

June 23, 1936.

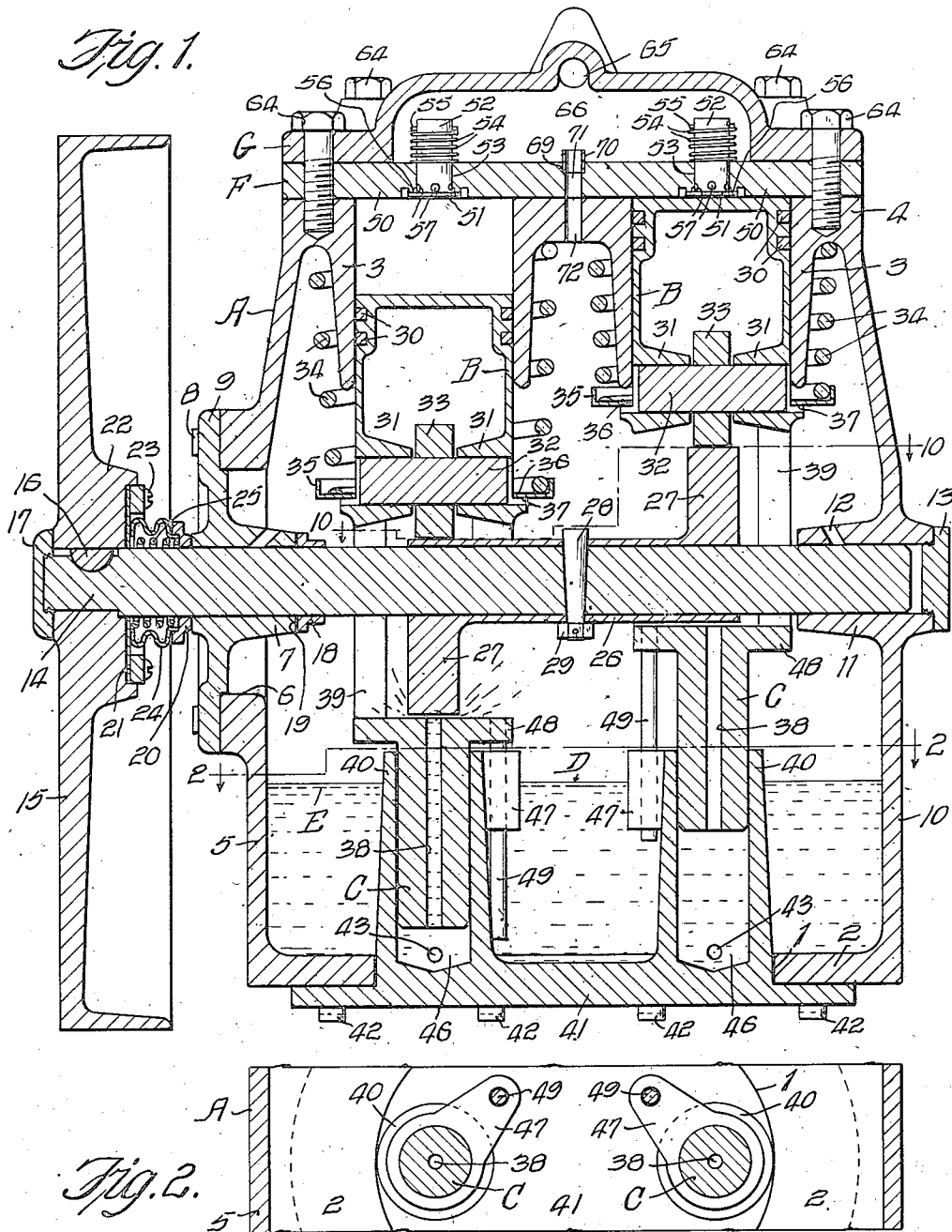
G. L. STREBLER

2,044,957

COMPRESSOR

Filed May 22, 1933

4 Sheets-Sheet 1



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June 23, 1936.

G. L. STREBLER

2,044,957

COMPRESSOR

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4 Sheets-Sheet 2

Fig. 3.

