C. I. E. MASTIN.

PACKING FOR PISTON RODS, &c.

APPLICATION FILED SEPT. 24, 1915.

1,178,741.

Patented Apr. 11, 1916.

Fig. 1

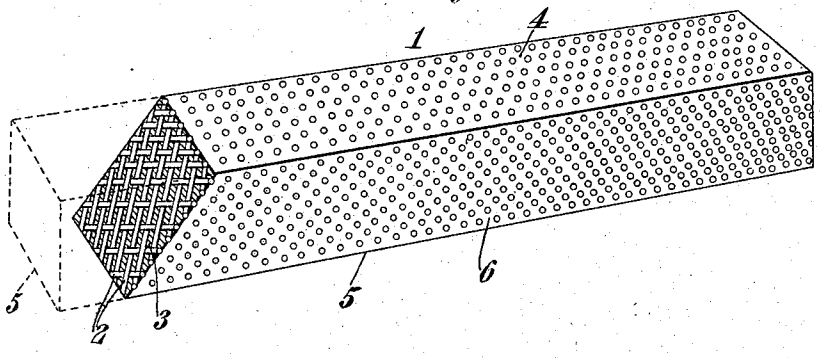


Fig. 2

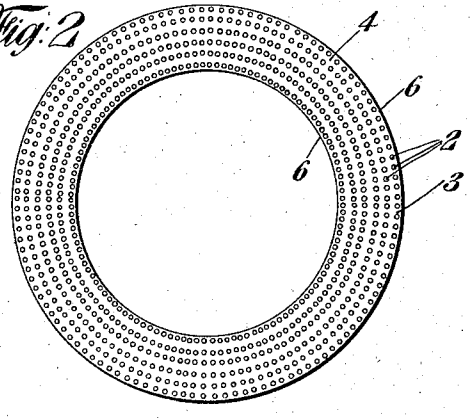


Fig. 4

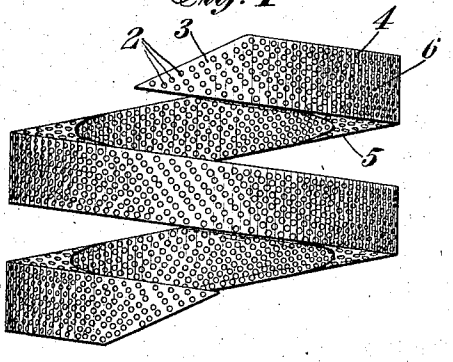


Fig. 3

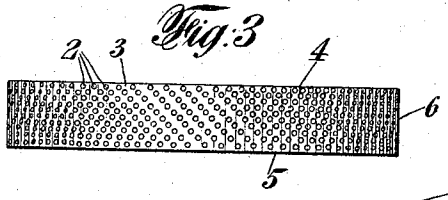


Fig. 5

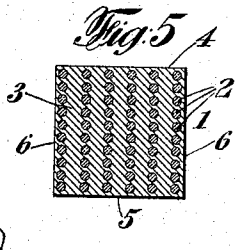
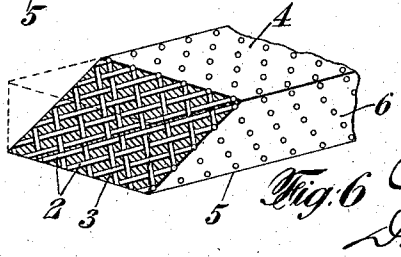


Fig. 6



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PACKING FOR PISTON-RODS, &c.

1,178,741. Specification of Letters Patent. Patented Apr. 11, 1916.

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To all whom it may concern:

Be it known that I, CHARLES I. E. MASTIN, a citizen of the United States, residing at Midland Park, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Packing for Piston-Rods, &c., and do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

The object of my invention is to provide a packing for piston rods and other moving parts of engines and machinery where a tight joint against the passage of steam, air, gas, oil, water, etc., is required, which packing will have the qualities of pliability and elasticity, so that while capable of easy application to the stuffing box it will, nevertheless, quickly respond to conditions calling for compression or expansion to make a tight joint, and adapt itself to non-alinement of the parts, and which will be durable so that it will possess these qualities for a long time.

The invention consists primarily in providing a strip for the manufacture of packing made up of alternate parallel layers of fabric and rubber wherein said layers are oblique to the longitudinal line of the strip.

A further object of the invention is to provide a packing strip wherein there are no threads of the fabric layers running longitudinally of the strip, all of said threads being arranged obliquely and transversely of the strip.

One of the many advantages of a packing strip made in accordance with this invention is that it may be readily shaped into ring form or into a spiral coil, there being no longitudinally extending threads to resist the bending or coiling of the strip.

Another advantage of the construction described herein is that when the strip is coiled the inner surface thereof is condensed and contracted while the outer surface thereof is more or less free to yield and expand under the coiling strain. It is manifest that this is desirable for the reason that the inner surface of the ring receives the greatest wear.

There are many other advantages of a packing constructed in accordance with this invention, all of which will be manifest to those skilled in the art, and it is thought unnecessary to further enumerate them herein.

In the drawing Figure 1 is a perspective view of a packing strip made in accordance with this invention, one end of the strip being cut obliquely along one of the fabric layers; Fig. 2 a plan view of a packing ring made from the packing strip constructed in accordance with this invention; Fig. 3 an edge view of the ring shown in Fig. 2; Fig. 4 an elevation of a coil formed from a packing strip made in accordance with this invention; Fig. 5 a transverse sectional view of the packing strip; and Fig. 6 a detail perspective view of a strip of packing oblong in transverse section.

