This invention relates to certain improvements in wire tying or twisting devices, such as are generally used for twisting together the two ends of a binding wire, which has been passed around an article, or around a plurality of articles to be secured together. The device embodying the invention is particularly adapted for use in closing the mouth of a bag, or in securing together the reinforcing rods or elements used in concrete construction work, and is equally useful in binding together the transversely extending adjacent wires or elements of wire fencing. If it is to be understood, however, that the device is not limited to the uses above enumerated.

Among the particular objects of the invention is the provision of means for causing a binding wire to be extended around such article or articles as above referred to, and to thereafter automatically impart a twist to the adjacent ends of said wire, whereby to secure the latter in its position around the article or connected articles.

Another object of the invention is the provision of means adapted to automatically cut off the desired length of wire immediately prior to the twisting operation.

Still another object of the invention is the provision of means for so adjusting the device that the shearing means will cut off a binding wire of any desired length.

Other objects of the invention will be made apparent in the following specification, when read in connection with the drawings forming a part thereof.

In said drawings:

Fig. 1 is a fragmentary front elevation of the device.

Fig. 2 is a side elevation of the device, showing sections of the two articles to be connected.

Fig. 3 is a top plan view of the device in operation.

Fig. 4 is a somewhat diagrammatic view of the device immediately preceding the beginning of the binding operation.

Fig. 5 is a similar view showing the binding wire being drawn around two articles to be secured together, the binding wire having been severed from the stock.

Fig. 6 is a similar view at the end of the twisting operation.

Fig. 7 is a detailed perspective view of certain of the operative members in unassembled condition, and,

Fig. 8 is a fragmentary sectional detail view taken through the operating heads.

Now referring specifically to the drawings, in which like reference numerals indicate like parts throughout the several views, 1 indicates a metallic supporting plate, of the general configuration shown, as most clearly indicated in Fig. 4. Pivotedly secured to said plate 1, at opposed points adjacent the upper edge thereof, are curved links 2 and 3, the lower ends of said links 2 and 3 being pivotally secured to the lower ends of straight vertical arms 4 and 5, each arm 4 and 5 terminating in a disk-like head 6 and 7, respectively.

On the lower corner of the front side of the plate 1 is pivotally mounted a bell crank lever 8, a similar lever 9 being similarly mounted on the opposite corner of the rear side of said plate. Each of the levers 8 and 9 extend transversely across the plate 1, and thence are turned upwardly and extend in parallelism and closely adjacent the arms 4 and 5, respectively, when in assembled condition. The top end of each lever carries a disk-like head, 10 and 11, respectively, each head being pivotally connected by a pin or peg to the adjacent concentric head 6 or 7 of the arms 4 or 5, as shown in Fig. 2.

Rigidly connected to the lower edge of the plate 1 is a spindle 12, carrying regular screw threads at its top, and provided along the major portion of its body with a steep-pitch spiral groove 13, as best shown in Fig. 1. A tubular handle 14 telescopically surrounds the spindle 13, and carries internal projections 15 entering the groove 13 on the spindle 12. Mounted on the screw threads of the spindle 12 is a nut 16 carrying a beveled upper surface adapted to enter a socket 17, formed in the lower edge of the plate 1, whereby to regulate the device, as will hereinafter appear. Springs 18 and 19 here shown as spirals, are secured at one end to the spindle 12, and each secured at the other end to the links 2 and 3, respectively.

Each of the heads 6 and 7 is provided on the front side with a concave slot 6' and 7' extending transversely across the face of the head, as best shown in Fig. 7.
Each of the heads 10 and 11 carries a cutter knife 10' and 11' which extends laterally of the head and normally lies in a plane parallel with and immediately above the plane of the slots 6' and 7' formed in the heads 6 and 7.

With the instrumentalities as above explained, the operation of the device is as follows, it being assumed that reinforcing rods A and B are to be tied together by a piece of wire C, as shown in Fig. 1.

