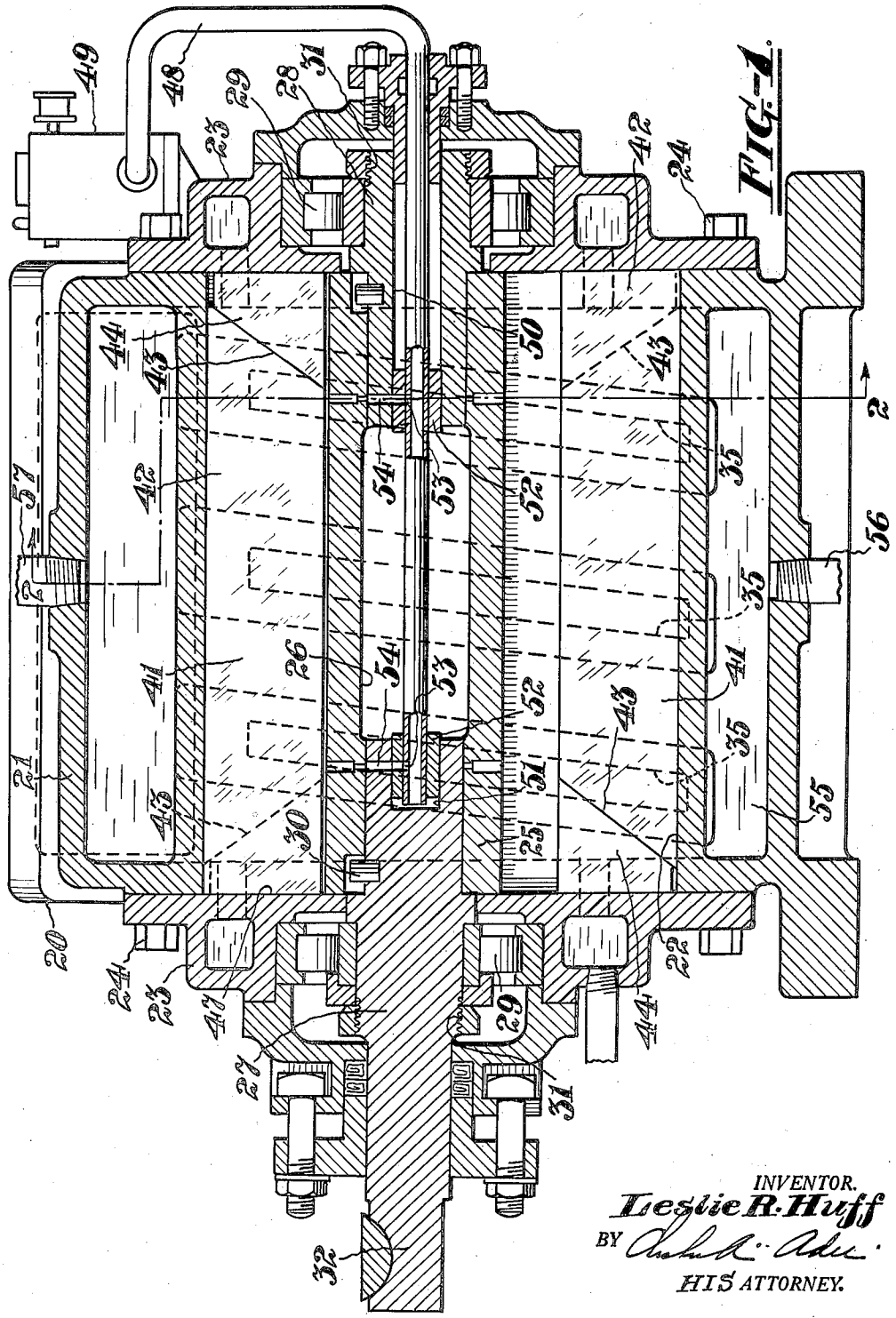
Jan. 14, 1936. L. R. HUFF 2,027,594

ROTARY COMPRESSOR

Filed Oct. 19, 1933 3 Sheets-Sheet 1

FIG. 1.



