Dec. 30, 1952 M. ARTONI 2,623,550

METHOD OF MAKING SPLIT RINGS

Filed May 4, 1950

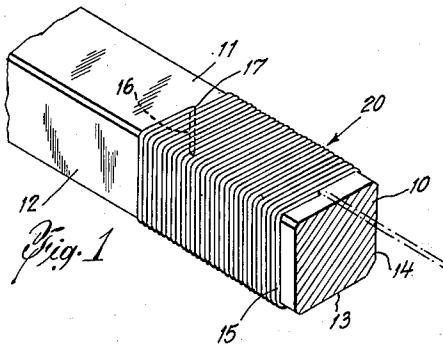


Fig. 1

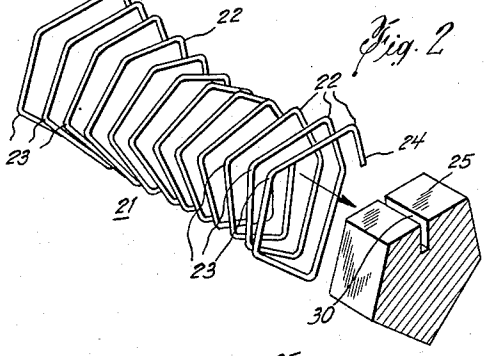


Fig. 2

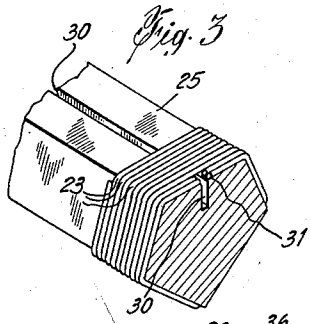


Fig. 3

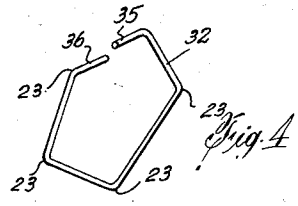


Fig. 4

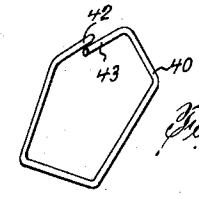


Fig. 5

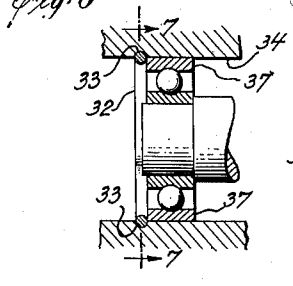


Fig. 6

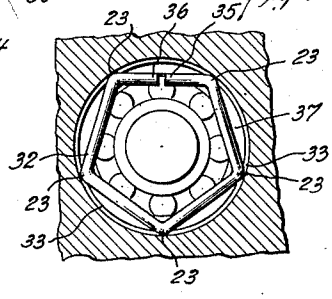


Fig. 7

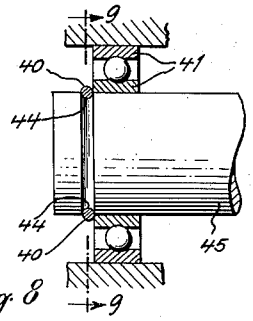


Fig. 8

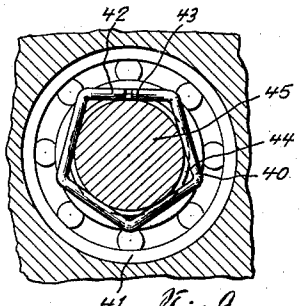


Fig. 9

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Patented Dec. 30, 1952

2,623,550

UNITED STATES PATENT OFFICE

2,623,550

METHOD OF MAKING SPLIT RINGS

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Application May 4, 1950, Serial No. 159,985
In France December 20, 1948

2 Claims. (Cl. 140—88)

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This invention relates to retaining rings and in particular to the method of making split-type retaining rings having plural sides thereon.

Heretofore, retaining rings have been formed from sheet metal stampings, a process which results in a large scrap residue relative to the actual metal utilized in the rings. Therefore, the produced rings were expensive due to the inefficient method of production. Similarly, wire rings were individually formed and here again, the efficiency of production was low and the cost high.

The instant invention provides an efficient method of making retaining rings in volume which therefore results in labor-cost savings and a relatively inexpensive product.

An important object thereof provides for a novel method of making split-type retaining rings employing plural-sided mandrels around which wire may be wound.

Another object provides for means for making retaining rings having plural sides thereon.

Another object provides for means on which retaining rings may be mass-produced.

Other ancillary objects will be apparent henceforth from the following detailed description when read in the light of the drawings, in which

Fig. 1 is an isometric projection of a four-sided mandrel having wire wound therearound.

Fig. 2 is an isometric projection of a fragment of a second mandrel having five sides thereon and a helical wire coil about to be placed thereon.

Fig. 3 is a fragmentary isometric projection of a five-sided mandrel having the helical coil positioned thereon.

Fig. 4 is an isometric projection of a retainer ring to be utilized externally on a shaft.

Fig. 5 is an isometric projection of a retainer ring for use internally in a bore.

Fig. 6 is a section plan view of the internal-type ring in a bore and a bearing retained thereby.

