Feb. 28, 1928.

1,660,563

R. MALBAY

ROTARY COMPRESSOR

Filed July 13, 1925

Fig. 1

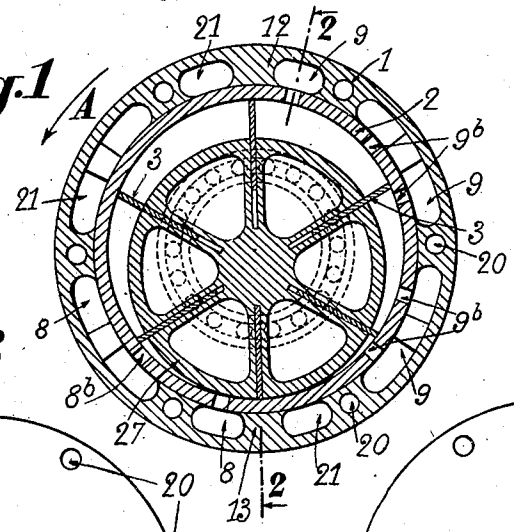


Fig. 3

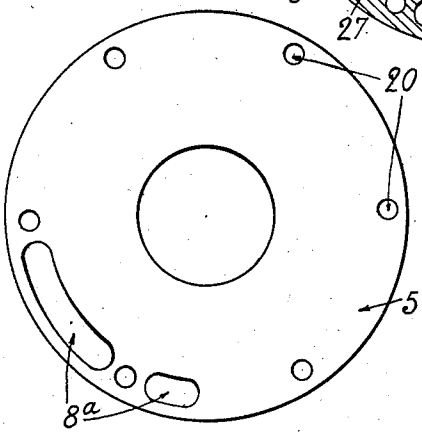


Fig. 4

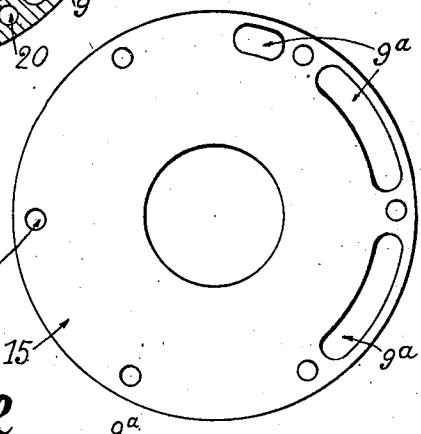
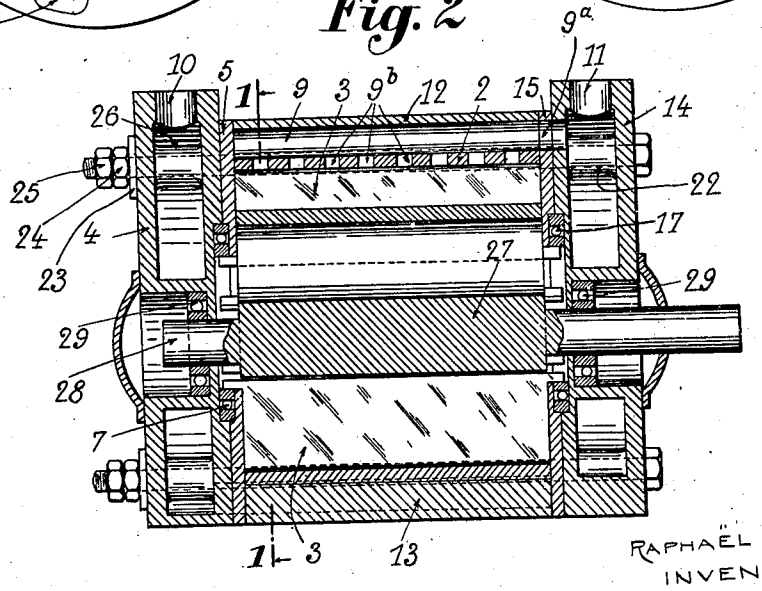


Fig. 2



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UNITED STATES PATENT OFFICE.

RAPHAËL MALBAY, OF PARIS, FRANCE.

ROTARY COMPRESSOR.

Application filed July 13, 1925, Serial No. 43,120, and in France July 26, 1924.

The present invention relates to improvements in rotary apparatus such as pumps and compressors of the sliding blade type, and chiefly as concerns their use for the compression of fluids intended for the supply of motors. The said improvements may also be employed to advantage for all uses of the said apparatus.

The rotary compressors and like apparatus comprising blades or displacers which are slidable in a rotor are subject to the following principal drawbacks as concerns their use for the high compression of gases:

1. Their size and weight are considerable for a relatively low output, since it is necessary to limit their speed in order to reduce the wear of the parts.

2. The apparatus is however subject in all cases to wear of the cylinder and of the blades, due to friction.

3. The efficiency becomes low as soon as the parts begin to wear, i. e. after a very short period of working, so that the machine, which thus becomes useless, must be at once replaced.

