Dec. 19, 1933. J. F. FOEHR 1,939,683

PISTON PACKING

Filed Feb. 5, 1930

Fig. 1.

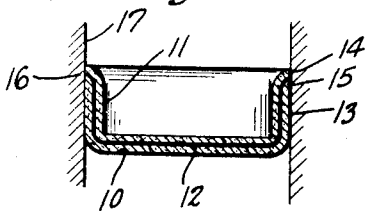


Fig. 3.

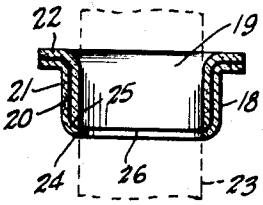
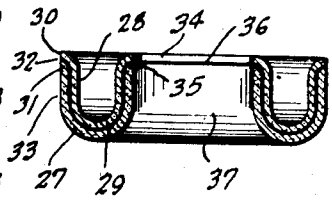
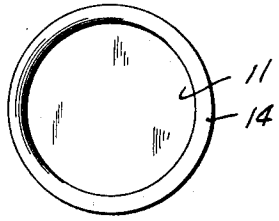
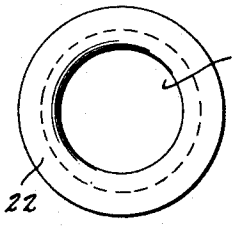


Fig. 5.







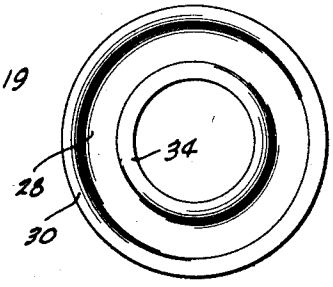


Fig. 2.

Fig. 4.

Fig. 6.

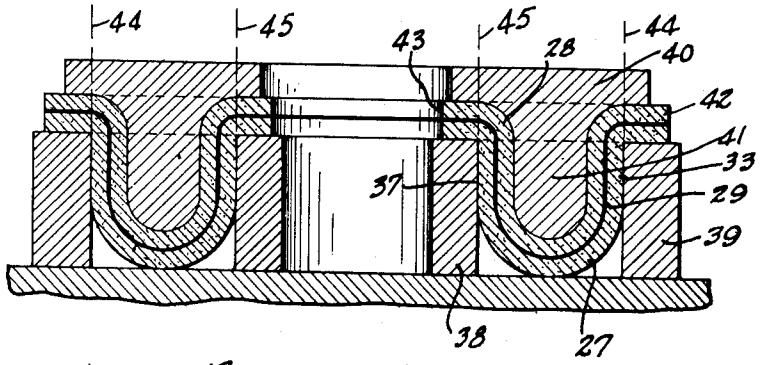


Fig. 7.

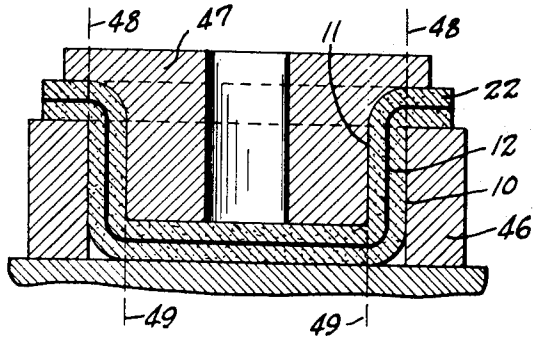


Fig. 8.

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PISTON PACKING

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Application February 5, 1930. Serial No. 425,970

9 Claims. (Cl. 154—45.5)

This invention relates to a packing for pistons, plungers, rods and the like, and particularly to a packing for use in connection with gasoline, oil, water, air or similar fluids, and it is an object of the invention to provide a packing which is largely or wholly impervious to such fluids. A particular use for which these packings are designed is in gasoline or oil pumps where it has been very difficult to prevent leakage of the gasoline or oil past the packing as these materials very readily penetrate the fibrous materials ordinarily used for packings. It is, however, to be understood that these packings are not limited to such use but may be used with water, steam, air or other fluids, and are not limited to cup or rod packings, but are equally adapted for so-called U packings, V packings, flange packings and the like.

