Jan. 12, 1932. C. R. HUBBARD ET AL 1,840,449

PACKING AND METHOD OF MAKING THE SAME

Filed Aug. 13, 1930

Fig. 2.

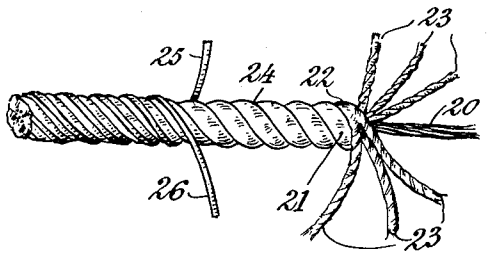


Fig. 3.

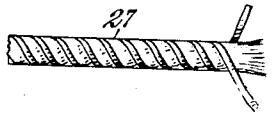


Fig. 4.

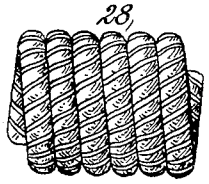


Fig. 1.

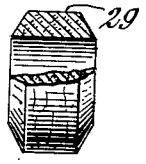


Fig. 5.

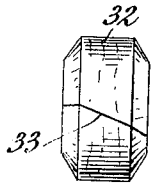
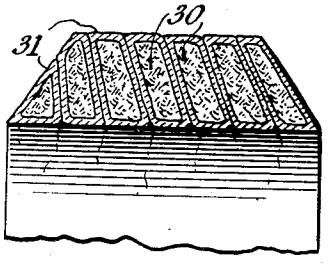


Fig. 6.



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UNITED STATES PATENT OFFICE

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PACKING AND METHOD OF MAKING THE SAME

Application filed August 13, 1930. Serial No. 474,919.

This invention relates to an improved packing ring especially adapted for use in packing rotary pumps for the water-cooling systems of automobiles, although the packing is not limited to that particular use but is of more or less general application. The invention also relates to a novel method of making the improved packing ring.

One of the objects of the invention is to produce a packing ring of fibrous material and soft metal, the parts being so distributed that the surface of the ring will be almost completely coated with metal even though the metal may constitute a relatively small proportion of the constituent elements of the packing as compared with the amount of fibrous material used.

A further object of the invention is to produce a relatively light packing ring well adapted to retain lubrication, yet having a substantially continuous metal surface of wearing properties similar to those of a bearing.

Another important feature of the invention is its relatively high degree of resilience and its capability of standing up under relatively sudden and extreme changes of temperature.

In the accompanying drawings illustrating the preferred form of the invention,—

Figure 1 is a side view of a packing ring embodying the invention, a part of the ring being broken away and illustrated in cross-section.

Fig. 2 is an illustration of a metal-wound rope of fibrous material from which the packing ring may be constructed.

Fig. 3 is a representation of the rope shown in Fig. 2 after it has been coated with rubber cement or some equivalent binding element and twisted so as to reduce its diameter and increase its density.

Fig. 4 is an illustration of a helical coil of packing material formed by bending a piece of the twisted rope illustrated in Fig. 3, the coil being of a diameter such that it may be compressed between suitable dies to form the ring illustrated in Fig. 1.

Fig. 5 is a side view of a ring similar to that shown in Fig. 1, except that it is represented as having been severed by a diagonal cut to permit it to be sprung open and slipped over a rod to be packed when it cannot be applied endwise.

Fig. 6 is a large-scale cross-sectional view of a packing ring embodying the invention.

The rope from which the packing is made may comprise fibrous material of any suitable character such as cotton or asbestos, or both, having one or more ribbons or strips of lead, Babbitt metal, or other suitable soft metal, helically wound about the fibrous material. The fibrous material may be built up of soft yarn, which should preferably be slightly twisted and the twisted yarns then twisted together to form the rope.

In the preferred form of rope illustrated in Fig. 2, the rope is represented as being built up of a cotton core 20 about which are wound two strands 21, 22 of asbestos fibre, each strand comprising three yarns 23. The core and the yarns are represented as being loosely twisted and the yarns are loosely twisted with respect to each other before they are twisted about the core to form the rope 24.

The metal winding, preferably of lead, comprises two ribbons 25, 26 helically wound along the rope of fibrous material.

At any suitable time during the building up of this rope structure the fibrous material may be coated or saturated with an appropriate binding element, such as rubber cement, and this coated, loosely-twisted, rope of fibre and metal may then be more tightly twisted to reduce its diameter and increase its density, the excess binding material being wiped off. The resulting product represented in Fig. 3 is a metal-bound relatively compact rope 27 of fibrous material, the parts of which are firmly cemented together by the binding element.

