July 13, 1954 W. H. NOBLE 2,683,638

LINER FOR COMPRESSORS

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Fig. 1

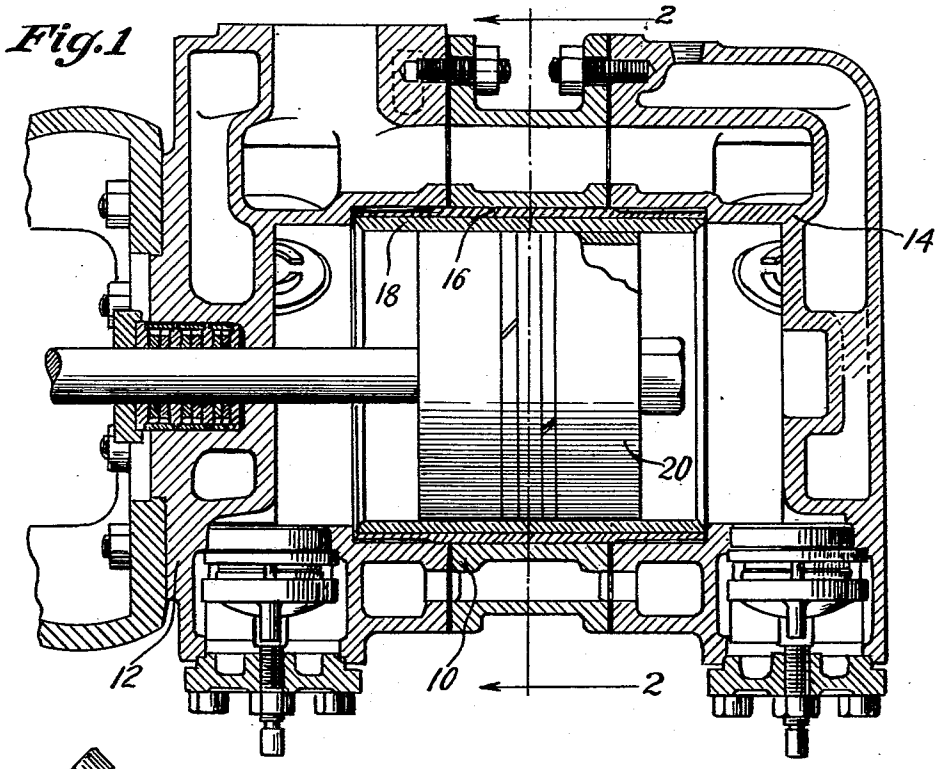
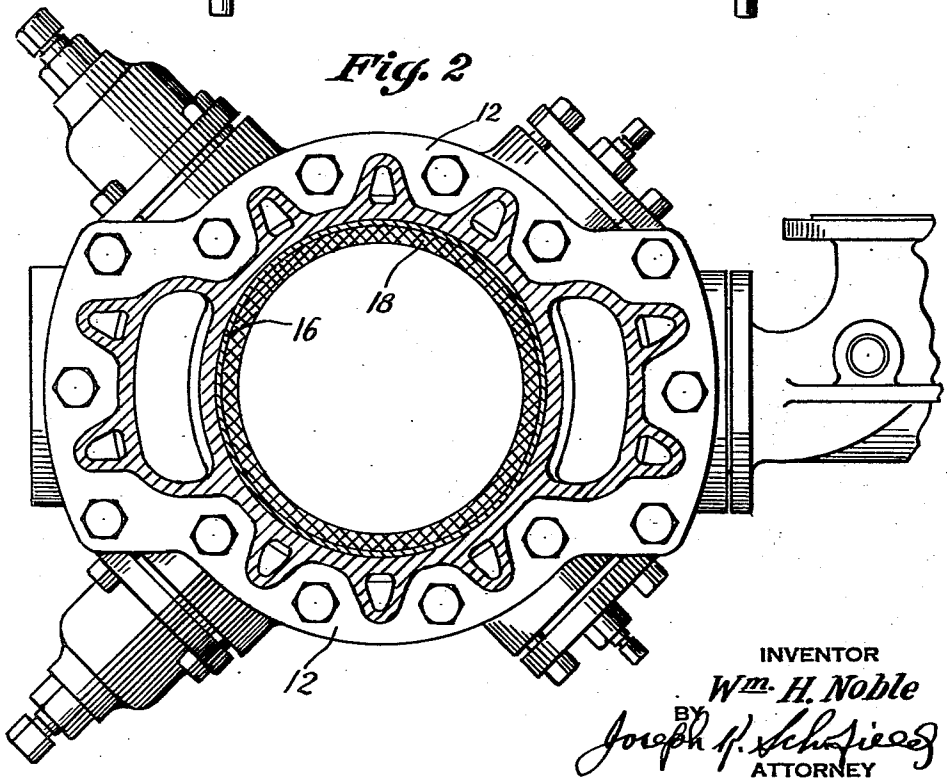


Fig. 2



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LINER FOR COMPRESSORS

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2 Claims. (Cl. 309—3)

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This invention relates to compressors and more particularly to a non-metallic liner for the cylinder of the compressor within which the piston reciprocates.

