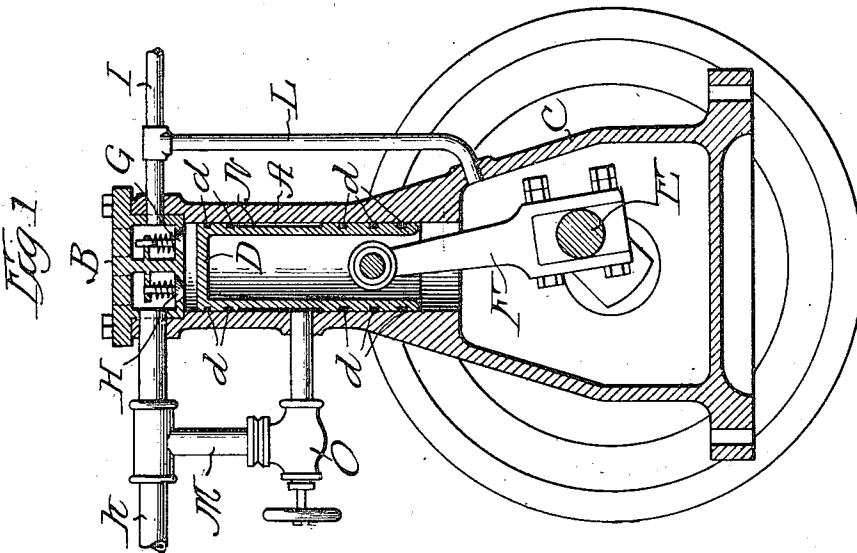
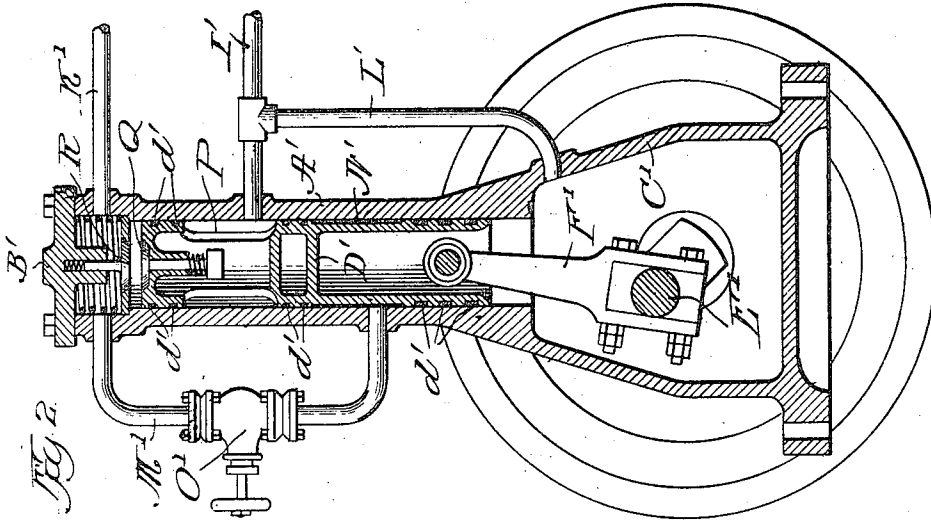


L. N. UDELL.
GAS COMPRESSOR.
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1,260,100.

Patented Mar. 19, 1918.



Witness
J. D. Adams

Inventor
Louis N. Udell,
By Bond & Wilson
Atty's.

UNITED STATES PATENT OFFICE.

LOUIS N. UDELL, OF CHICAGO, ILLINOIS.

GAS-COMPRESSOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS N. UDELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas-Compressors, of which the following is a specification.

This invention relates to gas compressors, and has reference more particularly to that type of compressor wherein the necessary lubrication of the piston is effected on the splash principle by means of a body of oil contained in a closed crank-chamber.

In gas pumps of this type, especially ammonia compressors used in refrigerating and cooling systems, it is very objectionable to get oil over into the piping circuit, since that seriously affects the efficiency of the radiating surfaces. In this type of compressor great difficulty is experienced in preventing an excess amount of oil from working past the piston up out of the crank-case and into the discharge circuit. Many manufacturers have tried to operate these machines at very high speeds, but are prevented from going beyond certain speeds of which the compressor in other respects was capable, on account of the higher speeds causing the oil to splash too much, as it were, and work past the pistons in excessive quantity, thus getting into the piping circuit and injuring the efficiency of the latter.

The object of the present invention is to provide a simple device in the nature of an attachment which shall automatically operate to prevent this working up of the oil between the piston and cylinder into the discharge circuit.

There are two general types of these crank-case compressors now in common use, which types I have illustrated in the accompanying drawing, wherein—

Figure 1 is a vertical section of that type wherein the gas enters through a suction valve in the head and passes out through a discharge valve also in the head, showing my present improvement applied thereto; and

Fig. 2 is a similar view of the other type, wherein the gas enters below the head of the piston and passes through a suction valve located in the latter, the head of the cylinder being provided with a single education or discharge valve, this view also showing my present improvement applied to a compressor of this type.

