

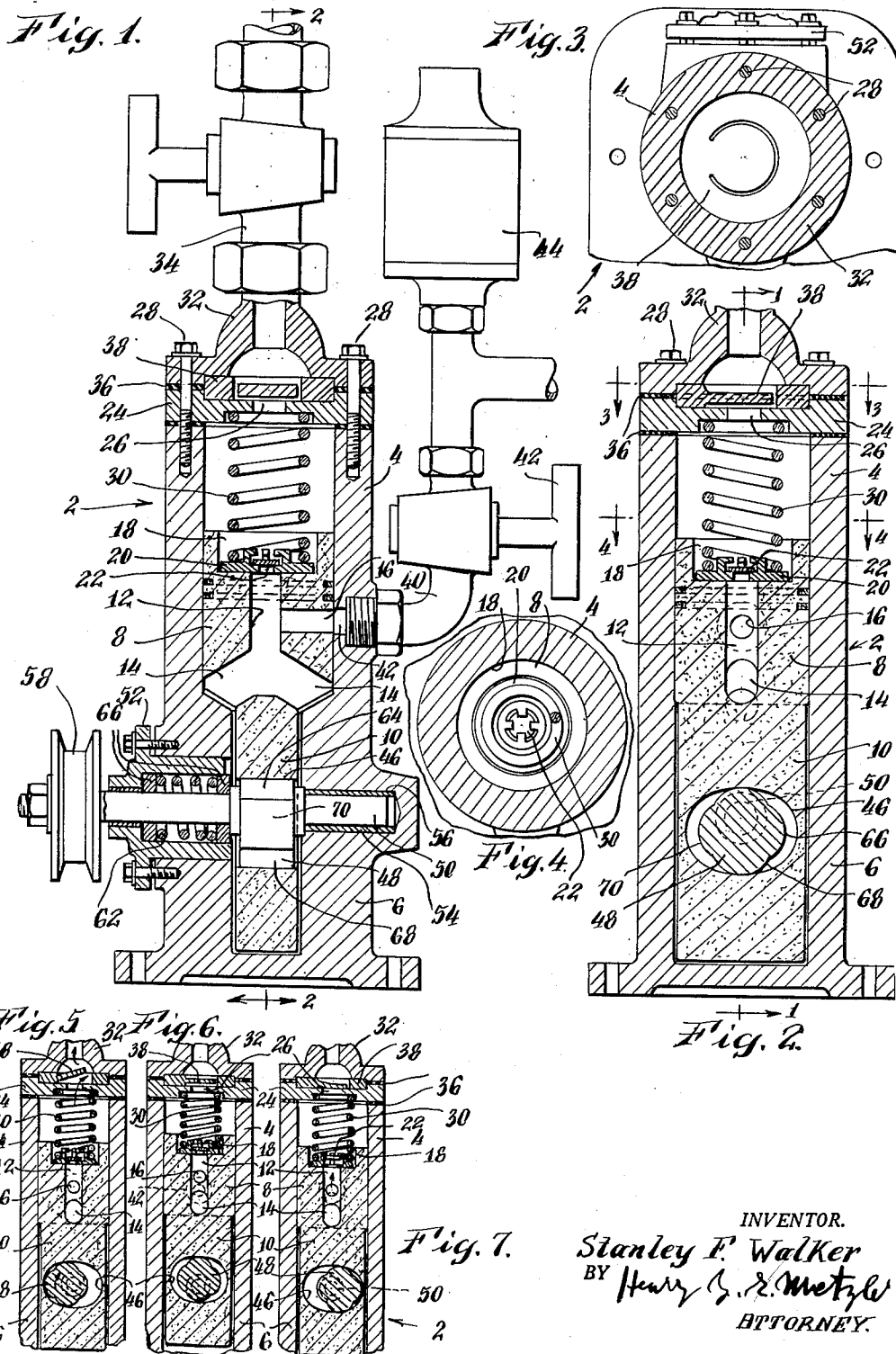
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VALVED PISTON COMPRESSOR

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VALVED PISTON COMPRESSOR

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1 Claim. (Cl. 230—190)

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The present invention relates to improvements in compressors for refrigerators and the like and, more specifically, to a new and improved compressor particularly well adapted for use in connection with midget refrigerators of the type described in my co-pending patent application Serial No. 722,317, filed January 16, 1947 now Patent No. 2,512,077 dated June 20, 1950.

One object of the present invention is the provision of a device of the character described which consists of fewer parts, and of parts which are less expensive to manufacture and to assemble and which are lighter in weight, than has been the case with hitherto known compressors.

Another object of the present invention is the provision of a device of the character described which has movable parts and/or bearings consisting mainly of hard rubber or fibre so as to avoid to a large extent the necessity of any lubrication, said movable parts being of such a simple construction and being arranged in such a manner that they can be exchanged quickly and at a very low cost when they are worn out.

A further object of the present invention is the provision of a device of the character described which is highly efficient and reliable in operation, and which is simple and inexpensive to manufacture and to operate, but which is also sturdy, durable and well adapted to withstand the rough usage to which devices of this type frequently are subjected.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing a preferred form of the invention has been shown.

In said drawing:

Figure 1 is a fractional sectional view on the line 1—1 of Fig. 2 of a preferred embodiment of my invention;

Fig. 2 is a fractional sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a fractional sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a fractional sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a reduced fractional vertical sectional view showing the movable parts in a certain position different from the position shown in Figs. 1 and 2;

Fig. 6 is a reduced fractional vertical sectional view as Fig. 5 showing the movable parts in another position; and

Fig. 7 is a reduced sectional view as Figs. 5 and

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6 showing the movable parts in still another position.

Similar reference numerals refer to similar parts throughout the several views.

