No. 713,940. Patented Nov. 18, 1902.

J. BARRON.

WIRE SPLICING MACHINE.

(Application filed Aug. 19, 1902.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

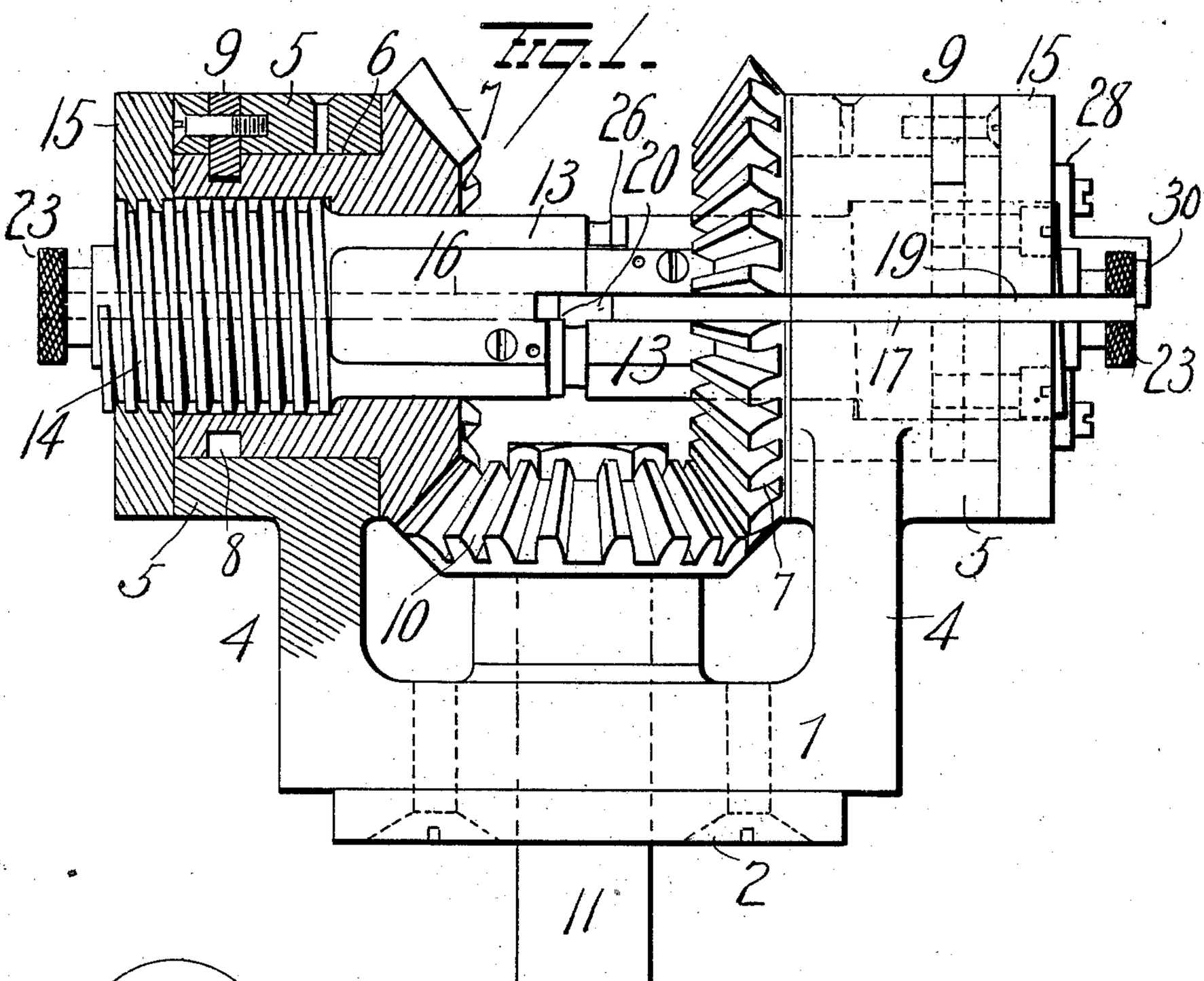

FIG. 2.

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FIG. 3.