In the accompanying drawing, I have illustrated by way of example three different types of packings, and have also illustrated an effective method of making these packings to insure that they will be practically impervious to the fluids with which they are to be used.

In this drawing

Fig. 1 is a section of a cup packing constructed according to my invention of the type which are largely used for gasoline and oil service pumps and pistons such as are used with air, steam, water and the like.

Fig. 2 is a top plan view thereof.

Fig. 3 is a section of a flange or rod packing involving my invention.

Fig. 4 is a top plan view thereof.

Fig. 5 is a section of a U packing involving my invention.

Fig. 6 is a top plan view thereof.

Fig. 7 is a cross section through a die showing an effective method by which the U packing may be made, and

Fig. 8 is a similar view showing a die illustrating an effective method of making the packings shown in Figs. 1 and 3.

It has been proposed to make this type of packing of a plurality of plies of fibrous material such as leather secured together by an intermediate layer of adhesive material impervious to air with which the packing was to be used, but these packings have always had a certain area which was not protected by the impervious material so that a certain amount of the air would always leak through the packing. Such a construction would be particularly objectionable for use in gasoline and oil service pumps as rendering the pumps inaccurate. I have overcome these objections by so constructing the packing that the layer of impervious adhesive material extends to the bearing surface of the packing so as to engage the surface of the piston, plunger, rod or the like with which the packing is used and over which the packing moves in use, so that this impervious protecting layer extends entirely across the area or passage to be protected by the packing and thus reduces the leakage of the fluid to a minimum as there is no unprotected portion of the fibrous material which can permit the fluid to pass through. The packing remains sufficiently flexible to maintain a tight contact with the surface of the cylinder rod or other member with which it is to be used.

Referring to the packing shown in Figs. 1 and 2, this is a cup or piston packing and may be built up of any desired number of layers or plies of the fibrous material. This is true in all the forms of packings shown or described, but for simplicity in illustration they have all been shown as composed of two plies only of the fibrous material. Thus, the packing shown in Figs. 1 and 2 comprises a cup member 10 of any suitable fibrous material such for example as leather and an inner cup member 11 in nested relation therewith of the same or any desired fibrous material. These two cup members are secured together by an intermediate layer 12 of an adhesive material impervious to the fluid with which the packing is to be used. Thus, for example, for use with gasoline, oil, water, air and the like a cement or adhesive material is used which is water and oil proof, such for example as a cellulosic cement comprising nitro cellulose dissolved in a suitable solvent such as acetone. This impervious material is applied so as to cover the entire opposed surfaces of the fibrous members and to thus provide a continuous layer of this material between them. In this type of packing the outer side surface 13 is ordinarily the bearing surface and is the surface which engages the surface of the cylinder with which the piston employing the packing is to be used. It will be noted that the outer free edge 14 of the inner member 11 extends laterally over the free edge 15 of the outer member 10 and the intermediate layer of impervious adhesive material 12 extends to the bearing surface 13 as indicated at 16. Therefore, the free edge of this intermediate layer of impervious material is exposed on the bearing surface 13 of the packing and engages the surface of the cylinder indicated diagrammatically at 17 with which the packing is to be used. It will, therefore, be noted that with this construction there is no portion of fibrous material

which is left unprotected by the impervious layer and, therefore, the leakage of fluid through the packing is wholly prevented or reduced to a minimum. The inner member 11 can be termed a liner or protector for the layer of impervious material.

