March 30, 1926. 1,578,880

E. R. DE LUIZ

COMPRESSOR

Filed April 30, 1924

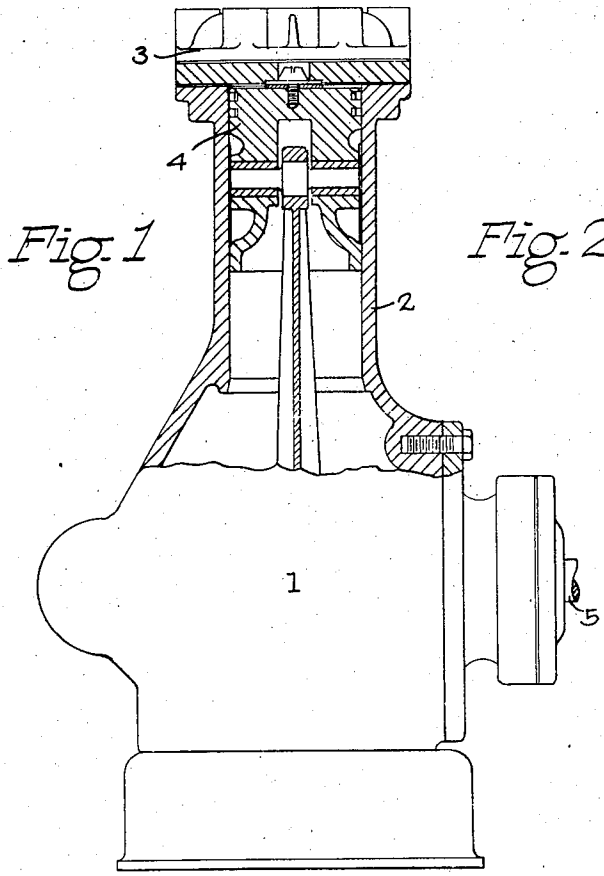


Fig. 1

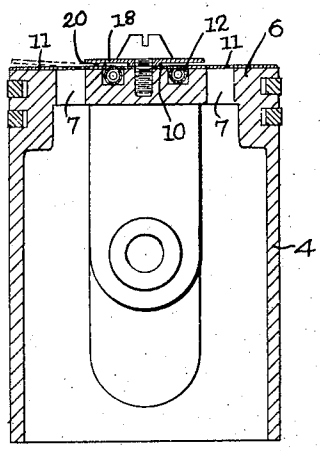


Fig. 2

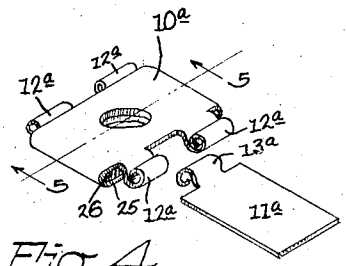


Fig. 4

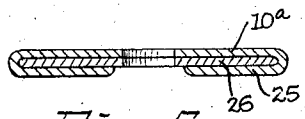


Fig. 5

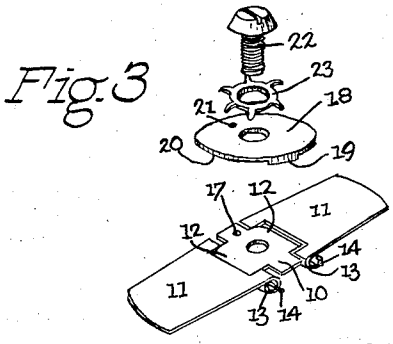


Fig. 3

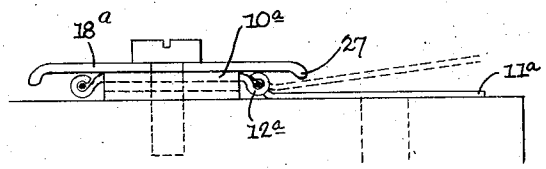
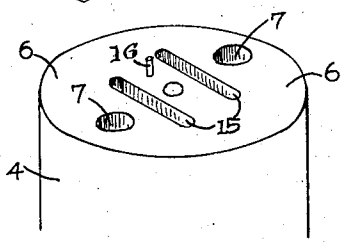


Fig. 6



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UNITED STATES PATENT OFFICE.

EDWARD R. DE LUIZ, OF FLINT, MICHIGAN, ASSIGNOR TO COPELAND PRODUCTS, INC., OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

COMPRESSOR.

Application filed April 30, 1924. Serial No. 710,134.

To all whom it may concern:

Be it known that I, EDWARD R. DE LUIZ, a citizen of the United States of America, and a resident of Flint, in the county of Genesee and State of Michigan, have invented certain new and useful Improvements in Compressors, of which the following is a full, clear, and exact description.

This invention relates to compressors and has particular reference to a compressor for use with domestic refrigerating apparatus although not restricted to that use, as some features of the same may be of more general application. The objects of the invention are the provision of a new and improved piston head valve which can be cheaply made, readily installed, and is quick, tight, quiet and reliable in operation, and is not subject to crystallization or breakage. Further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application I have shown certain physical forms in which my inventive idea may be embodied although it will be understood that these drawings are intended to be merely illustrative and not limiting upon me. Fig. 1 illustrates a simple type of compressor, partly in section and partly in elevation, provided with my improved valve; Fig. 2 is an enlarged sectional view of the piston shown in Fig. 1 taken at right angles to the position in the first view; Fig. 3 is a separated perspective view of the parts shown in Fig. 2; Fig. 4 is a separated perspective view of parts of a modified form of valve; Fig. 5 is a sectional view corresponding to the line 5—5 of Fig. 4; and Fig. 6 is a side elevation of part of a piston head showing the valve parts illustrated in Fig. 4.