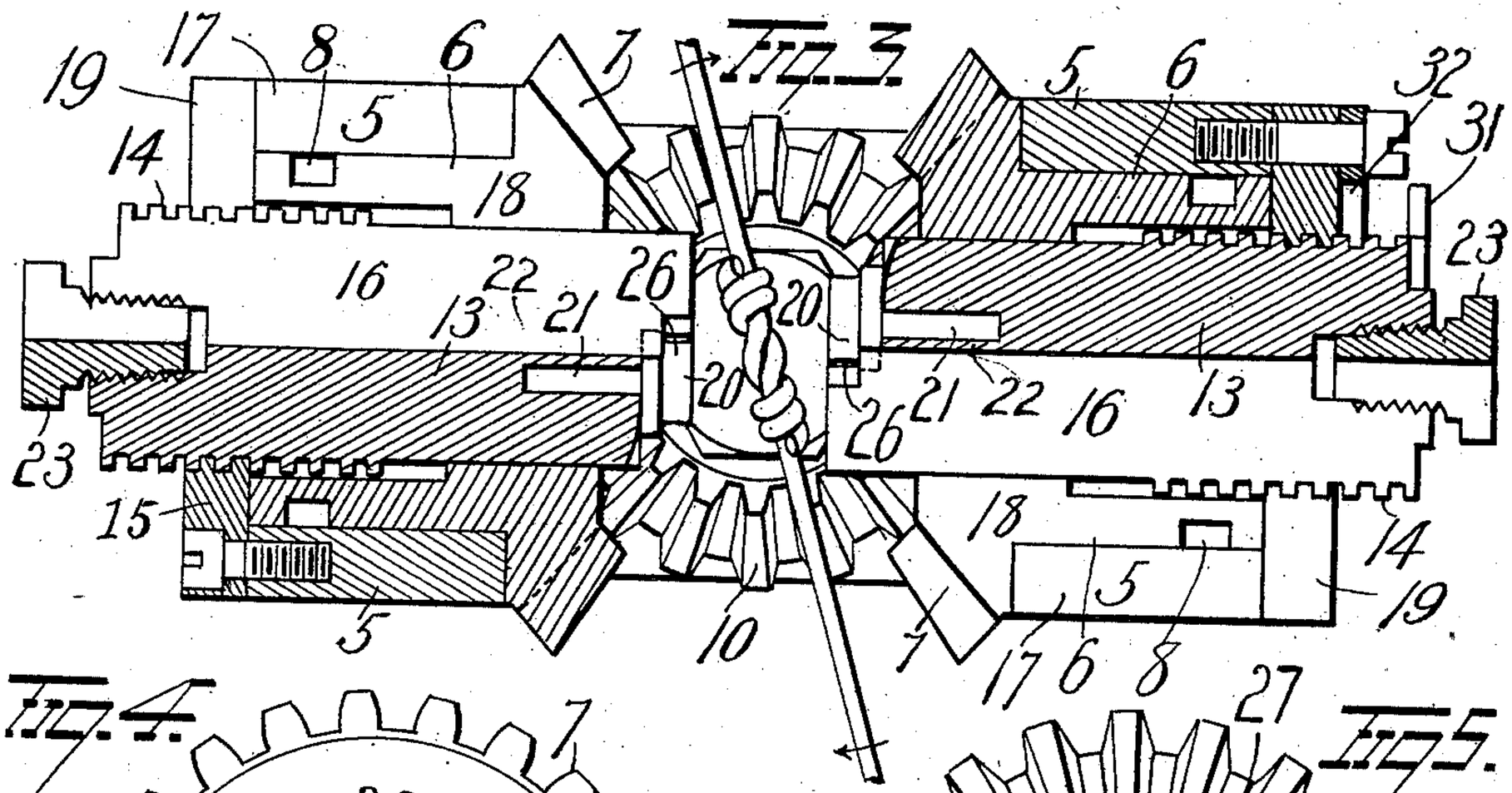


FIG. 4.

