

I. J. YOUNG,

MACHINE FOR FORMING SPLIT PINS.
APPLICATION FILED JUNE 15, 1912.

1,119,211.

Patented Dec. 1, 1914.

3 SHEETS—SHEET 1.

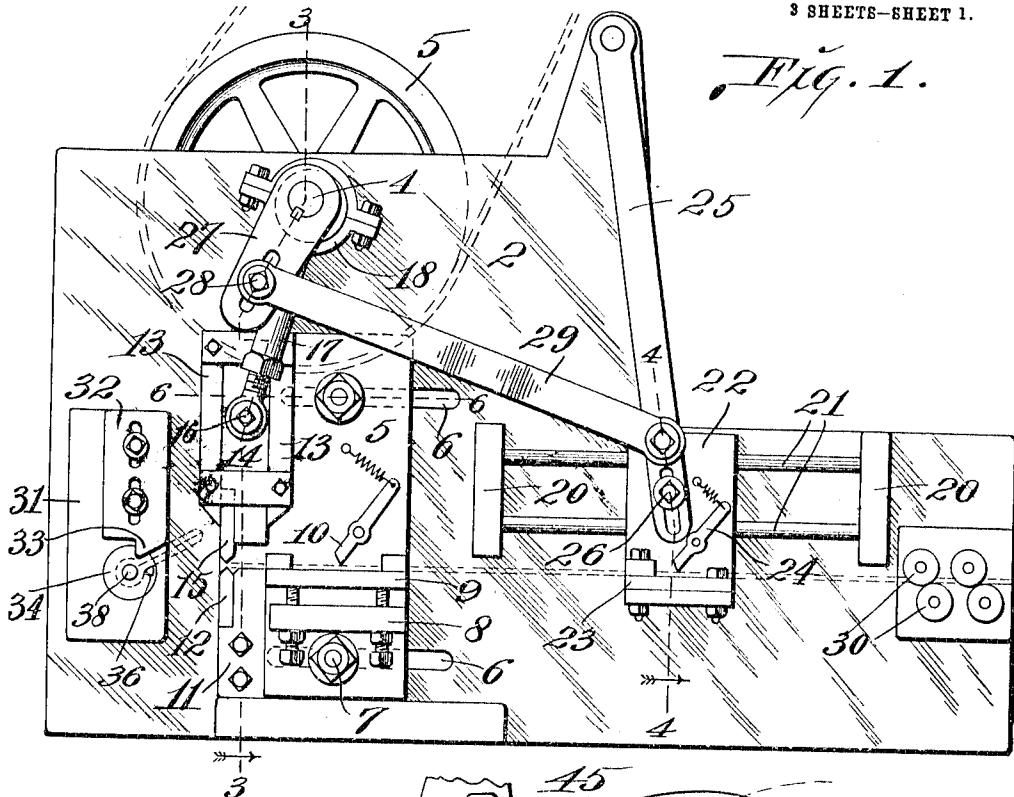
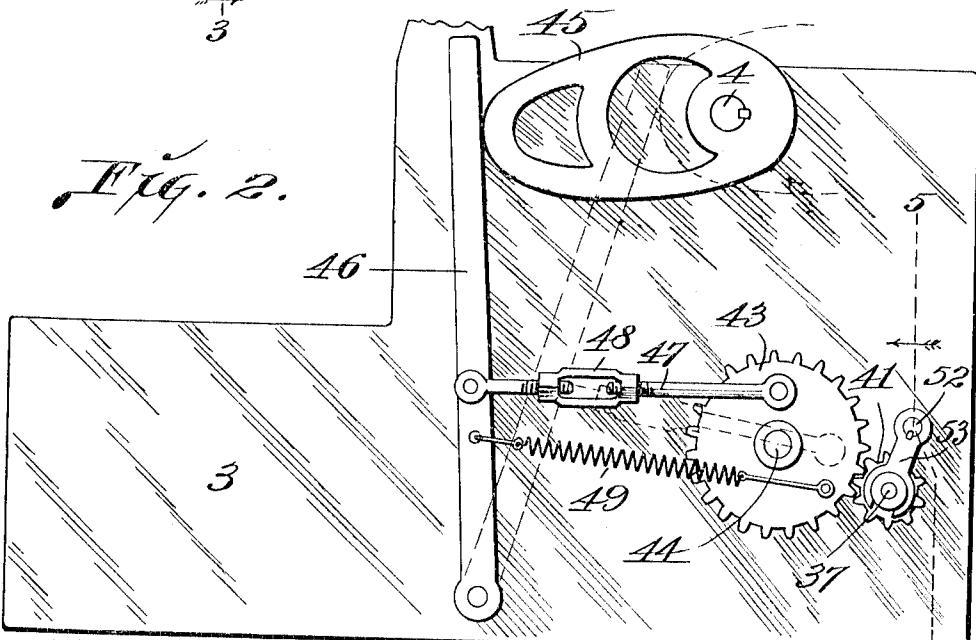


