaft 10, upon each side of and at a distance from the worm 13, is a worm 17, having a pitch opposite to and considerably greater than the pitch of the worm 13. Beneath these worms 17 and meshing with them are worm-gears 18, carried by shafts 19, which have bearing in boxes 20, bolted to the under face of the frame 1.

Upon each of the shafts 19 is rigidly mounted a disk 21, which rotates with the shaft under the impulse of the worm-gear 18. Upon the shaft 19 are placed two loose disks 22, one upon each side of the disk 21 and lying flat against its face, but free to rotate with a differential speed. These disks 22 inclose the disk 21, and upon their edges are formed teeth 23, which project beyond the periphery of the disk 21. The shafts 19 are placed at such distance from each other that the intermediate shaft 15 may pass between the edges of the disks on one shaft 19 and those of the disks on the other shaft 19 and carry the transferring-gear 24. This gear consists of a disk having a series of transverse teeth 25 of such width that they engage the teeth upon the disks 22 on both shafts 19, thereby causing the serrated disks 22 and the intermediate gear to rotate in unison with and communicating to each pair of disks 22 a movement of similar speed, while the rigid disks 21, being driven by the worms 17, rotate at a different speed and in the same direction. Upon each of the flat faces of the intermediate gear 24 are formed teeth 26, extending beyond the edges of the transverse teeth 25, the serrations forming said teeth 26 being located in the lines of the transverse teeth 25.

The continuous wire from which the pins are formed is introduced through a wire-straightener 27. (Shown in Figs. 4ª and 9.) This device is one well known to those skilled in the art, and requires no detailed description. It is simply mounted upon the feed end of the machine, as shown in Fig. 2, the wire-guides 28 of the wire-straightener being so arranged that the wire passes from the said guides to a guide 29, mounted upon a feed-slide 30. This feed-slide reciprocates upon a bed-plate 31, which forms part of the frame 1 of the machine. Upon said slide or plate is rigidly mounted a block 32, to which is pivotally connected one end of an arm or lever 33, by means of a link-plate 34, said arm having a jaw 35, which engages with the vertical face of the block 32. The end of the arm 33 is connected to a pitman 36, operated by a crank-pin 37, which projects from a disk 38 upon the end of the shaft 10. The crank-pin 37 is mounted upon a threaded support 39, upon which it is adjustable in a diametrical slot in the disk 38 to vary the throw of the pitman and adjust the feed-stroke to the requirements of the manufacture. A set-screw 40, tapped through a post 41, rising from the slide-plate 30, bears against the arm or lever 33 and permits a limited pivotal movement thereof upon the reverse movement of the pitman 36, whereby the jaw 35 releases the wire, but is prevented from again clamping it by a further pivotal movement, thus permitting the feed-slide to move back far enough to secure a new hold upon the wire preparatory to a second feed. As the wire is advanced by these devices it passes over the top of a locking-post 42, above which is arranged a spring-raised pin 43, upon which rests the end of an arm or lever 44, which is pivoted upon a bracket 45 and has its other end connected to a ring-cam 46 on the shaft 10. As the wire advances over the post 42, and at the moment when the feed movement ceases, the lever 44 is operated and caused to depress the spring-raised pin 43, throwing it down upon the post 42 and against the wire lying thereon, whereby said wire is rigidly locked during the retrograde movement of the feed-slide 30. After passing the post 42 the wire enters a cylindrical guide 46ª, which is mounted in a bracket 47, wherein it is held by a set-screw 48. Emerging from this guide, the wire passes in front of a disk cutter 49, mounted upon a rocking arm 50, whereby said disk is caused to reciprocate over the end of said guide, which operates as the rigid or stationary member of the cutting devices, while the disk forms the movable member.

Upon the arm 50, which carries the disk cutter 49, are mounted a pair of crotched guides or supports 51, which receive the cut portion of the wire. As the arm 50 rocks toward the disk 21 the guides or crotched supports 51 pass outside of the two disks 22 and carry the severed pin-blank into the teeth of said disks, the ends of the pin resting in the teeth and projecting somewhat on each side,

while the intermediate portion rests against the periphery of the central disk 21. The arm 50 is vibrated by a rock-shaft 50^a, having an arm 51^a, acted upon by a cam 52^a on the shaft 10. It is reciprocated in the other direction by a spring 53^a. As the arm 50 rocks over and carries the pin-blank into the teeth of the two outer disks it enters the serrations just below the point of a retaining-plate 52, Fig. 5, which is mounted on a housing 53, overhanging the disks and supported in proper position by means of brackets 54, mounted on the frame 1. The edge of this retaining-plate follows the surface or periphery of the middle disk 21 for a short distance, lying close enough thereto to permit the passage of the pin-blanks. A shield 55 prevents the insertion of the blanks at any point below that to which they are carried by the vibration of the arm 50.