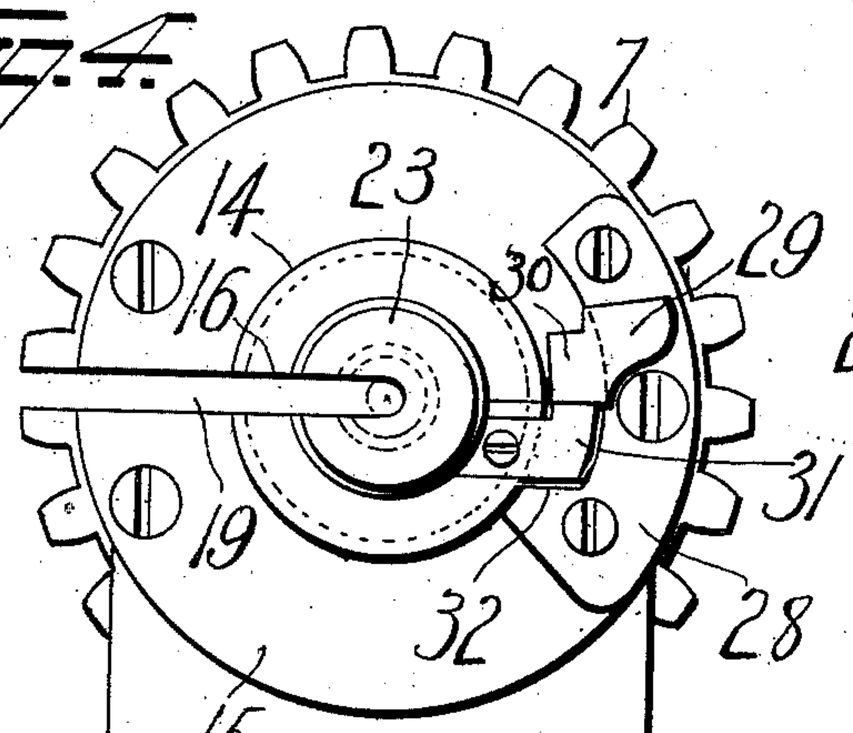


FIG. 5.

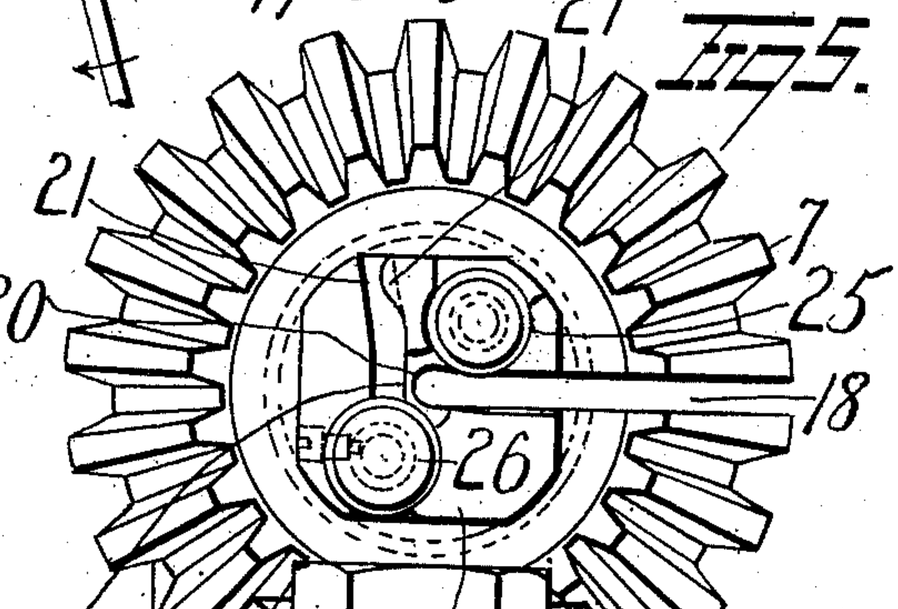
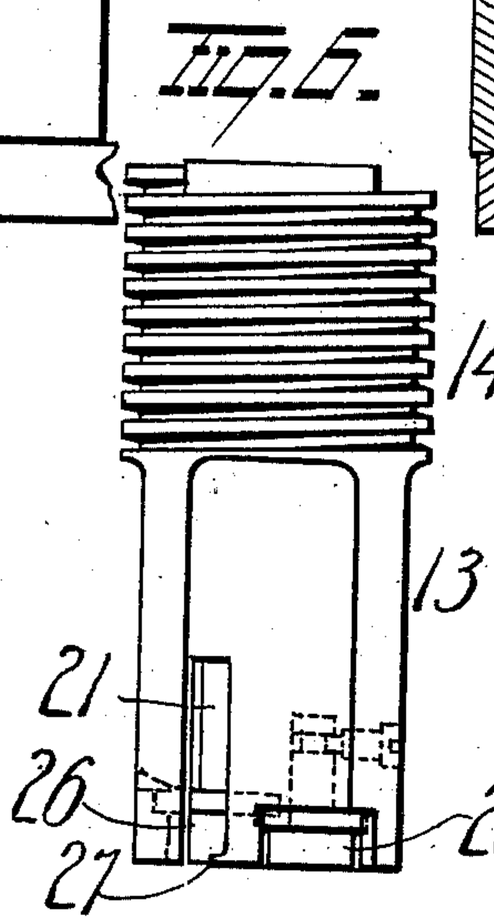


