

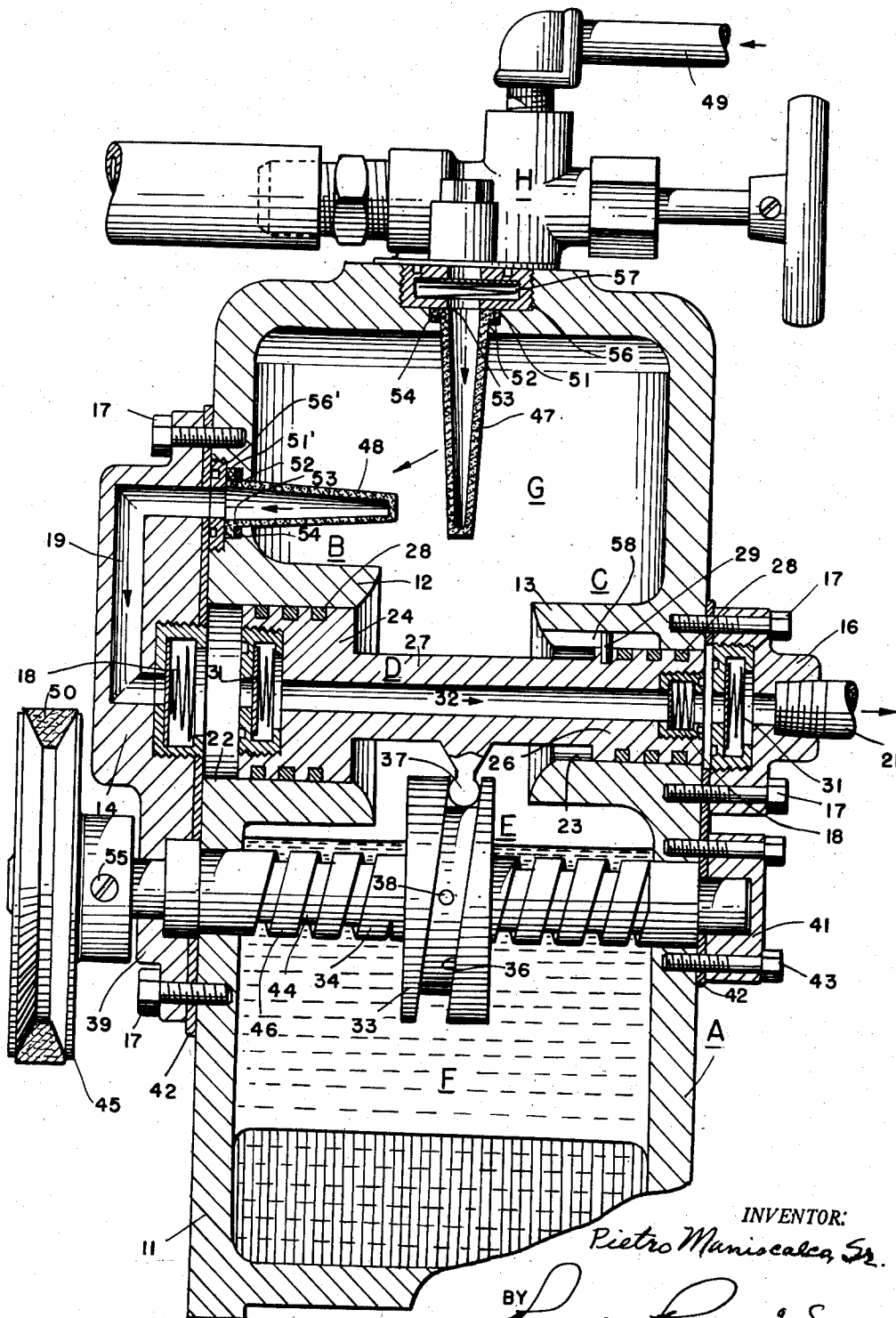
July 15, 1958

P. MANISCALCO, SR

2,843,312

COMPRESSOR

Filed July 7, 1954



1

2,843,312

COMPRESSOR

Pietro Maniscalco, Sr., Chicago, Ill.

Application July 7, 1954, Serial No. 441,907

2 Claims. (Cl. 230—192)

This invention relates to compressors of the light-running, multistage type particularly suitable for use in compressing refrigerant fluids required for refrigerating and/or air conditioning equipment.

The main objects of this invention are to provide an improved form and arrangement of the refrigerant fluid flow channels to, through, and from the compressor; to provide improved means in the fluid flow channel for filtering out from the refrigerant fluid any foreign substances that may have been collected in its transit through the flow channel to, through, and from the related equipment; to provide an improved form of piston-reciprocating mechanism particularly suitable for a fluid-filtering compressor; and to provide an improved compressor of this kind which is simple in construction, compact in arrangement, light running in operation, and economical to manufacture.

