My invention relates to improvements in devices, such as merri-leis, streamers, festoons, wreaths, and similar ornaments formed of strips of crepe paper or other flexible material, and employed for ornamenting the person, the room, or other things or places; and the same has for its object more particularly to provide a simple, attractive and durable device which is of uniform and symmetrical appearance, and which is produced at low cost.

Further, said invention has for its object to provide a device of the character specified in which a plaited strip having a core thread therethrough is twisted to form convolutions of uniform character uniformly distributed along the core, and radially reinforced to retain the same permanently in convoluted form in transverse relation to the core.

Further, said invention has for its object to provide a device of the character specified in which the convolutions thereof project substantially at right angles to the core thereof without being over twisted, and having radially extending folds therein serving to stiffen or reinforce said convolutions to retain the same in extended position, and to resist untwisting thereof.

Further, said invention has for its object to provide a device of the character specified in which the mandrel on which the flexible strip is twisted to form a convoluted or spiral portion constitutes a permanent part of the resulting product, and serves to retain said portion in distended condition conforming to a predetermined shape or configuration.

Further, said invention has for its object to provide a device of the character specified in which the core or mandrel on which the flexible strip is twisted to form a convoluted or spiral portion serves to retain said portion in permanent shape when the same is formed into a wreath or other device of endless configuration.

Further, said invention has for its object to provide a device of the character specified in which the convolutions thereof appear alternately enlarged and constricted providing a staggered arrangement producing a striking ornamental effect.

Further, said invention has for its object to provide a device of the character specified in which the successive convolutions thereof are permanently secured to the core thereof to prevent the same from being displaced thereon.

Further, said invention has for its object to provide a device of the character specified in which the opposite edges of the flexible strip employed are colored or tinted to produce a characteristic spiral colored effect when the strip is twisted.

Further, said invention has for its object to provide a device of the character specified in which the convoluted portion is disposed upon an endless distending member with the contiguous ends of the convoluted portion in close relation to each other.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends my invention consists in the novel details of construction, and in the combination, connection and arrangement of parts, hereinafter more fully described, and then pointed out in the claims.

In the accompanying drawings:

Figure 1 is an elevation showing means for twisting a plaited strip having a thread passed through the folds thereof;

Fig. 2 is an elevation showing the product resulting therefrom;

Fig. 3 is a view illustrating the twisting means employed for twisting a plaited strip having a wire core threaded therethrough;

Fig. 4 is an elevation showing the product resulting therefrom formed into a circular wreath;

Fig. 5 is a view similar to Fig. 4 showing said product formed into a heart-shaped device;

Fig. 6 is an enlarged detail view of means for locking the ends of the wire core together, the same being shown disconnected;

Fig. 7 is another detail view of said locking means showing the same in locking position;

Fig. 8 is a perspective of the convoluted
portion, the same being shown in expanded position;

Fig. 9 is a perspective showing the thread or wire constituting the core disposed in offset relation to the medial line of the plaited strip;

Fig. 10 is an elevation showing the product resulting from the twisting thereof; and

Fig. 11 is an elevation showing the article obtained by removing the string or core from the convoluted portion.

In practicing my method a strip 10 (or two or more superimposed strips) of crepe paper or other flexible material (Fig. 1) are crimped or plaited, as indicated at 12, and a thread 14 is run longitudinally through the folds thereof like a running stitch. This operation is preferably performed by means of a suitable machine, although the same may be performed by hand, if so desired.

In my method I effect the twisting of the strip or strips, or portions thereof, either by reducing the frictional resistance between the core 14 and the strip 10, or by employing the core 14 to assist in twisting the strip by rotating the core during the twisting operation, or both. The rotation of the core also reduces the frictional resistance, because the relative movement between the core and the twisting strip is then less. Further, the untwisted strip 10 is so flexible that the twisting power cannot be readily transmitted from end to end thereof until said strip becomes sufficiently twisted to offer torsional resistance to the twisting, and hence to transmit the twisting power to the more remote portions thereof. The less the core resistance, the more readily the twisting is transmitted through the strip itself to the more remote portions thereof.

In order to reduce the frictional resistance between the strip 10 and the core 14, the needle used to perforate the strip 10 is preferably made larger than the thread or wire used so that the latter passes more readily through the perforations formed. I have also discovered that the twisting may be more readily accomplished by impregnating the strip 10 about the perforations therein with minute quantities of oil, such as machine oil, or other liquid or solid lubricators, such as, for instance, carbon tetrachloride, it being preferable that substances, such as water, tending to destroy or modify the characteristics or qualities of the paper or flexible material, be not employed.

