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SEALING STRIP FOR ROTARY PISTONS OF INTERNAL COMBUSTION ENGINES

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Fig. 2

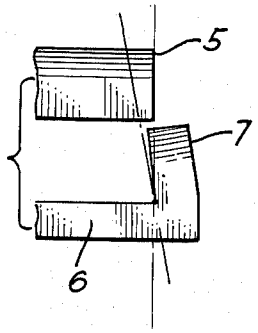


Fig. 1

Fig. 4

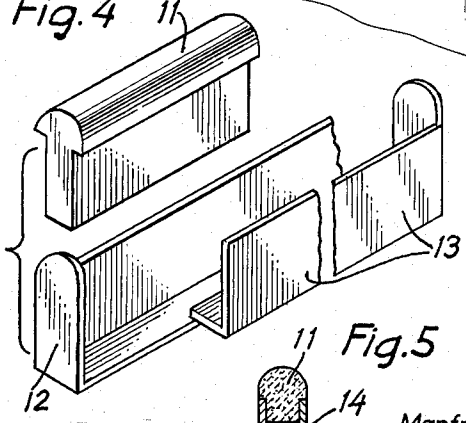


Fig. 3

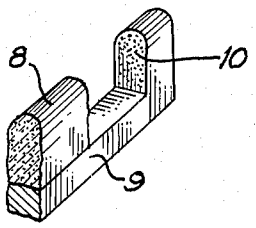


Fig. 5

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SEALING STRIP FOR ROTARY PISTONS OF INTERNAL COMBUSTION ENGINES

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This invention relates to sealing strips or vanes for rotary pistons of rotary devices, such as engines, motors, and gas compressors.

It is known to provide seals in the form of strips or vanes for the pistons of rotary machines formed of non-metallic materials such as carbon or graphite, pressed or otherwise formed into a substantially rigid body. Strips of this material can be made self-lubricating if desired, and ordinarily operate quite satisfactorily. Strips of this nature also eliminate the chatter marks which often occur when metallic sealing strips are employed and pass over the areas of the trochoidal surface inside the cylinder in which the rotary piston is mounted.

Sealing strips or vanes of non-metallic material, however, are easily broken and particularly at the ends where the strips necessarily have a relatively sharp corner.

The present invention deals with improvements in sealing strips embodying non-metallic materials and has as the primary object the provision of an arrangement for protecting the non-metallic material against breakage.

Another object of this invention is the provision of a sealing strip for a rotary piston engine which will be practically as strong as a solid metal strip while having the advantages of a non-metallic strip.

Another object is the provision of a sealing strip for a rotary piston which is partly metallic and partly non-metallic, and wherein the two materials are integrally united with no possibility of the materials becoming separated.

Still another object of this invention is the provision of a sealing strip for a rotary piston engine consisting of a principally non-metallic rubbing surface for engaging the cylinder wall while the other surfaces of the strip are principally metallic.

These and other objects and advantages will become apparent to those skilled in the art from the following description wherein:

FIGURE 1 is a perspective view showing a rotary piston with a slot for a sealing strip, and showing a sealing strip according to the present invention for being received in the slot;

FIGURE 2 is a fragmentary view showing how the metal portion of the strip may be arranged for being sprung against the non-metallic portion of the strip;

FIGURE 3 is a fragmentary view, partly broken away, showing how the metallic and non-metallic portions of the strip may be integrally united;

FIGURE 4 is a perspective view showing how the box-like frame of metal may be arranged for receiving and holding the non-metallic portion of the strip; and

FIGURE 5 is a cross-sectional view showing how spring means may be embodied in the construction of FIGURE 4 for urging the box-like metallic members outwardly toward the flanks of the slot in the rotary piston.

Referring to the drawings somewhat more in detail, a rotary piston is indicated at P and it is provided with a lot S for receiving a sealing strip for sealing between the piston and the cylinder in which it is mounted.