One specific embodiment of this invention is shown in the accompanying drawing, in which:

The single figure is a sectional elevation of a fluid-filtering compressor constructed in accordance with this invention.

The essential concept of this invention involves a filtering chamber interposed in the fluid-flow channel from the related equipment to the fluid-compressing cylinders, the piston unit for which is reciprocated by a cam mechanism so positioned as to splash a lubricant onto the relatively moving parts of the cylinder-piston mechanism.

An improved, light running, multistage compressor embodying the foregoing concept comprises a supporting housing A, mounting a pair of opposed, axially-alined cylinders B and C wherein a dual piston unit D is reciprocated by a cam and follower mechanism E and which housing A incorporates a lubricating chamber F and a fluid-filtering chamber G, entrance to which latter chamber is controlled by a service valve H.

The supporting housing A, as herein shown, is in the form of a hollow casting with base 11.

The cylinders B and C are in the form of hubs 12 and 13 cast integral with the housing A, and extending inwardly from the inside walls thereof, in opposed axial alinement and provided with the usual cylinder heads 14 and 16. These cylinder heads 14 and 16 are secured in appropriately sealed positions by machine screws 17 and equipped with recessed check-valves 18, the specific form and character of which is disclosed in my copending application Serial No. 441,906, filed July 7, 1954.

The cylinder head 14 is of a much larger size than is required for merely covering the cylinder B. This is to make provision for a channel 19 affording direct communication between the filtering chamber G and the cylinder B as presently will be described more fully. The cylinder head 16 has an outlet conduit 21 connected thereto and leading to the equipment through which the refrigerant fluid circulates.

The bores 22 and 23 of the respective cylinders B and C, are of different diameters. Cylinder B serves as the initial and low-compression cylinder whereas cylin-

2

der C serves as the secondary and high-compression cylinder.

Piston unit D is a machined casting formed with heads 24 and 26 connected by an intervening integral body part 27. The heads 24 and 26 are dimensioned to fit in the bores 22 and 23 of the respective cylinders B and C. These heads 24 and 26 are equipped with the usual rings 28. A spring pressed pin 29 in the piston head 26 extends into a slot 31 in the adjacent wall of the cylinder C and holds the piston unit D against turning in the cylinders B and C. At the opposite ends of a channel 32, extending axially through the piston unit D, the piston heads 24 and 26 are each formed with axially recessed removable check valves 31 similar to the check valves 18.

The cam and follower mechanism E, comprises a drum or disk 33, mounted on a motor driven shaft 34. The drum 33 is formed with a peripheral oblique groove or track 36 into which extends a follower pin 37 on the body part 27 of the piston unit D. This drum cam 33 is keyed to the shaft 34 by a pin 38.

The shaft 34 extends across the housing A below the piston unit D on a parallel axis and is journaled on the opposite walls of the housing. Hub bearing caps 39 and 41 are secured to the exterior faces of the housing A over the ends of the shaft 34 with interposed gaskets 42 to form fluid seals for the shaft.

The hub cap 39 is an integral extension of the cylinder head 14 whereas the hub cap 41 is separate from the cylinder head 16 (although the two parts could be integral) and is secured in position by machine screws 43.

The periphery of the shaft 43, on opposite sides of the drum cam 33, is formed with spiral grooves 44 providing spiral ridges 46. During the rotation of the shaft 34 these ridges coast with the drum cam 33 splashing lubricant from the chamber F up onto the piston unit D and thereby insuring the proper lubrication of the contacting and relative moving surfaces of the piston heads 24 and 26 and the bores 22 and 23 of the cylinders B and C respectively. The shaft 34 is here shown driven by a pulley 45 suitably secured thereto by set screw 55 and connected to a motor (not shown) by a belt 50.

The filtering chamber G comprises the upper part of the housing A above the cylinder-piston mechanism. It is equipped with two filter elements 47 and 48, the one communicating with an inlet conduit 49, through the service valve H, and the other communicating with the channel 19 in the cylinder head 14.

These filter elements 47 and 48 are of a type of sintered material possessing such a degree of porosity as to allow for penetration of fluids, both gas and liquid, but, obviously, gas more readily than liquid. These elements are preferably molded into a hollow frusto-conical form, as shown. They extend through the inlet and outlet ports 51 and 51' so that the flanges 52 thereon rest on the inwardly extending peripheral flange 53 with an interposed gasket 54. They are held in this fluid sealed relationship by apertured and recessed threaded rings 56 and 56'. The ring 56 is equipped with a removable check valve 57 similar to the valves 18 and 31.

