To all whom it may concern:

Be it known that we, CHARLES M. LAMB, residing at Monessen, in the county of Westmoreland, State of Pennsylvania, and JAMES W. SNEDEKER, residing at Adrian, in the county of Lenawee, State of Michigan, citizens of the United States, have jointly invented certain new and useful Improvements in Eye-Forming Machines; and we do 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, reference being had to the accompanying drawings, and to the figures marked thereon, which form a part of this specification.

This invention relates to an eye-forming machine more especially adapted for turning an eye in the end of the horizontal wires of a wire fence or of a single wire strand for the purpose of enabling said wires to be attached to a terminal support or to be joined together end to end when additional length is desired. The object of the invention is to provide simple and efficient means for forming an eye upon the ends of the horizontal wires in fences and other structures or of single wire strands to be used for any purpose whatsoever by so twisting the crossed strands upon and about each other as to prevent the twisted union or connection so formed from untwisting when the eye is subjected to great strains, such as results from stretching a section of fence or a single wire at high tension between fixed points.

The above object is attained by the mechanism illustrated in the accompanying drawings, in which Figure 1 is a plan view of our improved machine. Fig. 2 is a plan view of the machine, showing the position of the traveling head at the end of the twist and illustrating one of the twisted strands wrapped around the other strand, which is straight at that point. Fig. 4 is a perspective view showing the machine as at work upon the horizontal wires of a bundle of wire fencing. Fig. 5 is an enlarged vertical section through the upper end of the standard, showing the gear-wheels mounted thereon, the crank for operating said gear-wheels, and the rotary bracket which supports the sideway upon which the head is adapted to slide, parts being broken away. Fig. 6 is an inverted view of the movable carrier in which said head is pivoted and the arm which shifts said head and is mounted upon the pivot-pin thereof. Fig. 7 is a transverse section through said head and carrier, the arm, and the sideway in which the carrier is adapted to travel.

Referring to the characters of reference, 1 designates a vertical standard having journaled in the upper end thereof a shaft 2, carrying at one end a crank 3 and at the other end, which projects through said standard, a pinion 4. Said pinion meshes with a gear-wheel 5, journaled upon a shaft 6, that extends into the standard 1 and is secured therein against rotation by set-screw 7, that firmly locks said shaft in place. Also journaled upon shaft 6 is a block 8, which is firmly attached to the gear-wheel 5 and rotates therewith. Secured to the block 8 by the bolt 9 is a bracket 10, carrying at its outer end the horizontal sideway 11, having raised sides provided with under-cut edges 12, (see Fig. 7,) which receive the projecting beveled margins 13 of the sideway 14, which is adapted to reciprocate on said sideway. Mounted upon the carrier is a triangular head 16, in which is fixed a pin 18, that is journaled in said carrier and passes therethrough, its lower end having fixed thereon a reciprocatory arm 17, 85 In the projection end of said arm is a pin 19, on which is journaled an antifriction-roller 19, adapted to travel in a channel 20, extending longitudinally of the bed-plate 21 of said sideway. The outer end of said channel is 90 deflected sharply to one side, as shown at 22, for purposes hereinafter stated.

The shaft 6, which projects through the block 8 and upon which said block and the gear-wheel 5 are journaled, is provided at its 95 outer end with a hook 23. The ends of the
lateral wires 24, which project from the bundle of wire fencing 25, (illustrated in Fig. 4,) are formed in a loop 26, the free end 27 of the loop portion lying across the strand that leads to the bundle. In forming the eye the loop is placed upon the base 28 of the shaft 6, with the strand 24 lying in the channel 29, formed in the upper face of the triangular head 15, along one margin thereof, and the crossed end 27 lying in the undercut channel 29, formed in the opposite edge of said triangular head, which position of parts is illustrated in Fig. 1. By means of the crank 3 the slideway 11 is then rotated about a center of which the shaft 6 is the axis. The head 15 being in horizontal alignment with the axis of rotation causes the strands of wire which are held in the channels therein to twist together, as shown in Fig. 3. As said strands are twisted together said head is gradually forced rearwardly on the slideway 11, the carrier 14, upon which said head is pivoted, traveling straight along said slideway, with the antifriction-roller 19 of said arm 17 traveling in the channel 20 in the bed of said slideway. During the initial twisting of said strands the head 15 is revolved with its geometric center in line with the axis of rotation, so that the twisting of said strands are equal, as shown at 30. As the carrier slides rearwardly in the operation of twisting the strands the antifriction-roller 19 upon the rearwardly-projecting arm 17 encounters the deflected portion 22 of the channel of the slideway and swings said arm to one side, thereby turning the head 15, so as to bring the channel 28 in line with the shaft 6 and cause the channel 29 to stand at a tangent thereto, whereby the strand 24 is left straight, as at 31, and the strand 27 is wrapped one or more times around the strand 24, as shown at 32, until the end thereof slips from the overhanging channel 29 in the rotary head, whereby the strand 27 becomes firmly wrapped around the strand 24 in the manner to prevent a possible unwinding thereof by any strain that may be placed upon the eye formed of the loop 26 through the twisting of said strands.