With the members in normal position, or that shown in Fig. 4, the heads 6 and 7 are passed astride the rods A and B, and a binding wire C laid in the slots 6 and 7 in the heads 6 and 7, it being noted that the wire C passes out of the slot immediately beneath the cutter knives 10' and 11'. In this position the handle is pulled to a point such that the wire C contacts the rod B, and a continued pull on the handle bends the wire C around the rods B and A, simultaneously causing the heads 6 and 7 to pass below the rods, and to converge one towards the other, as shown in Fig. 5, and in dotted lines, Fig. 1. The downward movement of the device, with the wire C contacting the rod B, obviously has caused the links 2 and 3, the arms 4 and 5, and the bell-crank levers 8 and 9, to swing around their pivot points, to the position shown in Fig. 5, and against the slight resistance of the springs 18 and 19. Since the arms 4 and 5 are longer than the upright portions of the bell-crank 8 and 9, the heads 6 and 7 are given greater rotative movement than are the heads 10 and 11, and therefore under such movement, the knives 10' and 11' contact the wire where it protrudes from the slots 6' and 7', and shear it off. If the wire is taken from a roll D, see Fig. 4, only one shear is necessary. If the operator is using wires already cut to the desired length the knives will be inoperative, because the ends of the wire will not project from the slots.

With the members of the device in the position shown in Fig. 5, a continued pull on the handle 14 will cause the projections 15, and the spiral groove 13 in the spindle 12, to rotate the spindle and the plate 1, and, consequently the arms 4 and 5. Since the ends of the wire C are now in the slots 6' and 7' and necessarily bent at an angle therein, as shown in Figs. 5 and 6, the rotation of the arms 4 and 5 will twist the wire C to tightly bind the rods B and A together, as shown in Fig. 6. The pull on the handle 14 is then released, and a coiled spring (not shown) within the handle restores the latter to normal position, leaving the wire in twisted position around the rods B and A. The springs 18 and 19 immediately restore the members 2, 3, 4, 5, 8 and 10 to normal position, as shown in Fig. 4, as soon as the pull upon the handle is released.

The recess 17 is provided to permit of the adjustment of the opening between the heads 6 and 7 when in normal position. As the nut 16 is screwed upwardly on the spindle it engages the lower edges of the bell-cran 8 and 9, and causes them to pivot around the points of connection to the plate 1, resulting in movement of the heads 10 and 11, one towards the other. Since the upper ends of the bell-cran 8 and 9 are also pivotally connected to the heads 6 and 7 however, such movement of the bell-cran 8 and 9 causes the heads 6 and 7 to move inwards, the one towards the other, a reverse movement of the nut 16 manifestly tending to separation of the heads under the tension of the spring 19. It is therefore clear that vertical movement of the nut 16 regulates the distance between the heads 10 and 11, and therefore the length of the wire portion to be cut.

From the foregoing it will be understood that, while I have provided a device which is adapted for use with binding wires already cut to the desired lengths by hand at the factory, the construction embodying the invention carries means for automatically shearing the wire to the desired length, during the wire bending and twisting operation. The slots 6' and 7' are concaved and rounded at their deepest portions, and the wire is laid in the slots by simply placing the end sections in parallelism with the slot entrances and moving the wire laterally towards and within the slots, the wire then gravitating to the bottom of the concaved portion, as shown in Fig. 8. In this position the bent ends of the wire (see Fig. 5) are securely held during the twisting operation, after which a slight twist of the device will easily remove them from the slots, as will be obvious. While binding wires cut to the desired length at the factory may be purchased for use with devices of the same general character, they are much more expensive than is the uncut stock, and it is manifestly a tedious and costly operation to cut them by hand before inserting them into the twisting device. In so far as I am aware, I am the first in the art, not only to provide a device which straddles the article or articles to be bound and, by a pull on an operating handle, automatically cause the wire to be extended on each side of said article or articles and simultaneously twist the wire to bending position, but I am also the first to automatically cut off the wire to the desired length, simultaneously with and during this operation.

In actual practice, if desired, the heads 6' and 7' may be made of tool steel, and also the knives 10' and 11', and may be made renewable, if preferred.

Modifications of and changes in details in the structure described will be suggested to those skilled in the art, but the invention covers all embodiments falling fairly within the scope of the appended claims.
What I claim is:
1. A device of the character described, for binding one or more articles with wire and thereafter twisting the free ends of the said wire, comprising a supporting member carrying means for gripping said wire on both sides of said article, and instrumentalities carried by said member adapted for co-operation, when the member is moved to forcibly press the gripped wire against said article or articles, to first enclose the latter by the wire, and to thereafter twist the ends of the wire, the one around the other.

