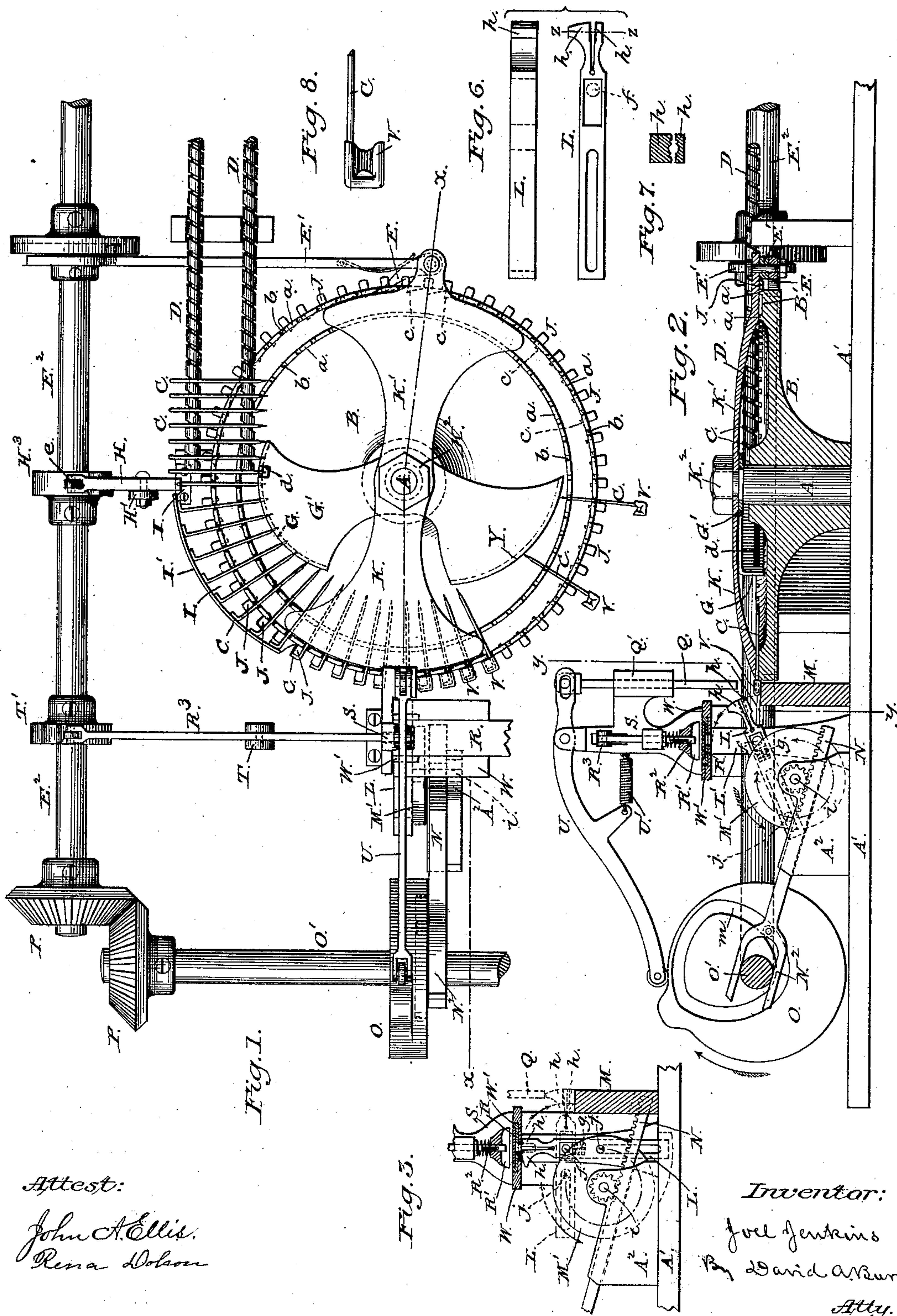


2 Sheets—Sheet 1.

No. 349,223.

Patented Sept. 14, 1886.



N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOEL JENKINS, OF MONTCLAIR, NEW JERSEY.

SAFETY-PIN MACHINE.

SPECIFICATION forming part of Letters Patent No. 349,223, dated September 14, 1886.

