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COMPRESSOR

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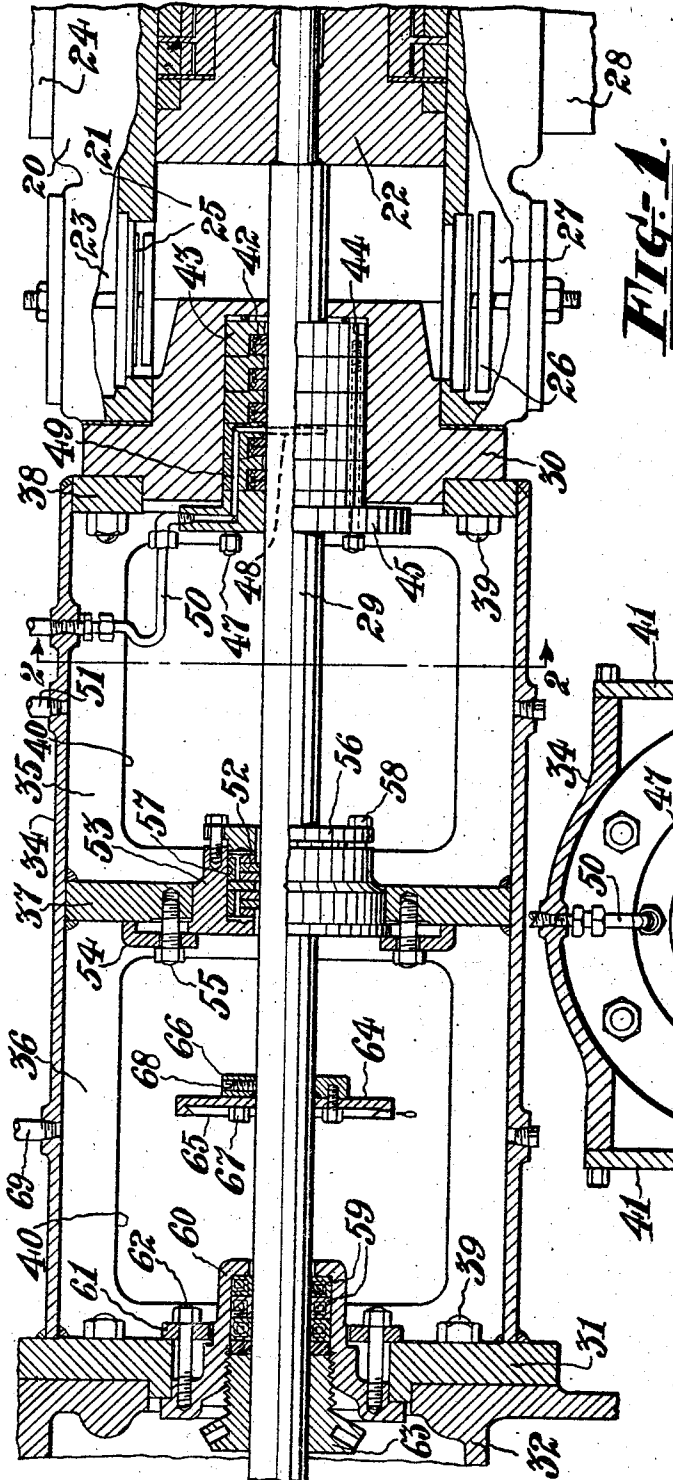


FIG. 1.

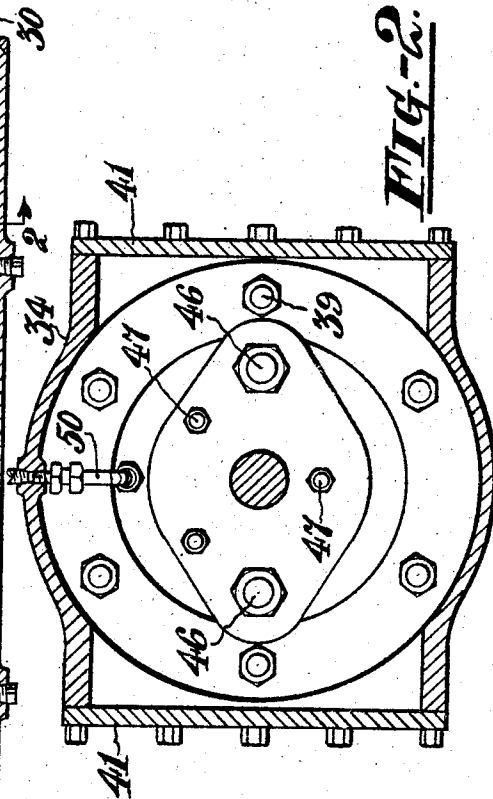


FIG. 2.