Fig. 2.



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Fig. 3

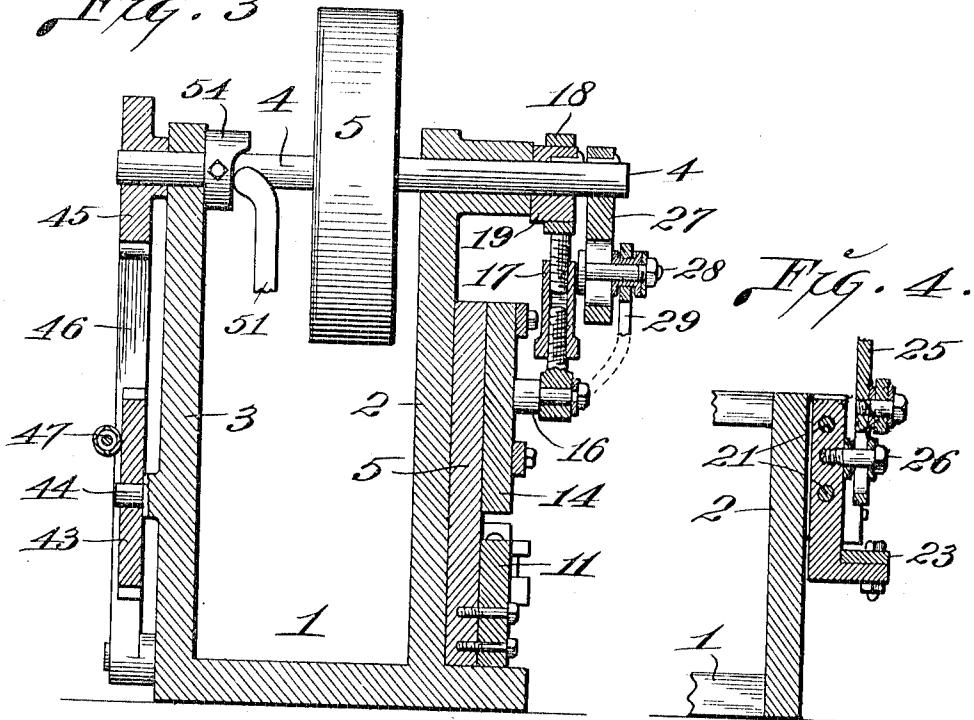
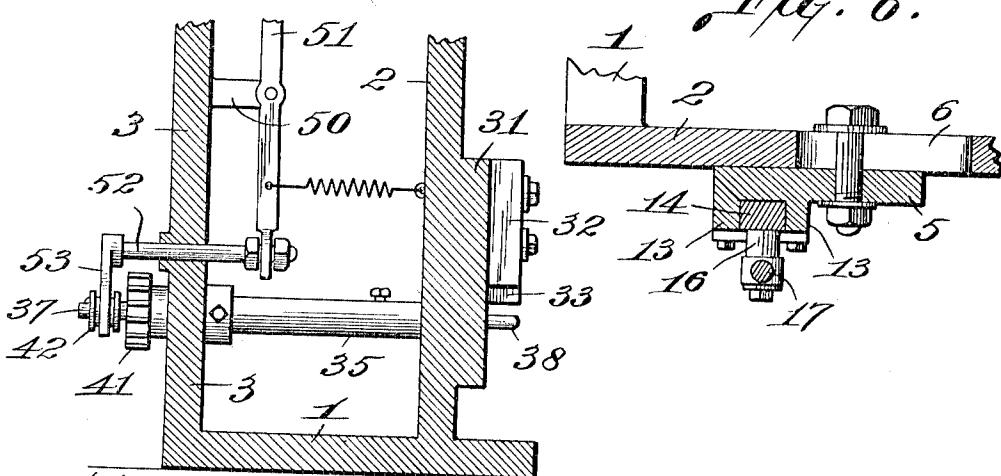