After the formation of the eye above described the head 15 is moved forward upon the slideway to the initial position (shown in Fig. 1) and the operation repeated. The direction of rotation of the head is such as to always confine the strand 24 in the channel 28 therein, while the overhanging edge of the channel 29 prevents the escape of the strand 27 therefrom. As the head is moved forward after the forming of an eye the antifriction-roller passing into the straight portion of the channel 20 swings said head to the normal position, as will be understood. It will now be apparent that by means of this improved method an eye may be quickly formed in the projecting ends of the horizontal wires of a section of fence or in the ends of wires to be used for other purposes in a manner to so unite the crossed strands as to prevent them from untwisting through any tensile strain which may be applied thereto, enabling the wires to be quickly and permanently attached to a terminal post or other object or to a cross or to similar wire when two or more are to be joined end to end.

The standard 1 is supported upon a platform 33, mounted upon suitable casters 34, so as to render it transportable, said platform also carrying a seat 35 for the operator. This arrangement renders the machine portable and enables it to be moved from bundle to bundle of fencing in the operation of turning an eye on the ends of the horizontal wires thereof or from place to place for any purpose desired.

In order to provide sufficient friction to prevent the head from sliding too freely upon the slideway, the beveled margin or strip 13 of the carrier 14 is pivoted at one end to the carrier by the pin 36, while the other end is forced away from its companion part 13 by the coiled spring 37, which is interposed between them and whose tension is normally exerted to force the pivoted margin or strip outwardly, as shown by dotted lines in Fig. 6. This action of the spring causes the beveled margin of the carrier to bind in the slideway, thereby by resisting the tendency of the wire strands to force the head outwardly as they are twisted together, whereby the wires are more closely twisted together and a more satisfactory result is obtained.

Having thus fully set forth our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an eye-forming machine for wire strands, the combination of a rotatable slideway, a head mounted to rotate with said slideway and slideable thereon, said head being adapted to receive and retain the crossed strands of wire, a fixed member for receiving the loop of the wire in horizontal alignment with said head, and means for rotating the head and slideway.

2. In a machine for the purpose set forth, the combination of a rotatable slideway, a head mounted to slide on said way and to rotate therewith, said head being adapted to have a movement at one end transversely of the slideway, projections upon the head for engaging crossed strands of wire, a fixed member concentric with the axis of oscillation of the head adapted to receive a wire loop, and means for revolving said head concentric with the axis of rotation to twist the strands of wire together.

3. In a machine for the purpose set forth, the combination of a fixed member adapted to engage a wire loop, a head mounted to move horizontally and to rotate about an axis concentric with said fixed member, said head having means for engaging crossed strands of wire, and means for swinging said head as it moves rearwardly to place one
strand of wire concentric with the axis of rotation, and the other strand tangent thereto.

4. In a machine for the purpose set forth, the combination of a fixed center adapted to engage a wire loop, a rotatable slideway adapted to describe a circle about said center, a head mounted to slide on said way, and to have at one end a movement transversely thereof, diverging channels in said head adapted to contain crossed strands of wire, and means for rotating said head and slideway.

5. In a machine for the purpose set forth, the combination of a rotatable slideway having a longitudinal channel in the bed thereof, the outer end of said channel deflecting, a carrier mounted to slide upon said way, a triangular head pivoted near its apex to said carrier, an arm connected with said head having a pin extending into said channel, means carried by said head for engaging crossed strands of wire, a fixed hooked member adapted to engage a wire loop, and means for rotating said head and carrier about said fixed member.

In testimony whereof we each sign this specification in the presence of two witnesses.

CHARLES M. LAMB.

JAMES W. SNEDKER.

Witnesses of Charles M. Lamb:

ALFRED TANZER,

S. F. LOEB.

Witnesses of James W. Snedeker:

F. E. OSGOOD,

GEO. L. BENNETT.