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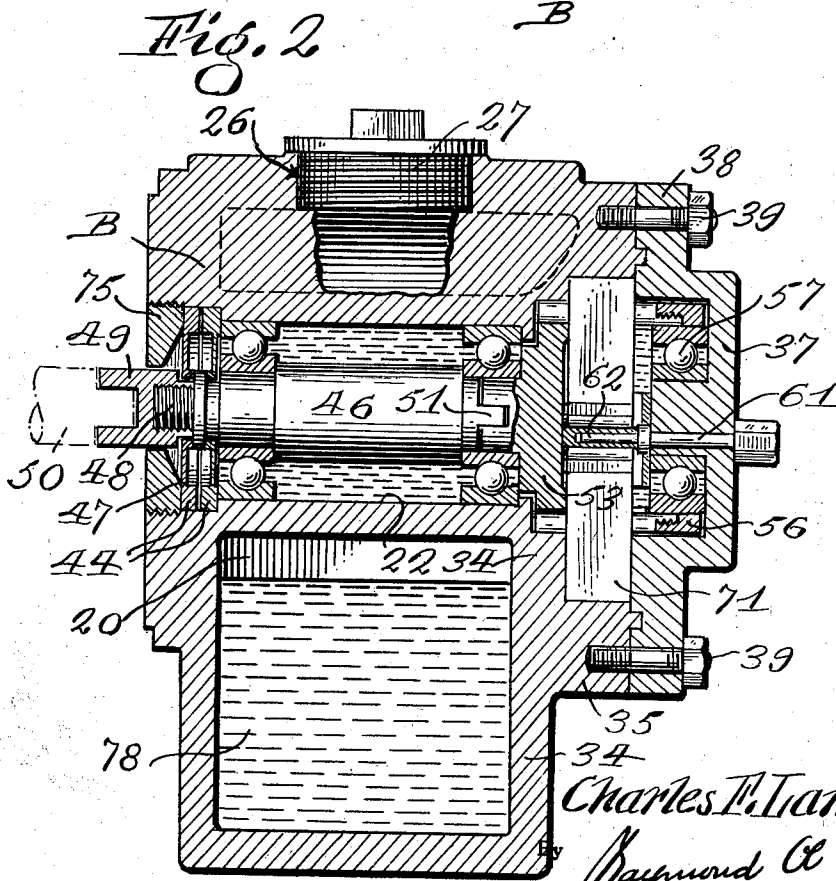
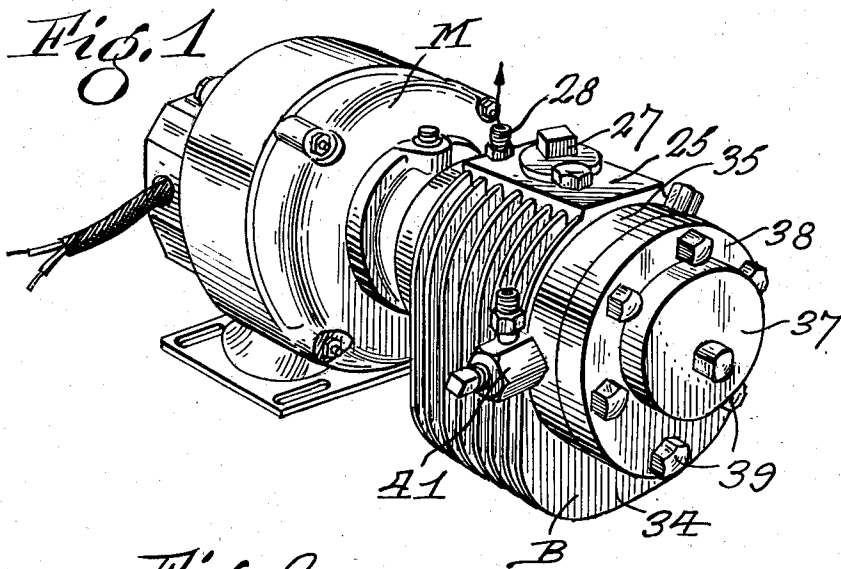
C. F. LAMBIN

