April 2, 1940. G. R. MEADOR 2,195,968

ROTARY COMPRESSOR

Filed Oct. 31, 1938 3 Sheets-Sheet 1

Fig. 1

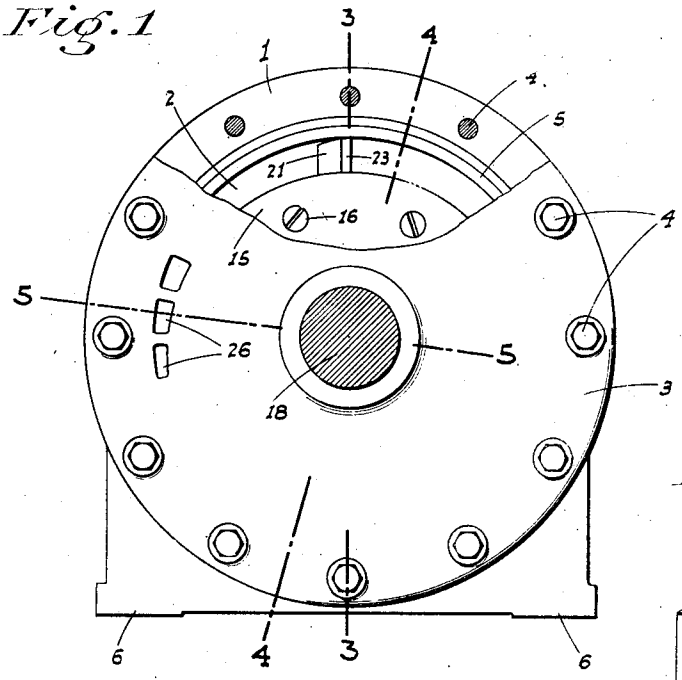


Fig. 6

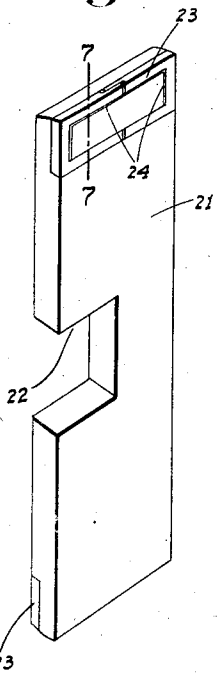
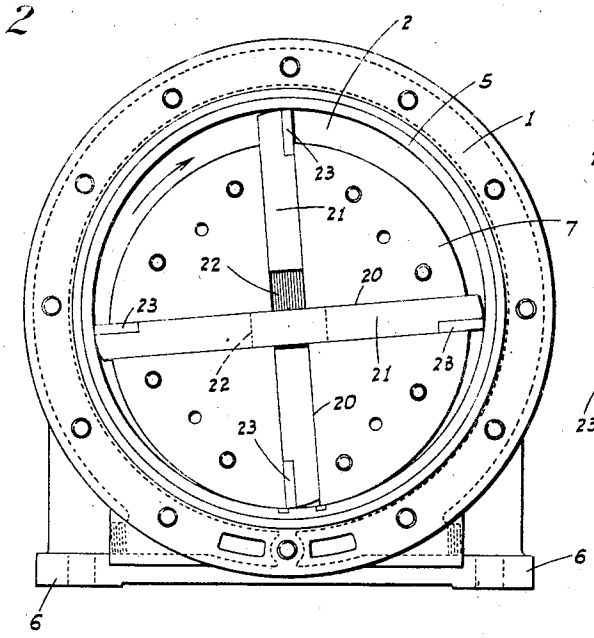


