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DEVICE FOR TWISTING METAL STRIP

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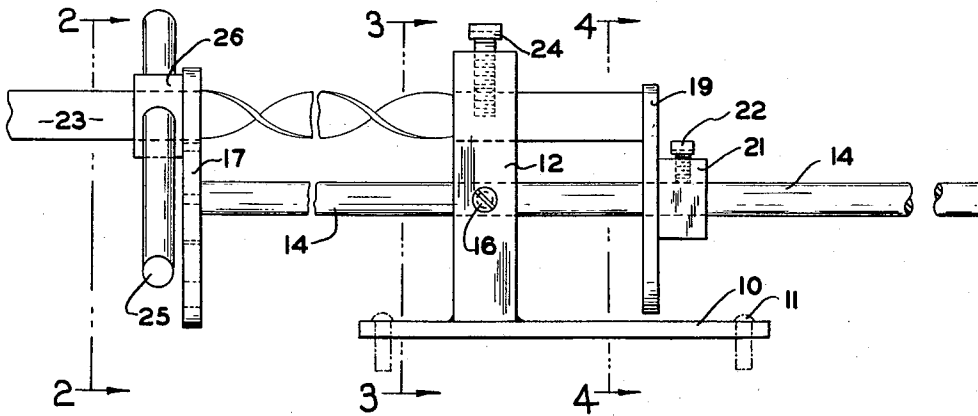


Fig. 1

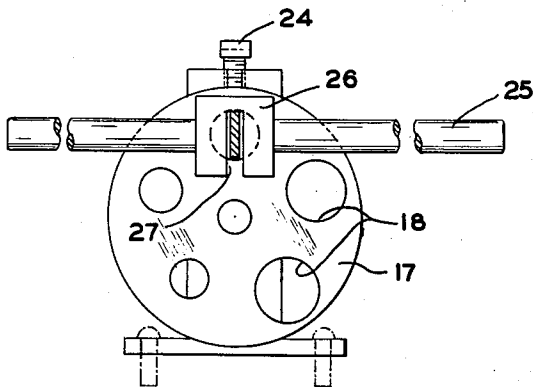


Fig. 2

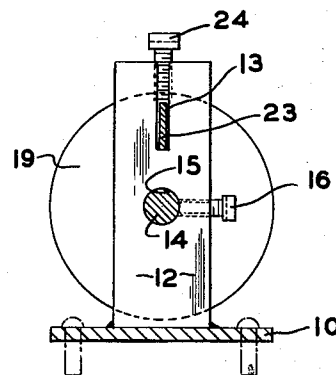


Fig. 3

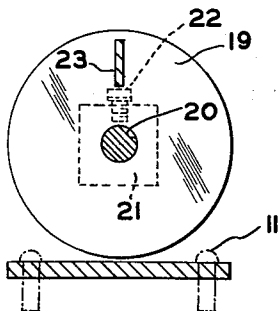


Fig. 4

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## DEVICE FOR TWISTING METAL STRIP

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5 Claims. (Cl. 153—78)

The present invention relates to a device for twisting a workpiece and, more particularly, to apparatus for imparting reproducible convolutions or spirals to elongated ductile stock such as a metal bar, rod, strip, slab, and the like.

In the art of metal working, it is often desired to contort a strip of wrought iron, for example, about a longitudinal axis into a spiral shape for decorative or utilitarian purposes. A certain amount of skill is required in order to obtain a smooth spiral. Also, the apparatus heretofore available is often heavy and bulky and not suitable for the amateur or "home-shop" type of metal working.

In contrast, my twisting apparatus is small, compact, easily carried about, and quickly installed. Moreover, the present twisting apparatus is capable of considerable adjustment so that twists of various leads or pitch can be imparted. Further, the length of the twist or spiral can be accurately controlled, and still further, the spacing of such a twisted length can be spaced as desired a pre-established distance from one end of the workpiece.

In one form of my invention, I use a support post for the workpiece which cooperates with a second support jointly to carry the workpiece. The distance between the two supports is adjustable to define a twisting zone of a desired length. At one of the supports, preferably the post, the workpiece is held against rotation, while suitable twisting means adjacent the other support turns the workpiece about a longitudinal axis. The resulting twist is thus confined between the two adjustably positioned supports and can be twisted a desired number of turns to impart a spiral having a desired lead or pitch. By permitting the workpiece to extend past the post a pre-established distance, the zone of twist can be stationed as desired from the end of the workpiece. Various other modifications and adjustments are contemplated in the present apparatus as hereinafter disclosed.

It is, therefore, a principal object of the present invention to provide an improved twisting device.

Another object is to provide a twisting device by which reproducible and semi-precision results can be obtained by an amateur metal worker.

A further object is to provide a twisting device in which the twist or convolution can be confined to a predetermined length along the workpiece.

A still further object is to provide a twisting device by which the length of twist can be imparted to a workpiece a pre-selected distance from the end of the workpiece.

Other objects will become apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention consists of the features hereinafter fully described and particularly pointed out in the claims, the annexed drawing and following disclosure describing in detail the invention, such drawing and disclosure illustrating, however, but one or more of the various ways in which the invention may be practiced.

