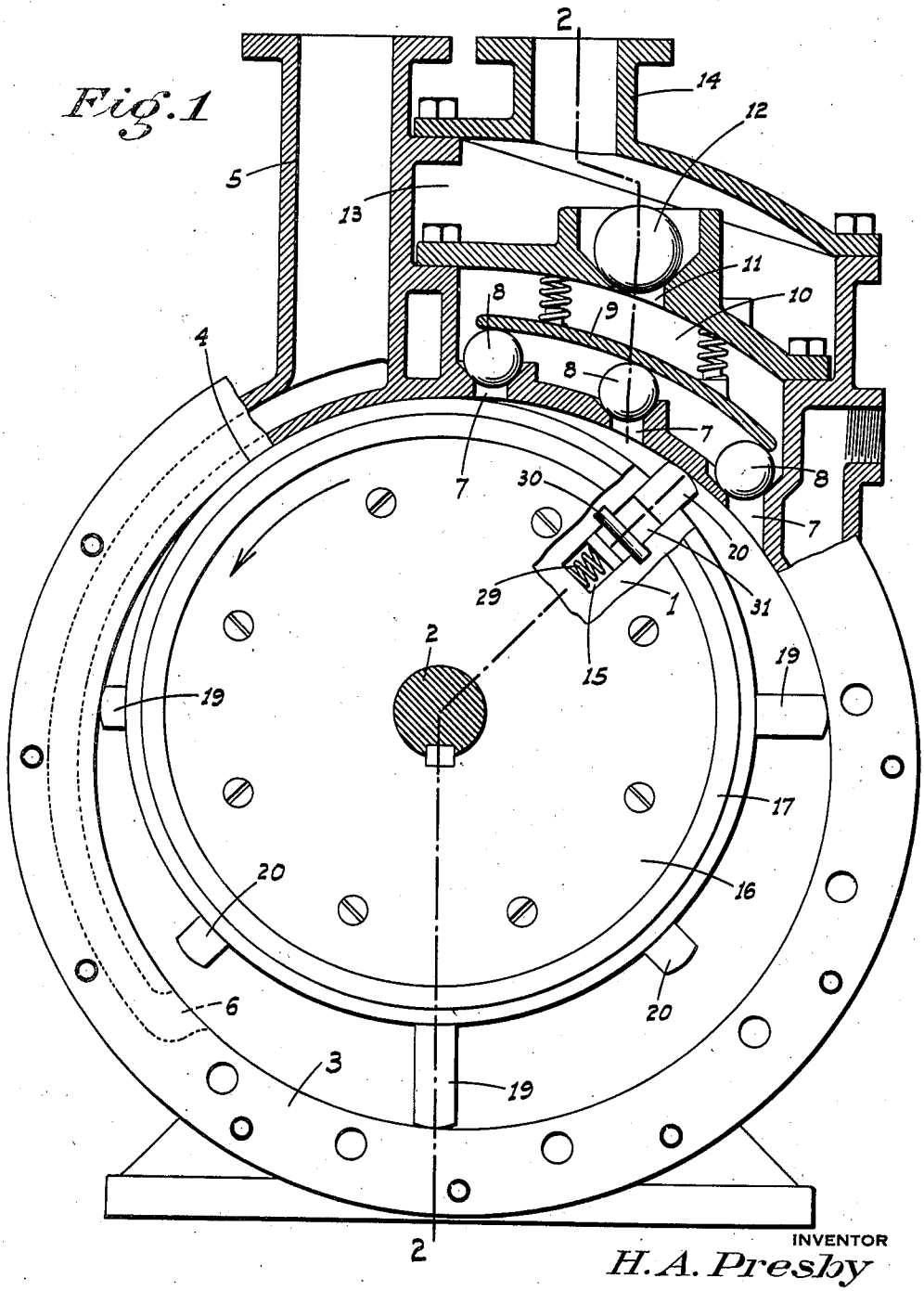
Sept. 13, 1938. H. A. PRESBY 2,129,960

ROTARY COMPRESSOR

Filed Jan. 30, 1937 2 Sheets-Sheet 1

Fig. 1



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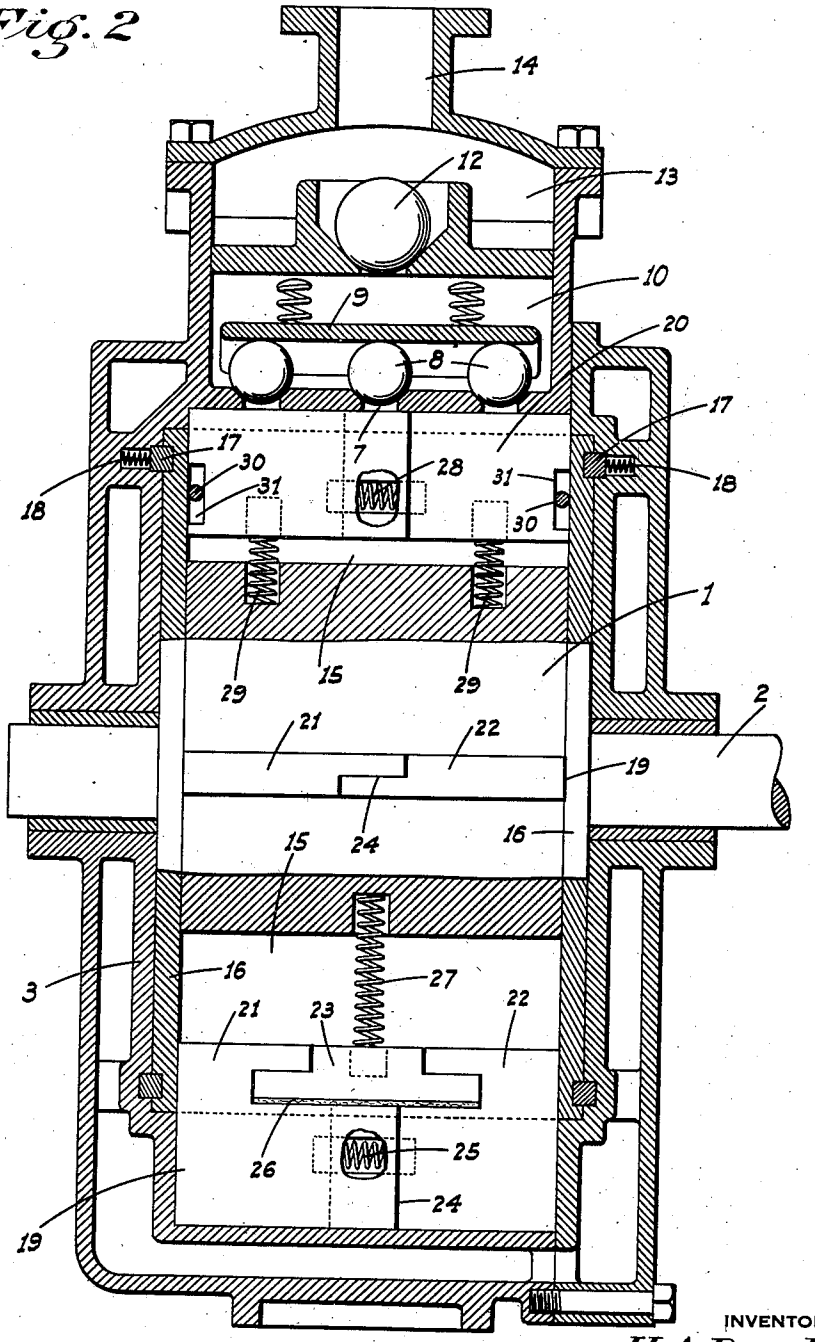
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Fig. 2



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Patented Sept. 13, 1938 2,129,960

UNITED STATES PATENT OFFICE

2,129,960

ROTARY COMPRESSOR

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Application January 30, 1937, Serial No. 123,211

4 Claims. (Cl. 230—152)

This invention relates to compressors or pumps of the turbine or rotary type which consist essentially of a rotor mounted eccentrically in a casing and having radial vanes slidably engaging the walls of the casing.

The principal object of my invention is to so construct and mount these vanes and the rotor that a highly efficient seal is obtained between the relatively moving parts which eliminates the probability of leakage therepast.

Another object is to arrange the outlet check valves so that the compressor may deliver compressed fluid to the outlet at different pressures, as may be desired, without change in the construction of the compressor or in the speed of the rotor and without the need of utilizing adjustable check valves or the like.

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 a side view of the improved compressor partly in section and with the side plate of the casing removed.