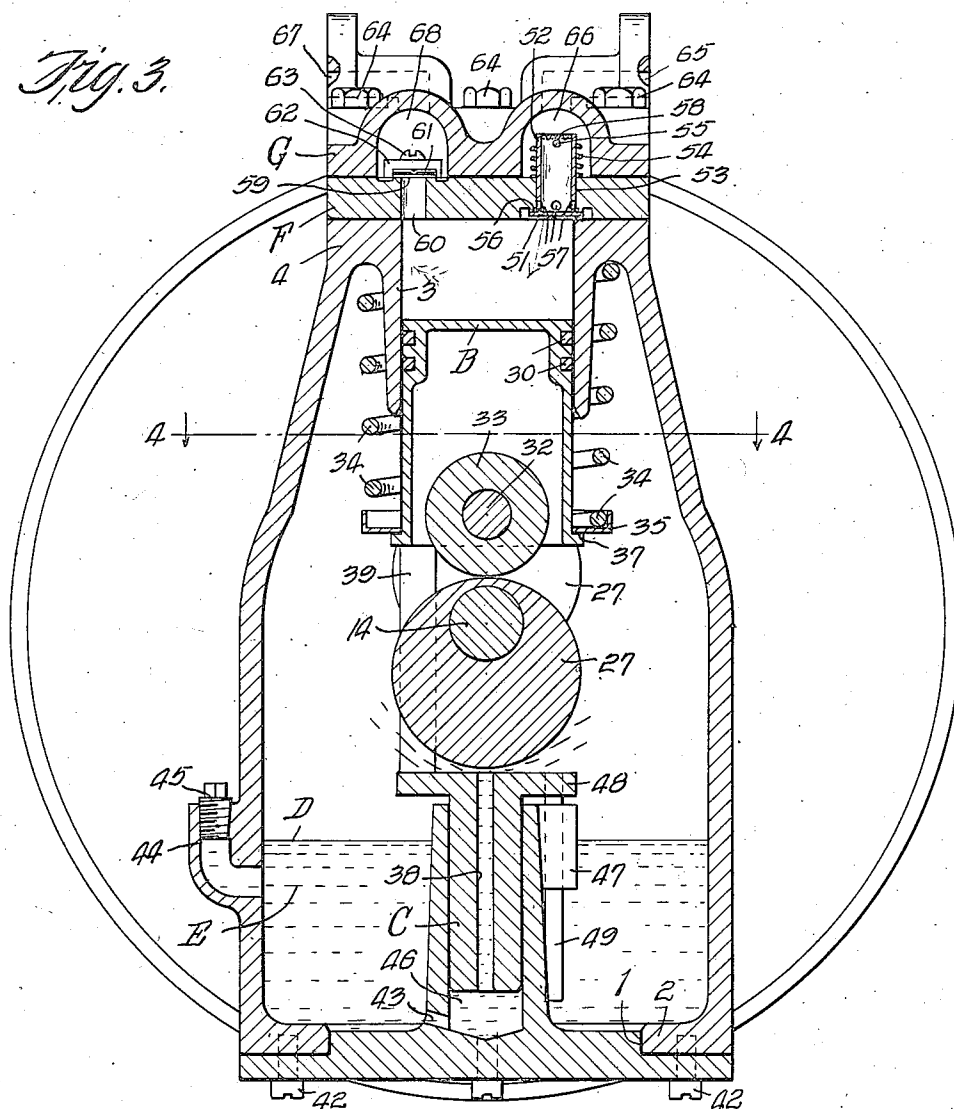
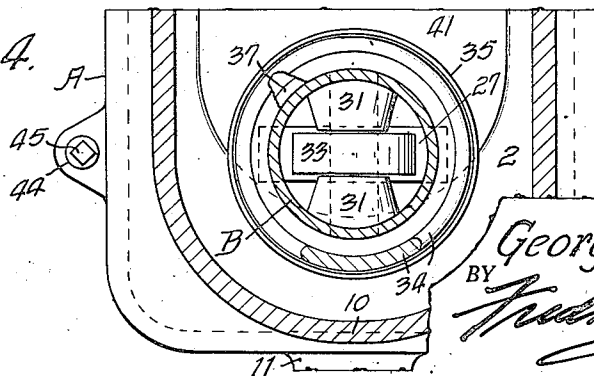


Fig. 4.



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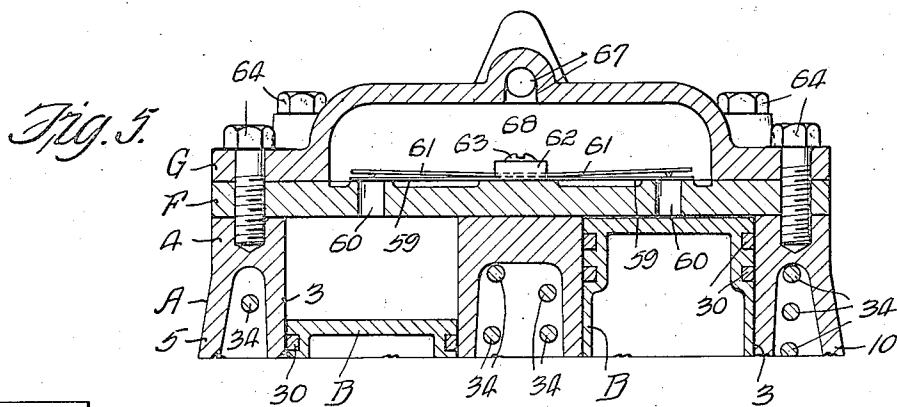
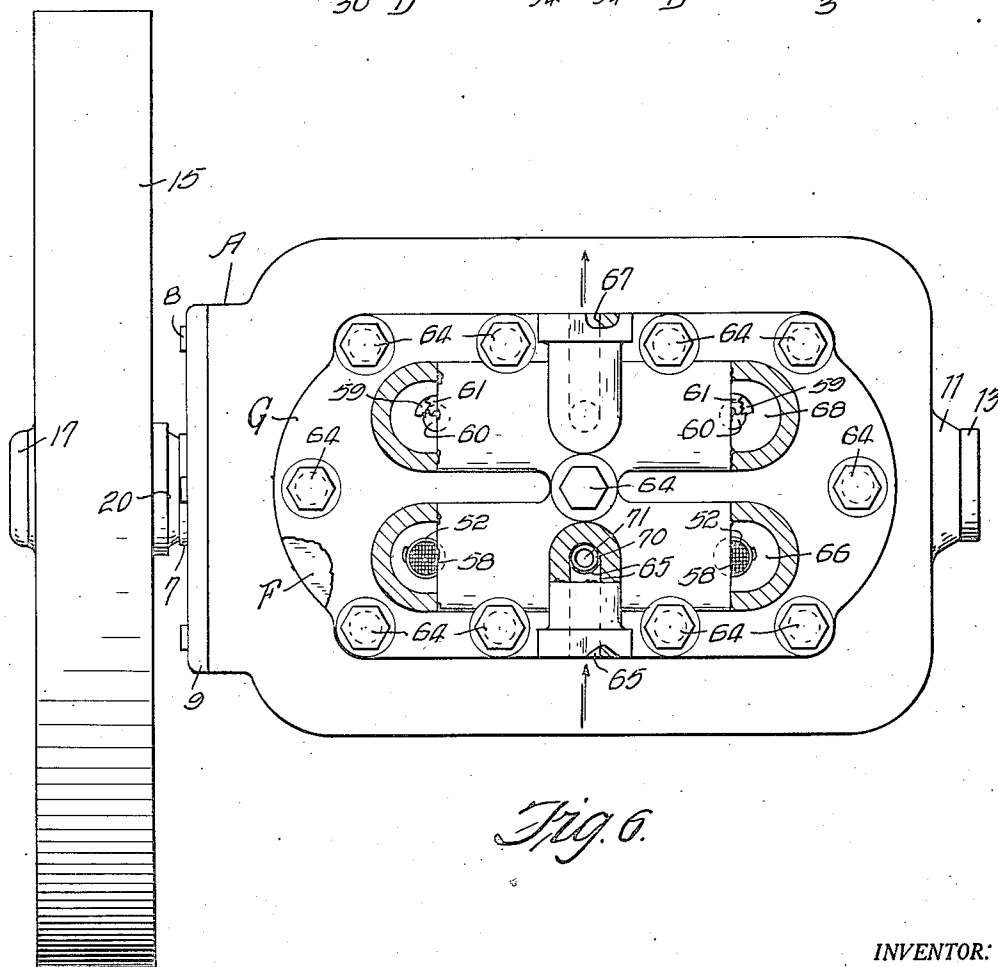
G. L. STREBLER