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ROTARY COMPRESSOR

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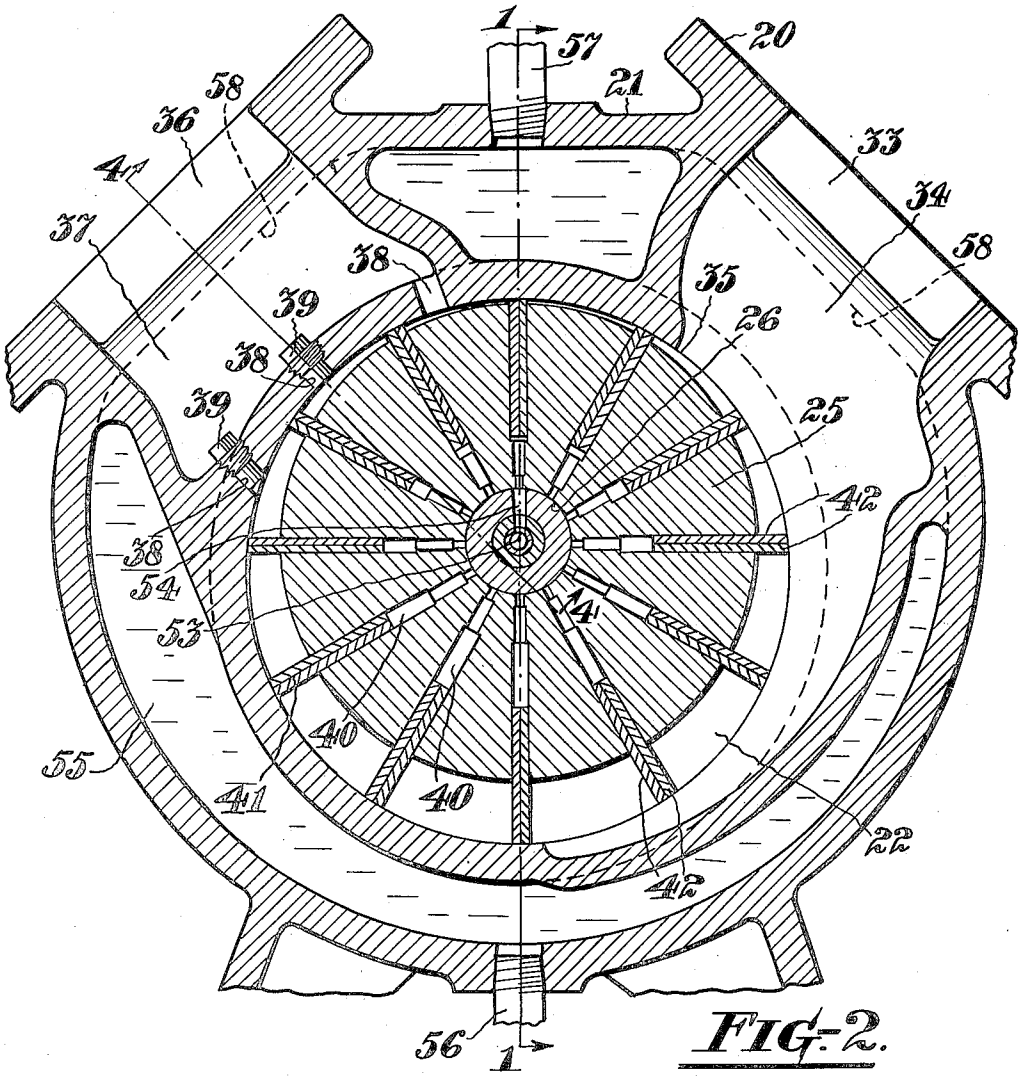


FIG. 2.

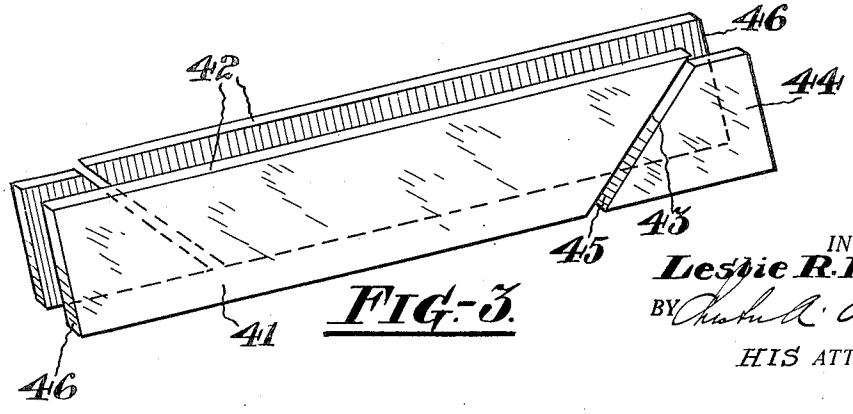


FIG. 3.