Application filed February 20, 1886. Serial No. 192,644. (No model.)

To all whom it may concern:

Be it known that I, JOEL JENKINS, of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful
5 Improvements in Safety-Pin Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a
10 part of this specification, in which—

Figure 1 is a plan view of my improved safety-pin machine; Fig. 2, an irregular vertical section in line *xx* of Fig. 1; Fig. 3, a partial detached section on said line *xx* of the
15 heading device, illustrating the movements thereof. Fig. 4 is a vertical diametric section, on an enlarged scale, through the conveying-wheel in line parallel with the bending-lever; Fig. 5, an irregular vertical section in line *yy*
20 *y* of Fig. 2, illustrating the movement of the lever actuating the clamping punch or plunger; Fig. 6, details, on an enlarged scale, of the end of the heading-arm, giving, respectively, a plan and a side elevation thereof; Fig.
25 7, a transverse section in line *zz* of Fig. 6; Fig. 8, a detached view, on an enlarged scale, of one of the pin heads or shields attached to the end of a pin-blank; Fig. 9, a detached vertical section of a portion of the conveying-
30 wheel in line with the retaining-plate confining the blanks when operated upon by the bending-lever, illustrating a modification thereof; and Fig. 10, a side elevation of the slotted heading-arm, illustrating a modification in the
35 construction of its jaws.

My invention relates to that class of machines by which a bit of pointed wire is bent at one end and fitted with a slotted head, in
40 readiness to be twisted centrally into a spring-coil, which shall bring the pointed end of the wire into line for engagement by the slotted head to form a safety-pin.

It has for its object to simplify the manufacture of the pin by improved mechanism
45 constructed for the purpose, and which is hereinafter described.

In the accompanying drawings, A represents a vertical spindle secured upon a bed-plate, A', and B a wheel rotating upon said
50 spindle as its axis, and whose upper face is dished centrally, leaving a wide, annular, flat face or rim, B', around its outer edge. This

upper rim is likewise recessed longitudinally, so as to leave low concentric ledges or upwardly-projecting flanges *a a* along the inner
53 and outer edge of the rim, and these flanges are notched radially at equal distances apart, (see at *b b*, Fig. 1,) to form seats which shall receive and retain in a radial position on the
60 rim of the wheel the wire blanks to be headed by the machine. The pointed wire blanks are represented at C C, and may be fed to the wheel B in any customary manner—as, for instance, by means of spirally-threaded conveying-shafts D D—from which they are delivered,
65 one at a time, into the notched seats *b b*, the wheel B being made to rotate intermittently, so as to bring the radial seats successively in order under the ends of the conveying-shafts D D, the length of each movement
70 being equal to the distance between the seats. The intermittent movement of the wheel is produced by means of a spring-actuated pawl, E, pivoted upon the end of a reciprocating rod, E', actuated by an eccentric upon the main
75 shaft E of the machine, which said pawl E engages notched teeth *c c*, (see dotted lines, Fig. 1,) formed upon the periphery of the wheel, as illustrated in Fig. 1. The pointed blanks C C are dropped from the conveying-shafts D
80 D into the radial seats *b b* in such manner as that their blunt ends shall project out beyond the periphery of the wheel, and at the first movement made by the wheel after a blank has thus
85 been delivered thereon the pointed end of the blank is carried into a horizontal slot, *d*, formed in the face of a vertical rim or plate, G, (see Figs. 1, 2, and 4,) dependent from the end of
90 a horizontal plate, G', projecting from the top of the spindle A, to which it is made fast. This slotted plate G is curved so as to be eccentric to the rim of the wheel, whereby as
95 the wheel moves forward the pointed ends of the blanks are in a few moves carried out clear and free of their engagement with the slot *d*, as shown in Fig. 1. So soon as the
100 blank C has been deposited in its radial seat *b b* in the wheel B, and its inner pointed end has passed into the slot *d* in the curved plate G, its outer end is brought into line under the
end of a bending-lever, H, and over a recess in a fixed horizontal plate, I. (See Figs. 1 and 4.) This bending-lever is made to oscillate in a vertical plane upon a suitable piv-

