(No Model.) 2 Sheets—Sheet 1.

E. FIXARY.

PACKING PISTON RODS OF REFRIGERATING MACHINES.

No. 345,041. Patented July 6, 1886.

Fig. 1.

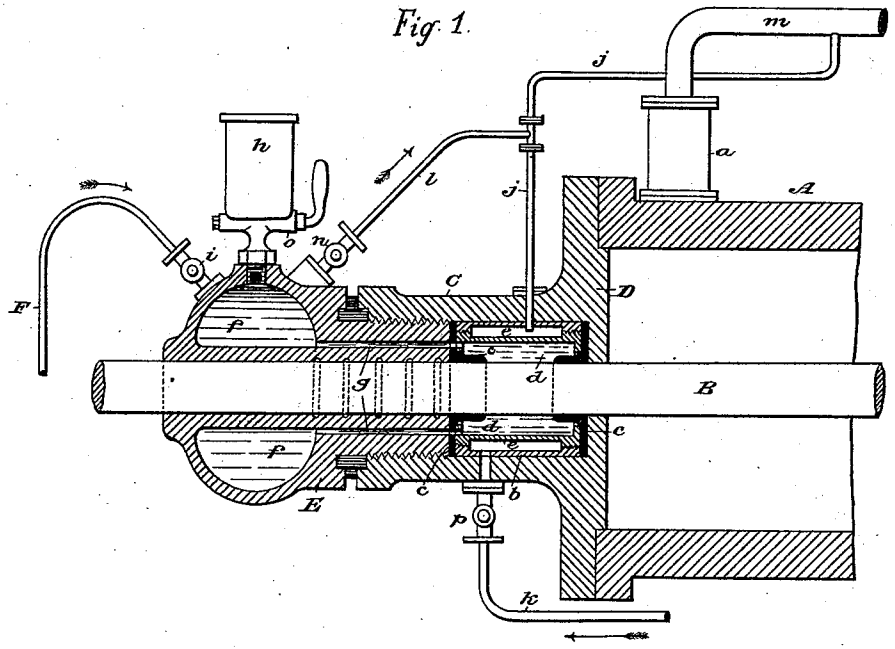
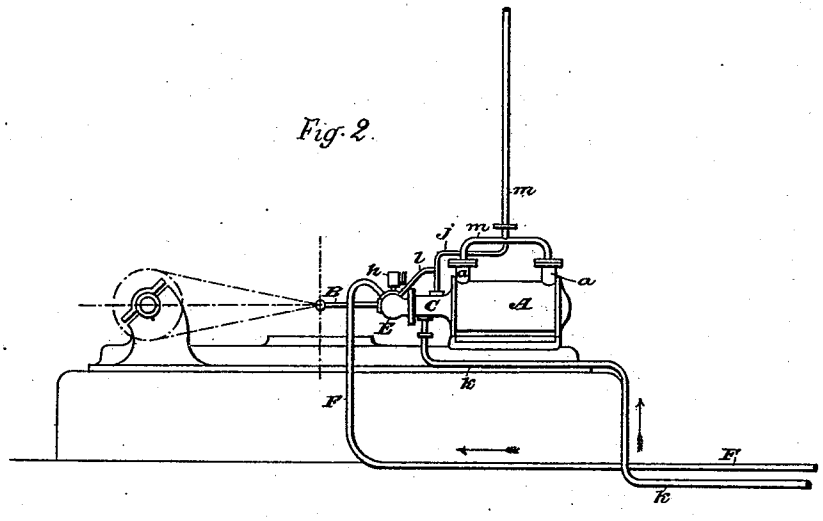


Fig. 2.