Fig. 2



INVENTOR

G. R. Meador

BY

ATTORNEY

April 2, 1940. G. R. MEADOR 2,195,968

ROTARY COMPRESSOR

Filed Oct. 31, 1938 3 Sheets-Sheet 2

Fig. 3

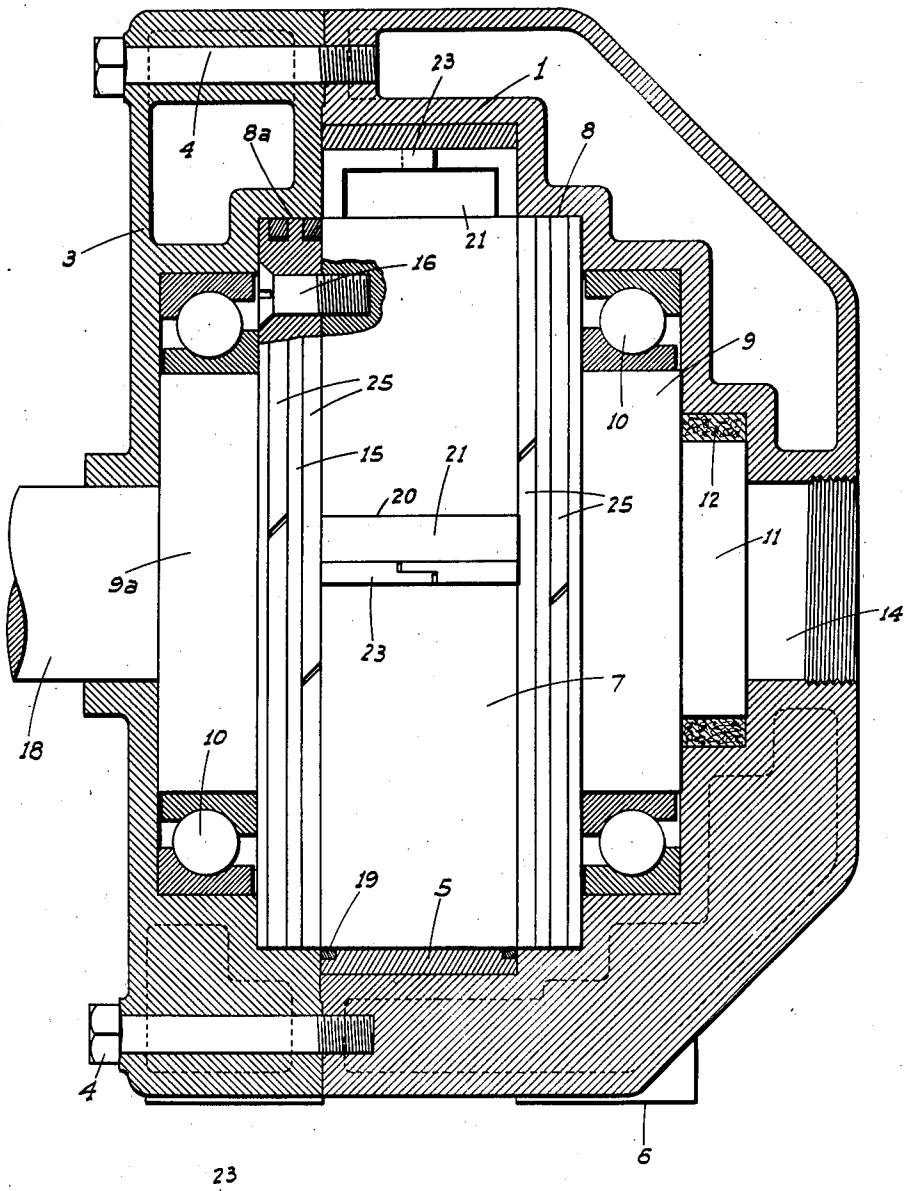
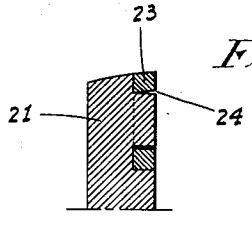


