Aug. 27, 1929. W. W. WERNER 1,726,279

COLLAPSIBLE COIL FORMING DEVICE

Filed April 27, 1927

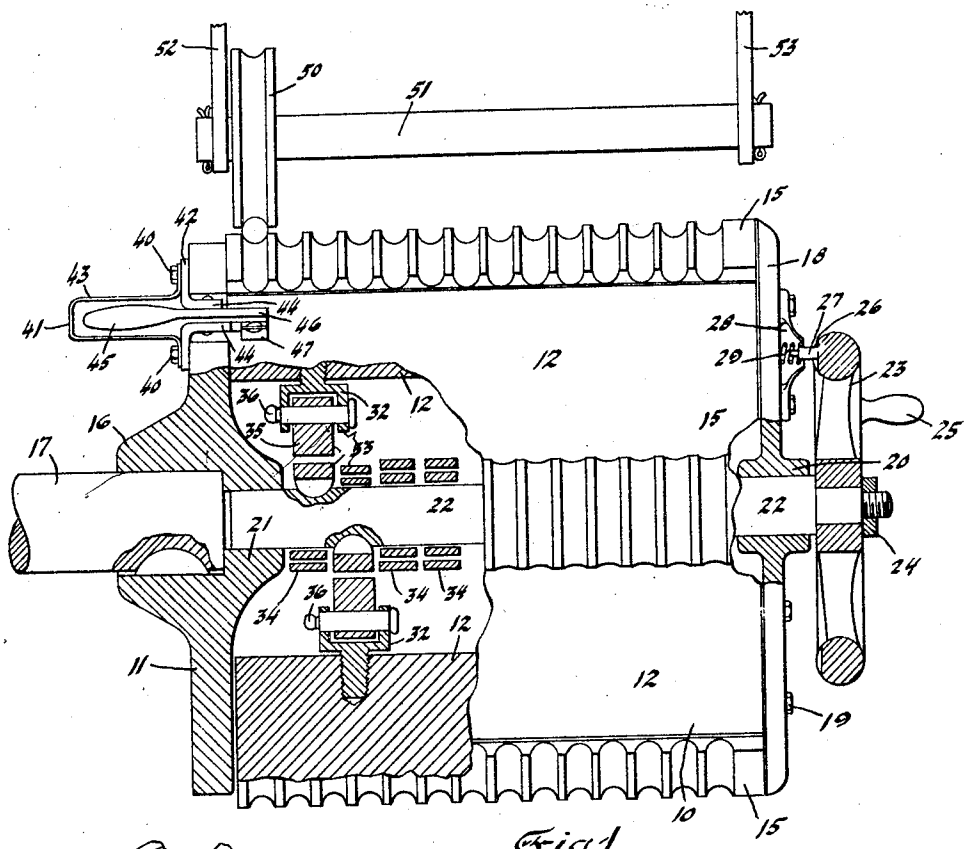


Fig. 1

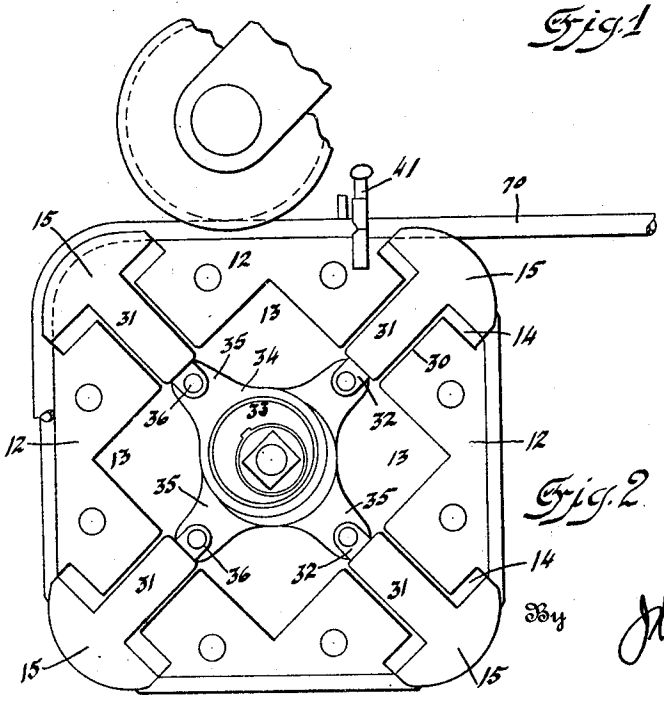


Fig. 2

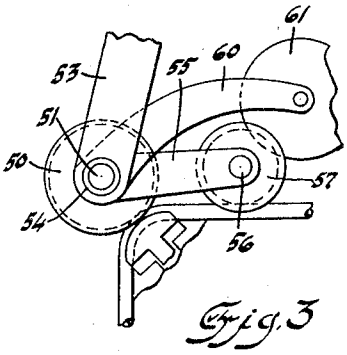


Fig. 3

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Patented Aug. 27, 1929. 1,726,279

UNITED STATES PATENT OFFICE.