Fig. 5.



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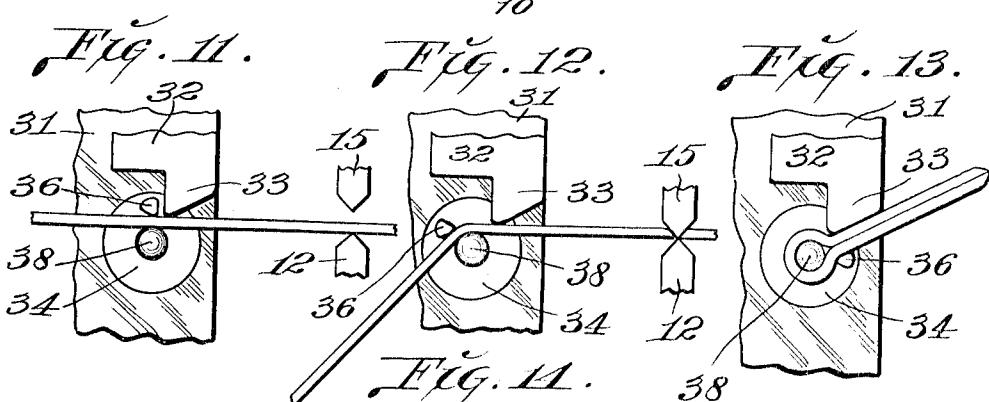
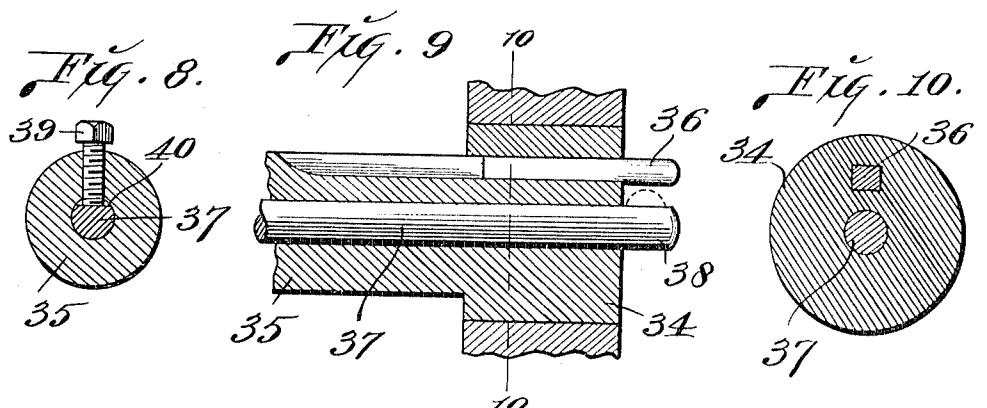
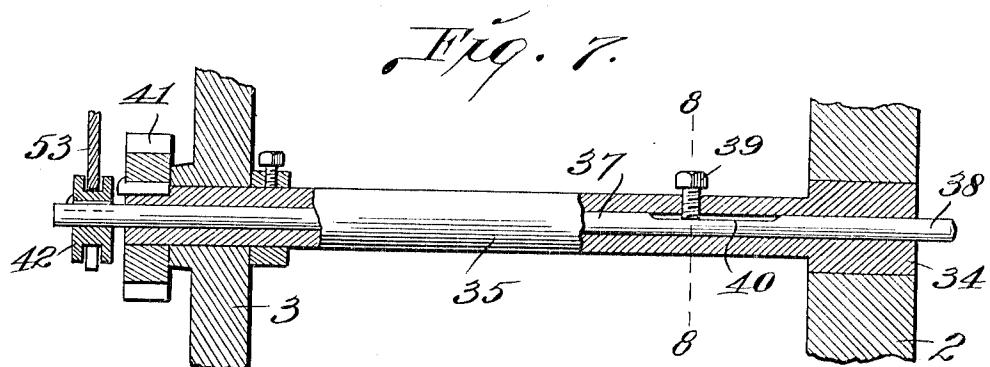
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3 SHEETS-SHEET 3.



