Dec. 12, 1950 E. J. POLTORAK 2,533,742

RING PACKING AND METHOD OF MAKING THE SAME

Filed March 11, 1947

Fig. 1.

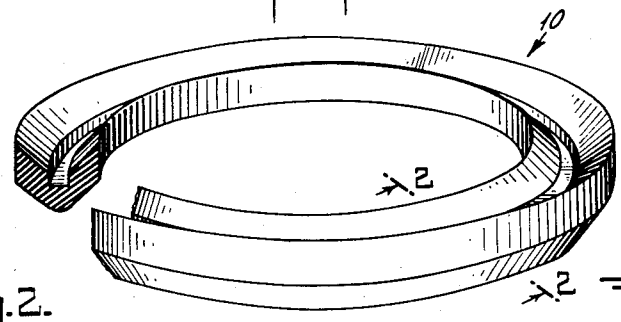


Fig. 2.

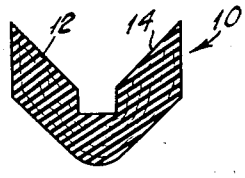


Fig. 3.

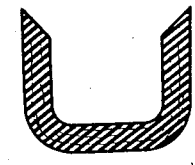


Fig. 4.

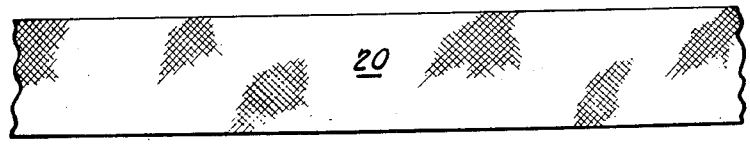


Fig. 5.

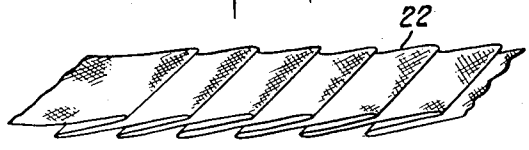


Fig. 6.

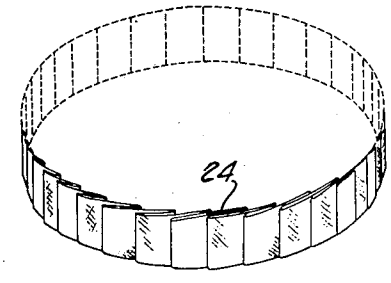


Fig. 8.

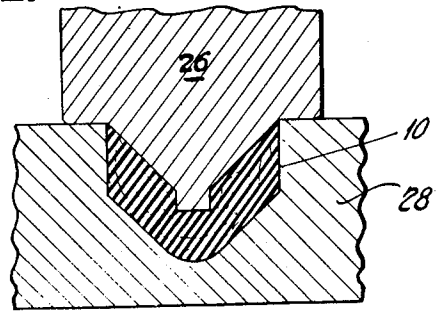
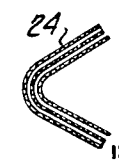


Fig. 7.



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RING PACKING AND METHOD OF MAKING THE SAME

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Application March 11, 1947, Serial No. 733,875

6 Claims. (Cl. 288—18)

1

The instant invention relates to packings and, more particularly, to an improved ring packing of the type adapted to engage and seal against a relatively rotating or reciprocating rod, shaft, plunger, cylinder or other moving part. Such packings are conventionally of generally U or V cross-section to include an upstanding lip or lips for sealing engagement with the moving part. They are made of a fabric base, such as a cotton or asbestos cloth impregnated with a heat-curable, yieldable material, usually a rubber compound.

In the manufacture of the conventional packings, a strip of the cloth carrying the rubber compound as an impregnant, or partial impregnant, is formed into a multi-ply ring by wrapping a plurality, say, 2 or 3 convolutions of the strip on a mandrel, or the like. Alternatively the multi-ply construction may be obtained by forming but a single convolution and then folding the ring approximately on the center line to form a double ply, or by inwardly folding the margins toward the center to similarly form a double ply. Also, it has been proposed to make the multi-ply thickness rings by laminating a plurality of thicknesses of the rubberized fabric and die-cutting the rings. The rings made in any of the ways described above are preferably pre-folded to an approximately V cross-section and are then placed in molds of the finished shape of the rings and subjected to heat and pressure. In the molding operation the rubberized material is first liquefied so that it flows to substantially embed the fabric in rubber and is then vulcanized.