Fig. 7 is a cross sectional view taken along line 7—7 of Fig. 6.

Fig. 8 is a sectional view of the external-type retaining ring on a shaft on a bearing retained thereby.

Fig. 9 is a sectional view taken along line 9—9 of Fig. 8.

Referring to Fig. 1 there is shown therein, a mandrel 10 having sides 11, 12, 13 and 14 thereon. A wire 15 possessing inherent resiliency is tightly wound therearound with the end 16 thereof anchored in an aperture 17 provided in side 11. The winding of the wire 15 on the mandrel 10 is the first step of the ring forming operation and

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while a four-sided mandrel is illustrated, mandrels having a differing quantity of sides may be employed as will be hereinafter apparent.

The wire 15, forming the coil 20 on mandrel 10 is released therefrom and automatically assumes the pentagonal helical winding shown in Fig. 2 as coil 21, as a result of the inherent resilient characteristics of the wire.

It will be noted therein, that the wire 15 has expanded sufficiently for each of the windings 22 to assume a five-sided position with the adjacent angular portions 23 of each winding forming a distinct helical pattern.

It is readily apparent that the end 24 of coil 21 may be inserted on the five-sided mandrel 25. The positioning of the first few windings of coil 21 adjacent the end 24 thereof on the mandrel 25, will secure the said end thereon, therefore the feeding of each of the remaining windings of coil 21 on the mandrel is readily accomplished by rotating the opposite end of the coil, and windings adjacent thereto, in the direction opposite to that naturally assumed by the said coil, i. e., reversely rotating the portion of coil 21 not on the mandrel 25 to a position wherein the angular portions 23 of each adjacent winding form a substantially linear pattern, which results in each winding being pentagonally shaped. In this latter position the coil may be placed on the five-sided mandrel as shown in Fig. 3.

In some instances it will not be necessary to reversely rotate the outer end of the coil, but, on the contrary, rotation in the direction of the wind may be employed to position the multi-sided coil on the mandrel of similar shape. In other words, the degree of expansion of the wire of the coil depends upon the tension applied to the wire during wrapping, the heat of the wrapping and the nature of the wire.

Centrally formed in one side of the mandrel 25 is a lateral recess 30 in which a cutting tool, not shown, is arranged to travel, thus severing each of the windings as shown at 31 in Fig. 3, into individual retaining rings.

While the mandrel 10 is disclosed as having four sides thereon and the mandrel 25 as having five sides thereon, the number of sides in each respective mandrel may vary without altering the aforementioned method, however, the basic requirement is that the second mandrel must have at least one side more than the number of sides on the first mandrel.

The ring 32, Fig. 4, is the natural product taken from the mandrel 25 and is intended for use within a bore such as shown in Figs. 6

and 7. The angular portions 23 thereof are arranged to reside in an annular recess 33 formed in the internal periphery of the bore 34 with the free ends 35, 36 of the retainer in substantial alignment. It will be noted that the free ends 35, 36 of the ring 34 terminate on differing planes when the said ring is not positioned in a recess. This feature is a result of the forming of the rings from a helical coil and further secures the said rings in the related recess when positioned therein.

The bearing member 37 abuts against the linear portions of the ring 32 and is substantially positioned thereby.

Analogously, the ring 40, Fig. 5, effectively retains a like bearing member 41 on shaft 42, Figs. 8 and 9. The ring 40 is compressed to assume the natural position shown in Fig. 5, with the free ends 42, 43 thereof terminating in differing planes. Therefore, the ring 40, when temporarily expanded may be positioned on a shaft and when placed in a related recess 44 in the periphery of shaft 45 will contract to engage the said recess with the linear portions of the ring in actual contact therewith.

While a form or embodiment of the invention has been shown and described herein for illustrative purposes, and the construction and arrangement incidental to a specific application thereof have been disclosed and discussed in detail, it is to be understood that the invention is limited neither to the mere details or relative arrangement of parts, nor to its specific embodiment shown herein, but that extensive deviations from the illustrated form or embodiment of the invention may be made without departing from the principles thereof.

In which I claim:

1. The method of making split-type retaining rings consisting of winding wire having inherent resilient characteristics on a mandrel having at least four sides, removing the helical coil therefrom and permitting the coil to assume a natural shape resulting from the inherent resiliency thereof, feeding the said coil on a second mandrel having plural sides thereon, the number of which exceed by one the number of sides of said first mandrel, and cutting said coil longitudinally to sever each winding thereof to form individual retaining rings.

2. The method of making split-type retaining rings having plural sides and arcuate portions connecting therebetween, the free ends of which terminate on differing planes, consisting of winding wire having inherent resilient characteristics on a mandrel having at least four sides, removing the helical coil therefrom and permitting the coil to assume a natural shape resulting from the inherent resiliency thereof, feeding the said coil on a second mandrel having plural sides thereon, the number of which exceed by one the number of sides of said first mandrel, one of the sides of said second mandrel having a centrally positioned, longitudinal slot for the receiving of cutting means therein, and cutting said coil along said slot to sever each winding thereof to form individual retaining rings.

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The following references are of record in the file of this patent:

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