otal support, H' , its outer end being fitted with a friction-roller, e , and held by the tension of a spring, H^2 , into constant contact with a cam-wheel, H^3 , upon the main shaft. In the revolution of the wheel H^3 the outer end of the lever H is forced upward by the cam on the wheel at the moment the wire blank C is brought under the inner end of the lever, and said inner end is thereby made to bend down the end of the blank at a right angle to its length, (see Fig. 4,) the inner end of the blank being meantime confined and supported by its engagement with the slot d in the plate G . The next move of the wheel B will cause the bent end of the blank to swing upward into a horizontal position by reason of its contact with the wall of the recess in the fixed plate I , and is carried thence in said position over the face of said plate I , as shown in Fig. 1. The outer edge of the plate I is made to curve inward beyond the bending-lever H , and an upwardly-projecting flange, I' , is formed along said outer edge, against which the bent ends of the blanks $C C$ are carried, and by which the blanks are gradually forced inward until the bent portion is brought against one of a series of supporting-lugs, $J J$, projecting radially from the periphery of the wheel in line with the radial seats $b b$ on its face. The outer end of each lug J is of a width corresponding exactly with the length of the inner side of the bent portion of the blank, so as to fit closely in the angle thereof and extend to its end without projecting beyond it, as shown in Fig. 1. So soon as the end of a blank C is thus fitted upon a supporting-lug J , it is carried by the next movement of the wheel under a segmental elastic clamping-plate, K , which extends far enough over the face of the wheel to bear upon the blanks carried thereon until they have passed beyond the heading device. This elastic plate K is made to curve in an arch from the rim of the wheel to the top of the spindle A , and to project radially beyond it in the shape of a curved arm, K' , to the opposite side of the wheel, where it is connected by a hinge-joint to the end of the horizontally-reciprocating pawl-rod E' . It is pivoted upon the top of the spindle A , and confined thereon by means of a nut, K^2 , which, when screwed down upon the spindle, bears upon the center of the elastic arch formed by the plate K and its arm K' , and by its pressure forces and holds the plate down firmly with an elastic pressure upon the wheel B , and upon the interposed blanks $C C$, carried upon the wheel to the heading-machine. By its connection with the reciprocating rod E' the plate is made to move in unison with the wheel B as the wheel is moved forward, and is then carried back by the rod in unison with the pawl E as the latter is thrown back to re-engage the wheel. By this means the plate K clamps the blank C firmly as it is carried to and beyond the heading device, the movement of the plate being effected while the blank is caught and held by said device. So

soon as the headed blanks pass beyond the heading device in the intermittent movement of the wheel B , their inner ends are brought to bear against the eccentric curved edge of a plate, Y , projecting over the wheel from its spindle A , the edge of the plate being bent down or widened to serve as a flange, and the blanks are thereby gradually forced outward until they will automatically drop into a receptacle placed under the wheel to receive them. The heading device consists of a lever, L , swinging in a vertical plane extending radially through the center of the wheel B upon a pivot pin or stud, f , projecting laterally from an upright, L' , through a longitudinal slot in the lever. A spiral spring, g , is fitted within the slot between its lower end and the pivot-pin, so as to keep the upper wall of the slot normally against the pin. An anvil block or post, M , is placed in close proximity to the rim of the wheel B , with the level of its upper face slightly below the upper face of the wheel, and in the same vertical radial plane wherein the lever L vibrates, and the lever L is so proportioned in length and its pivot f so located with reference to the rim of the wheel B as that when the lever is swung into a horizontal position its outer end will drop upon the top of the anvil M (see dotted lines in Fig. 3) in close proximity to the bent end of the wire blank C , brought over the anvil by the wheel B , as illustrated in Fig. 2. The outer end of the lever L is slotted longitudinally and transversely, so as to form two elastic jaws, $h h$, (see Fig. 6,) and the inner opposite faces of these jaws are recessed, (see cross-section, Fig. 7,) so as to form dies the counterpart of the finished head (see Fig. 8) to be secured upon the end of the wire blank, the dies being sprung apart sufficiently by the normal elasticity of the jaws to receive readily between them a blank head, V . As an equivalent device, one of the jaws, h' , may be hinged to the opposite jaw, h^2 , and a spring, h^3 , interposed between them, as shown in Fig. 10. The lever L is made to oscillate from the horizontal position in which its jaws rest upon the anvil, as shown in dotted lines in Fig. 3, to a vertical position, in which its jaws are brought directly beneath a press in which the blank heads are formed. (See positive lines in said Fig. 3.) This oscillation is obtained by extending the lever beyond its pivot at f , over the face of a crank-wheel, M' , mounted to rotate reciprocally in a vertical plane parallel with the lever upon a stud-axle, i , mounted in a bearing formed below and in the rear of said pivot f in a standard, A^2 , on the bed-plate A' of the machine. This longer end of the lever L is longitudinally slotted to receive a crank-pin, j , projecting from the face of the wheel M' . The stud-axle i of the wheel M' is fitted with a pinion, which is engaged by a reciprocating rack-bar, N , sliding in suitable ways formed in the standard A^2 , and the bar N is made to reciprocate back and forth, as required, by the engagement of a pin on its