A primary object of the invention is to provide a liner of hard carbon for the cylinder of an air or gas compressor having a metal sleeve to form a backing therefor, the carbon being bonded to the inner surface of the metal sleeve throughout its entire length.

A feature of importance of the invention is that the metal sleeve may be closely fitted within the central portion of the cylinder and fit loosely within the end members forming with the central portion a complete compressor cylinder. By this means the head end of the cylinder may be removed from the compressor without disturbing the liner or the central portion, and the head end may be removed with the central portion of the cylinder from the remainder of the compressor together with the liner.

Another object of the invention of importance therefore is to provide a rigid and sturdy liner that readily may be repeatedly applied to and removed from a compressor and will provide a non-metallic contact with the piston.

With the above and other objects in view, the invention may include the features of construction and operation set forth in the following specification and illustrated in the accompanying drawing.

In the accompanying drawing annexed hereto and forming a part of this specification, I have shown the invention embodied in a standard form of air or gas compressor but it will be understood that the invention can be otherwise embodied and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawing:

Fig. 1 is a central longitudinal section of an air or gas compressor having the present metal backed liner applied thereto, and

Fig. 2 is a transverse sectional view taken on the plane of line 2—2 in Fig. 1.

In the above mentioned drawing, there has been shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly, and in its preferred aspect, the invention may include the following principal parts: First, a compressor for air and gasses having a cylinder construction made up of a crank portion, a central portion and a head portion; and second, a liner comprising a metal sleeve fitting within the members forming the cylinder and having a hard carbon relatively thick walled sleeve bonded to its inner surface.

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Referring more in detail to the figures of the drawing it will be seen that the cylinder shown in Fig. 1 comprises a central portion 10, a crank portion 12, and a head portion 14. Each of these portions as shown may be water jacketed in the usual manner by having communicating water jacket spaces formed therein. The crank portion 12 may be bolted directly to the compressor base or frame and the central portion 10 of the cylinder may be bolted as shown to the crank portion 12 on one side thereof. The head portion 14 of the cylinder is bolted to the opposite side of the central portion 10.

The liner for the cylinder comprises a metal sleeve 16 closely fitting and pressed firmly into the central portion 10 of the cylinder. In length the metal sleeve 16 is long enough to extend into the crank portion 12 and head portion 14 to abut against shoulders formed in these members. For convenience in assembling and disassembling the cylinder components there is provided a slight clearance between the outer surface of the sleeve 16 and the inner wall of the crank portion 12 and head portion 14 of the cylinder.

By means of this clearance the head end may be removed from the compressor without disturbing the sleeve 16 and liner 18. Also, the head end 14 may be removed from the compressor with the central portion 10 of the cylinder and the sleeve 16. If desired also the head end 14 may first be removed and then the central portion 10 of the cylinder and sleeve 16 may be separately removed. To replace a worn liner it is only necessary after separately removing the head end 14 and central portion 10 to press the metal liner 16 or sleeve from the central portion 10 of the cylinder and press a new sleeve 16 with its carbon liner 18 bonded thereto into the cylinder central portion 10. The central portion, with its new liner, may then be remounted in position on the compressor and the head portion again attached.

To the inner surface of the metal sleeve 16 is bonded or otherwise secured throughout its surface a carbon uniformly thick sleeve or cylinder 18. The inner surface of the carbon sleeve 18 is machined to a dimension to permit slidable movement of the piston 20 with a substantially air or gas tight fit between the carbon liner 18 and the piston rings in the piston.

By the provision of this carbon liner the necessity for any form of lubricant for the cylinder wall is avoided. As the carbon liner 18 is permanently attached to its metal sleeve 16 it may be handled as a metal part and when the carbon becomes worn the metal backing formed by the sleeve 16 may be again provided with a new carbon liner. The length of the carbon surface 18 is such that its entire length is traversed by the piston rings so that the wear of the carbon will be uniform throughout its entire length.

I claim as my invention:

1. A cylinder for an air or gas compressor having a crank portion, a central portion and a head portion, means to detachably connect said portions in alignment with each other, communicating water jacket spaces in each of said portions, a metal sleeve pressed into said central portion, said sleeve extending from opposite ends of said central portion and freely entering said head and crank portions of the cylinder, and a carbon liner permanently attached to said metal sleeve throughout the length of its inner surface.

2. A cylinder for an air or gas compressor having a crank portion, a central portion and a head

portion, means to detachably connect said portions in alignment with each other, communicating water jacket spaces in each of said portions, a metal sleeve pressed into said central portion, said sleeve extending from opposite ends of said central portion and freely entering said head and crank portions of the cylinder, said sleeve having its outer surface reduced in diameter at its ends extending within said head and crank portions, and a carbon liner permanently attached to said metal sleeve throughout the length of its inner surface.

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