2,233,017

COMPRESSOR

Filed Aug. 10, 1938

3 Sheets-Sheet 1



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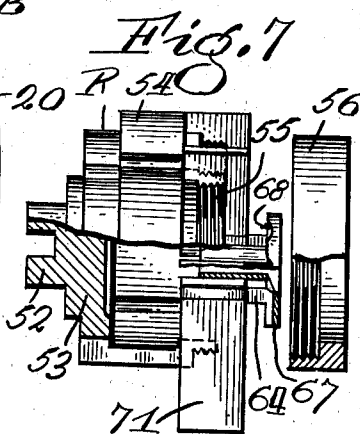
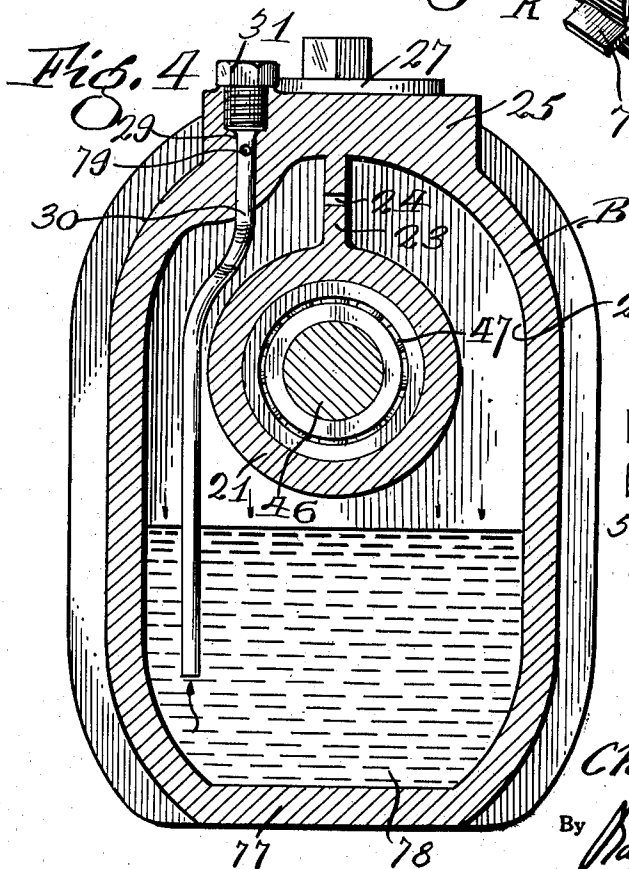
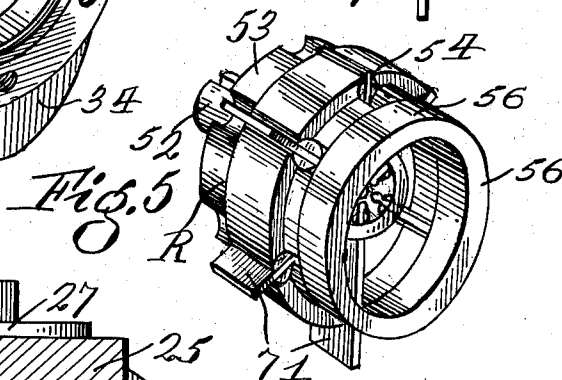
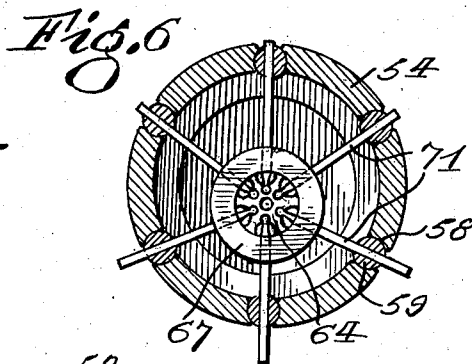
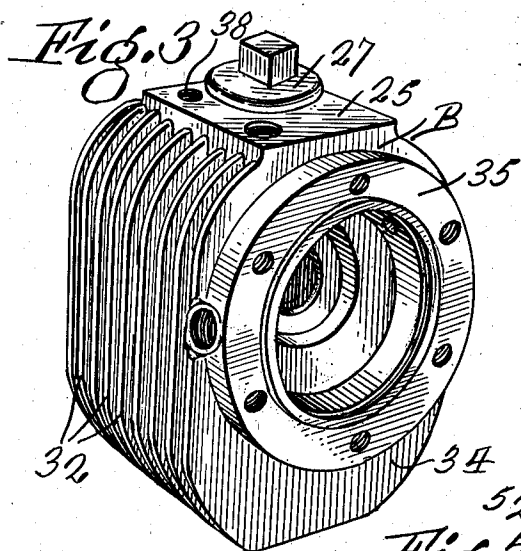
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COMPRESSOR