outer end with a cam-groove, *m*, in the face of a cam-wheel, *O*, mounted upon a shaft, *O'*, geared by bevel-wheels *P P* to the main shaft *E'*. The bar *N* is furthermore supported by means of a fork, *N'*, at its outer end, formed to embrace the shaft *O'*, as illustrated in Fig. 2. The cam-groove *m* is so shaped as that the bar *N* is not moved during a given interval in the rotation of the shaft *O'*, so that the lever *L* is thereby left at rest with its jaws *h h* upon the anvil *M*, while a punch or compressing-plunger, *Q*, is brought to bear upon the jaws to close them upon the head after the head has been carried over the end of a wire blank, *C*. The heads *V* (see Fig. 8) for the pins are produced, in the usual manner, by stamping a blank from a thin strip, *R*, (see Fig. 1,) of brass by means of a cutting-punch, *R'*, and a shaping-punch, *R''*, working centrally through it, (see Figs. 2 and 3,) the strip *R* being fed forward intermittently, in the customary manner, by the operation of rollers (not shown in the drawings) upon which it is wound. The punches *R'* and *R''* are fitted in a standard, *S*, to work vertically over a plate, *W*, and die *W'*, supported immediately above the pivotal axis *f* of the lever *L*, so that the blank for the head, after it has been cut out by the punch *R'* and forced down by the punch *R''*, in the usual manner, through the shaping-die *W'*, into its finished form, will drop automatically between the jaws *h h* of the lever *L*, which in the meantime has been brought into a vertical position to receive the head. The punches *R'* and *R''* need not herein be particularly described, being constructed and operated, in the usual manner, by means of a lever, *R''*, pivoted upon the top of a standard, *T*, on the bed-plate *A'* of the machine, so that its outer end may bear upon the periphery of a cam-wheel, *T'*, on the main shaft *E'*, with which it is kept in contact by means of a spring, *T''*. (See Fig. 5.) So soon as a head, *V*, has thus been deposited between the jaws *h h*, the lever *L* is swung over by the movement of the crank-wheel *M'* (see dotted lines in Fig. 3) into a horizontal position, and the movement of the wheel continued after the lever has attained its horizontal position will operate to move it longitudinally forward horizontally, so as to carry its jaws toward the wheel *B* and upon the anvil *M*. (See dotted lines, Fig. 3.) By this horizontal longitudinal movement of the lever upon its axial pin the head *V*, inserted between the jaws of the lever, is carried over the bent end of the pin-blank *C*, previously brought into position over the anvil *M*, by the movement of the wheel *B*, as hereinbefore described. So soon as the jaws *h h* of the lever *L*, with the head inserted between them, have been brought over the bent end of the blank *C* above the anvil *M*, the punch or plunger *Q* is brought down upon the upper jaw with sufficient force to close and compress it tightly against the opposite jaw supported on the anvil, and thereby close and clamp the interposed head *V* firmly upon the bent end of the pin-blank in the proper form

required for a finished pin. (See Fig. 8.) The punch *Q* is mounted to reciprocate vertically over the die in suitable bearings formed in a bracket, *Q'*, projecting from the standard *S*. Its upper end is pivoted to one end of a lever, *U*, pivoted upon the top of the standard *S*, and whose outer longer end is made to bear upon the periphery of the cam-wheel *O* on the shaft *O'*, (see Fig. 2,) being kept in constant contact with the wheel by means of a spring, *U'*, in the customary manner.