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Fig. 3

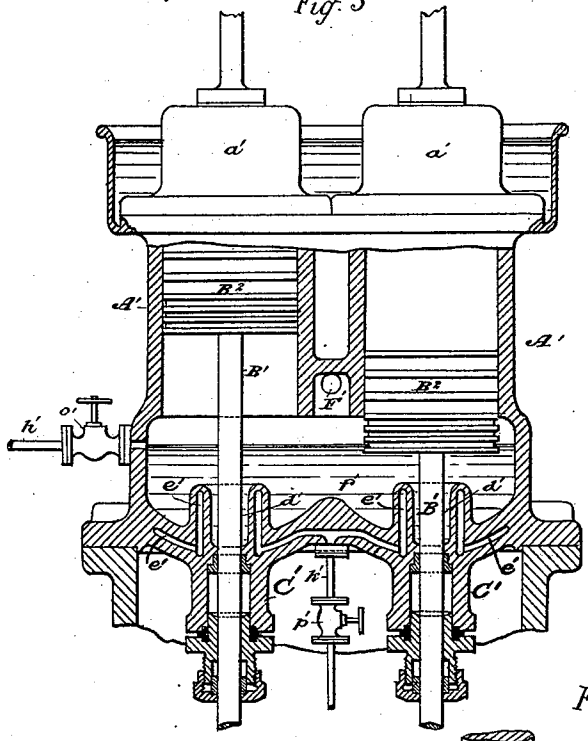


Fig. 4

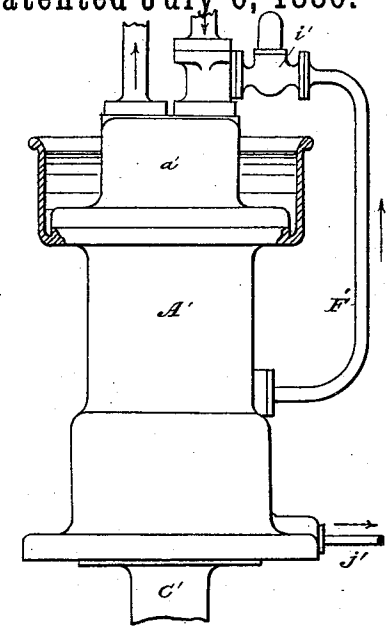
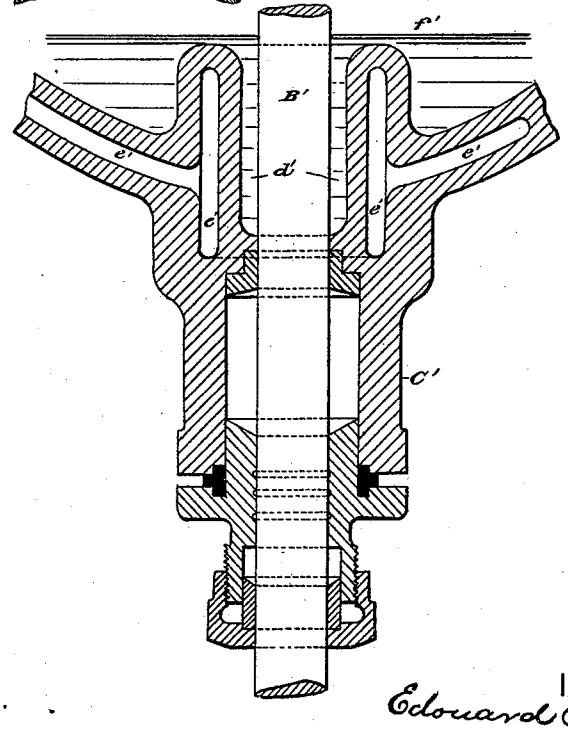


Fig. 5



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EDOUARD FIXARY, OF PARIS, FRANCE.

PACKING PISTON-RODS OF REFRIGERATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 345,041, dated July 6, 1886.

Application filed February 23, 1886. Serial No. 192,798. (No model.) Patented in France February 21, 1885, No. 167,210; in England February 25, 1885, No. 2,387; in Belgium June 6, 1885, No. 69,195; in Luxemburg June 6, 1885, No. 637, and in Italy June 9, 1885, XIX, 18,588.

To all whom it may concern:

Be it known that I, EDOUARD FIXARY, a citizen of the French Republic, and a resident of Paris, France, have invented certain Improvements in Means and Methods of Lubricating and Packing the Piston-Rods of Compressors Employed in Refrigerating-Machines, of which the following is a specification.

My invention relates to a mode of packing and lubricating the piston-rods of both single and double acting compression-pumps employed in compressing the vapors or volatile liquids—such as ammonia-hydride, for example—commonly employed in machines for refrigerating or freezing; and the object is to utilize the lubricant under the influence of cold and pressure as a packing for the rod.

My invention will be hereinafter fully described, and its novel features carefully defined in the claims.

In the drawings, which serve to illustrate my invention, Figure 1 is a sectional view taken in the plane of the axis of the piston-rod, showing the application of my invention to a double-acting compression-pump; and Fig. 2 is a side elevation of said pump on a smaller scale. Figs. 3, 4, and 5 illustrate the application of my invention to a double-cylinder single-acting compression-pump. Fig. 3 is a sectional elevation in the plane of the axes of the piston-rods, the valve-casings being in elevation. Fig. 4 is a side elevation, the wall of the basin around the valves alone being in section; and Fig. 5 is a section, on a large scale, of the stuffing-box of one of the piston-rods.

I will preface the detailed description of the means I usually employ for carrying out my invention by saying that I effect the combined lubrication and packing of the piston-rod by introducing the lubricant—any suitable lubricating-oil, for example—under pressure to an annular chamber surrounding the piston-rod, and subject the lubricant in this chamber to intense cold, whereby it is hardened and compacted. This insures the proper lubrication of the rod, and at the same time packs hermetically the joint where the rod passes out from the cylinder, and thus prevents the escape of the gas.

