Oct. 23, 1945. C. R. WASEIGE 2,387,629

ROTARY VANE PUMP

Filed Dec. 30, 1942 2 Sheets-Sheet 1

Fig. 1

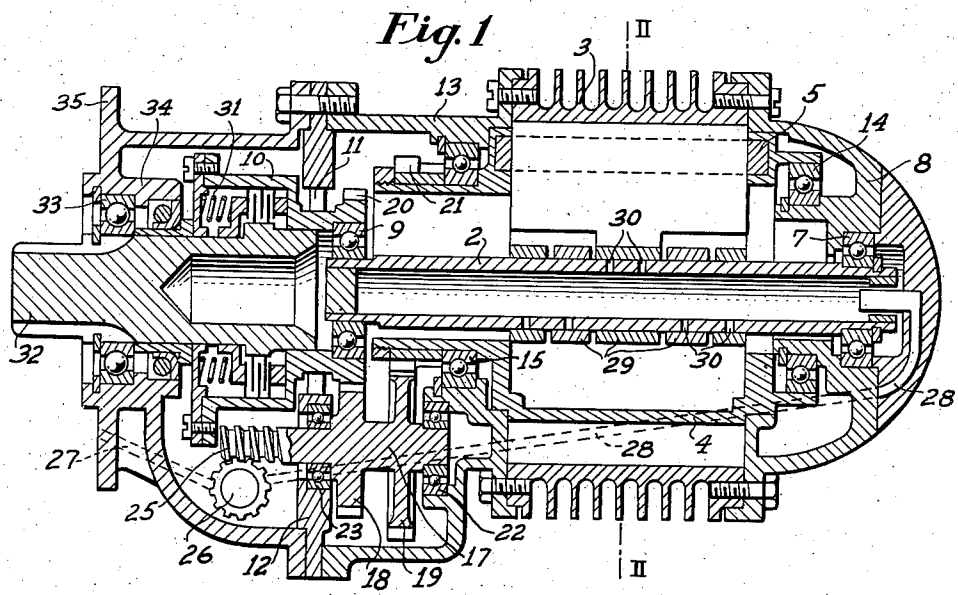


Fig. 3

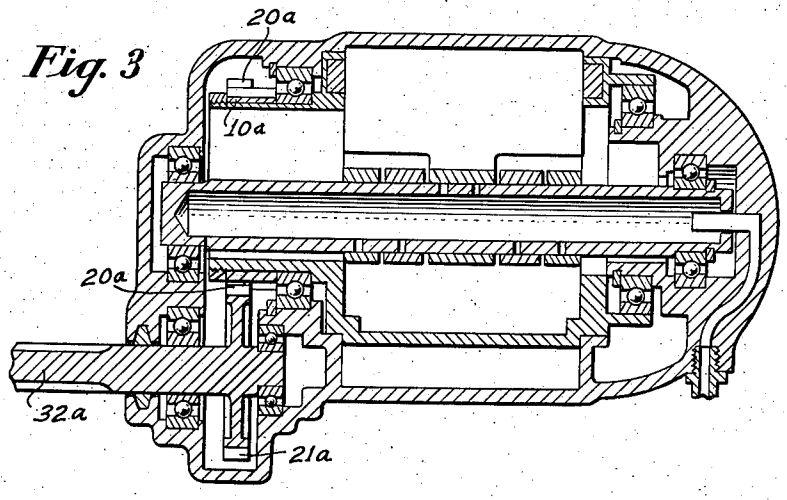
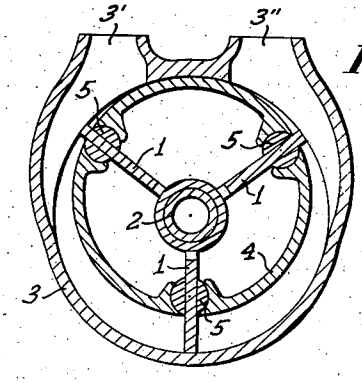


Fig. 2



Inventor
CHARLES R. WASEIGE

By R. W. Holcombe
Attorney.