Upon the housing 53 is mounted a cushion composed of a strip of leather or other suitable flexible fabric 56, below which lies and is attached a strip of metal 57, such as brass. This cushion is of such width as to lie between the toothed peripheries of the outer disks 22 and upon or near the periphery of the intermediate disk 21.

Upon the leather plate rests a strip or plate 58, of suitable metal—such as lead—and set-screws 59 are tapped through the housing 53 and bear upon this plate, which is kerfed, slotted, or channeled between the points of engagement of said screws to permit the several parts of the plate to yield independently and force the cushion down upon the edge of the disk 21. As the latter revolves in the same direction with the disks 22, but at a different speed, the pin-blanks will as they pass beneath the cushion begin to rotate by reason of the frictional contact of the cushion and the edge of the disk 21, upon both of which said blanks roll, and this rotation will continue until the blanks emerge from beneath the cushion.

As the wire forming the pin-blanks is fed into the machine, and after its end passes through the guide 46^a and into the crotched guides 51, its end abuts against and is arrested by a stop-plate 60, consisting of an angular bracket having one arm resting upon the frame 1 and connected thereto by a bolt 61, passing through the frame 1 and through an elongated slot 62 in the bracket-arm, whereby the stop may be adjusted to vary the length of the pin-blanks. The upright arm of the bracket or stop-plate 60 is curved very gently toward the central plane of the conveyer, whereby as the pin-blanks are carried forward therein, their ends being swept over the concave face of this stop-plate, the blanks are moved longitudinally in the serrations of the conveying-disks 22 and their ends are projected somewhat, causing them to protrude a little farther upon one side of the conveyer than upon the other. The ends thus projected travel directly beneath the edges of vertically-adjustable plates 63, mounted upon the vertical face of the housing 53 by means of screws 64, passing through slots in the plates. The lower edges of these plates are so formed that when properly adjusted they form a curved supporting-edge practically concentric with the axis of the conveyer.

Upon the frame 1 is erected an arch 66, located upon the side of the conveyer adjacent to the plates 63 and parallel and concentric therewith. Upon this arch are supported plates 67, secured to the arch by screws 68, passing through one end of said plates and having the other ends, which are nearest the conveyer, vertically adjustable by means of set-screws 69. Upon these plates rest a series of cutting and polishing tools 70, having shanks 71, which are slightly twisted to enable their extremities to connect with arms 72, rigid upon a rock-shaft 73, this twist being necessary to secure the proper action of the shaft and at the same time permit the cutters to lie flat upon the plates 67.

The rock-shaft 73 is supported in bracket-bearings 74, and upon its end is an arm 75, connected by a link 76 to an eccentric 77 upon a shaft 78, mounted in bearings 79 upon the side of the frame 1. This shaft is provided with a pulley 80, belted to a large pulley 81 on the main shaft 5. Upon the outer edge of the arch 66 are mounted blocks 82, to which are attached springs 83, resting upon the shanks of the cutters and holding them down upon the plates 67. The cutting-tools described are preferably four in number, the first and third being cutters and the second and fourth polishing-tools.

A curved projecting and stop plate 83^a is arranged upon the side of the conveyer most remote from the cutting and polishing tools, against which plate the ends of the pins may abut as they are acted upon by the tools. This plate is mounted upon brackets or angle-irons 84^a, Figs. 3 and 4, which are adjustable on the frame 1 toward and from the conveyer to accommodate pins of varying length. By means of this projecting and stop plate the pin-blanks are first protruded, so as to project their ends over the cutting and polishing tools, and after passing the deflecting end of this plate the butts of the pin-blanks rest against and are supported by it under the action of the tools 70.

After the pin-blanks have been carried by the conveyer over the series of reciprocating tools 70, by which their projecting ends are trimmed to a sharp point and polished, they pass out from frictional contact with the cushion 56 57, but are still held in place by the extended end of the brass strip 57, forming part of this cushion. The further movement of the conveyer brings the pointed ends of the blanks into contact with the face of a plate 84, which is slightly inclined to the plane of rotation of the conveyer. This plate is curved to follow the line of movement of

the blanks, as shown in dotted lines in Fig. 5, and gradually approaches the vertical face of the conveyer, whereby the pin-blanks are caused to recede longitudinally and project their blunt ends upon the other side of the conveyer in a manner similar to that effected by the deflected end of the projecting plate 83a. By the action of this plate the pin-blanks are brought into such position that their extremities project about equally beyond the outer faces of the disks 22.