The instant invention has for an object the provision of an improved packing of this general type but one in which the sealing lips adapted to engage the moving part have a greater flexibility than the prior type and, hence, will conform more readily to and provide a more efficient seal against cylinders, rods, shafts and the like, particularly where they have irregularities of surface or dimensional variations. Due to the manner in which the fabric rings have been made in the prior practice described above, the relatively unstretchable, multi-layer fabric extends as a continuous ring into, and forms the basic element of, the lips whereby they are relatively stiff and unyieldable. The instant invention overcomes this disadvantage and imparts stretchability or yieldability to the lip, by forming the plied ring, or the major portion thereof, from a succession of overlapping folds or pleats of a single fabric strip. The overlapping pleats or folds are secured together solely by the rubber-

2

like material whereby distortion of the lips, which may be necessary to conform the packing to irregularities of surface or dimensional changes of the part against which it seals, requires only that the rubber between the pleats be stretched or distorted.

A further object of the invention is the provision of a method of making a packing as described above.

The invention will be more fully understood and further objects and advantages will become apparent when reference is made to the following more detailed description of a preferred embodiment of the invention and to the accompanying drawings in which:

Fig. 1 is a perspective view of a ring packing in accordance with the invention with a portion broken away for clearance of illustration;

Fig. 2 is a sectional view on an enlarged scale, taken on the line 2—2 of Fig. 1 and illustrating one typical ring cross-section;

Fig. 3 is a view similar to Fig. 2 illustrating a second typical ring cross-section;

Fig. 4 is a plan view of a fabric strip as employed in the instant invention;

Fig. 5 is a perspective view illustrating a step in the manufacture of the packing;

Fig. 6 is a perspective view illustrating a further step in the manufacture of the packing;

Fig. 7 is a sectional, detail view of the packing at a further stage in its manufacture; and,

Fig. 8 is a fragmentary, sectional view illustrating the final molding operation.

Referring now to the drawings, the invention is illustrated as embodied in a typical ring packing 10 of any conventional cross-section, such as the V-shape shown in Figs. 1, 2 and 8, or the U-shape shown in Fig. 3, the packing having projecting lips 12 and 14, either or both of which are adapted to seal against a moving part. It will be understood that the particular packing shape is immaterial, the concept of the instant invention being embodied in ring packings of any of the known styles but having sealing lips with a flexibility and yieldability not heretofore known.

Referring now particularly to Figs. 4–8, inclusive, the structure of the packing will be described in conjunction with the description of its method of manufacture. In Fig. 4 there is shown a strip of fabric 20 which is suitably a woven fabric of cotton, asbestos or other conventional material, the fabric being impregnated with a resilient, yieldable, stretchable compound which is curable by heat. In lieu of complete impregnation, the fabric may carry the compound as a coating

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which only partially impregnates the fabric. The compound conventionally used is a rubber compound, although resins or other compounds may be employed in conformity with the known practice of the art. The proportion of the compound employed may, of course, vary, depending upon the particular properties desired, but for purposes of illustration, where asbestos fabric is used, 40–50% of rubber by weight of the fabric may be employed. On the other hand, where a cotton fabric is used, the proportion is usually higher, say, 55–60% by weight of the fabric. Conventionally the fabric of strip **20** is known in the art as "rubberized fabric" and this term will be employed in referring to it.