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3 Sheets-Sheet 2



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COMPRESSOR

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3 Sheets-Sheet 3

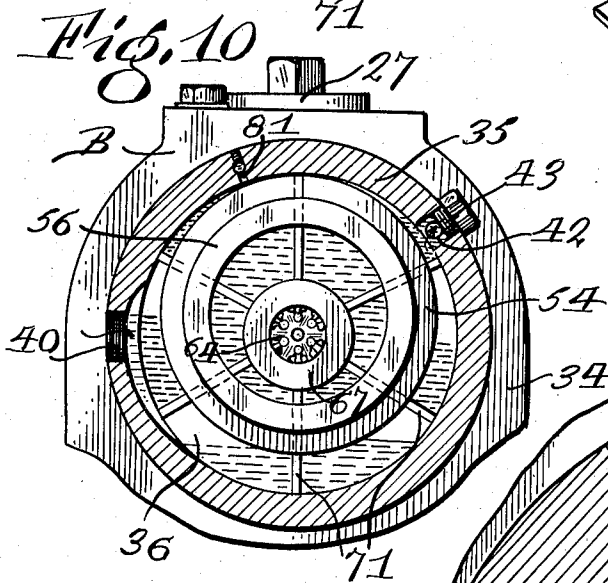
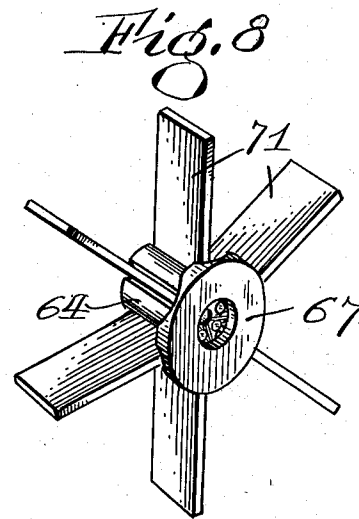
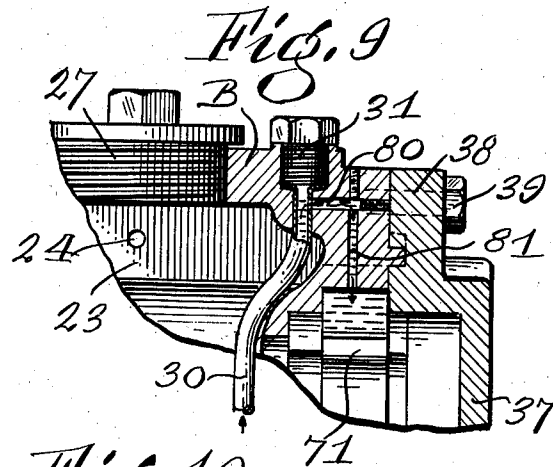
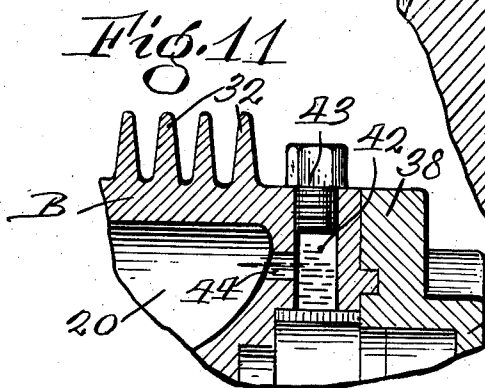
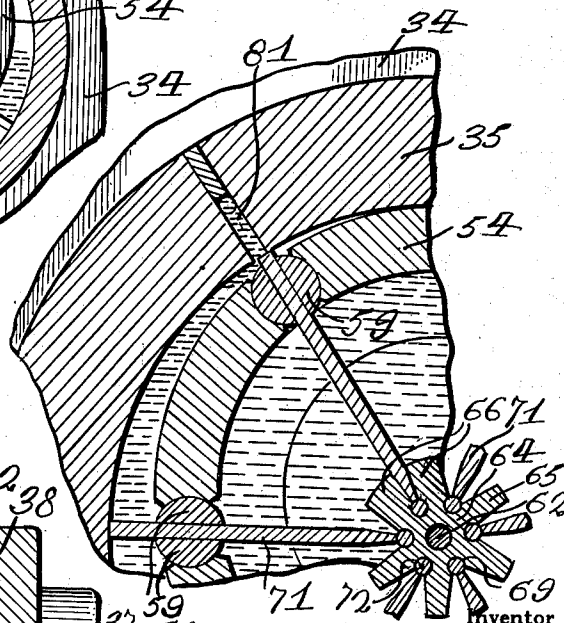


Fig. 12



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UNITED STATES PATENT OFFICE

2,233,017

COMPRESSOR

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1 Claim. (Cl. 230—157)

The present invention relates to improvements in compressors of the rotary type particularly adapted for compressing air and gases.