FIG. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES BARRON, OF SAN FRANCISCO, CALIFORNIA.

WIRE-SPLICING MACHINE.

SPECIFICATION forming part of Letters Patent No. 713,940, dated November 18, 1902.

Application filed August 19, 1902. Serial No. 120,232. (No model.)

To all whom it may concern:

Be it known that I, JAMES BARRON, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Wire-Splicing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in wire-splicing machines, the object of the invention being to provide a simple and efficient machine for joining the ends of a wire in a strong and permanent splice in the manufacture of single-strand hoops for barrels, &c.

A further object is to construct the machine in such manner that the ends of the wire forming the splice shall be closely coiled and so that the coils at respective sides of the crossing-point of the wires shall be close together, whereby the ends of the wire will be made to cross each other as near as possible to a right angle to insure the rigidity of the splice.

A further object is to so construct the twisting-heads that friction will be reduced to a minimum during the operation of making a splice.

A further object is to construct the machine in such manner that the convolutions of the coils of the splice shall be made to lie close to each other and at practically right angles to the axis of the body of the wire forming the hoop.

A further object is to provide simple and efficient means for retaining the wire properly in place in the machine during the twisting operation and to permit the ready removal of the hoop when the splice shall have been completed.

A further object is to provide means for automatically stopping the twisting-heads at both ends of their longitudinal movement.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a machine embodying my improvements. Fig. 2 is a horizontal sectional view showing the wire in place and the twisting-heads in contact with each other ready to begin the operation of twisting the wires and splicing them. Fig. 3 is a sectional view similar to that shown in Fig. 2, but showing the positions of the parts after a splice has been completed and also showing the splice and the manner of removing the spliced wires from the machine. Fig. 4 is a view of one end of the machine. Fig. 5 is an end view of one of the twisting-heads, and Fig. 6 is a detailed view of the twister.

1 represents a base or frame supporting the various parts of the machine, and said base or frame may be mounted upon an arm 2, adapted to be secured to any suitable support. Standards 4 project upwardly from the respective ends of the base 1 and terminate at their upper ends in horizontally-disposed barrels 5, in which the tubular hubs 6 of bevel-gears 7 are mounted to revolve, said gears being disposed vertically at the inner ends of the respective barrels, so as to face each other, and having bearings against the inner ends of said barrels. The tubular hubs are provided with peripheral grooves 8 for the reception of splines 9 in the barrels 5 to prevent longitudinal movement of the bevel-gears and their hubs, but permit the free rotation of the same. Motion is transmitted in reverse directions to the respective bevel-gears 7 by means of an intermediate bevel-gear 10, secured at the upper end of a vertical shaft 11, mounted in the base 1, and the lower end of this shaft is provided with means for turning it, which, as shown in the drawings, may be a crank 12. A portion of the bore of each tubular hub 6 is made angular in cross-section for the accommodation of a similarly-shaped portion of a twisting-head 13 for the purpose of permitting the latter to have a free longitudinal movement through the hub and prevent it from rotating independently thereof. Each twister-head is also provided with an externally-threaded portion 14, adapted to move freely through the hub 6, in which it is mounted, but to mesh with screw-threads in a ring or collar 15, permanently secured to the outer end of the adjacent barrel 5.