When the flexible strip is plaited and threaded, or during the plaiting and threading operation itself, the twisting operation is performed. For effecting the twisting, the thread or core, and the operation is the same for all kinds of cores such as those herein described, is supported or secured at the ends, or at spaced points thereof substantially taut. The plaited strip 10, or a portion thereof, disposed upon the core in untwisted condition, between the supports thereof, is then held relatively stationary at one end or portion thereof and power is applied at a remote point thereof to twist the same about the core as a mandrel. As described above the core may be simultaneously rotated to reduce the frictional resistance and to assist in transmitting the twisting power to the more remote portions of the strip, or in some cases, the core may be retained stationary and the strip, or a portion thereof, twisted thereon, the use of oil or relatively attenuated cores, or both, being relied upon to reduce the frictional resistance, if required, and to permit of the convolutions more readily sliding along the core to more uniformly distribute the convolutions along the core.

In one method, the plaited strip 10 with the core 14 threaded therein is clamped at both ends in the twisting apparatus shown at Fig. 1. This apparatus comprises a suitable pedestal 16 having an electric motor 18 mounted thereon. The motor shaft 20 extends through a bearing 22, and is provided at the inner end thereof with a pair of clamping jaws 24. Another pedestal 26 disposed in spaced relation to the pedestal 16 has a bearing 28 in axial alignment with the bearing 22. A shaft 30 is rotatably disposed within the bearing 28, and is also axially movable therein. A spring 32 is coiled about the shaft 30 intermediate the bearing 28 and an abutment 34 upon the outer end of said shaft 30 to normally retain the same in retracted position. The inner end of the shaft 30 is also provided with clamping jaws 36. The bearings 22 and 28 are preferably provided with the usual anti-friction devices or ball-bearings.

In order to twist the partially formed, threaded, plaited strip 10 employing a fibrous thread 14, having a plurality of strands as shown at Fig. 1, the ends of the thread 14 and the ends of the strip 10 are secured in position by the clamping jaws 24 and 36. The motor 18 is then rotated at a relatively high speed in a direction tending to unwind the strands of the thread 14, whereby, as the twisting operation continues, the thread becomes untwisted and elongated, and the strip 10 becomes twisted thereon substantially as shown at Fig. 2 without becoming contracted in length due to the twisting of the strands of the thread.

Inasmuch as the thread 14 is flexible the shaft 30 remains stationary during the twisting operation, although the thread rotates in the direction of the twisting movement because of its flexibility at the remote end thereof. Hence the strip 10 is rapidly twisted into completed form from the rotating end thereof to the stationary end thereof, the rotation of the thread reducing the friction, and serving to transmit the twisting power.
to the more remote portions of the strip 10. The operator by sliding the hand over the convolutions 38 of the twisted article can distribute the same uniformly upon the thread or string 14, producing the article or device 39 substantially as shown at Fig. 2.

By rapidly and continuously rotating the plaited and threaded strip 10 from one end, while retaining the opposite end of the strip relatively stationary, I am permitted to employ unusually long integral strips. The twisting power is applied at the end of the strip remote from the stationary end thereof, and the operation is accomplished very rapidly and effectively.

As the twisting operation continues the torsional resistance of the strip 10 increases to the point that sufficient power from the motor 18 is transmitted to the shaft 30 to cause the same to rotate. This prevents the article from being twisted too much and serves as a safety device to insure the production of an article in which the convolutions 38 thereof project outwardly at substantially right angles to the core. These convolutions are provided with radiating folds 38 as (Fig. 8), serving to maintain the convolutions permanently in twisted condition and to resist the untwisting thereof, and constituting reinforcing portions adapted to maintain the convolutions relatively stiff or rigid. These folds 38 at the outer edges of the convolutions form a device having a honey-combed or wavy appearance.

At Fig. 3 a resilient deformable member 14, such as a wire, is shown threaded through the plaited strip 10. The core 14 is of a material which may be readily deformed or bent into circular, or other form, the same constituting a distending member which is sufficiently resilient to maintain the device in the desired shape.