In the drawing the numeral 2 denotes a housing which has a cylindrical portion 4, that is open at its top, and a lower portion 6 of a crank-case-like shape whose interior preferably is substantially rectangular in cross-section. A piston 8, which preferably is made of hard rubber, plastic material, or the like, is adapted to be reciprocated in the cylindrical portion 4. A substantially rectangular portion 10 extends downwardly from the piston 8 into the lower portion 6 of the housing 2 and is so dimensioned that there is always some free space between it and the inner sides of the portion 6. The piston 8 is provided with a vertical bore 12, which extends preferably through the axial section of the piston 8 and whose lower end portion is bifurcated at 14, or diverging, and terminates at the lateral lower extremity of the piston 8, as may be seen in Fig. 1. A horizontal bore 16 extends through a lateral section of the piston 8 from its periphery and terminates into the bore 12. The top of the piston 8 preferably is provided with an excavation 18 into which is placed a non-return-check valve 20 of the flapper valve type having a flapper 22, or the like, adapted for closing the bore 12 whenever there is pressure above the piston 8, and to open the same whenever there is a vacuum above the piston 8. Any suitable cover is secured to the top of the cylinder 8, for instance a disk 24 having a perforation 26 is secured thereto by means of screws 28 or the like. A spring 30 preferably is interposed between the parts 20 and 24 and tends to force the piston 8 away from the cover 24. A dome-shaped member 32, to which is connected an outlet pipe 34, is fastened upon the disk 24 by the screws 28 or the like, and packing or gasket means 36 preferably are interposed between the disk 24 and the member 34 as well as the cylinder 8. The parts 24 and 32 preferably are provided with opposite excavations in which rests a non-return-check valve 38 of the flapper valve type or of any other suitable type.

An inlet pipe 40 is connected to a bore 42 (Figs. 1 and 6) in a section of the wall of the cylinder portion 4. The bore 42 registers with the bore 16 in the piston 8 when the latter is in its lowermost position (Figs. 1 and 2). The pipe 40 preferably is provided with a shut-off valve 42 and is connected to a liquid receptacle 44 or the like.

The portion 10 is provided with an oblong perforation 46 which is engaged by a cam 48, that is provided on a shaft 50. A bearing bracket 52 is secured to one side of the lower portion of the housing 2, and a bearing bushing 54 is provided in a horizontal bore 56 in the housing

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2 opposite the bracket 52. The shaft 50 rotates in the parts 52 and 54, and can be driven by a pulley 58 or the like. Any suitable packing means 60 (Fig. 1) are provided in the bracket 52 and are spaced from each other by means of a coiled spring 62 or the like. If the housing 2 and the bracket 52 are made of the same or a similar material as the piston 8, no bearing bushings are necessary.

If the parts 48, 50 and 58 revolve in a clockwise direction, the following mode of operation is apparent: While moving from the position shown in Figs. 1 and 2 to that shown in Fig. 6, the piston 8 moves upwardly, the valve 38 is open, and the valve 20 is closed (Fig. 5), so that fluid above the piston 8 will be forced out of the cylindrical portion 4 through the parts 24, 32, 32 and 34. Simultaneously there will be created a suction force and a vacuum in the portion 6, and as long as the bore 16 is adjacent the bore 42 or any part of it, fluid will be drawn into the portion 6 through the pipe 40 as well as through 16, 12 and 14. While the movement continues from the position shown in Fig. 6 to that shown in Fig. 7, the piston 8 moves downwardly, the valve 38 is closed, and the valve 20 is open, so that the fluid in the portion 6 will be compressed and will be forced into the cylindrical portion 4 through 14, 12, and 20, the bores 16 and 42 being no longer adjacent each other or in registering alignment so that no fluid can move back into the pipe 40. Upon continuation of the rotation of the shaft, the moving parts reach again the position shown in Figs. 1 and 2. Thus my new and improved compressor works substantially on a two-cycle principle. The cam 48 preferably has four raised circumferential sections 64, 66, 68 and 70 (Figs. 1 and 2), whose arrangement exactly controls the movement of the piston 8 during each part of each revolution of the cam 48.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:

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A device of the character described comprising a housing whose upper portion is cylindrical and has an opening in its lower wall section while the lower portion of the housing is shaped as a crankcase portion, a disk having an aperture in its center portion being secured to the upper end of the cylindrical portion of said housing, a piston of plastic material adapted to be reciprocated in said cylindrical portion having a perforation axially extended therethrough as well as a lateral bore extending from its periphery into said perforation, a first non-return-check valve at the top of said piston adapted for opening and closing said perforation, a second non-return-check valve provided at said perforated disk being adapted for closing the aperture in said disk whenever there is a vacuum within said cylindrical portion, a spring interposed between said disk and said piston adapted for forcing the latter away from the former and resting with its lower end upon said first non-return-check valve, a flattened portion secured to said piston and extending into said crankcase portion and having an oblong opening whose longitudinal axis is right angularly disposed to the axis of said piston, a shaft being rotatable in said crankcase portion, and a cam provided on said shaft adapted for engaging the side of said oblong opening in said flattened portion and being adapted to cause a reciprocating movement of said piston when the shaft revolves, said lateral bore in said piston being so located as to register with the opening in the lower section of the cylindrical portion of said housing when said piston is in its lowermost position, and that portion of said perforation which is adjacent said flattened portion being V-shaped and terminating at the lateral extremities of said piston adjacent said flattened portion.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
279,699	Bowman	June 19, 1883
1,917,690	Beeh	July 11, 1933
2,040,667	Moulet	May 12, 1936
2,344,565	Scott et al.	Mar. 21, 1944
2,512,077	Walker	June 20, 1950

FOREIGN PATENTS

Number	Country	Date
427,910	Great Britain	May 2, 1935