An object of the invention is to provide a compressor of novel construction and designed so that increased efficiency as compared with previous constructions is obtained.

Another object of the invention is the provision of a compressor having means for providing an effective seal about the piston vanes.

A further object of the invention is to provide a compressor having an improved lubricating system.

Still another object of the invention is the provision of a compressor of the aforesaid character embodying a novel hub connection for the vanes.

A still further object of the invention is the provision of a compressor of the above character which is simple and efficient in construction and reliable in operation.

Other objects and advantages of the invention will become apparent as the description progresses.

In the accompanying drawings forming a part of this specification and in which like reference characters are employed to designate corresponding parts throughout the same:

Figure 1 is a perspective view of the compressor connected with an operating motor.

Figure 2 is a vertical longitudinal section through the compressor.

Figure 3 is a perspective view of the compressor body.

Figure 4 is a vertical transverse section through the same.

Figure 5 is a perspective view of the rotor and associated mechanism,

Figure 6 is a transverse section through the same,

Figure 7 is a side elevational view of the rotor mechanism, partly in section and showing parts thereof in disassembled relation.

Figure 8 is a perspective view of the vanes associated with the novel hub structure.

Figure 9 is a fragmentary longitudinal section taken through the upper portion of the compressor.

Figure 10 is a fragmentary transverse sectional view through an end portion thereof.

Figure 11 is a fragmentary longitudinal section through an end portion of the compressor, and

Figure 12 is an enlarged fragmentary transverse section through an end portion of the compressor body and rotor.

Referring to the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, B generally designates the compressor body, in the present instance in

the form of an approximately rectangular shaped case forming a relatively large fluid receiving chamber 20. In the upper portion of this chamber is formed a longitudinally extending tubular housing 21, the interior of which provides the major intermediate part of a shaft bore 22 extending longitudinally through the body. A vertical partition 23, having apertures 24, extends longitudinally between the top of the housing 21 and the top wall 25 of the case. In the centre of the top 25 is provided an interiorly threaded filling opening 26 normally closed by a screw plug 27. In the rearward portion of this top is provided a discharge port 28, while a vertical bore 29 in the forward portion thereof is designed to snugly receive therein the upper portion of a tube 30. The upper part of this bore 29 is enlarged to receive a screw plug 31. Upon the exterior of the body may be formed a plurality of cooling fins 32.

Upon the outer end wall 34 of the body is formed an annular boss 35 defining a compression chamber 36, having communication with and eccentric to the bore through the case. A cap 37, having an annular groove concentric with the bore through the body in its inner side, and formed with a flange 38, is fastened by bolts 39 to the boss 35. In one side of the boss is formed an intake port 40 having an angle fitting 41 connected therewith. At the opposite side, at an elevated position, is provided a bore 42 having the outer portion closed by a plug 43 and forming the outlet port which communicates with the main receiving chamber 20 through a passage 44. In the through bore 22 of the case is mounted a main drive shaft section 46 journaled on ball bearings 47 and having a reduced threaded extension 48 at one end connecting with a coupling section 49 adapted for connection with a motor shaft 50. The opposite end of the shaft section 46 is connected, as by a tongue and slot connection 51, with a stub section 52 formed integral with a rotor R, the circular head portion 53 of which is stepped to fit correspondingly shaped portions of the main bore. On the periphery of the rotor head 53 is formed a cylindrical drum 54 designed to assume an eccentric position in the compression chamber 36 and formed with an exteriorly threaded rim 55 of reduced diameter. This rim is disposed to receive thereon an interiorly threaded retaining ring 56 which, in assembly, is journaled on a ball bearing 57 in the groove of the end cap 37. At spaced intervals in the drum are provided axially extending slots 58 having the side walls concave-grooved to receive the convex outer sides of complementary pairs of rocker packing strips 59.

Extending longitudinally through a bore in the end cap 37 and rigidly secured therein is a shaft 61 formed to provide a reduced spindle 62

arranged to assume a centric position within the compression chamber and eccentric to the axis of the rotor drive shaft. Upon this spindle is rotatably connected a hub 64 axially fluted to form radial ribs 65 defining V-shaped grooves therebetween. Two of the ribs, 66, are of greater thickness than the others to form a narrower slot therebetween. At one end of the hub is formed an annular flange 67 of greater diameter than the body of the hub and formed at the inner side with radial grooves 68 for registration with the grooves in the hub. At the base portion of each groove the hub is formed with an undercut rounded groove 69.