Oct. 23, 1945. C. R. WASEIGE 2,387,629

ROTARY VANE PUMP

Filed Dec. 30, 1942 2 Sheets-Sheet 2

Fig. 4

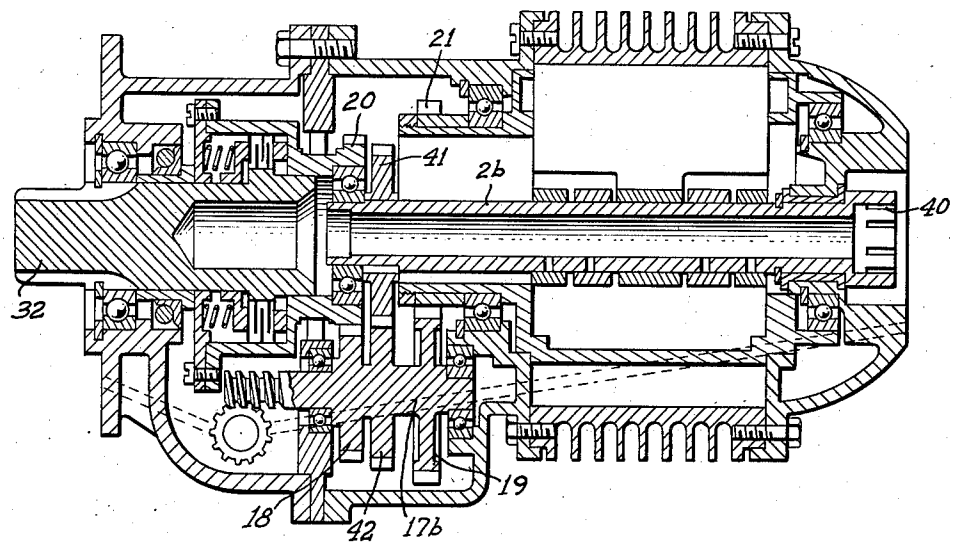
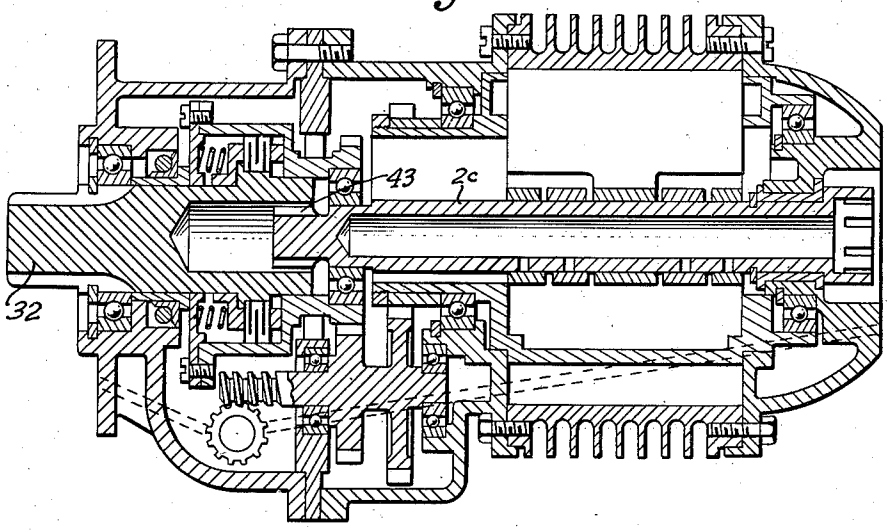


Fig. 5



Inventor
CHARLES R. WASEIGE

By *Allwoleombe*
Attorney.

Patented Oct. 23, 1945

2,387,629

UNITED STATES PATENT OFFICE

2,387,629

ROTARY VANE PUMP

Charles Raymond Waseige, Saint-Etienne, Loire, France; vested in the Alien Property Custodian

Application December 30, 1942, Serial No. 470,629
In France November 12, 1941

5 Claims. (Cl. 230—157)

My invention relates to rotary vane pump or compressor for air or other gases of the kind having radial vanes mounted on a shaft co-axial to the casing of the pump, for convenience hereinafter termed "barrel," and driven by a rotor arranged eccentrically to the barrel.

The main object of my invention is to improve this type of pump and more particularly the design used when weight, purity of the air and safety of working have a primary importance as is the case on aircraft.

It is known that in pumps of this kind, there have occurred jamming of the vanes in their guides and in the barrel, along with a heating of the eyes of the vanes when these pumps rotate at high speed. These undesirable results are caused by bending of the shaft of the vanes under the action of the centrifugal force and from insufficient lubrication of vanes on their shaft, lubrication which cannot be increased without charging the air with an objectionable quantity of oil.

Another object of my invention is to prevent the bending of the shaft of the vanes and to increase the rotational speed of the pump.

A still further object of my invention is to prevent the heating of the eyes of the vanes.

Other objects of my invention are brought out more fully in the description and claims. By way of non-limitative examples, various embodiments of a pump according to my invention have been schematically represented in the accompanying drawings.

In these drawings:

Fig. 1 is a longitudinal section of a pump.

Fig. 2 a transversal section according to the line II—II of Fig. 1.

Figs. 3, 4 and 5 are similar views to Fig. 1 with modifications.

In the examples illustrated, the pump belongs to the type comprising radial vanes 1, here three in number, freely engaged on a shaft 2 coaxial with the barrel 3 having an air inlet 3' and an air outlet 3'' (Fig. 2). A hollow rotor 4 is eccentrically mounted in the barrel 3 (the shaft 2 being arranged within the said rotor 4). At the periphery of the rotor 4 are formed sockets for guides 5 each of them being mounted for free rotation upon itself in its socket around an axis parallel with those of the rotor 4 and of the barrel 3. Each guide 5 is provided with a diametral slot in which a vane 1 is slidably mounted with light friction.