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ROTARY COMPRESSOR

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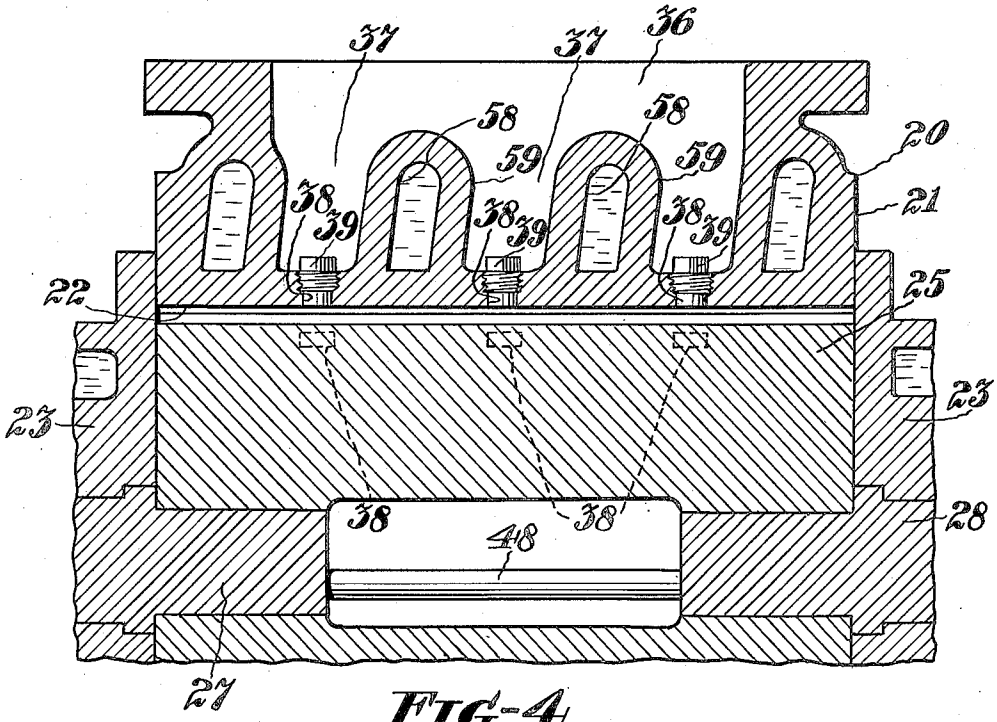


FIG. 4.

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Patented Jan. 14, 1936 2,027,594

UNITED STATES PATENT OFFICE

2,027,594

ROTARY COMPRESSOR

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Application October 19, 1933, Serial No. 694,232

2 Claims. (Cl. 230—152)

This invention relates to compressors, and more particularly to rotary compressors employing slidable vanes for impelling the fluid from the inlet opening to the discharge opening of the compressor.

The objects of the invention are to retain the vanes in substantial sealing relationship with a compression chamber wherein they operate, to minimize the noise incident to the discharge of the compressed fluid from the compression chamber, and to effect an adequate cooling of the compression chamber and the chambers wherewith it communicates.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawings illustrating the invention and in which similar reference numerals refer to similar parts,

Figure 1 is a longitudinal elevation, in section, of a rotary compressor constructed in accordance with the practice of the invention and taken on the line 1—1 through Figure 2,

Figure 2 is a transverse view taken on the line 2—2 of Figure 1 looking in the direction indicated by the arrows,

Figure 3 is a perspective view of a vane assembly, and

Figure 4 is a view similar to Figure 1 taken through Figure 2 on the line 4—4 looking in the direction indicated by the arrows.

Referring more particularly to the drawings, 20 designates, in general, a blower comprising a casing 21 bored to form a compression chamber 22 of which the ends are closed by heads 23 secured to the casing 21 in any suitable manner, as by bolts 24.

Within the compression chamber 22 is a rotor 25 which is arranged eccentrically with respect to the compression chamber 22 and has an axial bore 26 into the ends of which are inserted trunnions or shafts 27 and 28. The shafts 27 and 28 are journaled in anti-friction bearings 29 seated in the heads 23 and may be keyed to the rotor 25, as by means of pins 30.

Each shaft is provided with an externally threaded portion 31 for the accommodation of a nut acting against the outer end of the bearings 29, and the shaft 27 differs from the shaft 28 only in that it is provided with an extension 32 whereby it may be coupled to a prime mover (not shown).