Figure 2 is a vertical transverse section substantially on the line 2—2 of Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the compressor comprises a cylindrical rotor 1 mounted on an axial shaft 2. The rotor is turnably supported in a casing 3 which from the top for a certain arcuate distance in the direction of rotation of the rotor is concentric and has a running fit with the rotor as at 4; and for the remainder of its circumferential extent is eccentric to the rotor. A fluid intake passage member 5 is formed with the casing and delivers to the same at a point some distance beyond the concentric portion 4 as shown at 6.

Formed in the top of the casing ahead of the portion 4 is a circumferentially spaced series of transverse rows of ports 7 normally closed by upwardly opening ball checks 8. These are all engaged and yieldably held closed by a spring pressed plate 9 arranged for independent upward movement at either end. The ports 7 communicate with a common outlet chamber 10 thereabove, which has a large top outlet port 11 normally closed by an upwardly movable ball 12. The port 11 communicates with the main outlet chamber 13 to which the outlet passage member 14 is attached.

The rotor is formed with a plurality of evenly spaced radial slots 15 extending from side to side, the ends of these slots being covered by plates 16 rigidly secured on and the same diameter as the rotor, and completely countersunk in the end walls of the casing as shown in Fig. 2, said walls outwardly of the rotor being spaced the same as the width of the rotor.