In the embodiment shown in Fig. 1, the shaft 2 passes through the rotor and is supported, on either side of the latter, on the one hand in a ball bearing 7 mounted in an end plate 8 on the end of the barrel 3 and on the other hand in a ball bearing 9 mounted in a rotating member 10 itself supported by a roller bearing 11 fitted into a transverse partition 12 which is mounted on the end of a casing part 13 fixed on the other extremity of the barrel 3.

The rotor 4 is also supported at its two extremities by ball-bearings 14 and 15 respectively supported by the end plate 8 and the casing part 13.

The rotating member 10 serves as a driving member of rotor 4 by means of a gearing comprising an intermediary shaft 17 carrying two gears 18 and 19 of different diameters, the smaller of which 18 meshes with a gear 20 formed on the member 10 and the other 19 with a gear 21 formed on the rotor 4. Therefore this gearing serves as a speed increasing means. The shaft 17 is mounted in ball-bearings 22 and 23 respectively supported by casing part 13 and partition 12 and extends on the other side of the latter where it is provided with a worm gear 25 which operates an oiling pump 26 having an inlet pipe 27 for oil under pressure and an outlet pipe 28 to the extremity of the hollow shaft 2 to provide for the lubrication of the eyes 29 of the vanes, by means of transverse holes 30 provided in this hollow shaft 2.

The rotating member 10 also serves as a casing for a torque limiting device 31 of any suitable type, for coupling member 10 to a driving shaft 32 concentric with member 10 and journaled in a roller bearing 33 in a cover plate 34 fixed to the end of casing 13 about the partition 12. It will be noticed that in this embodiment, the gears are enclosed in casing part 13 on one side of partition 12 whereas the torque limiting device 31 and the oiling pump are on the other side, inside the cover plate 34. The latter has, for the mounting of the pump, a cheek 35 perpendicular to the rotation axis. The pump is operated by means of the shaft 32 which projects outside cover plate 34.

The operation of the rotor 4 by the described mechanism is obvious and the working of such a pump is well-known.

The modification represented in Fig. 3 differs chiefly from the preceding one by the fact that the driving shaft 32*a* is eccentrically arranged with reference to the barrel and operates the rotating member 10*a* through the medium of a single pair of gears 20*a*, 21*a* without an intermediary shaft.

In the further modification shown in Fig. 4,

the shaft 2b is provided, at its end opposite the end adjacent the driving shaft 32, with coupling means 40 here formed by splines, for coupling another apparatus directly on the pump. The shaft 2b is rotated by a toothed wheel 41 fixed upon it and in gear with another wheel 42 fixed on shaft 17b. Preferably the ratio of gearing 41—42 differs very slightly from that of gearing 19—21 so that there is a slow relative rotation between this shaft 17b and the eyes of the vanes.

The embodiment shown in Fig. 5 differs from the preceding one by the fact that the shaft 2c is driven directly by the shaft 32c and is provided for that purpose, with means 43, coupling it directly with this shaft 32c, formed for instance by splines.

What I claim is:

1. A rotary vane pump or compressor comprising a cylindrical barrel, a shaft co-axial with said barrel, radial vanes mounted on said shaft for free rotation about said shaft, a rotor eccentrically mounted in said barrel and engaging said vanes, a hollow rotatable member journaled in said barrel, a driving shaft co-axial with said first-mentioned shaft, said member having one end of each of said two shafts received therein, a driving connection between said driving shaft and said rotatable member and a driving connection between said rotatable member and said rotor.

2. A rotary vane pump or compressor comprising a cylindrical barrel, a shaft journaled in said barrel, radial vanes mounted on said shaft for free rotation about said shaft, a rotor eccentrically mounted in said barrel and engaging said vanes, a hollow rotatable member journaled in said barrel, a driving shaft co-axial with said first-mentioned shaft, said member having one end of each of said two shafts received therein, a driving connection between said driving shaft and said rotatable member, and a driving connection between said rotatable member and said rotor.

3. A rotary vane pump or compressor comprising a casing having a cylindrical barrel, a shaft co-axial with said barrel, radial vanes mounted on said shaft for free rotation, a rotor engaging said vanes and eccentrically arranged within said barrel, a hollow rotating member carried by the casing and co-axial with the said shaft; the end of said shaft being journaled in said rotating member, a driving connection between said rotor and said rotating member, a driving shaft having one end received in said member, and coupling means, interposed between and coupling said driving shaft and said rotatable member.

4. A rotary vane pump or compressor as claimed in claim 3 in which said driving connection includes a speed increasing gear enclosed in said casing.

5. A rotary pump or compressor comprising a casing having a cylindrical barrel, a shaft co-axial with said barrel, radial vanes mounted on said shaft for free rotation, a rotor eccentrically mounted in said barrel, a rotating member, co-axial with said shaft and carrying one end of same, driving gearing means between said rotor and said rotating member, an intermediate shaft forming part of said gearing, an oiling pump, oil passages being provided from said oil pump to the vanes for their lubrication, a driving connection between said intermediate shaft and said oiling pump and a driving member for said rotating member.

CHARLES RAYMOND WASEIGE.