From the construction and arrangement of parts thus far described it will be seen that

when the shaft 11 is rotated motion will be transmitted by the gear 10 to the gears 7 7, driving the latter in reverse directions and correspondingly rotating the twisting-heads 13. At the same time the rotation of the threaded portions of the twisting-heads in the threaded rings or collars 15 will cause said twisting-heads to move longitudinally in reverse directions either toward or away from each other, according to the direction in which the vertical shaft 11 is rotated. These movements of the twisting-heads are intended to effect the twisting of the ends of wires inserted therein to splice them and gradually separate said heads during the formation of the splice and afterward bring the twisting-heads together (when the spliced hoop shall have been removed) ready to repeat the operation on another hoop. Each twisting-head is made with a slot 16 extending from end to end thereof and having a depth slightly greater than the radius of said head, so that a wire can pass centrally through the latter. The barrels are also provided with elongated slots 17, which aline with slots 18 and 19 in the bevel-gears 7 and rings or collars 15, the slots 17 18 19 in one barrel and coöperating parts being at one side of the machine and the corresponding slots in the other barrel and coöperating parts being at the diametrically opposite side of the machine, so that after a splice has been completed and the heads separated, as shown in Fig. 3, the hoop can be removed through the alined slots, as also shown in Fig. 3. The alining of the said slots when the twisting-heads are brought together, as shown in Fig. 2, serve to permit the ready introduction into the machine of the ends of the wire to be joined. Each twisting-head is provided centrally in its inner end with a recess 20, which when the two twisting-heads are brought together, as shown in Fig. 2, form a cavity in which the ends of the wire are crossed in beginning the splice. Each twisting-head is also made with a socket 21, communicating with the recess 20, and this socket is preferably made elongated radially, so as to extend to the outer wall of the twisting-head. The socket 21 is thus made to extend from the outer face of the twisting-head to a point approximately in line with the longitudinal axis of the twisting-head, disposed approximately at right angles to the elongated slot 16 in said head and separated from the latter by a thin partition 22, so that when the end of the wire is introduced through the alining slots 16 17 18 19 of one set of devices it can be made to enter the socket 21 in the twisting-head of the other set. The depth of this socket will determine the size of the splice or the number of convolutions of the coils forming the splice, as those portions of the wire projecting into the sockets 21 in the twisting-heads will be fully utilized in making said coils. In any case the sockets in the two heads will be the same in depth, and the depth will be such that when the splice shall have been completed the extremities of the wire will terminate on the outside of the hoop, so that they will not interfere with the coopering of the barrel. In order to form a perfect splice, it is important that the portions of the hoop which extend into the machine shall be prevented from lateral displacement in the slots through which the wire is introduced, especially the elongated slots in the twisting-heads. For the purpose of holding the wire properly in position and preventing the displacement above alluded to I provide each twisting-head with a slotted plug 23. The plugs 23 are threaded to screw into the outer end of the respective twisting-heads and provided with elongated slots to aline with the elongated slots 17 18 19 to facilitate the introduction and removal of the wire, and each plug is provided at its free end with a serrated head to permit it to be readily manipulated by the operator. When the ends of the hoop shall have been introduced into the machine, the operator will turn the plugs 23 to move the slots therein out of line with the slots in the twisting-heads, when the wire will be held properly in place, and when the splice shall have been completed and the parts moved to cause the slots 17 18 19 to aline for the removal of the hoop the operator will turn the plugs 23 to cause the slots therein to aline with the slots 17 18 19, and thus release the hoop.