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UNITED STATES PATENT OFFICE

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COMPRESSOR

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4 Claims. (Cl. 230—206)

This invention relates to compressors, and more particularly to compressors employed for compressing gases which, because of their objectionable effects, are preferably excluded from the atmosphere.

Of these, chlorine gas is a well known example. This gas, moreover, has a deleterious effect upon oil lubricants and it is, therefore, essential that it be excluded from all portions of the compressor depending upon oil for lubrication, otherwise the oil will become solidified and destroy the packing members serving to seal the various chambers of the compressor.

It is accordingly an object of the present invention to prevent the exposure of oil lubricated surfaces to the gas pumped by the compressor.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawing accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a longitudinal view, partly in section, of a compressor constructed in accordance with the practice of the invention, and

Figure 2 is a transverse view taken through Figure 1 on the line 2—2.

Referring more particularly to the drawing, 20 designates the cylinder of a compressor having a compression chamber 21 containing a reciprocating piston 22. The gas intended to be compressed by the piston 22 is conveyed to an inlet chamber 23 in the cylinder by a conduit 24 and the admission of gas into the compression chamber 21 is controlled by an inlet valve 25 seated in the wall of the cylinder.

A discharge valve 26, also arranged in the wall of the cylinder 20, controls the flow of compressed gas from the compression chamber 21 into a discharge chamber 27 in the cylinder, whence the gas may be conveyed to a desired destination by a discharge pipe 28. The piston 22 is provided with the usual rod 29 which extends through a cylinder head 30 and the end wall 31 of a crank case 32 where said rod may be connected to a crosshead (not shown).

Between the cylinder 20 and the crank case 32 is a sealed distance piece 34 the interior of which, in accordance with the practice of the invention, is separated into two compartments or chambers 35 and 36 by a wall 37. One end of the distance piece 34 is suitably welded to the wall 31 and the opposite end to a ring 38 which lies in the end of the distance piece and is secured to the head 30 by bolts 39. Bolts 39 also secure the wall 31 to the crank case 32, and manholes 40, with

covers 41, are provided for the chambers 35 and 36 to permit access to the bolts 39.

In view of the adverse effect of chlorine gas on oil lubricant the material relied upon for effecting a seal between the head 30 and the rod 29 is preferably of the self-lubricating type, as for example rings or segments 42 of graphitic material. The rings 42 may, as shown, be arranged in groups of two in metallic holders 43 disposed in a bore 44 in the head 30. The holders 43 are pressed in position by a gland 45 inserted in the outer end of the bore 44 and secured to the head 30 by bolts 46.

To the end that the holders 43 may be removed as a unit, rather than separately, bolts 47 are extended through the gland and the holders and threadedly connected to the innermost holder 43. Thus, whenever it is desired to remove the packing elements from the bore 44 it is merely necessary to free the gland 45 and the assembly may then be withdrawn from the bore 44 by force applied to the gland.

In order that the major portion of the fluid medium leaking along the shaft 29 from the compression chamber 21 may be intercepted, and thereby prevented from passing into the chamber 35, an annular passage 48 is formed in an intermediate holder 43, and a passage 49 opening into the passage 48 extends through certain of the holders 43 and the gland 45 and opens into a conduit 50 which may be suitably connected to a point of low pressure, as for example the inlet side of the compressor.

The chamber 35, in effect, serves as a receiver into which gas leaking through the packing rings from the compression chamber 21 beyond the annular groove 48 may enter, and in the wall of the chamber 35 is a conduit 51 which may also be connected to the inlet side of the compressor or to a suitable pump (not shown) for evacuating the chamber 35.

Packing means of the nature inserted in the head 30 are also disposed in the wall 37 to effect a seal about the rod 29 and between the chambers 35 and 36. In the present instance, however, the sealing rings or segments designated 52 are arranged in a single holder 53 disposed on the wall 37 and secured thereto by clamps 54 and bolts 55. A gland 56 forms a closure for the bore 57 containing the sealing members 52 and is secured to the holder 53 by bolts 58.

Inasmuch as the portion of the rod 29 which reciprocates through the wall 31 is exposed to the oil lubricant in the crank case 32 the packing material serving to effect a seal between the crank

case and the chamber 36 is of the compressible type shown as a series of packing rings 59 arranged in a holder 60 in the wall 31 and secured thereto by a clamp plate 61 and bolts 62. A gland 63 threaded into the holder 60 serves to compress the packing rings 59.