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COLLAPSIBLE COIL-FORMING DEVICE.

Application filed April 27, 1927. Serial No. 187,052.

One of the objects of my invention is to provide a spool or mandrel upon which metal tubing may be wound for the purpose of forming a coil thereof which may be readily detached from the mandrel when formed.

Another object of my invention is to provide a spool or mandrel upon which coils of metal tubing may be formed which may be power driven.

With these and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims and shown in the accompanying drawings, in which:

Fig. 1 is a side elevation of my device, with certain parts in section.

Fig. 2 is a fragmentary end view of my device showing the adjustable corner members thereof.

Fig. 3 is a modification of the guide and holding roller which may be used on my device.

I have shown a mandrel designated generally by the numeral 10, which comprises a base 11 to which is secured either integrally or by other suitable means, horizontally extending members 12 which are positioned about a central space 13, as shown in Fig. 2. Longitudinal channels 14 are formed in the outer corners of members 12, and transversely grooved bars 15 are movably positioned therein.

The base member 11 is formed with a central hub portion 16 in which is suitably keyed the end of a drive shaft 17. Secured to the free end of members 12 by stud bolts 19 or other suitable means is a cover or plate 18 which has a central hub portion 20.

The hub portion 16 of member 11 has a reduced bearing 21 formed of its inner end in which is journaled for independent rotation the end of a shaft 22 which extends through the hollow central space 13 and is also journaled in the hub 20 of plate 18. That portion of shaft 22 which extends beyond the hub 20 is reduced and squared to receive a hand wheel 23 and is further reduced and threaded to receive a securing nut 24.

The hand wheel 23 is provided with a handle 25 and has a slot 26 formed on the inner side of its rim adapted to receive the end of a lock pin 27. Secured to the plate 18 adjacent the rim of the wheel 23 is a boss 28 in which is positioned a coil spring 29 and the end of lock pin 27. Spring 29 bears against the inner end of lock pin 27 and is tensioned to force the same outwardly against the rim of wheel 23 and hold it in the slot 26 when desired.

Leading inward from the bottoms of channels 14 in members 12 are a plurality of passages 30 in which are slidably positioned members 31 which are secured at their outer ends to the bottoms of bars 15 and have screwed in their inner ends clevises 32. Keyed on shaft 22 within the central space 13 are a plurality of eccentric cam members 33 upon which are rotatably mounted ring members 34 having ears 35 which are pivotally secured to clevises 32 by pins 36. The cam members 33 rotate freely in ring members 34.

The cam members 33 and the ring members 34 are so arranged that when shaft 22 is in a position so that lock pin 27 will engage slot 26 in wheel 23, the members 31 will be forced outwardly through passages 30, thus forcing the grooved bars 15 outwardly in the channels 14 so that the bottoms of the grooves in bars 15 will be on a level with the adjacent surfaces of members 12 and in position to receive the tubing which is to be coiled. It will be noted that the bars 15 fit in the channels 14 with sufficient closeness to eliminate any appreciable break between the bottom edges of the grooves in the bars 15 when they are in extended position and the adjacent edges of the surfaces of the members 12, which will provide an unbroken surface and thereby eliminate the possibility of indenting or corrugating the walls of the tubing being coiled.

Secured to one edge of the base member 11 by means of bolts 40 is a tube clamping device 41 which comprises a bracket member 42 to which is attached a handle 43. Pivoted between a pair of ears 44 which are formed on bracket 42 is a clamping lever 45 one end 46 of which is adapted to fit about and grasp approximately one-half the circumference of an end of the tubing which is being wound. The bracket member 42 is formed with an extension 47 which is also adapted to fit about and grasp the end of the tubing and to cooperate with the end 46 of lever 45 in retaining it in a given position.

The extension 47 of bracket 42 and the

end 46 of lever 45 are normally held together by a spring means (not shown, but readily understood) normally tensioned to force the outer end of lever 45 upward.

Positioned adjacent the members 12 is a guide roller 50 which runs freely on a shaft 51 which is supported by arms 52 and 53 which may be pivotally secured to any suitable frame or bracket, not shown, so that roller 50 will ride and align the oncoming tubing with the grooves in the bars 15 as the device is revolved.