My invention has for its object to obviate all of the said drawbacks, and it relates to a rotary apparatus, for instance a compressor, which is chiefly characterized by the fact that the blades, which are movable by the effect of centrifugal force, are caused to bear upon the inner rings of two ball bearings, coaxially mounted with respect to the cylinder within annular chambers provided between the end walls of the casing and sealing plates adapted to secure the proper gas-tightness.

In the appended drawing which shows by way of example a compressor according to my said invention,

Fig. 1 is a cross section on the line 1—1 of Fig. 2.

Fig. 2 is a lengthwise section on the line 2—2 of Fig. 1.

Fig. 3 is an elevational view of the sealing plate adjacent the delivery cover looking to the left in Fig. 1, and,

Fig. 4 is an elevational view of the sealing plate adjacent the admission cover looking to the right in Fig. 1.

In the drawing, 1 is an outer casing which is preferably made of a light metal, and 2 an inner cylindrical sleeve which is made of a strong metal. The movable blades 3 are slidably mounted in radial slots of a drum 27 carried by the shaft 28 journalled in ball bearings 29, mounted in the covers 4 and 14; each blade carries two lateral projections 6 and 16 which are respectively in contact with the inner rings of the two ball-bearings 7 and 17. The said bearings are mounted exactly coaxially with the cylindrical sleeve 2 and are situated between the end boxes or covers 4 and 14 and the discs or sealing plates 5 and 15, respectively. The discs 5 and 15 may be made of the same material as the sleeve 2, whilst the end boxes or covers 4 and 14 are preferably made of the same material as the outer casing 1, in order to reduce the weight. Said boxes are made hollow, the left hand box 4 serving for the delivery and the right hand box 14 for the admission. The casing 1 has longitudinal channels or grooves 8, 9, 21, and the discs 5, 15 are suitably apertured at 8^a, 9^a respectively, said apertures registering with corresponding apertures in the inner walls of the boxes 4, 14. The apertures 8^a of disc 5 register also with the channels 8 of casing 1 while the apertures 9^a of disc 15 register with channels 9, whereby channels 8 communicate with the chamber in box 4 and channels 8 with the chamber in box 14. Channels 21, sealed at both ends by discs 5 and 15, serve only for the purpose of reducing the weight.

However with plates 5 and 15 which would be otherwise apertured the function of channels 8, 9, 21, might be interverted partially or wholly, thus affording the possibility of altering the operation of the compressor. 20 denotes longitudinal holes provided through the casing 1, plates 5 and 15 and bosses or bridges 26 of the boxes 4 and 14. Bolts 22 extending through said holes are adapted to hold these parts together tightening nuts 24 and 25 being screwed thereon with the interposition of a washer 23.

The apparatus is so designed that when the projections 6, 16 of the blades 3 are in contact with the ball bearings 7, 17, there will be no contact between the said blades and the sleeve 2, but a clearance as small as desired will be left; in this manner I obviate all wear of the said blades and of the cylindrical sleeve as well as all vibration of the blades; the degree of fluid tightness which is thus obtained is in practice superior to what can be had in the known machines. The volumetric efficiency is also higher, due to the higher speed which may be given to the rotor and to the provision of the discs or sealing plates 5 and 15.

If certain parts such as the sleeve 2 and

the discs 5 and 15 require to be replaced after a long use, it will be an easy matter to effect the substitution of such parts which are comparatively inexpensive and the apparatus can thus be restored to a practically new condition at a small cost.

The operation is as follows:

The gas entering at 11 passes through the apertures 9^a of the inner wall of box 14 and plate 15 into the channels 9 and thence through apertures 9^b in the spaces limited by the drum 27, the sleeve 2 and the blades 3. Due to the rotation of shaft 28 drum 27 and blades 3 in the direction of arrow A the gas is compressed in said spaces, whose volume progressively decreases. As soon as a blade 3 clears the first aperture 8^b the compressed gas escapes into the channels 8 and thence, through apertures 8^a, into the chamber of the hollow head 4. 10 denotes the delivery branch. The longitudinal partitions 12 and 13 between the channels 8, 9, 21, are preferably cast in one with the outer casing 1. Should cooling be necessary, in case of a high degree of compression being desired, a water jacket can be readily provided around the cylinder for this purpose.

Obviously, the invention is not limited to the constructional forms hereinbefore set forth by way of example, these being susceptible of all necessary modifications without departing from the scope of the invention, as defined in the following claim.

Having now decribed my invention what I claim as new and desire to secure by Letters Patent is:

A rotary gas compressor comprising a cylindrical casing, two sealing plates respectively clamped against the end walls of said casing, an annular chamber being provided between each of said end walls and the respective sealing plate, coaxially with said casing, a drum eccentrically journalled in bearings of said end walls, ball-bearings respectively mounted within said annular chambers, radial slots in said drum, blades slidably mounted in said slots and having inner lateral projections adapted to bear against the inner rings of said ball bearings respectively and inlet and exhaust ports opening into the space between the inner surface of said casing and the outer surface of said drum.

In testimony whereof I have signed my name to this specification.

RAPHAËL MALBAY.