The inner surface of the casing as well as the outer surface of the rotor and its end plates are machined and finished throughout so as to provide a close running fit. Endless or segmental rings 17 are countersunk in the end walls of the casing and the plates 16 concentric with the shaft 2 and are engaged on one side by springs 18 which act to force the rings against the opposite engaging surfaces. In this manner possible leakage past the rotor is prevented.

Slidable in the slots 15 are the casing engaging vanes, alternate ones 19 of which are relatively long while the intermediate ones 20 are relatively short. The vanes 19 are arranged to engage the circular wall of the casing throughout its extent, while the vanes 20 only engage said wall for the portions of the same adjacent the intake and outlet ports. The purpose of this is to provide the desired sealed fluid retaining pockets close to the outlet where necessary, while eliminating the additional friction which would be had by the engagement of said vanes 20 along the major portion of the casing wall.

The vanes 19 are made up of three parts 21, 22 and 23 as shown in Fig. 2. The parts 21 and 22 are arranged for lateral separating movement and have a step cut in connection with each other at their adjacent ends as shown at 24. These parts are yieldably pressed apart, to cause them to closely engage the end walls of the casing, by an enclosed compressing spring 25. At their inner ends the parts 21 and 22 are provided with a symmetrically disposed T-shaped recess in which the part 23 of similar form is fitted, so that said part is in effect completely countersunk in the parts 21 and 22. A strip of felt or other absorbent material 26 is preferably disposed between and extends along the head of part 23 and the adjacent surfaces of parts 21 and 22. A radial compression spring 27 acts on the base of part 23 to not only hold the felt strip in compressed and tightly sealing relationship with the vane parts, but holds the vane as a whole in close yielding contact with the circular wall of the casing. By means of this vane construction, close contact of the vane with the walls of the casing, and take-up as wear occurs is automatically at-

tained, without the possibility of leakage past the main split parts of the vane from side to side, since the inner end of the step cut 24 is closed by the felt.

The vanes 20 are each formed of only two laterally separable parts arranged the same as the corresponding parts of the vanes 19 and yieldably pressed apart by an enclosed spring 28. Transversely spaced radial compression springs 29 act on the parts of the vanes 20 to force the same outwardly. Outward movement of said vanes is limited by pins 30 seated in the rotor at the ends of and extending across the adjacent portions of the corresponding slots 15, and riding in recesses 31 cut in the ends of the vanes 20. These pins and recesses are of course disposed so that the recesses are never exposed outwardly of the periphery of the rotor.

In operation it will be seen that with the rotation of the rotor, by means of power applied to the shaft 2, the fluid from the intake 5 is drawn into the casing and confined as individual masses by the adjacent vanes 19.

As each such mass of fluid approaches the outlet portions it is divided into two parts by the veins 20 which then engage the circular wall of the casing. If a relatively low pressure is present in the pressure chambers 10 and 13, as determined by the pressure in the outlet 14 and the pressure reservoir etc. to which it leads, the first row of balls 8 are left. This is because the compressed fluid between adjacent vanes and converging walls of the rotor and casing at that point will be sufficient to overcome the resistance to opening of said balls. If a greater pressure is in said chambers which correspondingly increases the resistance to opening of the balls, the vanes must move further around to more highly confine and compress the individual masses of fluid, and either the intermediate or last row of balls will then open. The compressor thus compresses the fluid before discharging the same to the extent determined by the pressure in the outlet chamber.

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.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In a rotary compressor, a rotor having radial slots, vanes slidably mounted in said slots, said vanes each comprising a pair of sections step-cut at adjacent ends and disposed in overlapping relation, said sections being movable apart axially of the rotor, an inverted T-shaped slot cut in each vane from the inner end and centrally of its sides, a T-shaped element disposed in said slot, a compression spring interposed between said sections outwardly of the slot and acting to force the sections apart, and another compression spring extending radially between the central leg of said inverted T-shaped element and the rotor to force each vane radially out.

2. A device as in claim 1 in which the inner end of the central leg of the element is formed with a radial bore to receive the outer end of said other spring, and the rotor is formed with a radial bore to receive the other end of the spring, whereby to prevent displacement of said spring.

3. In a rotary compressor including a substantially circular shell, a cylindrical rotor mounted in the shell, said shell being mainly eccentric to the rotor and engaging the same at one point, radial vanes slidably mounted in the rotor to engage the peripheral wall of the shell throughout its entire extent, a row of circumferentially spaced ports in said peripheral wall immediately adjacent but ahead of said one point; a plurality of separate outwardly opening steel ball valves normally closing said ports, said row of ports and the steel ball valves seated therein being disposed in a circular plane substantially concentric with the axis of the shell, an outlet pressure chamber into which said valved ports open, a curved plate having its inner face substantially concentric with the axis of the shell disposed in said chamber with said face in engagement with the row of steel ball valves, and a compression spring extending between each end of the plate and the adjacent portion of the chamber outwardly of the plate.

4. A device as in claim 3 including a plurality of transversely separated rows of circumferentially spaced ports including steel ball valves therein, said plate engaging all of said steel ball valves; there being a plurality of transversely spaced compression springs extending between each end of the plate and the adjacent portion of the chamber.

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