My method of twisting the flexible strip 10 on the wire 14 is as follows:

Both the wire 14 and the strip 10 are secured by the jaws 32 at the motor end of the device as illustrated at Fig. 3, and the wire 14 only is secured at the opposite end thereof by the jaws 30 of the rotatable shaft 30. When the motor 18 is running the rotation of the wire 14 at one end is transmitted to the other end of the wire, because of the torsional resistance thereof, resulting in the rotation of the shaft 30 and in the rotation of the wire as a whole. By holding the free end of the plaited strip 10 stationary as illustrated at 40, against movement with the wire 14, the plaited material is rapidly twisted from one end thereof to the other, the wire 14 serving as a mandrel upon which the material is twisted.

In the last method given as an example, the wire 14 continuously rotates, without being twisted, in the same direction that the strip 10 is to be twisted. At the motor end of the strip 10 the resistance is less than at the stationary end because the difference in speed between the core and strip is greater at the stationary end 40 of the strip 10. Hence the power applied to the wire 14 is first transmitted to the portion of the strip 10 adjacent to the stationary end thereof to effect the twisting of said relatively stationary portion forming the convolutions therein, and, as the torsional resistance of this portion increases due to the formation of said convolutions the strip progressively becomes twisted towards the motor end thereof.

This method permits of the production of articles of convoluted cylindrical formation with cores 14 which are deformable and bendable, and which ultimately serve to retain the completed devices in distended condition conforming to a predetermined configuration or shape. For instance, such devices may be readily bent or deformed to provide a circular wreath 42 as illustrated at Fig. 4, or the same may be permanently deformed into other shapes, such as a heart-shaped device 42 illustrated at Fig. 5.

The endless devices 42 and 42, illustrated as examples at Figs. 4 and 5, consists of the deformed or bent member or wire 14, about which is disposed the strip 10 twisted into a plurality of successive convolutions or spirals 38 uniformly distributed thereover, like the product shown at Figs. 2 and 8, said devices being of permanent shape or configuration.

At Figs. 9 and 10 is illustrated a modified form of the device in which the core 14, either a thread or wire, is strung or threaded through the successive folds of the plaited strip 10 in offset relation to the medial line of the strip. The twisting operation is performed in the manner above described, the method being varied, depending on whether a wire or thread is employed. The resulting product 49 consists of successive convolutions or spirals 44 and 44, which project outwardly and appear alternately enlarged and constricted as illustrated at Fig. 10, forming a staggered arrangement producing a characteristic effect.

The durability of the device and the permanency in the uniformity of the distribution of the convolutions 38 over the cores 14, 14, 14 may be enhanced by securing the convolutions permanently to the core, preferably by a suitable adhesive material, such as glue.

For this purpose the cores 14, 14, 14, as desired, are coated or treated with an adhesive which is normally hard, and which softens upon the application of a liquid or heat thereto, or both. When the strip 10, 10, 10 is twisted and uniformly distributed over the core thereof, the glue or other adhesive is softened, such as by the application of steam thereto. When the adhesive again hardens the convolutions 38 become perma.
nently attached to the core against displacement thereon. Striking color effects can also be obtained by tinting one edge 45 of the strip, such as the strip 10 at Fig. 9, with one color and the opposite edge 45 with another color.

When the strip 10 is twisted an alternating spiral colored effect is produced, consisting of alternate spirals of different colors. For readily securing or locking the ends of the wreaths or endless devices 42, 42' together one end of the wire core 14 (Figs. 6 and 7) is permanently bent or pre-formed to provide an end portion 46, extending at approximately an acute or sharp angle to the main portion of the wire and provided with a relatively shallow centering recess 45 on the outer side of the base thereof substantially at the bend. The inner part 50 of the portion 46 is a reverse curve having an inner notch 52 contiguous to the recess 48 and an outer notch 54. When the ends of the wire 14 are locked together the portion 46 lies substantially in the plane of the wire loop formed, and projects inwardly.

The opposite end of the wire core 14 is likewise permanently bent or pre-formed to provide an angular end portion 60 consisting of an inner reverse curve portion 58 extending inwardly along a line substantially in the plane of the wire loop formed when the ends thereof are secured together, and an outer portion 60 extending transversely of the plane of said loop substantially at an angle to the portion 58. The portion 58, which lies in a plane substantially at right angles to the plane of the part 50, has a relatively shallow centering recess 62 at the inner side of the base thereof adapted to engage the centering recess 48, and the oppositely directed notches 64 and 68 adapted to engage the notches 52 and 54.