In the operation of my machine a straight wire blank, *C*, previously pointed at one end, is delivered by the movement of the conveying-shafts *D D* and dropped upon the concentric flanges *a a* of the wheel *B* into the radial notches *b b*, by which it is confined in place in a radial position upon the wheel, with its blunt end projecting outwardly beyond the periphery of the wheel, as shown in Fig. 1. At the first intermittent movement of the wheel *B*, produced by the engagement of the reciprocating pawl *E* with its ratchet-teeth, the pointed end of the blank is carried under the upper edge of the slot *d* in the plate *G'*, and its outer end is carried over the recess in the plate *I* and under the end of the bending-lever *H*. During the next intermission in the movement of the wheel *B* the end of the bending-lever *H* is made to drop upon the end of the blank *C* and bend it down at a right angle to its length. The next movement of the wheel will carry this bent end over and upon the face of the horizontal plate *I*, the bent end being turned automatically into line parallel with the face of the plate *I*, upon which it rests, by its forward movement. As the wheel *B* thereafter moves intermittently forward, the blank is gradually forced inward by the contact of its outer bent end with the curved flange *I'* until said bent end is brought into contact with the supporting-lug *J*, projecting from the periphery of the wheel in line with the blank. In the meantime its inner end has passed out from the slot *d* in the plate *G'*. So soon as the bent end of the blank *C* has thus been carried against its supporting-lug *J* it passes under the edge of the plate *K*, and by it is confined closely upon the face of the wheel *B*, with its bent end alone projecting beyond the periphery of the wheel, and in this condition is brought into position over the anvil *M*. During the intermission which occurs in the movement of the wheel while the blank is over the anvil *M* a head, *V*, carried between the jaws *h h* of the lever *L*, is brought by the movement of said lever, produced in manner as hereinbefore described, from the cutting and shaping punches *R' R''* and die *W'*, by which the head is formed, and is slipped over the bent end of the blank, and then clamped down upon it and shaped thereon by the action of the plunger *Q* in closing the jaws. So soon as the plunger *Q* rises, the elasticity of the jaws will cause them to open automatically free from the head *V*, which remains secured to the pin-blank *C*, and the lever *L* and jaws *h h* will be withdrawn, so that the move-

ment of the wheel B will carry the headed pin-blank forward clear of the anvil. In the continued movement of the wheel the blank will be gradually forced outward by the contact of its inner end with the curved plate Y until it finally drops into a receptacle beneath.

Instead of forming the margin of the plate G' with a slotted flange, G, bent downward therefrom, by which to confine the inner ends of the blanks at the moment their outer ends are bent down by the bending-lever H, the plate G' may be extended far enough to permit its bent or flanged margin G to rest directly upon the blanks over their seats *bb* in the face of the wheel B, as illustrated in Fig. 9, and I contemplate this latter device as an equivalent modification of the first.

I do not claim as new the construction and operation of the mechanism as described for bending the end of the wire blanks C C, nor for cutting out and forming the heads V, as the same has heretofore been in use in other machines; and I contemplate the employment, in connection and combination with my machine, of any suitable device for bending the end of the wire blank after it has been placed upon the wheel B, and of forming the heads V for the blanks and of depositing said detached heads in any suitable manner between the jaws *h h* of the lever L while it is swung clear of the anvil M. I contemplate, also, the use of any well-known mechanism for producing an intermittent rotation of the wheel B synchronically with the intermittent movements of the heading-lever L and clamping-punch Q, as various devices may be substituted for those described herein with the same effect. It is evident, also, that an endless conveying chain or belt—such as is now commonly employed in safety-pin machines—may be substituted for the spiral conveying-shafts D D as a means for delivering the blanks to the wheel.

I claim as my invention—

1. The combination, with the mechanism, substantially as described, for bending the end of a wire blank in a safety-pin machine, of a carrying-wheel, B, rotating intermittently upon a vertical spindle, and a plate having a confining-flange with an edge parallel with the face of the wheel in position to engage the wire blanks placed radially on the horizontal rim of the wheel, substantially in the manner and for the purpose herein set forth.

