July 21, 1925.

1,546,397

H. C. MICHELSEN

PUMPING MECHANISM FOR VAPOR GASES

Filed Oct. 15, 1921

Fig. 1

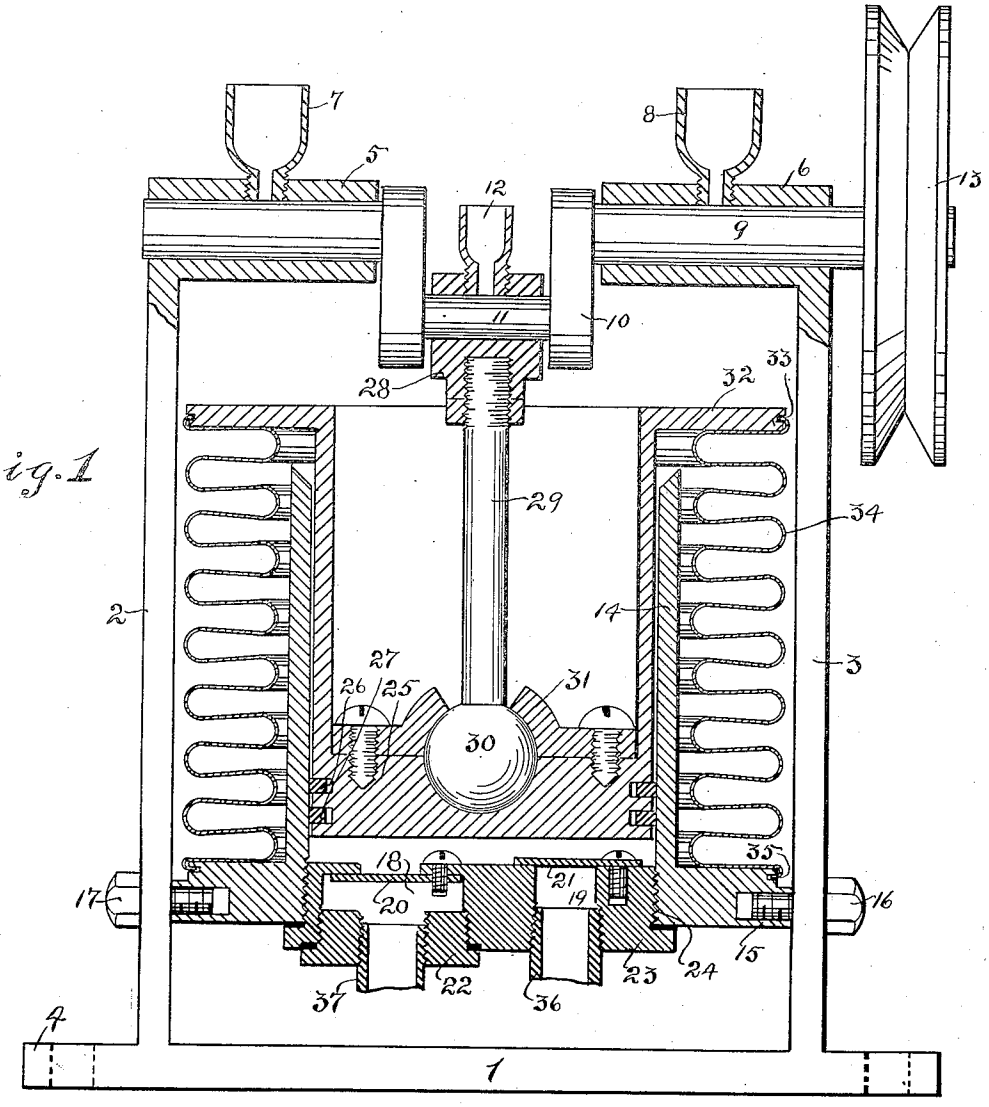
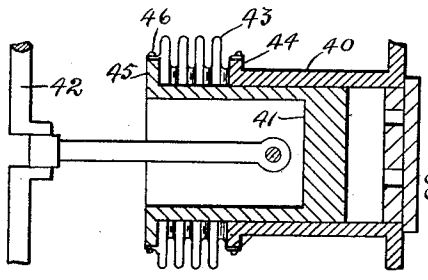


Fig. 2



Inventor

Henry C. Michelsen

By his Attorney

Richard Lefferts Mayer

Patented July 21, 1925. 1,546,397

UNITED STATES PATENT OFFICE.

HENRY C. MICHELSEN, OF YONKERS, NEW YORK.

PUMPING MECHANISM FOR VAPOR GASES.

Application filed October 15, 1921. Serial No. 507,830.

To all whom it may concern:

Be it known that I, HENRY C. MICHELSEN, a citizen of the United States, and resident of city of Yonkers, county of Westchester, State of New York, have invented certain new and useful Improvements in Pumping Mechanism for Vapor Gases.

The device the subject of this invention is intended as a means for pumping vapor gases and particularly fugitive gases, that it has in the past been found difficult to pump, because of the inability to pack pistons or to provide piston rings that would efficiently retain such gases.

The device that I will describe has been designed in a manner to accomplish the pumping of such gases as it prevents leakage by compensating pressures; the compensation taking place at that place or at the point where leakage occurs with greatest frequency.

Another object of the invention is to produce a simple pumping mechanism and one wherein the only communication from the pumping cylinder will be through the valve mechanism and one wherein the leakage which occurs past the pumping piston will be received and confined within a portion of the device to be again delivered to the pumping cylinder.

Another object of the invention is to produce a pump wherein a high possible pressure and a piston pump can be combined with the security and efficiency of a diaphragm pump. With these objects in view the following is what I consider the best means for carrying out this invention and the accompanying drawing should be referred to for a complete understanding of the specification which follows.