I have chosen for illustration a simple compressor of typical form having a crank base 1, cylinder 2, cylinder-head 3, and reciprocating piston 4 operated by a suitable shaft 5 entering the crank case. In small sized compressors it is generally cheaper and more convenient to lead the entering gases into the compressor cylinder by way of ports formed in the piston head, these ports sometimes communicating with an inlet chamber surrounding the cylinder which chamber opens through a hole in the piston wall, and at other times communicating directly with the crank case into which the entering gases are admitted. In the present embodiment I have shown the piston as formed with a flat head 6 intersected by longitudinal ports 7 which communicate directly with the crank case but do not limit myself to this arrangement. In either case the piston is necessarily provided with some kind of valve adapted to open upon the down stroke and close upon the up stroke.

According to my invention this valve comprises a block or plate 10 suitably secured to the piston and having metal flaps 11, 11 hinged thereto, one flap for each of the ports 7. These flaps are made of thin flat sheets of metal adapted to lie snugly upon the surface 6 and the hinges are made with sufficient looseness so that the flaps may become seated without binding and yet with sufficient tightness to prevent undue play or displacement of the parts. According to the construction shown in Figs. 1, 2, and 3 the block 10 consists of a small piece of sheet metal having opposite edges bent as at 12, 12 to form hinge sleeves, the flaps 11, 11 having portions 13, 13 rolled to form similar sleeves in line with the first sleeves, the parts being held together by loosely fitting pintles 14. The piston head is formed with recesses 15 for the accommodation of these hinges, this arrangement also serving to prevent accidental displacement of the pintles. A suitable pin 16 engaging a hole in the piston head and a registering hole 17 in the block 10 is preferably employed to hold the parts in line.

Above the block is located a washer 18 having at its center a thickened part 19 adapted to engage the block 10 and having its marginal parts where they over-lap the flaps relieved as at 20 to permit limited movement of the flaps as shown by the dotted lines in Fig. 2. This washer may also be formed with a hole 21 for the reception of the pin 16, both the washer and the block being apertured for the securing screw 22, and a suitable lock washer 23 preferably being employed to guard against unscrewing.

In Figs. 4, 5, and 6 I have shown a modified form of device designed to avoid the necessity of forming recesses 15 in the piston head. In these views I have shown the block 10^a as formed of a sheet of metal as before but with elongated end portions 25

which are folded underneath so as to embrace a thickening block 26, thus producing sufficient space for the hinge sleeves 12^a, 12^a. The flap 11^a is formed with an integral sleeve 13^a as before, excepting that the same is displaced above the flap instead of below the same. The retainiing member or washer 18^a no longer needs to be chamfered to afford play for the flaps, but may be even required to have its marginal parts bent down as shown at 27 lest the movement of such flaps be too great.

It will be understood that many other changes in details can be made within the scope of my invention and I do not limit myself in any respect except as specifically recited in my several claims. My improved construction permits the use of flaps of sufficiently thick metal to hold its shape and support the pressures necessary and without becoming crystallized or broken at the bend by reason of the repeated deflections.

Having thus described my invention what I claim is:

1. In a compressor, in combination, a piston having a port in its head, a block at one side of said port, a metal flap hinged to said block upon an axis parallel to the head, a clamping member engaging said block and having a part projecting over said flap and adapted to permit limited opening thereof, and means for securing said member and block to the piston head, the hinge parts being loosely fitted whereby the flap may seat itself freely.

2. In a compressor, in combination, a piston having a port in its head, a sheet metal block at one side of said port having its margin bent to form a hinge sleeve, a sheet metal flap having its margin bent to form a hinge sleeve adapted to interfit with said first sleeve, a loosely fitting pintle connecting said sleeves, a clamping member having a portion adapted to engage said block in securing relation and another portion adapted to overhang said flap in spaced relation, means for preventing said block and member from rotating relative to the piston head, and means for securing said member and block to said piston head.

3. In a compressor, in combination, a piston having a port in its head, a sheet metal block at one side of said port having its margin bent to form a hinge sleeve, a sheet metal flap having its margin bent to form a hinge sleeve adapted to interfit with said first sleeve, a clamping member having a portion adapted to engage said block and another portion adapted to overhang said flap, said piston having a central threaded socket and said block and member having apertures adapted to register therewith, and threaded means for securing said block and clamping member to said piston.

4. In a compressor, in combination, a piston having a port in its head and a recess at one side of said port, a metal block and a metal flap hinged together, the hinge portion lying in said recess and the flap overlying said port, and a clamping member secured to said piston over said block and having an extension overlying said hinge portion and constituting a stop for said flap.

5. In a compressor, in combination, a piston having a pair of ports in its head and a threaded hole between said ports a sheet metal block having a sheet metal flap hinged to opposite sides thereof, said block having an aperture registering with said screw hole and one flap overlying each port, a washer having a portion engaging said block and an aperture registering with the first aperture, the margins of said washer being decreased in thickness and overlying said hinges and a part of said flaps, and threaded means securing said washer and block to said piston.

In testimony whereof, I hereunto affix my signature.

EDWARD R. DE LUIZ.