2,044,957

COMPRESSOR

Filed May 22, 1933

4 Sheets-Sheet 3



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2,044,957

COMPRESSOR

Filed May 22, 1933

4 Sheets-Sheet 4

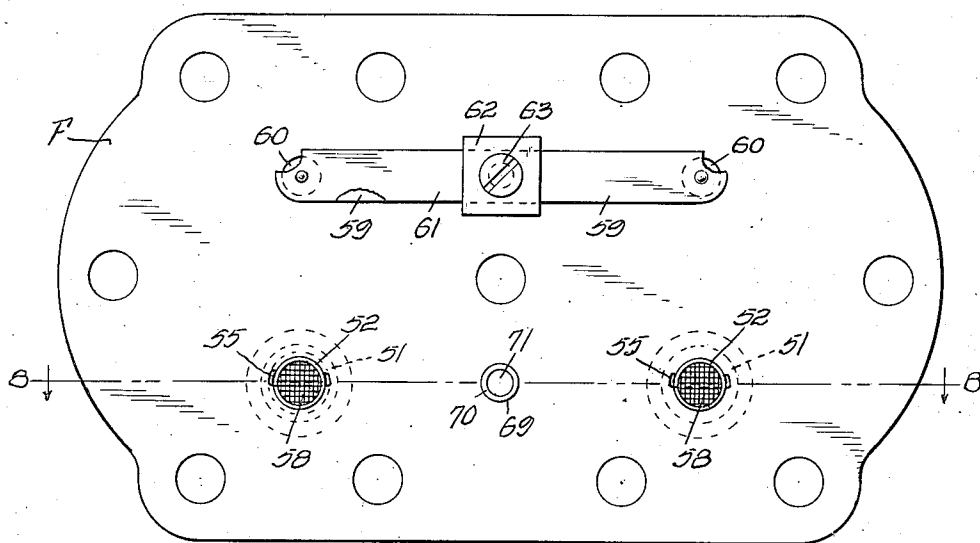


Fig. 7.

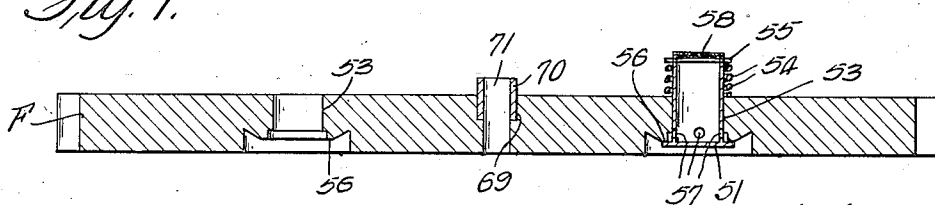


Fig. 8.

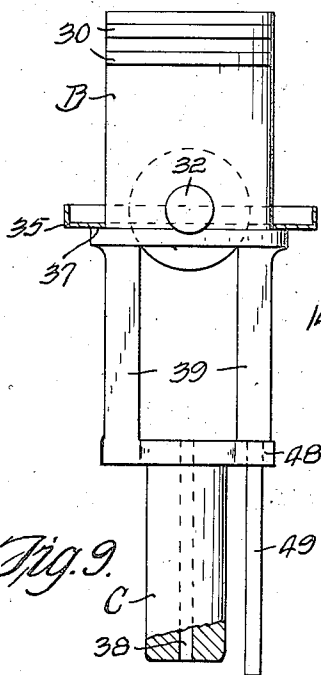


Fig. 9.

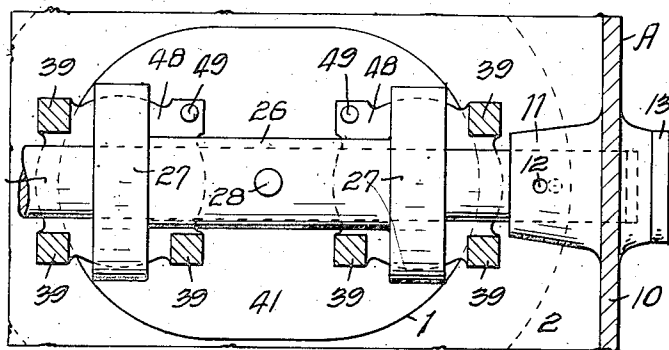


Fig. 10.