Fig. 7



INVENTOR

G. R. Meador

BY

ATTORNEY

April 2, 1940. G. R. MEADOR 2,195,968

ROTARY COMPRESSOR

Filed Oct. 31, 1938 3 Sheets-Sheet 3

Fig. 4

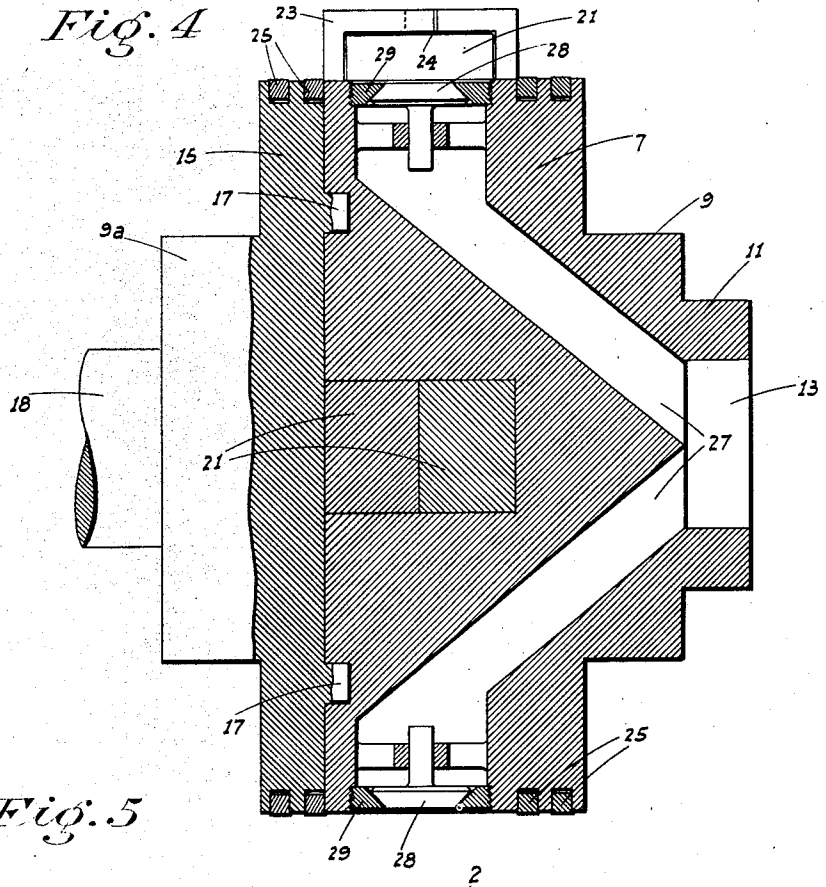
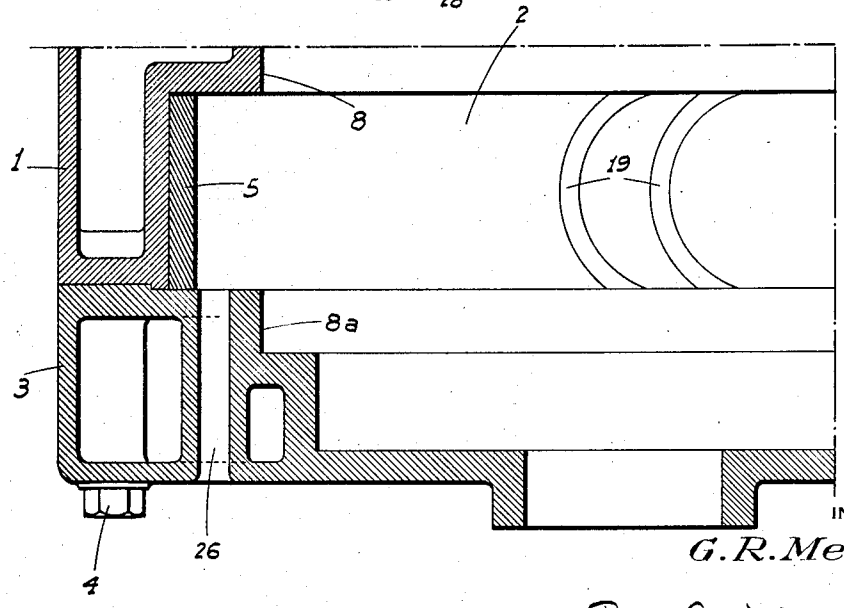


Fig. 5



INVENTOR

G. R. Meador

BY

ATTORNEY

Patented Apr. 2, 1940

2,195,968

UNITED STATES PATENT OFFICE

2,195,968

ROTARY COMPRESSOR

Gordon R. Meador, Fresno, Calif., assignor to Meador-Calender Corporation, Fresno, Calif.