In order to prevent the spreading of oil along the rod 29 to a point where it may be carried into the packing rings 52 a deflector or stop member 64 is attached to the rod. The deflector intercepts such quantities of oil as may creep along the rod in the direction of the wall 37 and deflects it toward the bottom of the chamber 36. The deflector 64 consists of a pair of plates 65 and 66 which are secured together by bolts 67. The plate 65 performs the deflecting function and the plate 66 serves more particularly as a hub for the plate 65 and contains a set screw 68 which is forced against the rod 29 to hold the deflector securely on the rod.

Although the various packing devices provided between the compression chamber and the chamber 36 greatly reduce the chance of exposing the oiled portion of the rod to the gas pumped by the compressor it has been found that the need of attentions to the packing members lying in the head 30 and between the chambers 35 and 36 may be further minimized by maintaining a volume of any compressed gas other than that being pumped, as for example dry air, in the chamber 36 of a pressure value in excess of that existing in the chamber 35. The chamber 36 is accordingly provided with a conduit 69 which may lead from a source (not shown) of gas or dry air of requisite pressure value wherewith the chamber 36 is in constant communication.

In the operation of the device and in a structure having the bleed-off channels including the groove 48 and associated passages the major portion of gas leaking along the rod 29 will be intercepted by these channels and conveyed to a point where it may again be reintroduced into the compressor. Any gas, however, that flows beyond the annular groove 48 and through the gland 45 will enter the receiver 35 whence it may escape or be withdrawn through the conduit 51.

By maintaining dry air in the chamber 36 at a pressure in excess of the pressure in the chamber 35 such gas as may be present in the latter chamber will be prevented from flowing along the rod into the chamber 36. By thus excluding the gas from the chamber 36 the oil on the rod will retain its lubricating qualities and the oiled surface of the rod and the packing device in the wall 31 will remain undamaged indefinitely.

I claim:

1. A compressor, comprising a casing having a compression chamber and a pressure chamber, a piston in the compression chamber, a rod for the piston extending through the pressure chamber, a self-lubricating packing at one end of the pressure chamber for the rod, an oil lubricated packing at the other end of the pressure chamber,

means on the rod to prevent the flow of oil along the rod from the oil lubricated packing to the self-lubricating packing, and means for constantly introducing pressure fluid into the pressure chamber to prevent fluid medium being pumped by the compressor from entering the pressure chamber.

2. A compressor, comprising a casing having a compression chamber and a sealed pressure chamber and a sealed receiver between the chambers to receive fluid medium leaking from the compression chamber, an outlet for the receiver, a piston in the compression chamber, a rod for the piston extending through the receiver and the pressure chamber, and means for constantly introducing pressure fluid into the pressure chamber and at a pressure in excess of the pressure in the receiver to prevent the leakage of fluid medium from the receiver into the pressure chamber.

3. A compressor, comprising a casing having a compression chamber and a sealed pressure chamber and a sealed receiver between the chambers to receive fluid medium leaking from the compression chamber, an outlet for the receiver, a piston in the compression chamber, a rod for the piston extending through the receiver and the pressure chamber, a self-lubricating packing for the rod at one end of the pressure chamber, an oil lubricated packing for the rod at the other end of the pressure chamber, means on the rod for preventing the flow of oil along the rod to the self-lubricating packing, and means for constantly introducing pressure fluid into the pressure chamber and at a pressure in excess of the pressure in the receiver to prevent the leakage of fluid medium from the receiver to the pressure chamber.

4. A compressor, comprising a casing having a compression chamber, a sealed receiver, a sealed pressure chamber and a crank case arranged in the same longitudinal plane in the order set forth, an outlet in the receiver for the escape of gas leaking from the compression chamber, a piston in the compression chamber, a rod for the piston extending through the receiver and the pressure chamber into the crank case, self-lubricating packings for the rod between the compression chamber and the receiver and between the receiver and the pressure chamber, an oil-lubricated packing for the rod between the pressure chamber and the crank case, a baffle in the pressure chamber secured to the rod to prevent oil flowing along the rod to the packing between the pressure chamber and the receiver, and a conduit for introducing an aeriform fluid other than that handled by the compressor into the pressure chamber and at a pressure value in excess of that in the receiver to prevent leakage of fluid medium from the receiver to the pressure chamber.

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