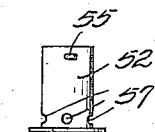


Fig. 11.

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UNITED STATES PATENT OFFICE

2,044,957

COMPRESSOR

George L. Strebler, St. Louis, Mo.

Application May 22, 1933, Serial No. 672,089

20 Claims. (Cl. 230—185)

This invention relates to compressors, and has particular application to fluid compressors employed for use with refrigerators, although not necessarily limited thereto, as it will prove equally effective and efficient as an air or similar compressor not associated with refrigeration.

An object of the invention is the provision of a relatively small, compact high pressure compressor for methyl chloride, sulphur dioxide and similar refrigerating fluids, a compressor which can be run at a relatively low speed and the parts of which can be quickly and easily assembled and disassembled.

A further object of the invention is the provision of a compressor having spaced vertically opposed cylinders in which pistons reciprocate, one of which cylinders and pistons serves as a compressor unit, and the other serving as an oil spray pump to effectively lubricate the compressor unit which is disposed above the oil pump unit.

A further object of the invention is the provision of a compressor having an oil sump disposed adjacent an oil pump cylinder, with the space above the oil level in the sump reserved for any fluid leakage past a compressor piston in a cylinder, and which fluid leakage is by-passed from the interior of the compressor casing through a passage into a fluid intake passage from where the fluid is again taken into the compressor cylinder.

A further object of the invention is the utilization of a by-pass passage between the interior of a compressor casing and a fluid intake passage for the return of surplus lubricant back into the oil sump from the intake passage, thus preventing its entrance into the fluid compressor with the fluid to be compressed and for the purpose of maintaining a balanced pressure above and below the piston to prevent the hanging of the piston, when, for instance, the intake passage is under a vacuum.

A further object of the invention is the provision of an intake valve for a compressor cylinder which will also serve as a means to prevent any accumulated oil and foreign matter in the fluid intake passage of the compressor from entering the compressor cylinder with the intake of fluid to be compressed.

A further object of the invention resides in the provision of means, such as a guide stem, serving to prevent rotation of the pistons relative to their cylinders during reciprocation thereof.

A further object of the invention is the provision of an inlet and outlet valve supporting

plate for a compressor serving also as a head for a cylinder or cylinders, and upon which a manifold head, having separated intake and outlet passages, is secured, and said plate having a by-pass passage serving as a communication between the intake passage of the manifold head and the interior of a compressor case to permit compressible fluid escaping past a piston in a cylinder to be brought back into the intake passage for re-entrance into the compression cylinder and to prevent hanging of the piston when the intake passage is under a vacuum.

A further object of the invention is the provision of a rotatable thrust member on the compressor piston upon which one end of a suitable coiled spring is seated to prevent, as far as possible, any torque action of the spring to effect rotation of the piston within its cylinder.

A further object of the invention resides in offsetting the position of the intake valve relative to the bore of the cylinder so that the valve will lie partially over the upper end wall of the cylinder.

A further object of the invention resides in imparting a suction stroke to the fluid compressor piston and a compression stroke to the oil pump piston through the action of a coiled spring surrounding the fluid compression cylinder and imparting a compression stroke to the fluid compressor piston and a non-compression stroke to the oil pump piston through the action of a piston actuator on a drive shaft.

A still further object of the invention is the provision of an antifriction member carried by a pin supported by the compressor piston to serve as a roller between a driver or actuator and the piston actuated in one direction thereby.

A further object of the rotatable thrust member above mentioned is to serve as means to prevent longitudinal movement of the roller supporting pin beyond the wall of the compressor piston.

A further object of the invention is the provision of a compressor wherein the raw gases are not taken into the compressor cylinder through the compressor case proper.

A still further object of the invention is the provision of a compressor, which will not permit of oil within the compressor casing being transmitted into the fluid intake passage with gas which has leaked into the case past the piston during its return to the fluid intake passage.

A still further object of the invention is the provision of a compressor which possesses advantages in points of simplicity and efficiency,

and, at the same time proves itself comparatively inexpensive in cost of manufacture.

With the above and other objects in view, the invention consists in the novel features of construction, arrangement and combination of parts hereinafter more fully described and finally pointed out in the claims hereto appended.

Referring to the accompanying drawings forming a part of this specification, wherein like characters of reference denote similar parts throughout the several views:

Fig. 1 is a longitudinal irregular, vertical, sectional view of a compressor embodying the features of my invention.

Fig. 2 is a view taken on line 2—2 of Fig. 1.

Fig. 3 is an irregular, transverse, sectional view taken through one of the complete working units of the compressor.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Fig. 5 is an irregular vertical sectional view of the upper end of the compressor and clearly showing the exhaust valves.

Fig. 6 is a top plan view of the compressor showing parts of the manifold head broken away and partly in cross section.

Fig. 7 is a top plan view of the combined cylinder head and valve supporting plate.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 7.

Fig. 9 is a side elevation of one of the double piston structures.

Fig. 10 is a sectional view taken on line 10—10 of Fig. 1.

Fig. 11 is a side elevation of one of the intake valves.

In carrying out the aim of my present invention, I employ a suitable hollow casing designated generally as A, which casing is provided with an opening 1 in the lower wall 2 thereof, and having one or more depending cylinders 3 which enter the interior of the casing from the top wall 4 of the hollow casing. The cylinder, or cylinders are preferably, although not necessarily, integral with the top wall 4 of the casing. One of the side walls of the casing, designated 5 is provided with a suitable opening 6 to receive a suitable bearing 7. The bearing 7 is held in position for closing the opening 6 by means of suitable fastening devices 8 passing through a bearing flange 9 for connection with the side wall 5 of the casing A. The opposite side wall 10 of the casing A is provided with a suitable bearing 11 having an oil opening 12. The outer end of the bearing is closed by means of a suitable plug cap 13.