Referring first to Figs. 1 and 2, A represents the cylinder of a double-acting compression-pump—such as is commonly employed in refrigerating-machines—and *a a* are the inlet-valves. I have not deemed it necessary to show all the details of this pump, as these are well known and form no part of my invention. B is the piston-rod of the pump, which passes out through a sleeve, C, on the head D of the pump. Within sleeve C is placed a cylinder, *b*, and bushings *c c*, which fit the piston-rod snugly. These bushings form heads for the cylinder *b*. Within cylinder *b*, and next to the piston-rod, is a chamber, *d*, which receives the lubricant, and within the wall of cylinder *b*, and surrounding chamber *d*, is an annular chamber, *e*, which I call a "freezing-jacket." E is a follower, which slips over the piston-rod and screws into the sleeve C and down upon the inclosed bushings *c c* and cylinder *b*, and in this follower are formed an oil-receiver, *f*, and a channel or channels, *g*, which connect receiver *f* with the chamber *d*. On the receiver *f* is mounted an oil-supply reservoir or cup, *h*, from which oil may from time to time be supplied to receiver *f*. F is a pipe, which connects receiver *f* with some fluid under pressure, the admission of the fluid being controlled by a cock, *i*. This pressure on the oil in the receiver forces the oil through the channels *g* into chamber *d*. The freezing-jacket *e* is connected on the one side by a pipe, *j*, with the suction or aspirating side of the pump and on the other side with the ammonia-receiver by a pipe, *k*. Thus the jacket *e* is in the circulation of the expanding volatile liquid, and the expansion therein will produce intense cold, which will freeze the oil in the chamber *d* solid. This oil thus becomes not only a lubricant for the piston-rod, but also a hermetic packing therefor, which will prevent the escape of gas from the cylinder of the pump. From the oil-receptacle *f* a pipe, *l*, leads through pipe *j* to the suction-pipe *m* of the pump. This pipe *l* is controlled by a cock, *n*.

The operation is as follows: Oil is admitted to receptacle *f* from cup *h*, and the cup is then cut off by the cock *o*, controlling the passage connecting them. Gas under pressure is now admitted to the oil-receptacle through pipe F by opening cock *i*. This pressure forces the oil

into the chamber *d* through channels *g*. The cock *p*, controlling the connection of pipe *k* with the freezing-jacket *e*, is now opened and at once the oil in chamber *d* is congealed. The heat absorbed by the constantly-expanding gas in the freezing-jacket keeps the temperature low at that point, and as the congealed lubricant wears away its place is supplied by oil from receptacle *f*, which oil is in turn congealed. In order to lubricate the valves and piston of the pump, the cock *n* in pipe *l* is opened a very little, and the pressure in the oil-receptacle forces the oil, drop by drop or in quantity as required, to pipe *m*, whence it finds its way through the valves to the interior of the pump-cylinder.

Referring now to Figs. 3, 4, and 5, A′ A′ represent two single-acting cylinders, having piston-rods B′ B′ and pistons B B. These cylinders are provided with suitable valves, *a*′, of the usual construction. The cylinders are connected at their lower ends, forming a single oil-chamber, *f*′. The oil is supplied to chamber *f*′ through a pipe, *h*′, controlled by a cock, *o*′. This inlet is arranged at such a height as to maintain a proper oil level—that is, the pistons should dip into the oil at the end of their downstroke; but space should be left above the oil for free circulation of gas between the cylinders over the oil. The gas under pressure is admitted to chamber *f*′ over the oil by a pipe, F′, controlled by a cock, *i*′. C′ is the exterior sleeve on the lower cylinder-head, through which the piston-rod passes out, and *d*′ is the annular chamber around the piston-rod, which contains the congealed lubricant. This chamber communicates direct with the oil in receptacle *f*′ and is supplied therefrom. Surrounding the two chambers *d*′ and connecting with each other are the annular freezing-jackets *e*′ *e*′, which are by preference constructed to extend out laterally into the metal of the cylinder-head through nearly its entire area. The volatile fluid is admitted to the freezing-jackets by a pipe, *k*′, controlled by a cock, *p*′, and passes out at pipe *j*′. (Seen in Fig. 4.) I have shown the piston-rods in these views provided with ordinary stuffing-boxes, and I sometimes employ these also as a precaution against the leakage of gas; but I may omit them. The bushings *c c*, Fig. 1, may also be omitted, or may form integral parts of cylinder *b*.

Having thus described my invention, I claim—

1. The herein-described method of lubricating and packing the piston-rod, which consists in supplying the liquid lubricant to the lubricant-chamber around the rod continuously, and constantly maintaining the lubricant in said chamber at a temperature low enough to congeal the same, as set forth.

2. The herein-described method of lubricating and packing the piston-rod, which consists in supplying the liquid lubricant to the lubricant-chamber around the rod under a constant pressure and constantly maintaining the lubricant in said chamber at a temperature low enough to congeal the same, as set forth.

3. The cylinder of a compression-pump provided with an annular lubricant-chamber around the piston-rod, an oil-receptacle communicating with the said chamber, a freezing-jacket around said lubricant-chamber, and means, substantially as described, for refrigerating the lubricant in said chamber, substantially as set forth.

4. The combination, with the piston-rod of the compression-pump, of the pump-cylinder provided with a sleeve, C, out through which the piston-rod passes, the cylinder *b* in said sleeve furnished with a lubricant-chamber, *d*, and a freezing-jacket, *e*, the follower E, furnished with an oil-receptacle, *f*, a channel communicating with chamber *d*, and an oil-inlet, and means, substantially as described, for effecting constant refrigeration of the lubricant in chamber *d*, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDOUARD FIXARY.

Witnesses:
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AMAND RITTER.