Referring to the various parts by numerals, 1 designates the packing strip. This strip is made up of alternate parallel layers of fabric 2 and rubber 3. The fabric is preferably what is known in the art as cotton duck or canvas, and each layer is coated and impregnated with rubber gum. The layers of canvas are obliquely arranged with respect to the longitudinal line of the packing strip and extend from what may be termed, for the convenience of reference, the upper surface 4 of the strip to the lower surface 5 thereof. These layers also extend through the strip from one side to the other. The upper and lower edges of each layer are perpendicular to the longitudinal line of the strip, as shown clearly in Fig. 1, so that each layer is formed of a rectangle piece obliquely disposed in the strip with the upper and lower edges of the layer perpendicular to the longitudinal line of the strip. In each fabric layer the threads are on the bias, as clearly shown in Fig. 1 so that the ends only of said threads are exposed on the four sides of the packing strip.

It is manifest from a construction such as described, there are no threads running lon-

gitudinally of the strip. This is necessarily so because of the oblique disposition of the layers of fabric and the diagonal arrangement of threads through the strip.

A strip made up in accordance with this invention may be bent into ring form as shown in Fig. 2, the sides 6 of the strip becoming the inner and outer surfaces of the ring; and the upper and lower surfaces of the strip, as viewed in Fig. 1, becoming flat surfaces of the ring. When a strip is bent into ring form the inner surface of the ring is compressed and the outer surface thereof is somewhat expanded or stretched. This is readily accomplished by reason of the fact that there are no longitudinal threads in the strip to resist the bending movement of the strip and because the threads in each fabric layer are on the bias. The edges of the layers of fabric exposed on the flat surfaces of the ring take a radial position as the strip is bent around to form the ring. The edges of the layers exposed on the inner surface of the ring are brought closer together, and the edges exposed on the outer surface of the ring are separated slightly on the bending or coiling of the strip.

In Fig. 4 the strip is shown as bent into a spiral coil; and it is manifest that the same action takes place and the same result is obtained as described with reference as to the making of the ring. Sections of the coil may be cut off for the purpose of making packing rings, as is common with respect to all packing strips made up in coil form.

In Figs. 1 and 5 the packing strip is shown as substantially square in cross section. All packing strips that I am aware of heretofore made and adapted to be coiled or bent into ring form were square in cross section. By reason of the peculiar arrangement of the fabric layers in a packing strip made in accordance with this invention the said strip may be of any rectangular form. As shown in Fig. 6 the packing strip is oblong in cross section, the greater dimension being across the top of the strip so that when the strip is coiled the flat surfaces of the coil are much broader than the inner and outer surfaces thereof. Strips of this form may be readily coiled or bent into ring form without buckling of the strip. When the packing strip is made into packing rings the ends only of the threads of the fabric layers are brought into contact with the moving part. It is also clear that the layers of fabric in the ring are obliquely disposed with respect to the axial line of the part that is packed. This is of advantage for the reason that the reciprocation of said part does not tend to separate the layers of fabric. It is manifest that the wear of the reciprocating part against the packing is on the ends only of the threads, and as said threads extend obliquely and transversely through the packing strip they cannot possibly be detached or disintegrated or loosened from the strip.

It is, of course, to be understood that a packing strip made in accordance with this invention may be cured or vulcanized under pressure, in a mold if desired, so that it will be adapted for use as a cold water packing, or for steam, hot water and hot oils.

A packing strip made in accordance with this invention is very durable, being especially adapted to withstand the disintegrating effect of the steam and hot oils in a stuffing box.

What I claim is:

1. A packing strip formed of alternate parallel layers of fabric and rubber, the fabric layers being arranged in planes transversely disposed and oblique to the longitudinal line of the packing strip, the four edges of each of said layers being exposed on the four sides of the packing strip and the threads of each layer being on the bias whereby the ends of said threads only are exposed on four sides of the packing strip.

2. A packing strip formed of alternate parallel layers of fabric and rubber, the fabric layers being transversely disposed and arranged with two opposite edges oblique to the longitudinal line of the strip and with the other two opposite edges perpendicular to the longitudinal line of the strip and on opposite sides of the strip, the threads of each fabric layer being on the bias and the ends only of said threads exposed on the four sides of the packing strip.

3. A rectangular packing strip formed of rubber and parallel layers of fabric, the fabric layers being transverse of the strip and arranged in planes oblique to and extending across the longitudinal line of the packing strip, the four edges of each fabric layer being exposed on the four longitudinally extending sides of the strip.

4. A packing ring formed of a strip of material rectangular in cross section and formed of rubber and parallel layers of fabric, the fabric layers extending transversely through the strip, two opposite edges of said layers being exposed on the opposite flat surfaces of the ring, the other opposite edges of the layers being exposed on the inner and outer surfaces of the ring and obliquely disposed, whereby each layer will extend transversely through the strip on an oblique angle and there will be no threads running longitudinally or annularly of the ring.

5. A packing ring formed of a strip of material rectangular in cross section and formed of alternate layers of fabric and rubber, the fabric layers extending transversely through the strip, two opposite edges of said

layers being exposed on the opposite flat surfaces of the ring and radially disposed, the other opposite edges of the layers being exposed on the inner and outer surfaces of the ring and obliquely disposed, the threads of each fabric layer being on the bias, the ends only of the threads being exposed on the four sides of the packing whereby each layer will extend transversely through the strip on an oblique angle and there will be no threads running longitudinally or annularly of the ring.

In testimony whereof I hereunto affix my signature.

CHARLES I. E. MASTIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."