2. A device of the character described, for binding one or more articles with wire and thereafter twisting the free ends of the said wire, comprising a supporting member carrying means for gripping said wire on both sides of said article, and instrumentalities carried by said member adapted for co-operation, when the member is moved to forcibly press the gripped wire against said article or articles, to first cut the wire to the desired length and then enclose the article by the wire, and to thereafter twist the ends of the wire, the one around the other, substantially as described.

3. A tool for the purpose described comprising a support provided with a handle, a handle telescopically mounted on the spindle and adapted to rotate the latter when moved longitudinally thereof, and two arms pivotally mounted on said support and rotatable therewith, each arm being provided at its end with a head provided with a socket adapted to receive a portion of a strand of binding wire, whereby rotation of said support may twist said wire substantially as described.

4. A tool for the purpose described comprising a support provided with a handle adapted to rotate the support when the former is pulled, a link pivotally secured to each end of said support, two links pivotally connected to the free end of each link, a handle carried by the free end of each arm, and means on each head adapted to receive a portion of a strand of wire.

5. A tool for the purpose described comprising a support provided with a handle adapted to rotate the support when the former is pulled, two arms pivotally mounted on said support, each arm being provided with a head adapted to receive a portion of a strand of wire, and two bell crank levers pivotally mounted on said support, each lever having a portion normally extending in the plane of and adjacent the plane of one of said arms, and a head on one of said portions carrying a knife adapted to sever the end of said wire upon pivotal movement of said arms, substantially as described.

6. A tool for the purpose described comprising a support provided with a handle adapted to rotate the support when the former is pulled, two links pivotally secured to said support, an arm pivotally secured to one end of each said links, said arms being provided with a head carrying a slot adapted to receive a portion of a strand of wire, and two bell crank levers pivotally mounted on said support, each lever having a portion normally extending in the plane of and adjacent the plane of one of said arms, and a head on one of said portions carrying a knife adapted to sever the end of said wire upon pivotal movement of said arms, substantially as described.

7. A tool for the purpose described comprising a support, an arm pivoted to and projecting laterally on each side of said support, said arms being adapted to straddle an article or articles to be bound with wire, means in the free ends of each arm adapted to receive an end of a binding wire, and means for automatically rotating said support whereby to twist said wire around said article or articles.

8. A tool for twisting wire around an article or articles, comprising a support, a link pivotally connected to each side of said support, an arm pivotally secured to each link and projecting beyond the plane of said support, a head on the outer end of each arm adapted to receive a portion of a strand of binding wire, and means for rotating said support whereby to twist said wire.

9. A tool for twisting wire around an article or articles, comprising a support, a lever pivoted to each side of said support and extending laterally therefrom, an arm pivotally connected to each side of said support, a head on each arm, each head being pivotally secured to the free end of one of said levers, a socket in each head adapted to receive a portion of a strand of binding wire, means for causing rotative pivotal action between the heads and the end of the associated levers, and means carried by the free end of each lever adapted to cut the wire in the adjacent head during such pivotal action.

10. A tool for twisting wire around an article or articles, comprising a support, a lever pivoted to each side of said support and extending laterally therefrom, an arm pivotally connected to each side of said support, a head on each arm, each head being pivotally secured to the free end of one of said levers, a socket in each head adapted to receive a portion of a strand of binding wire, means for causing rotative pivotal action between the heads and the end of the associated levers, means carried by the free end of each lever adapted to cut the wire in the adjacent head during such pivotal action, and means for rotating said support to twist said wire.

11. The method of twisting a wire around an article or articles to be bound, which consists in positioning a wire in proximity to and transversely of said article or articles, gripping the wire on each side of the article or articles, exerting a pull upon said wire to cause it to contact with and bend around the article or articles, simultaneously cutting the wire...
to the desired length, and thereafter twisting the end portions of the wire the one around the other.

12. A tool of the character described for binding a wire around an article or articles, said tool being equipped with means adapted for operation to initially cut the wire to the desired length and to thereafter enclose the article or articles with the wire and to automatically twist the free ends of said wire laterally of the article or articles.

13. A tool of the character described for binding a wire around an article or articles, said tool being equipped with means adapted for operation to initially cut the wire to the desired length, to thereafter enclose the article with the cut portion of the wire, and to then automatically twist the ends of said portion of the wire laterally of the article or articles, in combination with means adapted for adjustment to regulate the length of the wire to be cut.

In testimony whereof I affix my signature.

ARCHIE E. BASS.