A suitable driven member 14, such for instance, as a shaft, is journaled in the bearings 7 and 11 and one end of the shaft projects beyond the outer end of bearing 7, and there is suitably connected to the shaft 14 a suitable combined belt and fly wheel 15. The means shown for making the fly wheel connection with the shaft 14 includes a key 16 and a suitable cap 17, the cap having screw threaded connection with the projecting end of the shaft 14. Caps 13 and 17 serve to seal the ends of the driven shaft 14 against fluid leakage from the interior of the casing A along the shaft 14.

In order to prevent leakage from within the casing through the bearing 7 around the shaft 14, I provide the shaft 14 with a suitable fixed collar 18 adapted for frictional engagement with the inner face 19 of the bearing 7. A suitable collar 20 mounted on the shaft 14 frictionally en-

gages the outer end face of the bearing 7. Disposed between the collar 20 and a plate 21 attached to the inner face of the hub section 22 of the wheel 15 by means of suitable fastening devices 23, is a sylphon or longitudinally expandable connection 24. Disposed within the sylphon connection 24 and surrounding the shaft 14, is a suitable coiled spring 25, the ends of which act against the collar 20 and the plate 21 to prevent leakage around the shaft 14.

As clearly shown in Figs. 1 and 10, a suitable sleeve 26 is mounted upon the shaft 14 within the casing A. The sleeve, which serves as a connection, is provided with two suitable eccentrics, or cams 27, which are disposed in alignment with the axis of the fluid compression cylinders 3. The sleeve 26 is held against longitudinal and rotary displacement relative to the shaft 14 by means of a suitable fastening device, which is shown in the drawings as a tapered pin 28 passing through registered openings in the shaft and the sleeve, and which is provided with a nut 29 at its smaller end.

Mounted for reciprocation in each cylinder 3, which I term compressor cylinders, is a suitable hollow piston B provided at its upper end with suitable piston rings 30. The lower end of each piston B is provided internally with a pair of spaced opposed transverse bosses 31 provided with registered horizontal openings to receive a suitable pin 32. A suitable roller 33, preferably hardened, is mounted on the pin 32 carried by each piston B, and the roller is disposed between the inner faces of the bosses 31, as shown. The roller 33 on the pin 32 of each piston B is designed for rolling contact with its respective shaft eccentric, or cam 27, as clearly shown in Fig. 1, so as to serve as an antifriction member between the eccentrics, or cams 27 and the pistons B.

A suitable coiled or helical spring 34 encircles each compressor cylinder 3. The upper ends of the springs engage or seat against the inner face of the casing top 4. The lower end of each spring 34 is seated upon a suitable flanged thrust member 35. Each thrust member, or plate is provided with a central opening 36 so that it can be slipped into position over its associated piston B from the upper end thereof. The lower end of each compressor piston B is flanged outwardly to provide a shoulder 37 upon which the thrust members 35 are rotatably seated to compensate for torsional movement of the springs 34 during action thereof. It will be here observed that the thrust member 35, on each piston B, also serves as a means to limit longitudinal movement of the wrist pin beyond the wall of its piston B, as will be clearly apparent from Figs. 1, 3 and 9.

Disposed in spaced axial alignment below each piston B is a suitable oil pump piston C. Each piston C, shown as solid, is provided with a suitable longitudinal bore 38 therethrough. Each oil pump piston C is connected with its respective piston B by means of a plurality of suitable connecting members 39, as clearly shown in Figs. 1 and 10. The pistons C are reciprocally mounted in suitable upright cylinders 40, which serve as oil wells and which are directed upwardly into the casing A from the bottom thereof. The cylinders C are on a suitable closure plate 41 which is secured by suitable fastening devices 42, to the bottom wall 2 of the casing A for closing the opening 1 in the bottom wall of the casing. The wall of each oil pump cylinder 40 is provided with suitable openings 43 near the lower end thereof adjacent the floor plate 41.

The lower end of the casing A, up to a point a suitable distance below the upper ends of the oil pump cylinders 40 and indicated by the oil level line D, serves as an oil sump to be filled with oil E through the oil inlet 44, which inlet is closed by means of a suitable closure plug 45. The oil pump pistons C are shorter in length than their respective cylinders, thus, it will be observed that the lower end of each oil pump cylinder 40 serves as a chamber 46 to be fed with oil from the oil sump through the oil passage 43 in the wall of each pump cylinder 40 in order that with each downward stroke of the pump piston C, a quantity of lubricant will be forced upwardly out of the pump cylinders through the bore 38 thereof in an upwardly direction into the casing A for lubricating the compressor parts located above the oil pump parts. The eccentrics 27 serve as baffles for the oil forced out of the upper end of the pump piston to set up an oil spray.

As shown in Fig. 1, each oil pump cylinder 40 is provided with a suitable bearing 47 and the upper flanged end 48 of each pump piston C is provided with a suitable depending guide member 49, which is slidably receivable in the bearing 47 on its respective cylinder 40 to prevent any possible rotation of the compressor and oil pump pistons in their respective cylinders, and to prevent contact of the connections 39 between the compressor and pump pistons from coming into contact with the driven member 14 or the eccentric carrying sleeve 26, as shown in Figs. 1, 3 and 10.