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In said annexed drawing:

Figure 1 is a side elevation of twisting apparatus embodying the present invention, and

Figures 2, 3, and 4 are sections of Figure 1 on the lines 2—2, 3—3 and 4—4, respectively.

Referring to the drawing, the embodiment disclosed includes a platform 10 which may be fixed to a suitable support by means of screws or bolts 11. An upstanding support post 12 is welded or otherwise secured to the platform 10 at one end and has a longitudinally extending slot 13 at the other end. A set screw 24 engages threaded sides of the slot 13 to serve as an adjustable member which is adapted to vary the effective height of the slot and thereby conform the slot to the height of a workpiece resting in the bottom of the slot. A stem or rod 14 freely moves through an opening 15 in the post 12 to dispose portions of the stem 14 on opposite sides of the post. A set screw 16 secures the stem 14 with respect to the post at a selected longitudinal position. A disc 17 having a plurality of different sized openings 18 is fixed to a portion of the stem 14 disposed on one side of the post 12, and a second disc 19 capable of freely sliding along the stem 14 through an opening 20 is disposed on the other side of the post. The disc 19 has a boss portion 21 which in cooperation with a set screw 22 locks the disc 19 at a selected station along the stem 14.

In practice, the stem 14 acts as a gauge to station the disc 17 at a predetermined length from the post 12 and thereby define between the disc 17 and post 12 a twisting zone. The set screw 16 locks these parts at the predetermined length. An elongated workpiece such as the metal strip 23 is then placed in the slot 13 of the post and through an opening 18 of the disc 17 which is aligned with such slot. A set screw 24 threadably engaging the sides of the slot 13 is then turned until contact is made with the strip 23 in order to hold the strip in position within the support post 12. Preferably the bottom of the hole 18 selected and placed in alignment with the slot 13 and the bottom of such slot are about at the same level to maintain the strip 23 in a substantially horizontal position. The slot 13 is of a shape to prevent rotation of the strip 23 about a longitudinal axis. Twisting means is then applied to the strip 23 adjacent the disc 17 and preferably on the side of the disc 17 away from the post 12, although the reverse side of the disc 17 can be used if desired. The twisting means may be any suitable tool for gripping the strip 23 and in the embodiment illustrated consists of handles 25 having a central head portion 26 provided with a slot 27. The latter is only slightly wider than the width of the strip 23, so that a twist is easily imparted by turning the handles 25 circumferentially about a longitudinal axis of the strip 23. The resulting spiral or convolution starts at the post where the strip is held against rotation and extends to the twisting means or to the head portion 26, since the remainder of the strip disposed in a direction away from the post 12 is free to turn with the handles 25 and head portion 26. In this regard the thrust of turning the handles 25 can also be used to abut the head portion 26 against the disc 17, thereby continuously observing the setting of the disc 17 with respect to the post 12 and confining the length of the twist to the pre-set distance between the disc 17 and post 12. Further, any contraction in length of the strip 23 due to the twisting is automatically compensated for, since the strip 23 is free to move longitudinally through any of the openings 18 as the twisting takes place. In the same manner, as shown in Figure 2, the strip 23 is free to move through the slotted head portion 26. If desired, means can be included at any of the openings 18 or such openings can be of such a shape

as to prevent rotation of the strip 23 about a longitudinal axis; but in this case the post 12 is provided with a sufficiently large slot that rotation of the strip can be there accommodated, and similarly the twisting means is then operative on the strip at a position adjacent the post 12. Once the twisting has begun any number of turns can be imparted up to the breaking point of the workpiece, the number of turns selected determining the lead or pitch of the convolutions of the twist.

Various modifications are possible. For example, if it is desired to impart a twist at a given or pre-established distance from the end of the strip 23, the disc 19 is fixed to the stem or rod 14 by the set screw 22, so that the width of the post 12, in a direction parallel to the strip 23, plus the distance to the disc 19 equals the pre-established distance. Where the amount or length of the twist is also to be regulated, the setting of the disc 19 normally follows the setting of the disc 17 with respect to the post 12.

In order to steady the strip 23 while it is being twisted and to obtain a uniform twist, it is advisable to prevent movement of the strip substantially in a vertical plane. For this reason, the set screw 24 is used to bear against the strip 23 in the post. For the same reason, the diameter of a selected opening 18 in the disc 17 should also generally correspond to the height of the stock fed therethrough. Accordingly, in order to accommodate a strip, bar, or other type of workpiece which may vary in thickness or height, the variously sized openings 18 are used. In use the bar 14 is rotated in the post opening 15 until a selected opening 18 is aligned with the slot 13, and the set screw 16 is then tightened. As used herein, the terms "stem" or "rod" are taken to include members having a polygonal cross-section as well as a circular cross-section, although the latter is preferred to facilitate the rotation of the stem 14 and positioning of a selected opening 18 in the manner just described. Whatever the size of the opening 18, the bottom of each opening preferably rests on a common circle which is concentric with the stem 14, and the circle and the bottom of the slot 13 are preferably at the same level to maintain the strip 23 in a substantially horizontal position.