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Fig. 14.

UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING SPLIT PINS.

1,119,211.

Specification of Letters Patent.

Patented Dec. 1, 1914.

Application filed June 15, 1912. Serial No. 703,832.

To all whom it may concern:

Be it known that I, IRA J. YOUNG, a citizen of the United States, residing in St. Louis, State of Missouri, have invented certain new and useful Improvements in Machines for Forming Split Pins, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

10 My invention relates particularly to a machine designed for making split pins or cotter pins, the principal objects of my invention being to provide a simple, inexpensive machine that can be operated with comparatively little power and which will very rapidly perform in succession the operations necessary to form split pins from wire that is fed into the machine and cut into sections of proper length.

20 In the manufacture of split pins or cotter pins it is essential that said pins be formed with an eye at the center and with a pair of parallel legs that are perfectly straight and lie immediately against one another in order that the pins may be readily introduced into the pin holes or openings and to this end I have designed a machine wherein parts of the forming means move simultaneously with the length of wire of 25 which the pin is formed, thereby avoiding the tendency of the wire to creep while the eye is being formed and the legs are bent together.

30 A further object of my invention is to combine in a single machine, wire feeding means, wire severing means, and forming means, all of which parts operate in proper time relation with each other, said parts being all operated from a single main driving 35 shaft.

To the above purposes my invention consists in certain novel features of construction and arrangement of parts hereinafter more fully set forth, pointed out in the 40 claims and illustrated in the accompanying drawings in which—

Figure 1 is a front elevation of my improved machine. Fig. 2 is an elevation of the rear side of the machine. Fig. 3 is a 45 vertical section taken on the line 3—3 of Fig. 1. Fig. 4 is a detail section taken on the line 4—4 of Fig. 1. Fig. 5 is a vertical section taken on the line 5—5 of Fig. 2. Fig. 6 is a detail section taken on the line 55 6—6 of Fig. 1. Fig. 7 is a detail section

showing a tubular shaft in which the center pin spindle of the forming mechanism is located. Fig. 8 is an enlarged cross-section taken on the line 8—8 of Fig. 7. Fig. 9 is an enlarged detail section of the forward 60 end of the tubular shaft and the center pin of the forming mechanism. Fig. 10 is a detail section taken on the line 10—10 of Fig. 9. Figs. 11, 12, 13 and 14 are elevational views of the forming mechanism and 65 showing the various stages of formation of the split pins.

In the construction of the machine as shown, 1 designates a base plate and extending upwardly therefrom is a pair of 70 plates 2 and 3. Journaled for rotation in suitable bearings in the upper portions of these plates is a transversely disposed shaft 4 carrying a wheel 5 that performs the function of a fly-wheel as well as a belt wheel. 75 Arranged on the front side of the plate 2 below the shaft 4 is a plate 5 and passing there through and through slots 6 in the plate 2 are bolts 7, thereby providing means whereby said plate can be adjusted horizontally. Fixed to and projecting outwardly from the lower portion of the plate 5 is a bracket 8, and positioned thereon is a vertically adjustable plate 9 over which the wire passes as the same is fed to the severing 80 means. Arranged on the plate 5 immediately above this plate 9 is a spring held pawl 10, the point of which is adapted to engage the wire as it passes over said plate 9 thereby preventing reverse movement of 85 said wire. Fixed on the plate 5 in front of the bracket 8 is a block 11 carrying a fixed cutting member 12, the upper end of which is of inverted V shape. Arranged to reciprocate vertically between guides 13 on 90 the upper portion of the plate 5 and immediately over the block 11 is a block 14 carrying on its lower end a cutting member 15, the lower end of which is V shaped in order to coöperate with the upper end of 95 the cutting member 12. Projecting outwardly from the block 14 is a trunnion 16 upon which is journaled the lower end of an adjustable pitman 17 and the upper end of this pitman is provided with a strap 18 that passes around an eccentric 19, carried by the forward portion of the shaft 4.

