

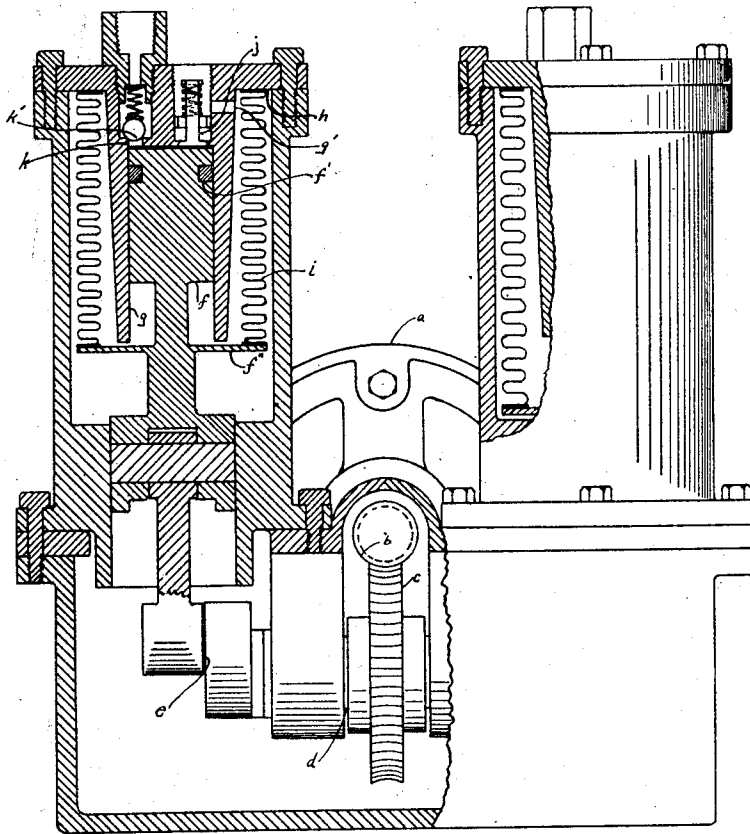
May 22, 1928.

1,670,799

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LEAKPROOF COMPRESSOR

Filed Feb. 26, 1923



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Patented May 22, 1928.

1,670,799

UNITED STATES PATENT OFFICE.

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LEAKPROOF COMPRESSOR.

Application filed February 26, 1923. Serial No. 621,476.

My invention relates to improvements in leakproof compressors and is explained and shown herein as applied to a type of gas pump adapted for small refrigerating plants. The object of my invention is the provision of a compressing appliance for gases which will hermetically seal the moving parts against the escape of any gas and which will avoid the employment of packing or stuffing boxes in this class of apparatus.

Various expedients have been suggested for overcoming the escape of gases when placed under high pressure in gas pumps, alternative to specialized packed glands, such as encasing all of the working apparatus in an exterior gas-tight enclosure. However, I have sought to provide relatively inexpensive and simple means for overcoming the leakage past a high-pressure piston, while making my improved apparatus extremely compact and avoiding liability to get out of order. For this purpose I have provided a flexible gas-tight chamber merely for the moving parts of the compressor, which chamber preferably is connected back by a suitable vent to the low-pressure side of the compressor.

The details of my embodiment and further features and advantages of my invention may be more readily explained by making reference to the accompanying drawing illustrating partly in side elevation broken away, and partly in vertical section, a two-cylinder compressor or gas pump embodying my said improvements.

An electric motor *a* is adapted to drive the associated gas pumps by means of the worm *b* and its gear wheel *c*. Said gear is mounted intermediately of the driving shaft *d* whereon the crank pins *e* are connected preferably at 180° for driving the respective pistons *f* of the paired compressors; one piston being shown upon the left at the upper extremity of its stroke within its cylinder *g*. Both pistons are identical in structure and function, hence reference to the sectional showing upon the left will be sufficient.

Below the piston *f*, which is provided with a packing ring of leather *f'*, or of other suitable material, there is provided an integral disc *f''* and between this disc and the inner face of the head-plate *h* a corrugated cylindrical metallic bellows *i* is hermetically connected. This bellows member preferably is

of hard-drawn copper and care should be used in soldering its upper and lower rims to the reciprocating and stationary anchorages of the pump so that the copper will not be softened or deteriorated in the soldering operation.

An inlet valve *j* from the source of supply or low-pressure side of the system, as from a sulphur-dioxide tank, is provided upon the right side of the cylinder head, while an outlet valve *k* of smaller aperture, closed by the spring-pressed ball *k'*, guards the high-pressure side of the system. The details of the supply and the pressure piping connected with these valves in practice do not require illustration, since they form no part of my invention.

From the foregoing it will be observed that the pump cylinder and its connections and working parts are hermetically enclosed in the flexible metallic bellows *i*, so that any gas which leaks past the piston and piston rings will be retained therein from leakage into the external air. However, a port or vent *q'* is provided in the cylinder wall so that the interior of the bellows and the supply or low-pressure side of the pump or system are interconnected beyond the inlet valve *j*. Moreover, since the outlet valve is likewise enclosed within the hermetically-sealed bellows, any accidental leakage from the high-pressure side of the pump will find its way to the low-pressure side, provided the piston rings or packing do not hold the pressure-leakage.

It is important to observe, however, that the relatively thin walls of the flexible bellows member are protected against any excessive pressure by reason of the fact that this flexible casing for the pump cylinder and piston is vented directly into the low-pressure line, while there is no waste or loss of gas with its attendant disadvantages. Again, it is apparent that the simplest and most efficient pump mechanism is employed, as opposed to a diaphragm or fluid medium for effecting variable compression of the gas employed.

It will be appreciated that the relatively small compressor unit herein shown as embodying my invention is merely typical by way of explaining my improvements, which are equally adapted for larger refrigerating compressors or other mechanisms where, in the leakage, particularly of gases, must be safeguarded and overcome.

Having now described a preferred embodiment of my invention. I desire to claim, together with such modifications in detail and type as may be made by ordinary skill, the following:

1. The combination with a compressing pump cylinder and its reciprocating piston, of a flexible gas-tight bellows sealing said pump cylinder and piston hermetically; a vent being provided from said bellows to the inlet side of the pump, substantially as set forth.

2. In a compressor for refrigerating plants and the like, the combination with a pump cylinder and its reciprocating piston, of a flexible bellows hermetically sealed at one end to reciprocate with the piston and at the other end in stationary connection with the cylinder and its valves; a vent being provided from said hermetically-sealed bellows and connecting beyond the inlet to the cylinder, substantially as set forth.

3. In a compressor of the class described,

the combination with a pump cylinder, of a piston reciprocating therein, a disc in spaced relation from and reciprocated with said piston exteriorly of the cylinder, means for reciprocating said piston and disc, a flexible leakproof member exteriorly sealing said cylinder and piston, and a vent from said member to the inlet side of the cylinder, substantially as set forth.

4. The combination with a pump cylinder, of a piston reciprocating therein, means for actuating said piston, a flexible bellows member hermetically sealed at the outer end of the cylinder enclosing its outlet and inlet openings and exteriorly of the piston at the inner end of said member, whereby maximum length is insured for the bellows member; said cylinder and bellows member being connected to a common supply opening, substantially as set forth.

In testimony whereof I do now affix my signature.

STANTON D. DORNBIRER.