In the drawing:—

Fig. 1 is a centrally vertical section.

Fig. 2 a similar view but with less detail and showing a modified construction.

Similar reference numerals indicate like parts in all the figures where they appear.

At 1, I show the base or supporting member of my device, this member may be made of cast iron and is provided with uprights 2 and 3 and a flange 4.

Formed integral with or supported upon the uprights 2 and 3 are bearing boxes 5 and 6 provided with suitable lubricators as shown at 7 and 8 and adapted to support the driving shaft 9.

The shaft 9 is provided with a crank 10 and crank pin 11 and a suitable lubricator 12 is also provided for the crank pin. The shaft is rotated from a pulley 13 or from or by any other suitable means.

Supported between the uprights 2 and 3 is a cylinder 14 provided with a flange 15 and adapted to receive bolts as shown at 16 and 17. This cylinder may also be made of cast iron although any other suitable material may be employed and within the cylinder I arrange or provide valve ports, the outlet port is indicated at 18 and the inlet port at 19 and over these ports are valves as shown at 20 and 21. These valves may be flat, flexible and resilient metal plates or disks, suitably secured in operative position the one interior and the other exterior of the cylinder and a plug 22 allows access to the valve 18.

To allow the interior of the cylinder to be ground and to simplify the operations in the construction, the valves may be arranged in a cylinder head 23 screw-threaded as shown at 24 into the cylinder 14.

Operable within the cylinder is a piston 25 provided with suitable piston or packing rings and in this construction I have shown two piston rings as indicated at 26 and 27.

Upon the crank pin 11, I arrange a bearing member 28 which supports and operates a piston rod 29, this rod 29 is provided with a ball 30 and a supporting cup 31 secured to the piston 25 retains the ball 30 in a manner well understood.

It will be noted that the wall of the piston extends beyond and exterior to the end of the cylinder in which it operates and that in fact the piston is of a length greater than the length of the clear wall of the cylinder. At the end of the piston nearest the crank shaft and therefor at the end projecting from the cylinder I provide upon the piston a flange 32 which may be formed integral with the piston and which extends outward beyond the walls of the cylinder. In this flange I produce a groove 33 into which is secured by brazing, soldering or otherwise, one open end of a diaphragm or breather member 34 which extends almost the full length of the cylinder enclosing the cylinder and the other end of this diaphragm member is secured in a groove 35 in the flange 15 of the cylinder.

While the diaphragm member 34 may be formed of any suitable material I prefer that it be constructed of thin sheet copper,

brass or other desirable ductile and flexible member and while I have shown this diaphragm member provided with eight convolutions, projections or fins and a suitable number of inward projections or recesses it will be understood that a greater or less number of convolutions may be given the diaphragm, the number of which will be determined by the desired speed of movement or number of revolutions per minute of the shaft 9 or by the length of the cylinder or by other conditions. The ends of the diaphragm member should be secured not only by insertion into the grooves 33 and 35 but by soldering.

In the operation of this device the gas is drawn inward through the pipe 36 and valve 21 into the cylinder and at the same time the suction occasioned by the outward movement of the piston will cause a suction on both sides of the piston rings and when the gas or vapor is discharged through the valve 20 and pipe 37 by the return movement of the piston an approximately equal pressure will be found on both sides of the rings 26 and 27.

The suction and pressure on the outer sides of the rings are caused by the expansion and contraction or the accordion movement of the diaphragm or breather 34. If gas or vapor should leak past the rings, it will be entirely retained in the diaphragm member passing into this member it will be discharged therefrom by the compression or contraction of the diaphragm, but I have discovered that in operation the suction and pressure upon both sides of the rings equalize preventing the passage there through of gas or vapors being pumped.

In the foregoing I have described the preferred construction, I am aware however, that modifications may be made and a device constructed that will accomplish the purposes set forth. One such device is shown in Fig. 2 where only the principal elements are set forth.

In this figure the cylinder is shown at 40, the piston at 41, the crank shaft at 42 and it will be noted that the piston is of a relatively greater length than the piston shown in Fig. 1.

In this Fig. 2 the diaphragm of flexing member 43 is connected at the open end of the cylinder, a suitable flange 44 being provided therefor and the other end of the expansible and compressible member 43 is connected to a suitable flange 45 upon the piston. The connections may be made by means of a series of pins reenforced by solder, cement or even welding.

Other modifications may be made within the scope of the appended claims without departing from the principle or sacrificing the advantages of the invention.

Having carefully and fully described my invention what I claim and desire to obtain is as follows:

1. A compressor for refrigerating systems, comprising relatively movable compressing members forming a chamber therebetween, a flexible casing surrounding and forming a sealed joint between said members, and means for conducting fluid to and from said chamber, substantially as described.

2. A compressor comprising a piston member, a cylinder member, means for admitting the fluid to be compressed to the space between said members, means for exhausting the compressed fluid therefrom, and a flexible casing surrounding and forming a sealed joint between said members, substantially as described.

3. A compressor comprising a piston member, a cylinder member, inlet and outlet connections to and from the space between said members, and a flexible extensible casing connected at one end to one of said members and at the other end to the other of said members and forming a sealed joint between said members, substantially as described.

4. A compressor for refrigerating machines, comprising relatively movable compressing members forming a chamber therebetween, and a metallic bellows enclosing said relatively movable members and attached thereto, substantially as described.

5. A compressor for refrigerating machines having cylinder and piston members, inlet and outlet connections for said members, and a metallic bellows enclosing said cylinder and piston members and attached thereto, substantially as described.

Signed at the city, county and State of New York, this 4th day of October, 1921.

HENRY C. MICHELSEN.