As before stated, the ends of the wire are inserted into the sockets 21 in the twisting-heads, and in order that the coils forming the splice shall be close together and the portions of the wire between said coils made to cross each other as near as possible to a right angle the twisting-heads are brought together, as shown in Fig. 1, before the twisting operation is commenced, the portions of the wire which cross each other between the coils being located in the cavity formed by the centrally-located recess in the inner ends of the twisting-heads. Each twisting-head is made with a notch 24 to guide the end of the wire to the socket 21 when the wire is being introduced into the machine. A grooved roller 25 is mounted in a recess in the end of each twisting-head in close proximity to the socket 21, and this roller forms a portion of the wall of the central recess 20, hereinbefore referred to. Another roller 26 is mounted in a recess in the end of each twisting-head at a point diagonally opposite the roller 25 and also forms a part of the said central recess therein, so that when the twisting-heads are rotated in reverse directions in starting the twisting operation the wires will be engaged by the rollers of the respective heads and bent one across the other. The continuance of rotation of the twisting-heads and their gradual longitudinal movement away from each other will cause the wires after having been crossed to be coiled around the body of the wire, close to the crossed portion thereof,

and as these coils are being formed the extremities of the wire in the sockets 21 will gradually move laterally in said sockets and the convolutions of the coils will be made to lie close together. In order to prevent the escape of the extremities of the wire from the sockets 21 and the consequent lapping of said extremities over the coils as the latter are being formed, I provide each twisting-head with a lip 27, which overhangs the end of the socket 21.

In order that the twisting-heads shall be properly set relatively to each other to receive the ends of the hoop and to limit the outward movement of said heads to insure the alinement of the various slots to facilitate the removal of the hoop after the splice shall have been completed, I provide an automatic stop device. In constructing this device a plate 28, provided with an enlargement 29, is secured to one of the fixed rings 15. A lug 30 projects inwardly from the outer end of the enlargement 29 and is adapted to be engaged by a stop-arm 31, projecting laterally from one of the twisting-heads, and stop said heads when they reach the outer end of their movements with the slots in alinement for the removal of the spliced hoop. In manipulating the machine to bring the heads together to position them for starting the splicing operation the simultaneous rotary and longitudinal movement of the twisting-head carrying the stop-arm 31 will cause the latter to pass the lug 30 during the second revolution of the head, and when the heads shall have been fed toward each other until they approximately engage each other they will be stopped with the various slots in proper position to receive the ends of the wire hoop by the engagement of the stop-arm 31 with a lug 32 at the lower end of the plate 28.

Various slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, and hence I do not wish to limit myself to the precise details herein set forth.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wire-splicing machine, the combination of twisting-heads, means for rotating said heads and simultaneously moving them longitudinally, each twisting-head having a slot for the passage of the wire to be spliced, and each twisting-head also having a socket separated from said slot for the reception of an end of the wire.

2. In a wire-splicing machine, the combination with two twisting-heads, each having a longitudinal slot for the introduction and removal of the wire, and said heads having sockets independent of and separated from the longitudinal slots for the reception of the ends of the wire to be spliced, said slots being closed at one end to limit the introduction of the wire ends, of means for moving said twisting-heads longitudinally in opposite directions and simultaneously rotating them in opposite directions.

3. In a wire-splicing machine, the combination of twisting-heads, means for moving them longitudinally in opposite directions and for simultaneously rotating them in reverse directions, said heads having sockets closed at one end for the reception of the ends of the wire to be spliced, and lips overhanging the open ends of said sockets.

4. In a wire-splicing machine, the combination of two twisting-heads and means for moving them longitudinally in opposite directions and simultaneously rotating them in reverse directions, each head having a central recess in one end, and said heads having sockets for the reception of the ends of the wire, said sockets closed at one end and communicating at their other ends with said central recesses.

5. In a wire-splicing machine, the combination of two twisting-heads and means for moving them longitudinally in opposite directions and simultaneously rotating them in reverse directions, each twisting-head having a central recess in one end, rollers mounted in said heads and forming portions of the walls of said central recesses, said heads also having sockets for the ends of the wire communicating with said central recesses.

6. In a wire-splicing machine, the combination of two twisting-heads, means for moving the said heads longitudinally in opposite directions and simultaneously rotating them in reverse directions, said heads having sockets for the reception of the ends of the wire and two rollers mounted at diagonally opposite points in the end of each head, one of said rollers in each head being located adjacent to the socket therein.