The sealing strip comprises a non-metallic portion 1 having a rounded upper edge and forming the principal

member for slidingly engaging the inside of the cylinder wall. Member 1 is set in a U-shaped metal carrier 2 having end portions 3 and 4 that fit along the ends of member 1 and thereby protect the side ends against breakage. The non-metallic material for strip 1 could comprise carbon or graphite, or a sintered material consisting largely of carbon or graphite. This will provide for low friction engagement of member 1 with the cylinder surface. The U-shaped metal carrier on the other hand, can be any metal conventionally used for sealing strips, and can be a good grade cast iron or bronze, or the like.

FIGURE 2 shows how the non-metallic member, indicated at 5, could be received in a metallic carrier 6 wherein the metallic carrier has its end flanges 7 bent inwardly somewhat so that it is necessary to spring these end portions outwardly to insert member 5 therebetween, and whereupon, upon releasing the end portions, member 5 will be tightly clamped to the metallic carrier.

FIGURE 3 shows non-metallic member 8 fixedly joined to the U-shaped metal carrier 9 by a bonding agent, generally indicated at 10, and which could be, for example, brazing or a suitable strong adhesive such as epoxy resin.

FIGURE 4 shows how a non-metallic member 11 could be supported and protected by a pair of box-like frame members 12 and 13 each having an upstanding end part for protecting one end of member 11, but also having side parts to protect the sides or flanks of member 11.

The arrangement of FIGURE 4 is illustrated in assembled relation, in FIGURE 5, and this view also shows how spring means 14 could be disposed between the box-like frame members 12 and 13 to urge them laterally outwardly whereby they will be in good sealing relation with the side walls while still protecting the flanks of non-metallic member 11.

The sealing strip or vane according to the present invention is relatively inexpensive and is characterized in improved sealing qualities and long life while being substantially more insensitive to abuse than a corresponding strip formed completely of metal or a strip in which the ends of the non-metallic member are unprotected.

It will be understood that this invention is susceptible to modification in order to adapte it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

What is claimed is:

1. A bar-like sealing strip for the rotary piston of a rotary piston machine, said piston including an axial slot opening radially outwardly, said strip being disposed in said slot, said strip comprising a member of non-metallic material forming the major portion of the length of the radially outer edge of the strip which engages the circumferential wall of a cylinder in which the piston is mounted, and metallic carrier means supportingly engaging said member and including end portions extending radially at the ends of said non-metallic member covering the entire said ends and engaging and protecting the said ends and forming the region of said strip that engages the end walls of the cylinder, said carrier including metallic means connected to said end portions and extending along the radially inner edge of said member from one said end portion to the other thereof.

2. A sealing strip according to claim 1, in which the said end portions of said carrier means are sprung toward each other whereby to be in pressure engagement with the ends of said member.

3. A sealing strip according to claim 1, in which said carrier means is a single U-shaped piece of metal and said member is fixedly joined thereto.

4. A sealing strip according to claim 1, in which said

carrier means is a single U-shaped piece of metal and said member is fixedly joined thereto by an adhesive.

5. A sealing strip according to claim 1, in which said carrier means is a single U-shaped piece of metal and said member is fixedly joined thereto by a metallic bonding agent.

6. A sealing strip for a rotary piston machine, said machine comprising a piston and an axial slot in the piston opening radially outwardly thereof for receiving said strip, said strip comprising a bar-like non-metallic member and a pair of box-like metallic frame members fitted together and receiving said non-metallic member, said box-like frame members having end portions extending over and engaging the entire area of the ends of said non-metallic member and having side walls extending over the major portion of the flanks of said non-metallic member, at least the radially outer portion of said member exposed for engagement with the circumferential wall of a cylinder in which the piston is mounted, said frame members and non-metallic member when assembled forming a unit receivable in the slot of said piston, with said non-metallic member being positioned for sliding engagement with the circumferential wall of said cylinder in which the piston

is mounted while the said end portions of said frame members are positioned for sliding engagement with the end walls of the cylinder.

7. A sealing strip according to claim 6, in which each of said frame members comprises one only of said side walls, and spring means are provided urging said frame members away from each other, whereby said side walls will be in sealing engagement with the flanks of a slot in which the sealing strip is mounted.

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