In Figs. 3 and 4 is shown how the same idea can be used with a flange embracing a rod or plunger. In this construction, the packing comprises two or more nested members 18 and 19 which are secured together by the intermediate layer of adhesive impervious material 20 corresponding to the layer 12 in Fig. 1. This packing, however, comprises a cylindrical portion 21 and a lateral flange portion 22 which flange portion is clamped between any suitable holding members to secure the packing in place, and the cylindrical portion is open at its lower end forming a passage for the rod 23. It will be noted that in this construction, the free edge 24 of the member 18 extends laterally over the free edge 25 of the member 19 so that the free edge 26 of the layer of impervious material 20 is exposed on the bearing surface of the packing and engages the surface of the rod 23 relative to which the packing moves. Thus, the entire fibrous portion of the packing is protected by the impervious layer 20 to prevent passage of fluid through this fibrous material the same as in the first form.

In Figs. 5 and 6 is shown how this same construction may be employed for a U packing. This packing comprises outer and inner fibrous members 27 and 28 respectively of substantially U shape in cross section and arranged in nested relation. The two members are separated and secured together by the intermediate layer 29 of the adhesive material impervious to the fluid with which the packing is to be used. This layer corresponds to the layers 12 and 20 of the first two forms of the packing described. It will also be noted that the free edge 30 of the member 28 extends laterally over the free edge 31 of the member 27 so that the free edge of the impervious layer 29 is exposed as shown at 32 on the outer bearing surface 33 of the packing. In like manner the inner free edge 34 of the member 28 extends over the inner free edge 35 of the member 27 so that the inner free edge 36 of the impervious layer 29 is exposed on the inner bearing surface 37 of the packing. Therefore, these free edges 32 and 36 of the impervious layer engage the surfaces of the piston, rod or other element with which the packing is to be used and relative to which it moves. It will, therefore, be seen that in this packing as well as in the other two forms the entire area of fibrous material is protected by the impervious layer to prevent passage of the fluid through the fibrous material.

In Figs. 7 and 8 is illustrated dies and a method of making the packings which is very effective in insuring that the layer of impervious material extends to the bearing surface entirely around the packing. Thus, in Fig. 7 which shows a die and method of making the U packing, the two plies of fibrous material 27 and 28 are placed one above the other with the liquid adhesive material 29 between them, and are placed on top of the spaced rings 38 and 39. A suitably shaped die member 40 having an annular projecting portion 41 is pressed down on top of these members forcing them downwardly between the rings 38 and 39. This shapes the fibrous members into substantially the U shape and the pressure also evenly distributes the cementing material 29 throughout the entire space between the two fibre members. The fibre members are made sufficiently large so that when thus formed they have lateral flange portions 42 and 43. After the cement has set, the packing may be removed from the die and then by cutting them around their peripheries at the desired size, usually on alignment with the cylindrical surfaces 33 and 37 as indicated by the lines 44 and 45 respectively. It will be noted that thus a continuation of the bearing surface is provided across the free edges of the fibre member. This cut also extends across the layer of impervious material 29 and thus insures that the free edges of this layer extend completely to the bearing surfaces of the packing.

In Fig. 8 is shown a similar method for making the packings of Figs. 1 and 3. Here the fibre members 10 and 11 are placed in superposed relation on a ring die 46 with a layer of adhesive impervious material 12 between them. The upper die member or plug 47 is then forced downwardly shaping the packing as shown in Fig. 8 and leaving a lateral flange portion 22. If, after setting, the packing is cut around its periphery as indicated by the line 48, this cut will cut through the impervious layer 12 leaving its free edge exposed in and flush with the outer side surface of the packing, and I have the packing shown in Fig. 1. If, however, instead of cutting on the line 48, we cut on the line 49 in alignment with the inner side surface of the packing, we also cut through the impervious layer 12 and produce the packing shown in Fig. 3 with a free edge of this impervious layer 12 exposed in and flush with this inner surface. This method of making insures that the material of the impervious layer extends flush with the bearing surface of the packing throughout its entire periphery.

It will be obvious that although I have illustrated only three different types of packing, the same construction may be employed in numerous other types of packing, the free edge of the intermediate layer of adhesive impervious material extending to and being exposed on the bearing surface of the packing in each case.