2. The combination of a carrying-wheel, B, rotating intermittently upon a vertical spindle, and having radial seats formed upon the upper face of its horizontal rim to receive wire blanks for safety-pins, with conveying-shafts for delivering the blanks to the radial seats on the wheel, and with mechanism, substantially as described, for placing and clamping a head upon the bent end of each of said blanks, substantially in the manner and for the purpose herein set forth.

3. The combination, with a carrying-wheel, B, rotating intermittently upon a vertical spindle, and having radial seats formed upon

the upper face of its horizontal rim to receive wire blanks for safety-pins, ratchet-teeth formed upon its periphery, a reciprocating rod, a motor actuating said rod, a pawl pivoted to the rod to engage the ratchet-teeth, and mechanism, substantially as described, for placing and clamping successively a head upon the bent end of each blank placed upon the wheel, of an elastic confining-plate mounted centrally upon the axial spindle of the wheel to extend over and bear upon the face of the wheel opposite said heading mechanism, and an arm extending radially from said plate and hinged to the reciprocating pawl-lever, whereby the bearing end of the plate is made to move forward in unison with the wheel and move back over its face when the wheel is at rest, substantially in the manner and for the purpose herein set forth.

4. The combination, with a carrying-wheel, B, rotating intermittently upon a vertical spindle, and having radial seats formed upon its horizontal rim to receive wire blanks for safety-pins, of a series of lugs, J J, projecting from the rim of the wheel, each in line with one of the radial seats and in position to support the projecting bent end of the blank resting therein, substantially in the manner and for the purpose herein set forth.

5. The combination, with a carrying-wheel, B, rotating intermittently upon a vertical spindle, and having radial seats formed upon its horizontal rim to receive wire blanks for safety-pins, and with mechanism, substantially as described, for bending the outer end of each blank, and lugs projecting from the rim of the wheel to support the bent ends of the blanks, of a horizontal plate over which said bent ends projecting beyond the rim of the wheel are carried in its movement, said plate having an eccentric flange on the outer edge of said plate to gradually force the bent ends inward against the supporting-lugs, substantially in the manner and for the purpose herein set forth.

6. The combination, with a carrying-wheel, B, rotating intermittently upon a vertical spindle, and having radial seats formed upon its horizontal rim to receive wire blanks for safety-pins, and lugs projecting radially from its rim in line with said seats to support the bent ends of said blanks, of a fixed anvil post or block, over which said legs are made to rest in succession in the movement of the wheel, a vibrating and reciprocating lever recessed at its outer end to receive a detached pin-head, and made to swing toward and move longitudinally over upon each lug in succession when the lug is brought to rest over the anvil, and thereby fit thereon the detached head, mechanism, substantially as described, for moving said lever, and a punch or plunger reciprocating to and from the anvil to clamp and compress the head carried by the lever upon the lug over the anvil, substantially in the manner and for the purpose herein set forth.

7. The combination, in a safety-pin machine,

of the mechanism, substantially as described,
for bending the end of a wire pin-blank, an
anvil post or block, a horizontal intermittent-
ly-rotating wheel for conveying the blank from
5 the end-bending mechanism to the anvil, a
compressing punch or plunger reciprocating
vertically to and from the anvil, and an oscil-
lating and longitudinally-reciprocating lever
carrying a detached head to the anvil under
10 the punch or plunger, and placing it upon the
bent end of the blank brought thereto by the
wheel, all substantially in the manner and for
the purpose herein set forth.

8. The combination, in a safety-pin machine,
15 of an anvil post or block, a horizontal inter-
mittently-rotating wheel for conveying a pin-

blank to the anvil, an oscillating and longi-
tudinally-reciprocating lever, and mechanism,
substantially as described, for operating the
wheel and lever, whereby a detached head is 20
carried to the anvil and placed upon the end
of the blank brought thereto by the wheel, all
substantially in the manner and for the pur-
pose herein set forth.

In testimony whereof I have signed my name 25
to this specification in the presence of two
subscribing witnesses.

JOEL JENKINS.

Witnesses:

RENA DOLSON,
JOHN A. ELLIS.