Aug. 21, 1928. 1,681,583

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ROTARY MOTOR OR COMPRESSOR

Filed March 11, 1927

Fig. 1.

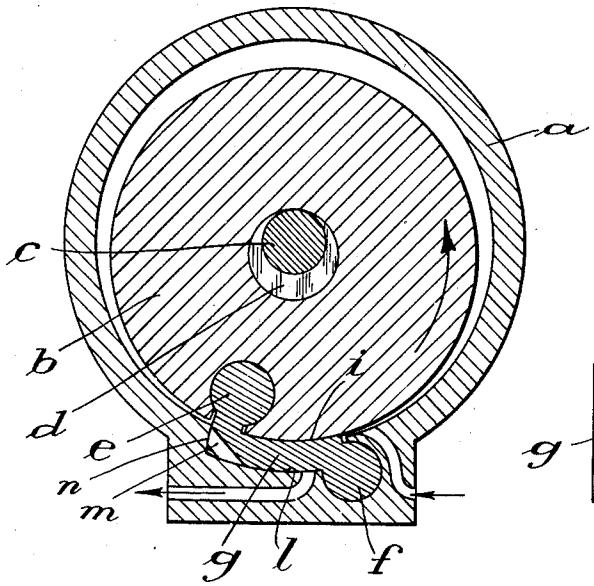


Fig. 3.

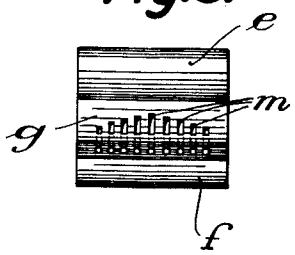
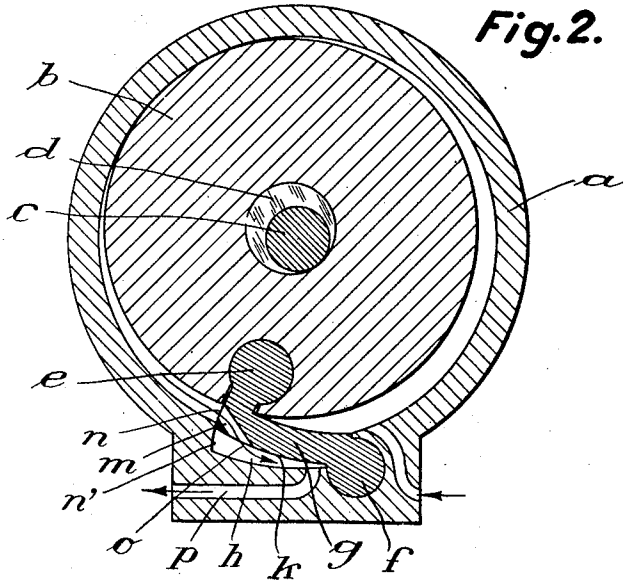


Fig. 2.



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Patented Aug. 21, 1928. 1,681,583

UNITED STATES PATENT OFFICE.

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ROTARY MOTOR OR COMPRESSOR.

Application filed March 11, 1927. Serial No. 174,663, and in Germany March 29, 1926.

My invention relates to rotary compressors and more particularly to a rotary compressor having a cylindrical piston eccentrically disposed within a cylindrical casing or cylinder.

In the rotary compressors of this type as hitherto constructed and in which a movable separating member or partition is provided between the piston and the cylindrical casing for the purpose of dividing, at each revolution of the piston, the space between the piston and the casing into two compartments such as a suction chamber and a compression chamber, the said movable member or partition is usually arranged radially or even tangentially with relation to the piston.

In the rotary compressors of this character hitherto known, the said movable member is pivotally connected with the one part, say the casing, and adapted to engage in a slot of the other part, say the piston, so as to be displaceable therein or, as an alternative, the movable member is firmly connected with the piston and adapted to engage in a revoluble retaining member or the like of the casing so as to be displaceable or movable therein.

The rotary compressors constructed as above indicated, however, are objectionable for the reason that the movable separating member is subjected to excessive stress or wear due to the pressure and strain exerted by the piston running over the plane of the separating member or, in other words, the vacuum produced on the one side of the piston and the high overpressure on the other side thereof act to subject the separating member to bending and shearing stresses. Obviously the stresses thus produced in the separating member detrimentally affect the efficiency and the life of the engine, especially as they tend to destruct or injure the retaining member serving to guide the reciprocating separating member. The destructive tendency of the stresses entails the danger of premature wearing and, in fact, excessive wear of the guiding members is a matter of inherence in engines of the indicated type, particularly if they are run with high speeds, so that the engine will soon become useless on account of reduced efficiency or objectionable for noise and shocks.

The object of my invention is to remedy this defect, and with this object in view I pivotally connect the separating member, according to the present invention, with both the piston and the cylindrical casing or cylinder, and further I construct the separating member to form, so to say, an arc of a circle or sector adapted to snugly fit and embed in a suitable recess provided for the purpose in the inner face of the cylinder, so that, on the one hand, the piston will be caused to run smoothly over the same with gentle pressure and, on the other hand, the separating member will be prevented from reciprocating in a bearing space and from the injurious effect of the sliding friction to which the same otherwise would be subjected.

Another advantage resides, according to my invention, in that the improved separating member constitutes at the same time a positively controlled means for discharging the compressed medium to be employed in engines of this type and, therefore, discharge valves as hitherto applied in engines of this kind may be discarded.