The function of these filter elements is to separate from the gaseous refrigerant any foreign substances such as, for example, lubricating oil that, through penetration into the cylinders B and C, may be carried along by the refrigerant gas as it is forced through the compressor. Obviously, if, in its movement through the refrigerant flow channel in the related equipment, the refrigerant picks up any solid particles, like scale from the inner walls of the conduits, such scale will be screened out from both the gaseous refrigerant and the entrapped lubricant, as they are forced through the filtering elements 47 and 48. Any oil that is initially trapped in the filtering element 47, will in the course of time, ooze out through the pores of the

filtering element 47, and will eventually drop off from the lower end of the element 47 onto the piston unit D.

The service valve H is a convention fitting for compressors of this kind, being operable to control the degree of flow of the refrigerant from the inlet conduit 49 to the filtering chamber G.

A compressor such as that herein shown, constructed in accordance with this invention, operates as follows:

The parts all being properly assembled and the motor being plugged-in to a source of power, rotation of the shaft 34 causes the drum cam 33, acting on the follower pin 37, to effect a rapid reciprocation of the piston unit D. As a vacuum is created in the channel 19, by a left to right stroke of the piston unit D, the refrigerant gas is drawn through the pores of the filter element 48, eliminating therefrom the last vestige of any foreign substances, and especially lubricating oil. On the reverse stroke of the piston unit D, the refrigerant gas is compressed in the cylinder B and caused to pass through the channel 32 into the cylinder C. With a return left to right stroke of the piston unit D the refrigerant gas in the cylinder C is further compressed and forced out through the outlet 21 into the flow channel leading to and through the related equipment. The drawing of the refrigerant from the chamber G tends to create a vacuum therein which together with the gas under pressure in pipe 49 results in the refrigerant gas being drawn through the filter element 47 in the course of which it has extracted any foreign substances there may be in it.

When necessary, the filter elements 47 and 48 may be removed for cleaning and flushing, in a manner well known with filter elements.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A compressor comprising, a hollow upright housing, a pair of transversely-disposed axially aligned cylinders integrated with the housing, the cylinders being of exterior diameter approximating one-third of the height of the housing and located intermediate its base and top and dividing the interior into a lubricating chamber below the cylinders and a refrigerant filtering chamber above the cylinders of nearly equal cubic capacity and each greater than the cubical measure of the cylinders extending into the housing, one of the cylinders having an outlet communicating with a refrigerant flow line, inlet and outlet ports located in the housing above the cylinders and respectively communicating with the refrigerant flow line and the other cylinder, a channelled reciprocable piston-unit having heads fitting the respective

cylinders to effect the compression of a refrigerant and cause a continuous one-way flow movement of the refrigerant to the refrigerant-flow line and through the filtering chamber, check valves associated with the respective cylinders and pistons for controlling the aforesaid compression and movement of the refrigerant, and filter elements connected to the filtering chamber inlet and outlet ports and extending into the filtering chamber with their inner ends closely adjacent each other for filtering out the impurities from the refrigerant in its passage through the filtering chamber before the refrigerant enters the valve-controlled piston-unit channel.

2. A compressor comprising, a hollow upright housing, a pair of transversely-disposed axially-aligned cylinders integrated with the housing, the cylinders being of exterior diameter approximately one-third the height of the housing and located intermediate its base and top and dividing the interior into a lubricating chamber below the cylinders and a refrigerant filtering chamber above the cylinders of nearly equal cubic capacity and each greater than the cubical measure of the cylinders, one of the cylinders having an outlet communicating with a refrigerant flow line, a refrigerant inlet port in the top of the housing and a refrigerant outlet port in one side of the housing directly above the other cylinder, the inlet and outlet ports being respectively connected to communicate with the refrigerant flow line and the other cylinder, a channelled reciprocable piston-unit having heads fitting the respective cylinders to effect the compression of a refrigerant and cause a continuous one-way flow movement of the refrigerant to the refrigerant-flow line and through the filtering chamber, check valves associated with the respective cylinders and pistons for controlling the aforesaid compression and movement of the refrigerant, and conical-shaped filter elements connected to the inlet and outlet ports and extending into the filtering chamber with the inner ends closely adjacent each other for filtering out the impurities in the refrigerant in its passage through the filtering chamber before the refrigerant enters the valve-controlled piston-unit channel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,769,978	West	July 8, 1930
2,062,206	Browne	Nov. 24, 1936
2,169,565	Maniscalco	Aug. 15, 1939
2,169,571	Maniscalco	Aug. 15, 1939
2,243,466	Kucher	May 27, 1941
2,343,514	McCormack	Mar. 7, 1944
2,420,442	Rataiczak	May 13, 1947
2,474,892	Ecabert	July 5, 1947
2,605,044	Hill	July 29, 1952
2,629,543	Maniscalco	Feb. 24, 1953