A suitable length of the rope 27 represented by Fig. 3 may be bent into a helical coil 28 shown in Fig. 4, and this coil may then be compressed into a solid ring of any desired cross-section by the use of dies of appropriate form. During the compression of the coil the rubber cement or other binding agent will be caused to permeate the entire mass of the material and bind it firmly into a unitary structure. If the binding material includes raw rubber and suitable curing agents calling for the application of heat, such heat may be applied in any appropriate manner during the compression of the coil by the dies, as a result of which the rubber composition may be vulcanized to any desired degree. On the other hand, if a binder of the character known as self-curing material is used, the application of heat may be unnecessary.

One form of packing ring 29 produced in the foregoing manner is illustrated in Fig. 1.

As indicated by the large-scale cross-sectional view (Fig. 6), the finished packing ring is a relatively solid structure of which by far the greater proportion of the material of which it is made is fibrous material 30 and a relatively small proportion is metal 31, yet the distribution of the metal is such as to provide for the ring an almost continuous outer metal surface.

The endless packing ring 29 illustrated in Fig. 1 is appropriate for use when packing a new structure, in which case the ring may be slipped over the end of the rod to be packed when the device is being assembled. To provide for the renewal of packing rings on devices which have been assembled and are in use, and in which it is impracticable to slip the ring over the end of the rod, a form of ring 32 may be made having a diagonal cut 33 to make it possible to spring the adjacent portions of the ring apart and snap them over the rod to be packed.

It will be apparent that the herein-described packing is of a character such as to readily change its form when subjected to pressure in order to completely fill the space in the stuffing-box, and, due to the coil-like structure of which it is built up, it is sufficiently resilient to follow up slight changes in diameter to compensate for minute lateral movements of the surface of the rod to be packed. The metal surface of the packing ring also adapts it for use analogous to that of a bearing ring, and in certain devices it might be used as a combined packing and bearing ring.

The invention is not intended to be limited to the specific form herein disclosed for purposes of illustration, but should be regarded as including modifications and variations thereof within the scope of the appended claims.

What is claimed is:

1. A packing ring comprising a compressed helical rope of fibrous material and soft metal, the diameter of the compressed rope being equal to the thickness of the ring and the soft metal comprising an externally-disposed spiral winding surrounding the coils of the fibrous portion of the helix, whereby each coil of the metal winding will have a portion exposed at the outer surface of the ring and another portion exposed at the inner surface of the ring.

2. A packing ring comprising a compressed cemented solid structure of a well-defined and persistent size and shape, said ring consisting of a helical rope of fibrous material, a coating of plastic binding material, and a winding of soft metal, the diameter of the compressed rope being equal to the thickness of the ring and the soft metal comprising an externally-disposed spiral winding surrounding the coils of the fibrous portion of the helix, whereby each coil of the metal winding will have a portion exposed at the outer surface of the ring and another portion exposed at the inner surface of the ring.

3. A packing ring comprising a compressed helical rope of twisted asbestos having a cotton core and an external winding of soft metal, the diameter of the compressed rope being equal to the thickness of the ring and the metal winding being in the form of a spiral surrounding the asbestos covering of the core whereby each coil of the metal winding will have a portion exposed at the outer surface of the ring and another portion exposed at the inner surface of the ring.

4. The method of making a packing ring, which consists in applying a helical winding of soft metal and a coating of plastic binding material to a rope of fibrous material and twisting the same, then bending the rope into a helical coil and compressing the coil between dies of proper shape and size to produce a ring of the desired cross-sectional form.

5. The method of making a packing ring, which consists in winding soft metal helically about a rope of fibrous material, coating the rope with rubber cement, twisting it to reduce its diameter and increase its density, bending the twisted, coated, metal-bound rope into a helical coil, and compressing the coil between dies of proper shape and size to produce a ring of the desired cross-sectional form.

6. The method of making a packing ring, which consists in windng strands of fibrous material helically about a fibrous core to form a rope, winding soft metal helically about said rope, coating said rope with rubber cement and twisting it, bending the twisted rope into a helical coil, and compressing the coil into a ring of the desired form.

7. The method of making a packing ring,

which consists in applying a helical winding of soft metal and a coating of rubber composition including uncured rubber and curing agents to a rope of fibrous material and twisting the same, then bending the rope into a helical coil and then compacting and curing the same to form a solid packing ring by applying heat and pressure.

In witness whereof, we have hereunto signed our names.

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