In accordance with the instant invention, the strips of rubberized fabric of known type, as shown in Fig. 4, are folded, as illustrated in Fig. 5, to form a succession of overlapping pleats **22** whereby a strip of multi-layer thickness is obtained. The amount of overlap will depend on the number of layers required to bring the fabric to the desired thickness. The ends of the pleated strip are joined, suitably by cementing them together as indicated at **24** in Fig. 6, whereby the strip defines a ring having a continuous succession of transverse folds or pleats. At this point a single thickness of an unpleated cloth may be applied to the ring to provide a covering if desired without materially affecting the desirable characteristics of the finished packing. The ring is then preferably folded circumferentially at substantially its mid-point (see Fig. 7) to an approximately V cross-section, and the preformed ring is then inserted in a mold having male and female members **26** and **28**, respectively, as illustrated in Fig. 8, of a configuration to mold the ring to the desired finished shape. As will be appreciated, in inserting the preform in the mold, it is necessary to distort it sufficiently to rotate the V from a substantially horizontal to a vertical position. This same condition is present in the manufacture of the conventional rings but in the instant case the distortion of the ring is greatly facilitated by its pleated character, inasmuch as the inner surface of the ring may contract and the outer surface expand sufficiently to readily permit the inclusion of the ring within the mold. The ring is subjected in the mold to heat and pressure in a conventional manner to cause the rubber-like material to first flow so that the fabric is substantially embedded in the rubber-like material, and to then become vulcanized or cured. When the packing is removed from the mold a construction, as shown in Fig. 1, is obtained.

In the use of the ring, the lip **12** or **14**, as the case may be, in contact with the relatively moving part, may readily yield, i. e., contract or expand, to accommodate itself to changes in contour of the relatively moving part with which it is in contact. In practice a decided increase in the flexibility of the lips has been found, greatly increasing the efficiency of the sealing action.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. A ring packing including a projecting lip comprising a fabric base and a yieldable compound impregnating the base, said base being built up to a multi-layer thickness by a succession of overlapping pleats with the fold lines thereof extending transversely of the ring and into said lip, the overlapping portions of the pleats being adhered together by the impregnant.

2. A molded ring packing including a projecting lip comprising a fabric base impregnated by and embedded in a rubber material, said base comprising a fabric strip built up to a plurality of thicknesses by a succession of overlapping, pleats with the fold lines thereof extending transversely of the ring and into said lip, the overlapping portions of the pleats being adhered together by the rubber material.

3. A molded ring packing including projecting lips and a connecting portion comprising a fabric base molded to define said lips and connecting portion, said base being impregnated by and embedded in a rubber material, said base comprising a fabric strip built up to a plurality of thicknesses by a succession of overlapping, pleats with the fold lines thereof extending transversely of the ring and into said lips, the overlapping portions of the pleats being adhered together by the rubber material.

4. The process of making a ring packing comprising folding a strip of cloth carrying a heat-curing, yieldable material to form a succession of overlapping, transverse pleats connecting the ends of the strip to form a ring, distorting the material of the ring to cause the fold lines of the pleats to lie in planes extending substantially radially of the ring, and molding the ring under heat and pressure to define a projecting lip, and simultaneously curing the yieldable material.

5. The process of making a ring packing comprising folding a strip of cloth carrying a rubber material to form a succession of transverse, overlapping pleats, connecting the ends of the strip to form a ring, distorting the material of the ring to cause the fold lines of the pleats to lie in planes extending substantially radially of the ring and molding the ring under heat and pressure to define projecting lips and a connecting portion and to vulcanize the rubber material.

6. The process of making a ring packing comprising folding a strip of rubberized cloth to form a succession of transverse, overlapping pleats, connecting the ends of the strip to form a ring, folding the ring centrally to have an approximately horizontal V cross-section, distorting the ring to rotate the V to an approximately vertical position, and molding the ring under heat and pressure to form the ring to the desired finished shape and to vulcanize the rubber.

EMIL J. POLTORAK.

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Certificate of Correction

Patent No. 2,533,742 **December 12, 1950**

EMIL J. POLTORAK

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 18, for the word "clearance" read *clearness*; column 3, line 9, for "40–50%" read *40–45%*; column 4, lines 10 and 21, respectively, after "overlapping" strike out the comma;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of February, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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