In order to lock the parts together the centering recess 62 is disposed within the centering recess 48. The portion 60, which is slightly shorter than the portion 46 is sprung or passed back of the latter, and the portions 46 and 60 twisted or rotated in opposite directions until the notch 64 engages the notch 52 and the notch 66 engages the notch 54, the parts snapping into position because of the inherent resiliency of the wire, and being securely locked therein against being accidently disengaged. The wire can be readily unlocked or released by pressing the end portions 46 and 60 in opposite directions.

It is to be noted that the ends of the wire 14 are locked along a line extending transversely of the circumference of the wreath, so that the convoluted strip at the ends thereof of may be permitted to substantially abut without leaving a space therebetween. The end portions 46 and 60, or either thereof, may, if so desired, serve for the attachment of greeting cards, streamers, embellishments, or other devices thereto, or as attaching means for supporting the wreath or device itself.

At Fig. 11 is shown a convoluted strip 68 which is produced by the methods herein described. The strip 68 is originally plaited, threaded and twisted as described above, and as illustrated at Figs. 1 and 2. The thread is then withdrawn releasing the convolutions which assume an elongated permanently spiral shape, as illustrated at 70, Fig. 11, having the transverse creases or folds 72 therein. The device 68 is attractive, being particularly adapted for use as a streamer, or the like, and the same is longitudinally resilient like a coil spring. When an impulse is imparted thereto, the same vibrates spirally and longitudinally, alternately elongating and contracting, to produce a novel effect.

By my invention, convoluted devices are produced in which the successive convolutions thereof are well formed and uniformly distributed along the wire or thread, and project outwardly at substantially right angles to the core, the convolutions being comparatively stiff or rigid, providing an attractive and highly ornamental device.

Further, by my invention articles of twisted or convoluted flexible material are produced in which the convoluted portion is maintained in different predetermined, permanent shapes or configurations, such as in the form of wreaths and the like, by the core about which the flexible portion is twisted.

The method herein described but not claimed is described and claimed in my copending Application Serial No. 304,724, filed May 21st, 1929.

I claim:
1. A device of the character described comprising a core constituting a distending member, and a twisted strip of flexible material upon said core and composed of a series of spiral convolutions disposed about the same; said core being deformed into a predetermined configuration, and serving to maintain the convoluted portion in distended condition conforming to said configuration.

2. A device of the character described comprising a plaited strip of flexible material, and a core constituting a distending member threaded through the folds of said strip; said strip being twisted about said core and composed of a series of convolutions thereon; said core having the ends thereof secured together to provide an endless core of substantially uniform diameter throughout; and the contiguous ends of the convoluted portion abutting each other to form a substantially endless convoluted portion.

3. A device of the character described comprising a plaited strip of flexible material, and a core constituting a distending member threaded through the folds of said strip; said
strip being twisted about said core, and composed of a series of spiral convolutions thereon; and said core having the ends thereof secured together into a predetermined configuration, and serving to maintain the convoluted portion in distended condition conforming to said configuration.

4. A device of the character described comprising a plaited strip of flexible material, and a wire threaded through the folds of said strip; said strip being twisted about said wire as a mandrel and forming a series of spiral convolutions thereon; and said wire being shaped into a predetermined configuration, and maintaining the convoluted portion in distended condition conforming to said configuration.

5. A device of the character described comprising a plaited strip of flexible material, and a core member threaded through the folds of said strip in offset relation to the medial line thereof, said strip being twisted about said core member, and composed of a series of alternately enlarged and constricted spiral convolutions.

6. A device of the character described comprising a plaited strip of flexible material, a core member threaded through the folds thereof; said strip being twisted about said core member and consisting of a series of relatively flat convolutions uniformly disposed along said core member, and having radially arranged folds therein serving to maintain said convolutions in permanently twisted distended condition projecting substantially at right angles to said core member.

7. A device of the character described comprising a core member, a strip of flexible material twisted upon said core member and composed of a plurality of convolutions disposed along the same, and means for securing said convolutions in fixed relation to said core member against displacement along the same.

8. A device of the character described comprising a plaited strip of flexible material, a core member threaded through the folds of said plaited strip; said strip being twisted upon said core member and composed of a plurality of convolutions disposed along the same, and an adhesive substance for securing said convolutions to said core member in fixed positions.

9. A device of the character described comprising a strip of flexible material having the opposite edges thereof differentially colored, and twisted into a spiral formation composed of a series of convolutions having spirals of alternating colors.

10. An ornamental figure comprising a semi-rigid core and a strip of sheet material twisted therearound, said strip having a series of transverse waves therein forming wavy edges, and presenting both its edges to define the surface of the figure.