Positioned upon the top wall 4 of the casing A is a suitable valve plate F. The portions of the plate adjacent the upper open ends of the compression cylinders B serve as heads, designated 50, for the cylinders B. Each cylinder head portion 50 of the valve plate F, is provided with an inlet valve 51 which has an upward tubular stem 52 of less outside diameter than the valve 51. Each valve stem 52 passes upwardly through a suitable inlet plate opening 53 and the tubular stem projects upwardly a suitable distance above the upper face of the valve plate F. A suitable coiled spring 54 encircles the projecting end of each tubular valve stem 52 and is disposed between the upper face of the valve plate and a suitable cross member 55 carried by the valve stem near the upper end thereof. Each inlet valve 51 engages a valve seat 56. Just above each valve 51, the stem thereof is provided with a plurality of wall openings 57 through which fluid can pass, from within the stem, into the compressor cylinders B during downward movement of the intake valves, which takes place with the suction stroke of the compressor pistons B.

Each tubular valve stem 52 is screened as at 58 to prevent foreign substance from entering the cylinders 3. The inlet valves 51 are slightly offset relative to the bore of the compressor cylinders 3 to be partly positioned over the upper wall 4 of the cylinder casing. Each valve seat 56 is formed on a recessed surface of the plate F so as to allow sufficient movement of the valves without striking the upper wall 4 of the casing. By this arrangement of valve location, should a valve stem cross member 55 work loose, the valve will not drop into the compressor cylinder 3.

The outlet valves are designated 59 and there is one for each compressor cylinder 3 which closes and opens an outlet opening 60 in the valve

plate F. The outlet valves 59 are shown as in the form of flat spring flap valves, and they are backed by a suitable flat spring 61. The springs are held in operative position by a suitable hold down member 62 held in position by a suitable fastening device 63. The outlet flap valves 59 are positioned upon and engage the upper face of the valve plate F, whereas the inlet valves engage the lower face thereof.

A suitable head designated generally as G, of the manifold type, is positioned on the valve plate F. The valve plate is held in position between the manifold head G and the top wall 4 of the casing A by suitable fastening devices 64.

The manifold head G is provided with a suitable fluid inlet passage 65, which communicates with a feed chamber 66 which, in turn, communicates through the apertured hollow valve stems 52 with the compressor cylinders 3. The feed chamber 66 is deep enough to receive and accommodate the upwardly projecting ends of the tubular inlet valve stems 52 and the chamber 66 serves also as an oil chamber or sump.

The manifold head G is also provided with a compressed fluid outlet passage 67, which communicates with a chamber 68 similar to chamber 66, and through chamber 68 the outlet passage 67 communicates with valve controlled compressed fluid outlet openings 69 and the compressor cylinders 3.

The valve plate F is also provided with a suitable opening 69 to receive upright tubular member 70 to provide what I term as a by-pass 71, which permits of communication between the manifold head chamber 66 and the interior of the casing A through a registered opening 72 in the top wall 4 of the casing A. The tube 70 projects above the upper face of the valve plate F to permit some of the oil accumulated in the chamber 66 of the manifold head to return to the casing and it also permits any fluid which leaks past the pistons B in the cylinders 3 into the casing to be returned to the intake chamber 66 in the manifold head to be returned to the cylinder for compression thereof. The by-pass 71 also serves to enable equal pressures to be maintained on opposite sides of the valve plate to prevent hanging of the pistons B which takes place when there is a vacuum created in the manifold intake chamber 66.

In operation, the fluid to be compressed is taken into the cylinder, or cylinders B, through the intake valves from the manifold head intake chamber 66, which is supplied with fluid through intake passage 65. As the cylinders 3 are being charged during the intake stroke of the pistons B therein, the pistons C in the oil pump cylinders 40, due to being moved downwardly, force oil under pressure out of the pump cylinder 40 through the bores 38 thereof to be forced in an upwardly direction for spraying the compressor parts disposed above the oil pump parts.

During the compression stroke of the compressor piston B, the fluid charge is forced into the outlet chamber 67 of the manifold head G under pressure. Any leakage of compressed fluid past a compression piston B into the casing A, is transferred into the intake chamber 66 of the manifold head G through the aforesaid by-pass 71 to again enter the compression cylinder. Surplus oil accumulation in the fluid intake chamber 66 of the manifold head G is denied entrance into the compression cylinder B, due to the tubular intake valve stem projecting above the upper face of the valve plate F and is drained back

into the casing A by gravity through the by-pass 71 as it overflows the tube 70 on the valve plate F. During each upstroke of the oil pump piston, oil is fed to the pump cylinder from the oil sump 5 through the oil cylinder wall openings 43 to replace that discharged through the oil pump pistons C.

From the foregoing description, it will be apparent that I provide a highly efficient and relatively slow speed compressor, having reciprocating pistons, novel and efficient means for operating the pistons and mechanism arranged in relationship to the compressor cylinders and pistons for properly lubricating the compressor parts to prevent wear. That, I provide a practically noiseless compressor and one in which the compressible fluid is not taken through the compressor casing proper to the cylinders, except such fluid as leaks past the compressor pistons into the casing and extracted therefrom back into the intake chamber 66 of the manifold head for re-entrance into the cylinders to be compressed. And, also, that I provide a compressor wherein any surplus oil accumulation deposited in the fluid intake chamber 66 is trapped and permitted to return to the oil sump in compressor case by gravity through a by-pass connecting the intake chamber 66 with the interior of the compressor casing, and, further that the by-pass causes to be maintained a balanced pressure above and below the piston at all times.

The many advantages of the herein described invention will readily suggest themselves to those skilled in the art to which it appertains.