Referring to Fig. 1, A designates the cylinder, B the cylinder-head, and C the crank-case of the compressor. D designates the piston or plunger, suitably equipped adjacent to its upper and lower ends with packing rings *d*. E is the crank, and F the usual pitman connecting the crank to the lower end of the piston. G and H represent the usual suction and discharge valves located in the cylinder-head B, I is the suction or intake pipe, and K the discharge pipe connected to the usual piping circuit.

In the case of ammonia compressors of this type it is customary to maintain the pressure in the crank-case (which is supplied with the lubricating oil) at substantially the pressure of the inflowing gas, for which purpose the crank-case is connected by a pipe L with the intake pipe I.

Referring now to those features wherein my present invention chiefly resides, M designates a by-pass pipe that at one end is connected into the gas-delivery pipe K, and at its other end leads through the cylinder-wall into the cylinder at a point between the upper and lower ring bearings *d* of the piston. Preferably, and as herein shown, that portion of the piston between the two series of packing rings is slightly narrowed or contracted, thereby forming a narrow annular sealing chamber N. Preferably, and as herein indicated, the by-pass pipe M is equipped with a pressure-reducing valve O.

By means of the by-pass pipe M and the valve O (when employed), gas at any desired pressure between that existing on the compression side and that existing on the suction side (which is the pressure existing in the crank-case) is admitted to the annular sealing chamber N, and this gas, tending to work downwardly past the lower bearing portion of the piston, forms an effective seal against the rise of an excessive amount of oil through the cylinder, since it operates to force any such excess oil back into the crank-case. In this way the system is safeguarded against the working up of any objectionable amount of oil through the cylinder of the compressor into the discharge pipe K and the piping circuit connected thereto.

In Fig. 2, I have designated the corresponding parts of Fig. 1 by the same reference letters with an added exponent. This type of compressor employs a somewhat longer piston or plunger, the upper portion

of which has its side walls cut away, as indicated at P, to permit the gas entering by the suction pipe I' to be drawn into the cylinder past a suction valve Q in the head of the piston; the compressed gas flowing past a discharge valve R into the head of the cylinder, and thence through the discharge pipe K'. The lower portion of the piston, between its intermediate and lower series of packing rings d', is preferably slightly contracted, as in Fig. 1, to provide the narrow annular sealing space N'; and this sealing space is connected with the head of the cylinder by the by-pass pipe M', in which is interposed the reducing or regulating valve O'.

The function and operation of my improved gas-sealing device, for preventing the working up of an excess quantity of oil between the cylinder and piston, are the same as described in connection with Fig. 1.

By means of my invention, the objectionable feature hereinabove pointed out in compressors of this type, which prevents their operation beyond a limited speed on account of oil getting into the piping circuit, is effectively obviated. Of course, the sealing agent may be drawn from another source than the delivery side of the compressor, if desired or convenient; but I have shown the same as taken from the delivery side of the compressor, since the latter constitutes a simple and convenient source of sealing pressure.

It will be obvious to those familiar with this art that the principle of my invention may be embodied in other specific forms and types of closed crank-case compressors than those herein shown; and the application of my invention to such other forms and types of compressors is contemplated within the purview and spirit of the appended claims.

I claim:

1. In a gas compressor, the combination with a cylinder, piston having packing rings, and crank case forming an oil chamber, of means for conducting a sealing fluid at a pressure not less than that existing in the crank case to the interior of the cylinder at a point that is intermediate two spaced packing-rings of the piston in all stroke positions of the latter to thereby form a seal against the flow of oil from the crank case through the cylinder to the outflow conduit of the compressor.

2. In a gas compressor, the combination

with a cylinder and a crank case forming an oil chamber, of a piston having longitudinally separated bearings on the cylinder wall, a sealing chamber in the cylinder between said separated bearings to prevent the passage of oil through the cylinder, and a connection between said sealing chamber and a source of fluid pressure not less than that existing in the crank case.

3. In a gas compressor, the combination with a cylinder and crank case forming an oil chamber, of a piston in said cylinder having an intermediate contracted portion between two bearing portions forming a sealing chamber to prevent the passage of oil through the cylinder, and a connection between said sealing chamber and a source of fluid pressure not less than that existing in the crank case.

4. In a gas compressor, the combination with a cylinder and crank case forming an oil-chamber, of a piston in said cylinder having an intermediate contracted portion between two bearing portions forming a sealing chamber to prevent the passage of oil through the cylinder, and a pipe connection between said sealing chamber and the pressure side of the compressor.

5. In a gas compressor, the combination with a cylinder and crank case forming an oil chamber, of a piston having longitudinally separated bearings on the cylinder wall, a sealing chamber in the cylinder between said separated bearings to prevent the passage of oil through the cylinder beyond the inner piston bearing therein, a connection between said sealing chamber and a source of fluid pressure not less than that existing in the crank case, and a connection between the crank case and the supply side of the compressor.

6. In a gas compressor, the combination with a cylinder and crank case forming an oil chamber, of a piston having longitudinally separated bearings on the cylinder wall, an annular sealing chamber in the cylinder between said separated bearings to prevent the passage of oil through the cylinder beyond the inner piston bearing therein, a connection between said sealing chamber and the pressure side of the compressor, means for regulating the pressure in said connection, and a connection between the crank case and the supply side of the compressor.

LOUIS N. UDELL.