100 Located on the front side of the plate 2 to the right hand of the plate 5 is a pair of brackets 20 carrying a pair of horizontally 105

disposed rods 21. Arranged to slide upon these rods is a block 22 provided on its lower end with a horizontally disposed plate 23, over which the wire passes as it is fed to the severing means. Mounted on the block 22 is a spring held pawl 24, the point of which engages with the wire to feed the same into the machine. Journaled upon a pin 25^a projecting outwardly from the upper portion 10 of the plate 2 is a swinging arm 25, the lower end of which is slotted to receive a pin 26 that is seated in the block 22. Fixed on the forward end of the shaft 4 is a crank arm 27, and adjustably carried thereby is a wrist 15 pin 28 upon which is journaled one end of a lever 29, the opposite end of which is pivotally connected to the lower portion of the arm 25. As the crank arm 27 revolves with the shaft 4, the arm 25 is oscillated thereby 20 moving the block 22 lengthwise upon the rods 21 and the point of the pawl 24 engages the wire and feeds the same toward the severing mechanism. During the reverse movement of the block 22, the point 25 of the pawl 24 rides over the wire which is held against reverse movement by the pawl 10. Located on the front side of the plate 2 and at the right hand end of the machine is a series of rollers 30 arranged in pairs 30 and which serve as means for straightening the wire fed into the machine. Fixed on the plate 2 immediately to the left hand side of the block 5 is a block 31 and arranged on the upper portion thereof is a vertically adjustable block 32 provided with a depending lug 33, the underside of which is inclined or beveled. Journaled in a suitable opening formed in the block 31, immediately below the block 32, is a head 34 and formed integral therewith is a tubular shaft 35, the opposite end of which is journaled in the plate 3. Seated in this head 34 and projecting forwardly therefrom is a pin 36 which is adapted to engage the wire and 40 bend the same around a center pin herein-after described. Arranged to slide lengthwise through the tubular shaft 35 is a spindle 37, the forward end 38 of which normally projects forwardly from the head 34 and this projecting forward end forms the center pin around which the central portion of the wire is bent to form the eye of the split pin. Passing through the tubular shaft 35 is a set screw 39 that engages on a 50 flat portion 40 of the spindle 37 thereby causing said spindle to rotate with the tubular shaft 35, but permitting said spindle to move longitudinally relative to said tubular shaft. Fixed on the rear end of the tubular shaft 35 is a pinion 41, and fixed on the rear end of the spindle 37 is a grooved collar 42. Meshing with the pinion 41 is a gear wheel 43 that is mounted for rotation on a stud 44 projecting from the plate 3. 55 Fixed on the rear end of the shaft 4 outside

the plate 3 is an eccentric 45, and bearing against the edge thereof is the upper portion of an arm 46 that is pivotally connected at its lower end to the plate 3, and pivotally connected to this arm 46 and to the gear 70 wheel 43 is a rod 47 provided with a turn buckle 48. One end of a retractile coil spring 49 is attached to the face of the gear wheel 43 and its opposite end is attached to the arm 46. Fulcrumed on a bracket 50 75 projecting inwardly from the plate 3 is a vertically disposed lever 51, the upper end of which bears against the face of a cam 54 that is fixed on the main driving shaft 4. The lower end of this lever 51 is bifurcated 80 and engages the inner end of a rod 52 that is arranged to slide through a bearing in the plate 3 and the outer end of this rod is provided with a depending arm 53, the lower end of which is bifurcated and engages the 85 grooved collar 42.