The disks 22 of the first conveyer now pass into mesh with the intermediate or transferring gear 24, the transverse teeth 25 of said gear engaging the serrated edges of the disks 22, while its teeth 26 overlap upon the outside of said disks and receive the projecting ends of the pin-blanks in the serrations between the teeth 26. Upon each side of the intermediate 24, lying near its lower edges and curved to correspond therewith, are two parallel guide-plates 85, the ends of which are curved upward to the point where the teeth 25 of the intermediate begin to withdraw from mesh with the teeth of the disks 22. The edges of these guides receive the ends of the pin-blanks and withdraw them from the teeth of the disks 22, retaining them in the serrations of the intermediate 24, and thereby guiding them into the similar serrations of the disks 22 of the second conveyer. Upon the outer face of one of the guide-plates 85 lies the plate 84, already described, its edge being carried above the edge of the plate 85, so that the ends of the pin-blanks rest upon the latter and lie close to the inner face of the plate 84. A similar guide-plate 86 lies immediately outside of and against the other guide 85, and these parts are arranged in parallelism and are curved to correspond with the line of travel of the pin-blanks. The inner guides 85 extend to the point where the teeth of the intermediate come into full mesh with the teeth of the second conveyer.

The second conveyer is constructed in all respects like the first, and is arranged beneath a housing 87, similar to that over the first conveyer. Depending from the end of the housing 87 is an angular plate 88, which is tapered to a point at its lower end, which lies between the serrated edges of the disks of the second conveyer, its point entering shallow central notches 89 in the transverse teeth 25 of the intermediate, while the edge of the plate is curved into parallelism with the edge of the disk 21 of the second conveyer. As the latter revolves in mesh with the intermediate the pin-blanks pass under the point of this plate and are withdrawn from the serrations of the intermediate into those of the disks of the second conveyer, traveling in the latter and beneath the curved edge of the plate 88 until they pass under the cushion, which is similar in construction to the cushion used on the first conveyer. As the pin-blanks enter the disks of the second conveyer, however, they project equally at each end, or thereabout, and in order to trim and polish the blunt ends it is necessary to project the latter from the second conveyer sufficiently to enable the cutters to operate thereon. To effect this, the end of the guide-plate 84 is bent at an angle to the plane of rotation and caused to gradually approach the conveyer, while the corresponding guide-plate 86 upon the other side of the conveyer is bent at a similar angle and parallel with the deflected portion of the plate 84. As the pin-blanks move between these plates, after entering the serrations of the second conveyer, the finished points impinge upon the deflected end of the plate 84 and are pushed longitudinally in the direction of their blunt ends, thereby projecting the latter the required distance. They then pass beneath the cushion and are revolved, the projecting ends being supported by a series of adjustable plates 90, similar to the plates 63 on the housing of the first conveyer. While passing beneath the cushion their blunt ends are operated upon by a second series of cutting and polishing tools 91, which are duplicates of the tools 70, already described, whereby their ends are trimmed and polished, thereby completing the pin. As the second conveyer rotates farther the finished pins drop out of its serrations into a suitable receptacle. They are now ready for the further processes of manufacture, by which they are bent into suitable form and receive the caps. The mechanisms by which these results are accomplished form the subject-matter of separate applications.

It will be noticed that in operating upon the pin-blanks the cutting and polishing tools act upon their ends from beneath, and their operative stroke is toward the ends of the pin-blanks, instead of from them, thus avoiding the formation of a burr upon the point and giving a perfectly-sharp, highly-polished, slender, and uniform point.

The second series of tools 91 are mounted and arranged in all substantial respects like the tools 70, and are operated by a shaft 92, having a pulley 94, driven from a large pulley 95 on the main shaft 5. The wire-straightener (shown in Fig. 4a) is revolved by a pulley 96, belted to a pulley 97 on the main shaft, the belt being carried over guide-pulleys 98, journaled upon an extension 99 of the main frame. The wire-straightener slides upon side supports 100 and is linked to a lever 101, which is connected by a coupling 102 to the arm 33 on the feed-plate 30. The precise construction of the wire-straightener has not been set forth, as it is well known in the art.

It will be seen that by the differential rotation of the disks of the conveyers the pin-blanks are not only caused to roll upon the cushion and upon the periphery of the plain disk, but are also held in true transverse position and parallel with each other by the serrations of the disks, the movement of the latter being speeded to accompany the roll-

ing movement of the pin-blanks, and thereby avoid the strain of the teeth of the disks upon upon the pin-blanks.

What I claim is—

1. In a machine for making double-ended pins for pin-fasteners, the combination, with a conveyer consisting of serrated rotating disks inclosing a smooth differentially-rotated disk, of a friction-cushion adjustable toward the latter and a series of tools operating upon the projecting ends of the pin-blanks as the latter are carried beneath the cushion while lying in the serrations of the disks, substantially as described.

2. The combination, with a conveyer consisting of two serrated rotating disks inclosing a smooth differentially-rotating disk, of a friction-cushion adjustable toward the latter and a series of reciprocating tools acting upon the projecting ends of the pin-blanks as they lie in the serrations of the outer disks, said tools operating upon the under side of the pin-blanks and cutting toward their ends, substantially as described.