From the foregoing description, it is evident that a simple device for this purpose has been disclosed, but it is to be understood that I do not desire to restrict, or limit myself to the very details of the construction shown and described, which is merely illustrative, it being obvious that changes, not involving the exercise of invention, may be made without conflicting or departing from the spirit of the invention within the scope of the appended claims.

What I claim is:

1. In combination with a fluid compressor adapted to contain lubricating oil in the lower part thereof and having a fluid inlet, an outlet and an eccentric actuating means, of an oil spraying mechanism within the compressor embodying a cylinder having oil inlets adjacent its lower end and a piston having a longitudinal bore therethrough, the eccentric actuating means operating the piston of the oil spraying mechanism in its non-compression stroke only, and a coiled spring operating the compressor in its non-compression stroke only and the piston of the oil spraying mechanism in its compression stroke only to cause an oil spray to be delivered to the eccentric actuating means and compressor parts thereabove.

2. In combination, a fluid compressor casing having a fluid inlet and an outlet, an oil spraying mechanism, a rotatable actuator disposed between the fluid compressor and the oil spraying mechanism for actuating the compressor in its compression stroke and the oil spraying mechanism in its non-compression stroke, a coiled spring for actuating the compressor piston in its non-compression stroke and the oil spraying mechanism in its compression stroke, a fluid intake chamber adjacent the fluid inlet and a by-pass between the fluid intake chamber and the interior of the casing of the compressor to maintain an equalization of pressures in the fluid in-

take chamber and the interior of the casing of the compressor.

3. A reciprocating piston compressor having, in combination, a casing, a fluid intake chamber and a by-pass between the chamber and the interior of the casing of the compressor to maintain the equalization of pressures between the intake chamber and the interior of the compressor casing, and means embodying a cylinder having an apertured wall and including a tubular piston workable therein for effecting lubrication of the interior compressor parts by establishing an oil spray within the compressor casing during one stroke of the pistons.

4. A compressor unit comprising, in combination, a casing a reciprocating piston fluid compressor, an oil spraying pump, mechanism for actuating the compressor and pump in unison, said fluid compressor having a valve controlled inlet and a valve controlled outlet, a fluid chamber adjacent the valve controlled inlet, and a by-pass to establish communication between the fluid chamber and the interior of the casing of the compressor to maintain an equalized pressure above and below the piston of the fluid compressor.

5. In combination in a reciprocating piston compressor, a hollow casing provided with a valve controlled inlet and a valve controlled outlet, a manifold head having a fluid intake chamber adjacent the valve controlled inlet, and a by-pass establishing communication between the fluid intake chamber and the interior of the hollow casing to maintain an equalization of pressures above and below the piston of the compressor.

6. In combination in a reciprocating piston fluid compressor, a hollow casing provided with a valve controlled inlet and a valve controlled outlet, an oil pump disposed within the hollow casing operable in unison with the reciprocating piston compressor to discharge a spray of oil from a supply of oil within the casing for lubricating the compressor parts within the casing during each non-compression stroke of the reciprocating piston compressor.

7. In a compressor structure, in combination, a hollow casing, a pair of spaced vertically opposed cylinders projecting into the casing from the top and bottom thereof, spaced connected pistons reciprocable in the cylinders, and actuators for reciprocating the pistons in unison, the uppermost cylinder and piston serving to compress fluid and the lowermost cylinder and piston serving to lubricate the upper cylinder and piston by forcing a quantity of oil upwardly into the casing during the non-compression stroke of the upper piston and the compression stroke of the lower piston.

8. In combination in a reciprocating piston compressor, a hollow casing and open ended cylinder, a plate closing the outer end of said cylinder, an intake valve on the plate, an outlet valve on the plate, a manifold head on said plate having a fluid inlet chamber and a fluid outlet chamber and a by-pass establishing communication between the fluid inlet chamber and the interior of the casing to maintain equal pressures in the inlet manifold chamber and the interior of the compressor casing.

9. A reciprocating piston compressor having, in combination, a hollow casing adapted to contain a quantity of lubricant, a pair of cylinders in the casing having pistons reciprocably mounted therein, and a fluid intake chamber above and separated from the interior of the

casing by means of a valve carrying plate serving as a head for the cylinders and said plate having an opening having communication with the casing and the intake chamber to enable equal pressures to be maintained within the fluid intake chamber and within the casing.

10. A compressor comprising, in combination, a hollow casing adapted to contain a quantity of lubricant, a cylinder within the casing, a piston in the cylinder, mechanism for actuating the piston in its compression stroke, a resilient member for actuating the piston in its non-compression stroke, a plate closing the outer end of the cylinder, an intake valve on the plate, a discharge valve on the plate, a manifold head on the plate, said manifold head having a fluid inlet chamber adjacent the intake valve, and said plate and the compressor casing having registered openings serving as a by-pass to maintain a balanced pressure above and below the piston.

11. A compressor comprising, in combination, a hollow casing adapted to contain a quantity of lubricant, a cylinder within the casing, a piston in the cylinder, mechanism for actuating the piston in its compression stroke, a resilient member for actuating the piston in its non-compression stroke, a plate closing the outer end of the cylinder, an intake valve on the plate, a discharge valve on the plate, a manifold head on the plate, said manifold head having a fluid inlet chamber adjacent the intake valve, said plate and the compressor casing having registered openings serving as a by-pass to maintain a balanced pressure above and below the piston and co-operating members within the casing serving as a pump to spray lubricant upwardly into the casing during the non-compression stroke of the piston.