It will now be apparent that I have provided an improved twisting device. Twists of varying leads or pitch are easily imparted to a workpiece by an amateur with my device and such twists or convolutions are reproducible with semiprecision. Little or no skill is required. Additionally, by means of my twisting apparatus the twist that is imparted can be confined to a predetermined length along the elongated workpiece. Moreover, such a length of twist can be imparted to a workpiece at a preselected distance from an end thereof.

Other forms embodying the features of the invention may be employed, change being made as regards the features herein disclosed, provided those stated by any of the following claims or the equivalent of such features may be employed.

I therefore particularly point out and distinctly claim as my invention:

1. Apparatus for imparting to an elongated workpiece a predetermined twisted length which is spaced a pre-established distance from an end thereof, including a post having an opening to receive and pass the workpiece, a stem member carried by the post and having portions disposed on opposite sides of said post, a first disc member on one of said portions of the stem member, means to station the first disc member from the post to define a twisting zone of predetermined length extending from said first disc member to the post, a second disc gauging member on the other of said portions of the stem member, means to station said second disc member from the post to define a pre-established distance such twisted length is spaced from an end of the elongated work-

piece, said first disc having an opening to receive the workpiece and together with said post opening jointly support the workpiece in end-abutting relation with said second disc member, means cooperating with said post opening to prevent rotation of the workpiece about a longitudinal axis, twisting means operative on the workpiece contiguous to the first disc member to impart a twist to the workpiece extending only from said first disc member to said post, such opening of said first disc and said twisting means slidably receiving such workpiece during the twisting operation to permit the workpiece to contract in length due to such twisting.

2. Apparatus for imparting to an elongated workpiece a predetermined twisted length which is spaced a pre-established distance from an end thereof, including a post having an opening to receive and pass the workpiece, a rod member carried by the post adapted for longitudinal movement relatively thereto to dispose portions of the rod member on opposite sides of the post, a first transversely disposed disc fixed to one of said portions of the rod member, means selectively to secure the rod member relatively to the post to define a twisting zone of predetermined length extending from said first disc to the post, a second transversely disposed gauging disc on the other of said portions of the rod member and freely movable therealong, means to station said second disc from the post to define a pre-established distance the twisted length is spaced from an end of the elongated workpiece, said first disc having an opening to receive the workpiece and together with said post opening jointly support the workpiece in end-abutting relation with said second disc, said post opening being of a shape to prevent rotation of the workpiece about a longitudinal axis, and twisting means adapted to engage the workpiece contiguous to the first disc to impart a twist to the workpiece extending only from the first disc to said post, such opening of said first disc and said twisting means slidably receiving such workpiece during the twisting operation to permit the workpiece to contract in length due to such twisting.

3. Apparatus for imparting to an elongated workpiece a predetermined twisted length which is spaced a pre-established distance from an end thereof including a base, an upstanding post secured to the base and terminating at its upper end in a vertically disposed slot in which to receive the workpiece, a rod member, said post having an opening to receive the rod member for longitudinal movement of the rod member relatively thereto to dispose portions of said rod member on opposite sides of the post, a first transversely disposed disc fixed to one of said portions of the rod member, means selectively to secure the rod member relatively to the post in said post opening to define a twisting zone of predetermined length extending from said first disc to the post, a second transversely disposed gauging disc on the other of said portions of the rod member and freely movable therealong, means to station said second gauging disc from the post to define a preestablished distance the twisted length is spaced from an end of the elongated workpiece, said first disc having an opening to receive the workpiece and together with said post opening jointly support the workpiece in end-abutting relation with said second disc, said post slot serving to prevent rotation of the workpiece about a longitudinal axis, fastening means vertically adjustable in said post slot to bear against the workpiece and prevent movement thereof in a vertical plane, and twisting means adapted to engage the workpiece contiguous to the first disc and impart a twist thereto extending only from the first disc to said post, such opening of said first disc and said twisting means slidably engaging said workpiece for relative movement therebetween to compensate for contraction in length of the workpiece due to such twisting.

4. Apparatus as defined in claim 3 wherein said fixed disc has a plurality of openings of different sizes to ac-

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commodate the workpieces of correspondingly different sizes and said stem is also rotatable about a longitudinal axis with respect to said post substantially to align a selected opening of the disc with the slot of the post.

5. Apparatus as defined in claim 3 wherein said fixed disc has a plurality of circular openings of different sizes to accommodate the workpieces of correspondingly different sizes and said stem is also rotatable about a longitudinal axis with respect to said post substantially to align a selected opening of the disc with the slot of the post, the diameter of a selected opening being substantially equal to the largest cross-sectional dimension of the workpiece to steady said workpiece during such twisting and prevent vertical movement thereof the bottom

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of all of said differently sized openings of the disc resting on a common circle concentric with said stem, said circle and the bottom of the slot of said post being substantially at the same level to maintain the workpiece in a substantially horizontal position.

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