3. The combination, with a conveyer consisting of a plain rotated disk inclosed between two serrated differentially-rotated disks, of a friction-cushion overhanging the periphery of the plain disk and lying between the teeth of the two serrated disks, a kerfed flexible plate resting upon said cushion, and a series of set-screws resting on the plate between the kerfs, substantially as described.

4. The combination, with a conveyer consisting of a plain rotating disk inclosed between two serrated differentially-rotated disks, of a friction-cushion adjustable toward the periphery of the plain disk, a series of reciprocating tools operating upon the points of the pin-blanks lying in the serrations of the disks, a series of plates to support said tools arranged in the line of rotation and adjustable at one end to raise and lower the tools, and a series of adjustable plates arranged above the projecting ends of the pin-blanks and having their lower edges arranged in the line of rotation to support said blanks during the operation of the tools, substantially as described.

5. The combination, with a wire-straightener, of a reciprocating feeding device link-connected thereto, a wire-guide receiving the end of the intermittently-fed wire, a cutter reciprocating past the end of said guide and severing the wire and having forked guides or carriers receiving the severed portion, a conveyer consisting of a plain rotating disk inclosed between two serrated differentially-rotated disks, and a guide-plate between the teeth of the serrated disks and retaining the pin-blanks in position in the serrations of the disks as they are successively deposited therein by the reciprocating forked guides, substantially as described.

6. The combination, with a conveyer consisting of a plain rotating disk inclosed between two serrated differentially-rotated disks, of a reciprocating feeder, a reciprocating cutter having forked guides which receive the severed pin-blank and carry it into the serrations of the disks, a guide-plate having its end deflected at an angle to the plane of rotation, against which the ends of the pin-blanks are swept by the movement of the conveyer, a friction-cushion adjustable toward the periphery of the plain disk, a series of tools acting upon the projecting ends of the pin-blanks, and supports for the latter sustaining them under the action of said tools, substantially as described.

7. The combination, with a conveyer consisting of a plain rotating disk lying between two serrated differentially-rotated disks, of a reciprocating wire-feeder, a reciprocating cutter severing the wire and having forked arms receiving the severed portion and carrying it into the openings between the teeth of the serrated disks, a guide deflected at an angle to the plane of rotation, against which the ends of the pins are swept as the conveyer rotates, a cushion adjustable toward the periphery of the plain disk, a series of tools acting upon the projecting ends of the pin-blanks, a guide-plate restoring the pins to normal position, an intermediate gear having transverse teeth meshing with the serrations of the disks and provided with serrated edges overlapping the edges of the serrated disks, guide-plates supporting the ends of the pin-blanks beneath the intermediate gear, separate guides projecting their blunt ends outward, a second conveyer receiving said pin-blanks from the intermediate, a guide-plate withdrawing said blanks from the intermediate gear and carrying them into the teeth of the second conveyer, and a second series of tools operating upon the projecting blunt ends of said blanks, substantially as described.

8. The combination, with a conveyer composed of a plain disk and two serrated disks inclosing the same, all rotating in the same direction, the plain disk being driven at a different speed from the serrated disks, of a friction-cushion adjustable toward the periphery of the plain disk, a series of plates arranged upon one side of said conveyer upon an arch curved in the line of rotation, said plates being adjustable at one end, a series of cutting and polishing tools resting upon said plates and held down thereon by springs, and a rock-shaft reciprocating said tools toward and from the conveyer, substantially as described.

9. The combination, with a conveyer composed of a plain disk and two serrated disks inclosing the same, all rotating in the same direction, the serrated disks being driven at a greater speed than the plain disk, of a friction-cushion adjustable toward the periphery of the plain disk, a series of plates mounted upon an arch on one side of said conveyer and having an independent adjustment at their inner ends, a series of tools supported upon said plates, said tools being alternately

cutting and polishing tools, a rock-shaft reciprocating said tools beneath the ends of the pin-blanks lying in the serrations of the disks, and a series of independently-adjustable plates overhanging the projecting ends of the pin-blanks, their lower edges being curved to support the pin-blanks under the action of the tools, substantially as described.

10. The combination, with a conveyer consisting of serrated disks carrying the pin-blanks between their ends and a plain disk upon which the bodies of said pin-blanks rest, of a friction-cushion composed of strips of leather and metal overhanging the periphery of the plain disk, set-screws adjusting different parts of said cushion toward the disk, a wire-straightener, a locking device for the wire, a reciprocating cutter severing the end of the wire which lies in guides carried by the arm reciprocating the cutter, and means, substantially as described, for cutting and polishing the projecting ends of the pin-blanks, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH H. BAIRD.

Witnesses:

FREDK. L. ADAMS,

C. W. LOOMIS.