Application October 31, 1938, Serial No. 237,918

4 Claims. (Cl. 230—153)

This invention relates to rotary compressors, the main objects being to provide a compressor of this type constructed so as to have very high efficiency, and which employs a minimum of moving and wearing parts, and which operates with a minimum of vibration.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is an end elevation of the compressor with the casing head partly broken away.

Figure 2 is a similar view, with the casing head removed as well as the end plate of the rotor.

Figure 3 is a diametral section of the casing on line 3—3 of Fig. 1; the rotor being shown in full.

Figure 4 is a diametral section of the rotor detached on line 4—4 of Fig. 1.

Figure 5 is a fragmentary radial section of the casing on line 5—5 of Fig. 1.

Figure 6 is a perspective view of one of the rotor vanes.

Figure 7 is a fragmentary section of a vane on line 7—7 of Fig. 6.

Referring now more particularly to the characters of reference on the drawings, the compressor comprises a two-part casing including a main member 1 having a cylindrical compressing chamber 2 at one end, and a casing head 3 projecting from said end and forming the adjacent end wall of the chamber. Bolts 4 rigidly connect the casing parts together. The bore of chamber 2 is lined with a band 5 of relatively hard metal. Feet 6 on the casing enable the same to be bolted in a fixed position with its axis horizontal. Both parts of the casing are waterjacketed.

Mounted in the casing in eccentric relation to chamber 2 is the cylindrical rotor, which for manufacturing purposes is made in two parts. The main body 7 of the rotor extends across the chamber 2 from its head end, engaging the liner 5 at the bottom, and extends beyond the opposite end of the chamber and into close running engagement with a recess 8 in the casing member 1 concentric with the rotor. Beyond said recess the rotor body is formed with a reduced portion 9 engaged by an antifriction bearing unit 10 carried in the casing. The rotor body terminates in a portion 11 of further reduced size, engaged about its periphery by a sealing gland 12 of suitable character mounted in the casing. The portion 11 has a bore 13 open to its outer end which registers with an outlet passage 14 in the casing, and to which a pressure conduit may be connected.

The other part of the rotor comprises an end plate 15 the same diameter as the body 7 and the same width as the recess 8, which has a close running fit in a recess 8a in the casing head 3. Plate 15 is removably secured to body 7 by countersunk screws 16, and is connected in driving relationship with the body by said screws and by dowels 17 also if desired. At its end opposite body 7, plate 15 is formed with a reduced portion 9a the same size as portion 9, which is also engaged by an antifriction bearing unit 10 and mounted in the casing head 3. Outwardly of the portion 9a, a drive shaft 18 is secured on the rotor plate for connection to any suitable source of power such as an electric motor. It will be understood of course, that parts 9 and 9a, 11 and 18 are all concentric with body 7.

The rotor practically makes contact with the liner 5 at the bottom, and to provide a positive seal so as to prevent the passage of air between the rotor and liner at that point, one or more curved sealing bands 19 are mounted in the liner at the bottom, the curvature of the bands extending transversely of chamber 2 and their convex sides facing in the direction of rotation of the rotor.

The rotor body for the full width of the chamber 2 is provided with diametral intersecting slots 20 for the sliding reception of vane units 21 whose length is the same as the diameter of chamber 2. Each vane unit is cut away for half its width at the center and from one side as shown at 22 in Fig. 6, so that the vane units may pass each other without interfering with their relative sliding movement, while maintaining their outer ends in common alinement transversely of the chamber. This makes for a well balanced structure, eliminating vibration, assuring that the leading edges of the vanes contact the liner where there is always the minimum of deviation from the radial lines of the chamber, and giving a minimum of wear on the leading edges of the vanes. It will be noted that the center of the rotor and the center of the casing are of course offset from each other. The result is that the projecting end of the vanes is, during the compressing portion of the rotation of the rotor, disposed back of a radial line projected through the center of the casing. This causes the leading edge of the vane rings to remain in contact with the casing liner at all times, giving a positive air seal for that portion of the rotation where it is most needed.