Connected with the hub 64 so as to extend radially therefrom between the ribs are a plurality of, in the present example six, piston vanes or blades 71 of elongated rectangular shape and formed of flat metal or the like. Each of these blades has a diminishing taper at the inner end, which terminates in a transversely extended rounded pivot forming bead 72 adapted to be fitted in the undercut grooves 69. The vane disposed between the heavier ribs 66 is tightly wedged on the hub to prevent circumferential or angular movement thereof relative to the hub so that it permanently maintains a true radial position relative to the spindle 62 and functions to hold the hub member against angular displacement. The remaining blades are mounted so as to permit limited angular movement about the hub. The outer portions of the vanes 71 project between the inner flat sides of the packing strips 59 which form a fluid-tight pivot joint on the rotor drum. The ring 56 acts to firmly hold the vanes against axial displacement.

In an enlargement of the main bore at the inner end portion are mounted a pair of complementary grooved sealing rings 74 engaging annular grooves in the shaft and removably held in position by an annular packing gland 75 threaded in the bore.

The tube 38 extending downwardly in the case is disposed so that its bottom open end assumes a position just above the bottom 77 of the case and below the level of a lubricating and sealing fluid or lubricating oil 78 which is admitted into the chamber 20 prior to operation. This lubricating oil is preferably maintained at a level approximately half filling the receiving chamber, as shown at Figure 4. An outlet aperture 79 in the upper portion of the tube 30 registers with a longitudinally extending passage 80 in the boss of the body while this passage communicates with a right angular radial passage 81 opening into the compression chamber 36, as shown to advantage at Figures 9 and 10.

During operation the compressor is coupled with a drive motor, as for instance the electric motor M which drives the rotor R through the medium of the drive shaft. The eccentricity of the rotor in the compression chamber relative to the axis of the vane spindle 62, in the present instance on the vertical centre line, causes the rotor to assume a position in the chamber 36 so that the perimeter at the top of the rotor will be tangent to the wall of the chamber with only sufficient clearance to permit rotation of the drum without friction, and forms a crescent-shaped compression zone. The projecting end portions of the vanes form pockets in the compression zone in which the fluid, as air or gas, is compressed and forced through the outlet port

42, the passage 44 and into the chamber 20, eventually discharging through the port 28. The compressed fluid passing into the chamber 28 effects a relatively high pressure therein so that the oil 78 is forced through the tube 30 and connecting passages 80 and 81 and is injected into the compression chamber to lubricate the vanes and other movable parts and also forms a fluid seal about the edges of the projecting piston vanes so as to reduce by-pass leakage to a minimum and substantially increase the efficiency of the compressor.

The oil fed into the compression chamber, as the respective vanes move over the oil inlet port 81, is carried therefrom with the compressed fluid into the receiving chamber 20 where it separates from the said compressed fluid and settles in the lower portion for recirculation through the machine.

As will be noted, the piston or impelling vanes are mounted so that the outer portions will have substantially wiping contact with the peripheral walls of the cylindrical compression chamber and are spaced so as to form a group of segmental crescent-shaped compressor chambers in the cylinder. The pivoted or rocker connection of all but one of the vanes with the hub provides desirable flexibility of vane operation. This construction provides a compressor of greatly improved efficiency, capable of reliable operation and production of relatively high fluid pressure.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same, and that various changes as to the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

Having thus described my invention, I claim:

In a rotor compressor of the character described, a body having a central liquid lubricant reservoir and a cylindrical chamber at one side thereof, a rotor rotatably mounted in the chamber eccentrically thereof, a shaft journaled within the body for connecting said rotor to suitable driving means, an annular drum formed laterally on the chamber side of the rotor and disposed eccentrically of said chamber, said drum having spaced slots formed therein, a cover closing said chamber and provided with an inner extension, a ball bearing mounted on the periphery of said extension, said extension having its periphery concentric with said rotor a spindle fixed to said cover and extending inwardly within the chamber centrally thereof, a hub rotatively mounted on the spindle and having axially extending undercut grooves formed therein, a plurality of piston blades mounted in the slots of the drum to extend radially in wiping contact with the chamber periphery and sides, a rounded bead at the inner end of each blade for slidable engagement with the hub grooves, a threaded ring on the rotor bearing on said ball-bearing to form a journaled support for the outer end of the rotor in conjunction with the cover extension bearing, inlet and outlet ports in the periphery of the chamber, means for admitting oil from below the lubricant level in the reservoir to a point in the chamber spaced above the inlet port, and means for returning said oil from the outlet port after it has circulated through the compressor for lubrication and sealing thereof.

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