With the above recited object in view, reference is had to the following specification and drawings in which there is exhibited one example or embodiment of the invention which is in no way intended as a limitation upon the scope of the appended claims as it is to be clearly understood that variations and modifications which fairly fall within the true scope of said claims may be resorted to when found expedient.

In the accompanying drawings forming a part of this specification and showing for purposes of exemplification, a preferred form and manner in which the invention may be embodied and practised, but without limiting the claimed invention to such illustrative instance:

Figure 1 is a sectional view showing my invention as applied to a rotary piston compressor of substantially the conventional form;

Figure 2 is a similar view but with the movable parts in a different position, and

Figure 3 is a view in top plan of a single part of the compressor.

The compressor illustrated in the drawings is of the usual type comprising a casing or cylinder *a*, a piston *b* therein, a shaft *c* supporting said piston, an eccentric *d* integral with the shaft and a separating member. According to my invention the latter is not pivotally connected to the casing in the manner hitherto practised nor adapted to

slide in a slot of the piston, or vice versa, but is pivotally connected with both the casing or cylinder *a* and the piston *b* and is constructed and arranged to serve at the same time as a positively controlled means for the discharge of the compressed fluid medium.

In the preferred embodiment shown the separating or dividing member comprises a main body *g* shaped to form a sector and two cylindrical bodies or heads *e* and *f* integral therewith, the latter constituting two pivot pins for the connection with the casing and the piston, respectively, as will be clearly seen in the drawings. The casing *a* is recessed to from a seat *h*, see Figure 2, for the accommodation of the main body *g* so that the latter will snugly fit therein and, when the piston will come to the position shown in Figure 1, the bottom face *k* of the main body or sector *g* will be in full intimate contact with the bottom face *l* of the recess or seat *h* while the top face *i* of the sector will be in a like contact with the peripheral face of the piston.

As thus far explained, it will be apparent that, in synchronism with the up- and down movements of the piston, also the described separating member will reciprocate or move from the position shown in Figure 1 to that illustrated in Figure 2, as will be readily understood by those skilled in the art so that it seems unnecessary to explain the operation of the compressor more in detail.

I shall now proceed to describe the means provided in the compressor and more particularly in the separating member for the discharge of the compressed medium. In the end face *n* of the main body *g* there are provided a series of openings of preferably varying or stepped sectional area and these openings extend through the body *g* to form passages *m* leading or discharging, on the bottom face *k* of the body *g*, into the recess *h*, as will be seen in Figure 2. I desire to have it understood, however, that the particular member and shape of the passages *m* shown is simply one which has commended itself to me, but which is not at all necessary, since even a single passage of adequate sectional area will suffice in some cases for the purpose in view. The recess *h* is in communication with the discharging passage owing to the provision of a passage *p* in the base of the engine so that the fluid medium will be discharged through the passages as indicated by arrows *o* in Figure 2, whereas when the piston adopts the position shown in Figure 1 the passages will be closed, the end face *n'* of the recess co-operating with the end face *n'* of the recess to seal or control the passages *m*.

It will be seen that the usual discharge valve is entirely dispensed with and in substitution therefor the separating member is provided with passages or channels to constitute a positively controlled discharging element affording the advantage of giving the working fluid to be discharged, prior to the termination of the compression stroke or phase, a pressure of any desirable degree. Thus, if the passages *m* are arranged in a stepped manner, that is to say, of gradually increased or decreased cross-section, as shown in Figure 3, so that the majority thereof will act to close ere the highest degree of compression is attained, it will be possible to ensure any desirable final pressure up to the end of the piston stroke by reducing the cross-section of the passages accordingly.

What I claim is:—

1. A rotary motor or compressor, comprising a cylinder, an eccentric piston therein, a separating member of sector shape for dividing the free space of the cylinder into a suction compartment and a compression compartment at each revolution of the piston and allowing the compressed fluid to be discharged and cylindrical heads forming the two ends of said member for pivotal connection with the cylinder and the piston, the wall of said cylinder near the two cylindrical heads being adapted to receive the separating member and having an inlet and an outlet for the fluid.

2. A rotary motor or compressor, comprising a cylinder, an eccentric piston therein, a separating member of sector shape for dividing the free space of the cylinder into a suction compartment and a compression compartment at each revolution of the piston and being provided with a passage for discharging the compressed fluid, and cylindrical heads forming the two ends of said member for pivotal connection with the cylinder and the piston, the wall of said cylinder near the two cylindrical heads being adapted to receive the separating member and having an inlet and an outlet for the fluid.

3. A rotary motor or compressor, comprising a cylinder, an eccentric piston therein, a separating member of sector shape for dividing the free space of the cylinder into a suction compartment and a compression compartment at each revolution of the piston and being provided with passages of various cross-section, and cylindrical heads forming the two ends of said member for pivotal connection with the cylinder and the piston, the wall of said cylinder near the two cylindrical heads being adapted to receive the separating member and having an inlet and an outlet for the fluid.

4. A rotary motor or compressor, comprising a cylinder, an eccentric piston therein, a separating member of sector shape for dividing the free space of the cylinder into a suction compartment and a compression

compartment at each revolution of the piston and being provided with passages of various cross-section and cylindrical heads forming the two ends of said member for pivotal connection with the cylinder and the piston, the wall of the cylinder near the two cylindrical heads having in the inner face a recess of sector shape to conform to the shape of the separating member snugly fitting therein and an inlet and an outlet for the fluid.

In testimony whereof I affix my signature.

GEORG GÜTTNER.