The operation of my improved machine is as follows: The wire from which the split pins are formed is fed into the machine between the pairs of straightening rollers 30 90 and passes from thence over the plate 23 where it is engaged by the point of the pawl 24. As the block 22 and plate 23 are moved toward the left, the proper length of wire is fed forwardly over the plate 29. The adjustable wrist pin 28 that connects the arm 29 and the crank 27 provides means whereby the length of movement of the block 22 carrying the feeding means can be accurately regulated. The wire is thus intermittently fed across the top of the plate 8 between the cutting members 12 and 15 and the free end of said wire extends between the center pin 38 and the forming pin 36, as shown in Fig. 11. Immediately after the 100 feeding in movement of the length of wire, the eccentric 19 that is carried by the main driving shaft 4 moves the strap 18 and rod 17 downward, thereby moving the block 14 downward and as a result the pointed lower 110 end of the cutting member 15 is moved downward against the pointed upper end of the fixed cutting member 12, thereby severing a length of wire. During this severing movement and before said wire is completely 115 severed, rotary motion is imparted to the tubular shaft 35 by the engagement of the gear wheel 43 with the pinion 41 and as a result the forming pin 36 is carried around so as to engage the wire that is immediately 120 above the center pin 38, and the portion of the length of wire to the left of the center pin is bent downward into approximately the position seen in Fig. 12 at the instant the cutting means have completely severed 125 the wire. The gear wheel 43 is partially rotated by the action of the eccentric 45, the high portion of which engages the upper portion of the arm 46 and moves the same outwardly into the position seen in Fig. 2. 130

During the rotary motion of the tubular shaft 35, the spindle 37 carrying the center pin 38 rotates with said tubular shaft owing to the engagement of said spindle by the set 5 screw 39, and thus the center pin 38 and forming pin 36 move simultaneously during the formation of the eye at the center of the length of wire and such movement avoids all tendency of the wire to creep, 10 and for this reason the legs of the pin are formed equal in length. The forming pin 38 passes around until it occupies a position immediately beneath the forming lug 33 and the final movement of said forming pin 15 presses the legs of the pin directly against the inclined underside of the rigid forming lug 33, thereby causing said legs to lie parallel with each other and bear directly against one another, which is a particularly 20 desirable result in the formation of split pins. At this point in the operation the upper portion of the arm 46 rides onto the lower portion of the eccentric 45 and the retractile coil spring 29, which was heretofore 25 expanded, now acts to bring about a reverse rotary movement of the gear wheel 43, thereby reversely rotating the pinion 41 and as a result the tubular shaft 35 and spindle 37 are likewise reversely rotated. When these 30 parts have been partially rotated in reverse direction and brought to approximately the position seen in Fig. 14, the upper end of the lever 51 rides onto the high portion of the cam face of the disk 54, thereby swinging 35 said lever on its fulcrum. This movement imparts sliding movement to the rod 52 and the arm 53 carried by said rod engaging the grooved collar 42 moves the spindle lengthwise through the tubular shaft 35, 40 thereby withdrawing the center pin 38 from the eye in the center of the split pin and the latter is free to discharge into a suitable receptacle.

By my improved construction the completed pin is formed by a single arcuate movement of the forming pin 36, and the forming of the eye in the center of the length of wire is accomplished without extraneous means for holding the wire. The 45 end of the legs of the pin immediately adjacent to the eye bears directly against the fixed forming lug 33 while the forming pin 36 engages the central portion of the length 50 of wire and bends the same around the center pin. The head 34 carrying the forming pin 36 is partially rotated during the formation of the eye at the center of the pin, and prior to the completion of the partial 55 rotary movement of the parts 36 and 38, the length of wire is cut between the members 12 and 15. Immediately thereafter, the center pin 38 is withdrawn thereby releasing the completed pin and permitting the same 60 to discharge from the forming means. The forming pin 36 in operation engages the