In Fig. 3 I have shown a modification of the roller device for guiding and holding the tubing in the grooves of the bars 15. A free running sleeve 54 carrying the free roller 50 is mounted on shaft 51. On each end of the sleeve at each side of the roller 50 are secured arms 55 which carry a pin 56 between their free ends upon which is mounted a second roller 57. Also secured to the ends of sleeve 54 which carries arms 55 is a forked arm 60 which carries at its free end a weight 61 which tends to hold roller 57 firmly against the tubing. The use of the device shown in Fig. 3 is in roller 57 holding the tubing from bulging outwardly as roller 50 passes over the shoulder member.

In operation, the bars 15 are fixed in a raised position as previously described, the end of the tubing 70 to be coiled is secured in the clamping device 41 and power is applied to shaft 17 thus causing the entire mechanism to revolve; the operator pays out the tubing as needed. The transverse grooves in the bars 15 provide a spiral path over the length of the members 12 and as the device revolves, the roller 50 guides the oncoming tubing in the grooves in the bars 15. When tubing has been wound in the grooves of the bars 15 over the length of the members 12, the machine is stopped, the tubing cut at the end of the coil thus formed, and the lock pin 27 is withdrawn from slot 26 in the hand wheel 23, which is then turned sufficiently to rotate shaft 22 so that cam members 33 will turn in the ring members 34, and cause the members 31 to withdraw the bars 15 into the channels 14 sufficiently to release the formed coil from the bars 15 and permit it to be slipped off the members 12.

It is readily apparent that the members 12 may be of such shape and the bars 15 so positioned and connected to shaft 22 as to form a coil of any desired shape so long as it is not circular, and that my invention is therefore not limited to the particular shape shown herein. It is also apparent that my device may be readily adapted to form left as well as right hand coils.

It will be obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. A device of the class described comprising a spool member having a central passage there-through, transversely grooved bars movably and longitudinally positioned on said spool member, a rotatable longitudinal shaft positioned in the central passage of said spool member, eccentric bearing members secured to said shaft, means connecting said eccentric bearing members to said longitudinal bars whereby a turning of said shaft will cause a radial retraction or extension of said bars as desired, means for locking said bars in extended position, and means cooperating with said grooved bars for guiding and holding tubing in the transverse grooves thereof.

2. A device of the class described comprising a spool member having a longitudinal central passage there-through, transversely grooved bars movably positioned on said spool member, a rotatable longitudinal shaft positioned in the central passage of said spool member, eccentric bearing members secured to said shaft, means connecting said eccentric bearing members to said bars whereby a turning of said shaft will cause a radial retraction or extension of said grooved bars as desired, and means for locking said bars in extended position.

3. A device of the class described comprising a spool member having radially movable longitudinal shoulder members, a rotatable longitudinal shaft positioned in the central portion thereof, eccentric cam members secured to said shaft, ring bearing members positioned about said cam members and operatively connected to said shoulder members whereby a turning of said shaft and cam members will cause said movable shoulder members to be radially extended or withdrawn as desired.

4. A device of the class described comprising a rotatable mandrel having longitudinal channels therein, transversely grooved bars movably positioned in said channels, a rotatable shaft extending longitudinally through said mandrel, and means connecting said shaft and grooved bars whereby said bars may be moved in the channels in said mandrel in a radial direction relative to said mandrel by rotation of said shaft.

5. A device of the class described comprising a rotatable mandrel having longitudinal channels therein, transversely grooved bars positioned in said channels and movable in a radial direction relative to said mandrel sufficiently to cause either the upper edges or bottoms of the grooves in

said bars to lie flush with the adjacent surface of said mandrel, a rotatable shaft extending longitudinally through said mandrel, and means connecting said bars with said shaft whereby said bars may be moved relative to said mandrel by rotation of said shaft.

6. A device for forming coils of tubing comprising a rotatable mandrel having longitudinal channels in the surface thereof, transversely grooved bars closely fitted in said channels and movable in a radial direction in said channels relative to said mandrel a sufficient distance to cause the bottoms of said grooves to lie flush with the adjacent surface of said mandrel thereby providing an unbroken surface for supporting tubing, a rotatable shaft extending longitudinally through said mandrel, and means connecting said shaft and said bars whereby said bars may be moved in said channels by rotation of said shaft.

7. A device of the class described comprising a rotatable sizing member, transversely grooved coil spacing members carried thereby and radially movable relative to the surface thereof, and means for moving said coil spacing members to bring either the tops or the bottoms of the grooves thereof flush with the surface of said sizing member.

8. A device of the class described comprising a rotatable member adapted to size and support a coil on its surface, coil spacing means carried by said sizing member and radially movable therein, and means for moving said spacing means relative to the surface of said sizing member to clear or engage a coil thereon.

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