Having thus set forth the nature of my invention, what I claim is:

1. A packing of the character described comprising two or more plies of fibrous material secured together by a layer of adhesive material impervious to the fluid with which the packing is to be used, said packing having an outer bearing surface to engage and move over another surface, and said layer of adhesive material extending to the said outer bearing surface of the wall of the packing so as to engage the surface over which the packing is to move so that there is no fibrous material forming a direct path from one side of the packing to the other.

2. A packing of the character described comprising two or more plies of leather with a layer of adhesive material between adjacent plies, said packing having a bearing wall to engage and move over another surface, said layer of adhesive material being impervious to the fluid with which the packing is to be used and extending to the face of the bearing wall of the packing so as to engage the surface over which the packing is to move so that there is no leather forming a direct path from one side of the packing to the other.

3. A packing of the character described comprising a leather member covered on one side with a layer of an adhesive material impervious to the fluid with which the packing is to be

used, said packing having a bearing wall to engage and move over another surface, said layer of impervious material extending to the bearing surface of the packing so as to engage the surface over which the packing is to move and eliminate any direct path through the leather from one side of the packing to the other, and a protector for the impervious layer comprising a fibrous member over said layer and secured to the leather member by said adhesive material.

4. A packing for use with a cylinder or rod comprising two or more plies of fibrous material with the adjacent plies secured together by a layer of a cement impervious to the fluid with which the packing is to be used, said packing having a bearing surface to engage and move over the surface of the cylinder or rod, said layer of cement extending to the bearing surface of the packing so as to engage the surface of the cylinder or rod over which the packing is to move and there is no direct path through the fibrous material from one side of the packing to the other.

5. A packing for use with a cylinder or rod comprising two or more plies of leather with the adjacent plies secured together by a continuous layer of cellulose cement, said packing having a bearing surface to engage and move over the surface of the cylinder or rod, said layer of cement extending to the bearing surface of the packing so as to engage the surface of the cylinder or rod over which the packing is to move and eliminate any direct path through the leather from one side of the packing to the other.

6. A cup piston packing comprising two or more cupped members of fibrous material secured together in nested relation by a layer of adhesive material impervious to the fluid with which the packing is to be used, the free edge of the inner member being extended outwardly over the free edge of the outer member and in alignment with the outer surface of the outer member so that the edge of the layer of adhesive material is exposed on the outer bearing surface of the packing to engage the surface of the cylinder with which it is used and there is no direct path through the fibrous material from one side of the packing to the other.

7. A packing of the character described comprising two or more members of fibrous material in nested relation, the adjacent members being secured together by a layer of adhesive material impervious to the fluid with which the packing is to be used, a free edge of one member being extended laterally over a free edge of the next adjacent member and ending in alignment with a longitudinal surface thereof to form therewith a bearing surface and so that the free edge of the layer of adhesive material is in said longitudinal surface to eliminate any direct path through the fibrous material from one side of the packing to the other.

8. The method of making packing of the character described comprising covering the surface of a ply of fibrous material with a layer of liquid adhesive material impervious when hardened to the fluid with which the packing is to be used, placing a second ply over the first ply and pressing the two plies together to distribute the liquid adhesive throughout the opposed surfaces of the plies, and then cutting the packing to shape on a line spaced from the edges of each of the plies and across the layer of adhesive material to form a bearing surface to engage and move on the surface with which the packing is to be used and to eliminate any direct path through the fibrous material from one side of the packing to the other.

9. The method of making a piston or rod packing comprising placing a layer of liquid adhesive material between two plies of fibrous material, pressing the plies together and shaping to form portions extending longitudinally of the center line and another portion extending laterally therefrom, and then cutting the laterally extending portion on a line forming an extension of the surface of the longitudinally extending portion so that the edge of the layer of adhesive material will be on a surface of the longitudinally extending portion and there is no direct path through the fibrous material from one side of the packing to the other.

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