12. A compressor having, in combination, a hollow casing adapted to contain a supply of lubricant, a cylinder projecting into the casing, a piston mounted in said cylinder, a spring for moving the piston in its non-compression stroke, a driven member for moving the piston in its compression stroke, a pin mounted transversely on the piston adjacent the lower end thereof, and a roller mounted on said pin for anti-frictional engagement with the driven member to move the piston in its compression stroke.

13. A compressor having, in combination, a hollow casing adapted to contain a supply of lubricant, a cylinder projecting into the casing, a piston mounted in said cylinder, a spring for moving the piston in its non-compression stroke, a driven member for moving the piston in its compression stroke, a pin mounted transversely on the piston adjacent the lower end thereof, a roller mounted on said pin for anti-frictional engagement with the driven member to move the piston in its compression stroke and cooperating guide members to prevent rotation of the piston relative to the cylinder.

14. A compressor having, in combination, a hollow casing adapted to contain a supply of lubricant, a cylinder projecting into the casing, a piston mounted in said cylinder, a spring for moving the piston in its non-compression stroke, a driven member for moving the piston in its compression stroke, a pin mounted transversely on the piston adjacent the lower end thereof, a roller mounted on said pin for anti-frictional engagement with the driven member to move the piston in its compression stroke, a second piston having a longitudinal bore therethrough connected in spaced axial relation with the first piston, a cylinder for said second piston, the wall

of said cylinder having a lubricant inlet opening for the entrance of lubricant into the cylinder from the lubricant supply to be forced upwardly through the bore thereof during the non-compression stroke of the first piston.

15. A compressor having, in combination, a hollow casing adapted to contain a supply of lubricant, a cylinder projecting into the casing, a piston mounted in said cylinder, a spring for moving the piston in its non-compression stroke, a driven member for moving the piston in its compression stroke, a pin mounted transversely on the piston adjacent the lower end thereof, a roller mounted on said pin for anti-frictional engagement with the driven member to move the piston in its compression stroke, cooperating guide members to prevent rotation of the piston relative to the cylinder, a plate on the outer end of said cylinder, an intake valve on said plate, an outlet valve on said plate, a manifold head having an inlet chamber adjacent the inlet valve and a by-pass establishing communication between the manifold head inlet chamber and the interior of the casing to maintain a balanced pressure on opposite sides of the piston.

16. A compressor having in combination, a hollow casing adapted to contain a supply of lubricant, a cylinder projecting into the casing, a piston mounted in said cylinder, a spring for moving the piston in its non-compression stroke, a driven member for moving the piston in its compression stroke, a pin mounted transversely on the piston adjacent the lower end thereof, a roller mounted on said pin for anti-frictional engagement with the driven member to move the piston in its compression stroke, cooperating guide members to prevent rotation of the piston relative to the cylinder, a second piston having a longitudinal bore therethrough connected in spaced axial relation with the first piston, a cylinder for said second piston, the wall of said cylinder having a lubricant inlet opening for the entrance of lubricant into the cylinder from the lubricant supply to be forced upwardly through the bore thereof during the non-compression stroke of the first piston, a plate on the outer end of said cylinder, an intake valve on said plate, an outlet valve on said plate, a manifold head having an inlet chamber adjacent the inlet valve and a by-pass establishing communication between the manifold head inlet chamber and the interior of the casing to maintain a balanced pressure on opposite sides of the piston.

17. A fluid compressor having, in combination, a hollow casing, a cylinder within and integral with the casing, a piston in the cylinder, a rotatable member mounted within the lower end of the piston, a driven cam shaft for imparting a compression stroke to the piston, and a coiled spring surrounding the cylinder for imparting a non-compression stroke to the piston, the said rotatable member serving as an anti-friction connection between the piston and the driven cam shaft.

18. A compressor for refrigerating purposes comprising, in combination, a hollow casing adapted to contain a supply of lubricant, an upper cylinder having a valve controlled fluid inlet and a fluid outlet or lower cylinder having a wall opening, a piston mounted in each cylinder, a connection between said pistons, a pin transverse of the lower end of the upper piston, a roller mounted on the pin, a driven eccentric shaft disposed between the pistons and engaging said roller for imparting movement to the piston in one direction, a thrust plate rotatably mounted on the

lower end of the upper piston and serving to limit longitudinal movement of said pin, a flexible resilient member interposed between the top wall of the casing and the thrust plate and encircling the upper cylinder to impart movement to the piston in the opposite direction, guide members to prevent rotation of the pistons in the cylinders, the piston in the lower cylinder having a longitudinal lubricant discharge passage therethrough, a manifold head having an intake chamber adjacent the fluid inlet and a by-pass establishing communication between the fluid intake chamber and the interior of the hollow casing to maintain a balanced pressure above and below the upper piston.

19. A fluid compressor having, in combination, a hollow casing, cylinders within and integral with the casing, pistons in the cylinders, rotatable members mounted within the lower ends of the pistons, a driven cam shaft for imparting compression strokes to the pistons, and coiled springs surrounding the cylinders for imparting non-com-

pression strokes to the pistons, the said rotatable members serving as anti-friction connections between the pistons and the driven cam shaft.

20. A fluid compressor having, in combination, a casing adapted to contain lubricating oil, a pair of spaced cylinders projecting into the casing in opposite directions, one of the cylinders having oil inlets leading thereinto, connected pistons reciprocable in the cylinders, eccentric actuating means for moving one of the pistons in its respective cylinder in its compression stroke and causing the other piston to follow in its respective cylinder in its non-compression stroke, a coiled resilient member for reversing the movements of said pistons to cause lubricating oil to be forced upwardly through a longitudinal bore in the pistons moving in the cylinder having the oil inlets and delivering an oil spray to parts of the compressor disposed above the oil spraying mechanism.

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