7. In a wire-splicing machine, the combination with two barrels arranged in line with each other, gears having tubular hubs mounted to rotate in said barrels and means for preventing longitudinal movement of said gears and hubs, of twisting-heads mounted to move longitudinally through said hubs and to rotate therewith, each twisting-head having a recess in one end and a socket for the end of the wire, communicating with said recess, and a portion of each head having external screw-threads, internally-threaded rings secured to said barrels and meshing with the screw-threads in the twisting-heads and means for rotating said gears and their hubs simultaneously in reverse directions.

8. In a wire-splicing machine, the combination with two barrels, each having an elongated slot in one side, of gears, hubs projecting from said gears and mounted to rotate in said barrels, said gears and hubs having slots to aline with the slots in the barrels, twisting-heads mounted to move longitudinally through said hubs and to rotate therewith, said twisting-heads having slots to aline with the slots in the hubs, gears and barrels and each twisting-head having a socket for the

end of a wire, said socket adjacent to and separated from the slot in said twisting-head, means for rotating said gears in opposite directions, and means for causing the twisting-heads to move longitudinally in reverse directions when the gears are rotated.

9. In a wire-splicing machine, the combination with twisting-heads, each having an elongated slot from end to end, and means for rotating said heads and simultaneously moving them longitudinally in reverse directions, of a revoluble slotted plug mounted in one end of each twisting-head, substantially as and for the purpose set forth.

10. In a wire-splicing machine, the combination with two barrels, hubs mounted to rotate therein, gears on said hubs and means for transmitting motion to said gears, of twisting-heads mounted to move in said hubs, each head having a threaded portion, threaded rings secured to the barrels to mesh with the threads on the head, a stop-arm on one of said heads, and two fixed stop-lugs to be engaged by the stop-arm at respective ends of the movements of said twisting-heads.

11. In a wire-splicing machine, the combination with framework, two twisting-heads, and means for moving said twisting-heads longitudinally in reverse directions and for simultaneously rotating said heads in reverse directions, of two stop-lugs fixed to the framework, and a stop-arm secured to one of the revoluble longitudinally-movable twisting-heads and adapted to engage the respective stop-lugs at respective ends of the longitudinal movements of said twisting-heads.

12. In a wire-splicing machine, revoluble heads mounted for motion in line with each other about a common axis, each having a long slot in the side extending from end to end for introducing and withdrawing the wire laterally, of the head and a cavity in the end for receiving and confining the end portions of the wire in position to overlap the portion lying in the long slot, means for simultaneously revolving the heads at uniform speed in opposite directions about a common axis, and means operated from the revolving motion to feed back the twisting-heads with a rectilinear motion in contrary directions simultaneously with their revolutions.

13. In a machine for twisting wires to form a splice, the combination of twisting-heads revoluble in line with each other and in contrary directions, each head having a slot extending longitudinally of the axis of rotation and open from end to end of the head and a cavity in the end adjacent to the opposite head and approximately parallel with the axis of rotation and means on the opposite end of the head for temporarily confining the wire within the slot during the revolutions of the head.

14. In a machine for twisting wires to form a splice, the combination of twisting-heads revoluble in line with each other and in contrary directions about a common axis, each head having a slot longitudinally of the axis of rotation and open from end to end thereof, a recess in the end adjacent to the other head, and a cavity extending from the bottom of the recess approximately parallel with the slot, a rotary plug in the opposite end of the head having a slot adapted to be set in or out of alinement with the slot in the head by turning the plug, and means for revolving and feeding back the heads.

15. In a machine for twisting wires to form a splice, twisting-heads revoluble in line with each other in contrary directions, each head having a slot extending longitudinally of the axis of rotation and open from end to end, a recess in the end of the head and a cavity leading therefrom into the head approximately parallel with the slot, and means for feeding back the twisting-heads in opposite directions simultaneously with their revolving motion.

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

JAMES BARRON.

Witnesses:
MILTON J. GREEN,
JOSEPH E. BIEN.