Pressure rings 23, split for lateral expansion,

and of rectangular form both in cross section and peripheral outline, are recessed into the leading faces of the vanes so as to be flush with said faces. Each ring along the inside and the outermost portion thereof at the bottom, is cut so as to diverge somewhat from the adjacent face of the recess, as shown at 24. This provides a gap for air which being under pressure on that side of the vane as will be shown, urges the ring into firm engagement with the liner 5 as well as with the side walls of the chamber. These pressure rings are of such radial depth that the innermost portions thereof are always within the vane slots 20, even when the vanes are at their limit of outward radial movement.

Circular split expanding rings 25 are countersunk in the rotor body 7 and end plate 15 and engage the recesses 8 and 8a respectively, the adjacent rings being positioned to also contact the side portions of the vane rings 23.

Air intake passages 26 extend through the casing head to communicate with the chamber 2 beyond the bottom seal of the rotor and casing liner relative to the direction of rotation of the rotor. Formed in the rotor adjacent the vanes beyond their pressure or leading faces are air passages 27, which extend to the bore 13. Arranged in each passage adjacent the periphery of the rotor is a closure valve 28 cooperating with a seat 29 and opening inwardly and radially of the rotor.

In operation therefore, it will be seen that with the rotation of the rotor, the vanes will perforce move in and out, and will follow and engage the liner 5 throughout the extent of the chamber 2. Air will thus be taken into the chamber 2 through passages 26, and will then be compressed as the chamber diminishes in size. Such compressed air will then force the valves 28 (initially closed by centrifugal action) open, and will flow to outlet 13 and thence to the point of use or storage. This air will then tend to hold valves 28 closed, and they will thereafter be opened only by a pressure generated in the chamber 2 in excess of that in passages 27. Owing to the effectiveness of the vane rings due to their position on the vanes and the air pressure action thereon as previously explained, a very great pressure may be generated and held in the compression chamber to open the valves and thus supply sufficient pressure for all commercial needs.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

I claim:

1. A rotary compressor comprising a body having a cylindrical enclosed chamber, a rotor turnably mounted in the chamber eccentrically thereof and substantially engaging the bore of the same at one point, an intake passage into the chamber beyond said point, an outlet from the chamber, vanes slidably mounted in the rotor and engaging the bore of the chamber, laterally expansible sealing rings recessed into the vanes at their outer ends and engaging the bore and adjacent side wall portions of the chamber outwardly of the rotor, the rotor extending axially beyond the chamber on both sides and the casing having recesses to receive such extending portions with a running fit and an expansible ring mounted on each rotor extension and engaging the bore of the corresponding recess; the side of each ring nearest the chamber engaging the vane rings.

2. A rotary compressor comprising a casing having a cylindrical enclosed chamber, a rotor turnably mounted in the chamber eccentrically thereof and substantially engaging the bore of the same at one point, an intake passage into the chamber beyond said point, bore engaging vanes slidably mounted in and extending diametrically across the rotor and engaging the bore of the chamber, outlet passages in the rotor extending from the periphery thereof between the vanes both radially inward and axially of the rotor to clear the vanes to a common termination at one end of the rotor at the center thereof, and a central passage in the casing registering with such rotor passage termination.

3. A rotary compressor comprising a casing having an enclosed cylindrical chamber, a rotor turnably mounted in the chamber eccentrically thereof, an intake passage communicating with the chamber, bore engaging vanes slidably mounted in the rotor, outlet passages in the rotor extending from the periphery thereof between the vanes both radially inward and axially of the rotor to a common termination at one end of the rotor at the center thereof, a central passage in the casing registering with the rotor passage termination, a circular portion of reduced diameter on the rotor about such passage termination, and a sealing band about and between said portion and the adjacent portion of the casing.

4. In a rotary compressor, a casing formed with a circular enclosed chamber, a rotor turnably mounted in the chamber eccentrically thereof, vanes slidable in the rotor and engaging the chamber bore, each vane at its outer end and on its leading face having an endless recess of rectangular configuration cut therein exposed to the peripheral and side edges of the vane and a laterally expansible ring unit of rectangular form disposed in said recess.

GORDON R. MEADOR.