The fluid intended to be compressed may be conveyed to the compressor by suitable piping (not shown) but which may open into an inlet chamber 33 having a plurality of branches 34 each one of which terminates in a port 35 through which the fluid enters the compression chamber 22. In the opposite side of the casing 21 is a discharge chamber 36 which, like the inlet chamber 33, has oblong branch chambers 37 into which the compressed fluid passes from a port or ports 38 communicating the chambers 37 with the compression chamber 22.

Preferably, a series of ports 38 are arranged in spaced relation with respect to each other and radially with respect to the compression chamber 22. In the present instance three such ports are shown, one each being arranged at the ends of the chambers 37 and one intermediate the ends. Plugs 39 form closures for certain of the ports 38. The plugs 39 are threaded into the ports 38 and are, therefore, removable to enable the compressed fluid to be discharged into the discharge chamber either early or late with respect to the cycle of operation of the rotor 25, depending upon the desired value of the final discharge pressure.

The rotor 25 is, as is customary, provided with a plurality of radial slots 40 wherein are disposed slidable vanes 41 to impel the fluid from the inlet ports 35 to the discharge ports 38. Each vane 41 consists of a pair of plates 42 of less length than the length of the compression chamber 21 and having, at one end, a diagonal surface 43. The edge of greater length of the plates 42 bears against the wall of the compression chamber 22, and in the slots 40 is a complementary plate 44 having a diagonal surface 45 to seat against the diagonal surface 43. Thus when the rotor 25 is in operation the plates 42 and 44 are actuated centrifugally outwardly and the plate 44 will, by its action against the plate 42, cause the opposite end 46 of the plate 42 to be maintained in sealing relationship with the adjacent surface 47 of the head 23.

In their assembled positions the plates 42 are so arranged that the diagonal surface 43 of one plate lies adjacent the end 46 of the other plate of a pair, thus preventing leakage of fluid over the narrow edges of the plates 44 which are of less height than the plates 42 to prevent contact thereof with the peripheral surface of the chamber 22.

One objectionable feature in devices of this character, as heretofore constructed, has been that of the noise incident to the discharge of the compressed fluid through the discharge ports into the discharge chamber. In practice I have found that such noise is due largely to the equal spacing of the vanes 41 and a conse-

quent regularity with which the compressed fluid is discharged into the compression chamber. It is accordingly contemplated to obviate this objectionable occurrence by varying the spacing of the slots **40**, as for instance by regular increments in the spaces between the slots located in a quadrant. The spacing of the slots may, however, be otherwise arranged but should be such that no considerable number of adjacent slots are spaced equal distances apart.

To the end that the surfaces of the vanes and the slots **40**, whereby they are guided, may be adequately lubricated a tube **48** leading from an oil container **49** is disposed in an axial bore **50** in the shaft **28** and extends into a similar bore **51** in the shaft **27**. The portion of the tube **48** which extends into the shafts is journaled in bushings **52** which may be affixed to the shaft, as by bracing. In the wall of the tube are ports **53** through which oil passes into passages **54** opening into the bottoms of the slots **40**. The ports **53** are so arranged that they will be uncovered by the passages **54** only after completion of compression, thus preventing the entrance of compressed fluid into the tube to check the flow of oil into the slots **40**.

In order to assure rapid dissipation of the heat generated by compression the compressor is provided with a chamber **55** for cooling liquid. The cooling liquid is introduced into the bottom of the chamber by a conduit **56** and passes from the top of the chamber **55** through an outlet connection **57**, the lower and upper portions of the chamber **55** being connected by branches **58** lying between the discharge chambers **37** and the inlet chambers **34**. The branches **58** are defined by arched walls **59** which extend outwardly in the direction of the main chambers **36** and **33**. The air in passing through the chambers will thus be brought into contact with large areas of cooling surface to reduce the temperature of both the incoming and discharge fluid.

I claim:

1. In a rotary piston machine the combination with a cylindrical casing having an inlet and an outlet opening, of a rotary piston eccentrically arranged within the casing, and of loose blades carried by and circumferentially spaced apart on the rotary piston for outward and inward movement, the circumferential distances between adjacent blades being not all equal.

2. In a rotary piston machine as claimed in claim 1, the arrangement that the spacing of the blades varies irregularly and the tips of the blades bear against the casing-inside by centrifugal force.

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