wire and bends the same around the center pin and at the end of the arcuate movement of said forming pin, the legs of the split pin are forced into contact with each other. At this point the forming pin exerts pressure 70 upon the fixed forming lug 33 through the sides or legs of the split pin, and such pressure forms the reverse bends between the legs of the pin and the eye. Thus it is absolutely necessary that the length of wire 75 which forms the split pin be cut from the main body of the wire before the forming pin exerts pressure upon the fixed forming member through the parts or legs of the wire forming the neck immediately adjacent to the eye. In this manner a split pin 80 is formed which has legs of equal length which fit snugly against one another, and said legs being united at one end by a substantially round eye. This form of split pin 85 is especially desirable for use in various mechanical constructions, for the reason that the parallel close fitting legs can be easily inserted in an aperture of proper size. The fixed lug 33 is an essential part 90 of the forming mechanism, for the reason that it supports the length of wire while same is being formed into the split pin, and the inclined or beveled face of said fixed forming lug opposes the pressure of the 95 forming pin 36 when the legs of the split pin are forced into contact with each other. While the forming pin is exerting pressure upon one of the legs of the split pin, the face of the lug 33 is bearing against the opposite leg at the point where the same unites with the eye of the split pin, thus forming the neck portions or reverse bends between the eye and legs.

One of the principal features of my invention is the mounting of the spindle 37 within the hollow shaft 35 so that when said hollow shaft is positively rotated, first in one direction and then in a reverse direction by the engagement of the gear wheel 105 43 with the pinion 41, it necessarily follows that the spindle and center pin will likewise be positively rotated in both directions synchronously with the hollow shaft, and at the proper time the lever 51 is actuated to 110 move the spindle and center pin lengthwise with respect to the hollow shaft and the parts carried thereby.

The various parts of my improved machine are of such relative sizes and are so 115 timed in operation as to completely form one of the split pins with each complete revolution of the shaft 4, that is, the proper length of wire is fed forward by the block 22 and pawl 24, the cutting mechanism is 120 actuated and the forming means is actuated to form a complete split pin from the severed length of wire and the split pin is released during one complete revolution of 125 the shaft.

The various parts of the machine are arranged and connected so as to operate in proper sequence with great rapidity and thus a large number of split pins can be turned out within a comparatively short space of time, thereby materially reducing the cost of producing split pins for the market.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved machine can be made and substituted for those herein shown and described without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim:

1. In a machine of the class described, the combination with wire-feeding means, a portion of which is adjustable for regulating the length of wire fed by said means, of wire-severing means which is adjustable so as to vary the position of the point where the wire is severed, and rotary forming means adapted to engage the severed portion of the wire and form the same into a split pin, a portion of which forming means is movable to release the split pin when the same is completely formed.
2. In a machine of the class described, the combination with a main driving shaft, of adjustable wire-feeding means, adjustable wire-severing means, rotary forming means adapted to engage the severed section of wire and form the same into a split pin having a centrally located eye and a pair of straight legs of equal length, a portion of which forming means is movable to release the split pin when the same is completely formed, and connections between the main driving shaft, feeding means, severing

means and forming means whereby the latter are actuated in proper sequence to produce the completed split pin.

3. In a machine for forming split pins, each having a centrally arranged eye and a pair of straight legs of equal length, the combination with a split pin forming means comprising a head having a projection, a center pin normally projecting beyond the face of the head and connected therewith so as to rotate in both directions with said head, means for rotating the head, means for withdrawing the center pin, wire-feeding means, wire-severing means, and means whereby the forming mechanism, the wire feeding means and the cutting mechanism are operated in proper time relation and at regular intervals relative to each other.

4. In a machine of the class described, a split pin forming mechanism comprising a rotatably mounted center pin, a movable member for bending the wire around said center pin to form the eye of said pin, which center pin and member are connected so as to rotate positively with each other and a fixed forming member arranged in opposition to the movable member against which the legs of the pin are engaged, means for withdrawing the center pin from the eye of the split pin after the same is formed, and means for imparting partial rotary movement to the center pin and movable member first in one direction and then in the opposite direction.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 8th day of June, 1912.

IRA J. YOUNG.

Witnesses:

RUTH HENRY,
C. K. HALEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."