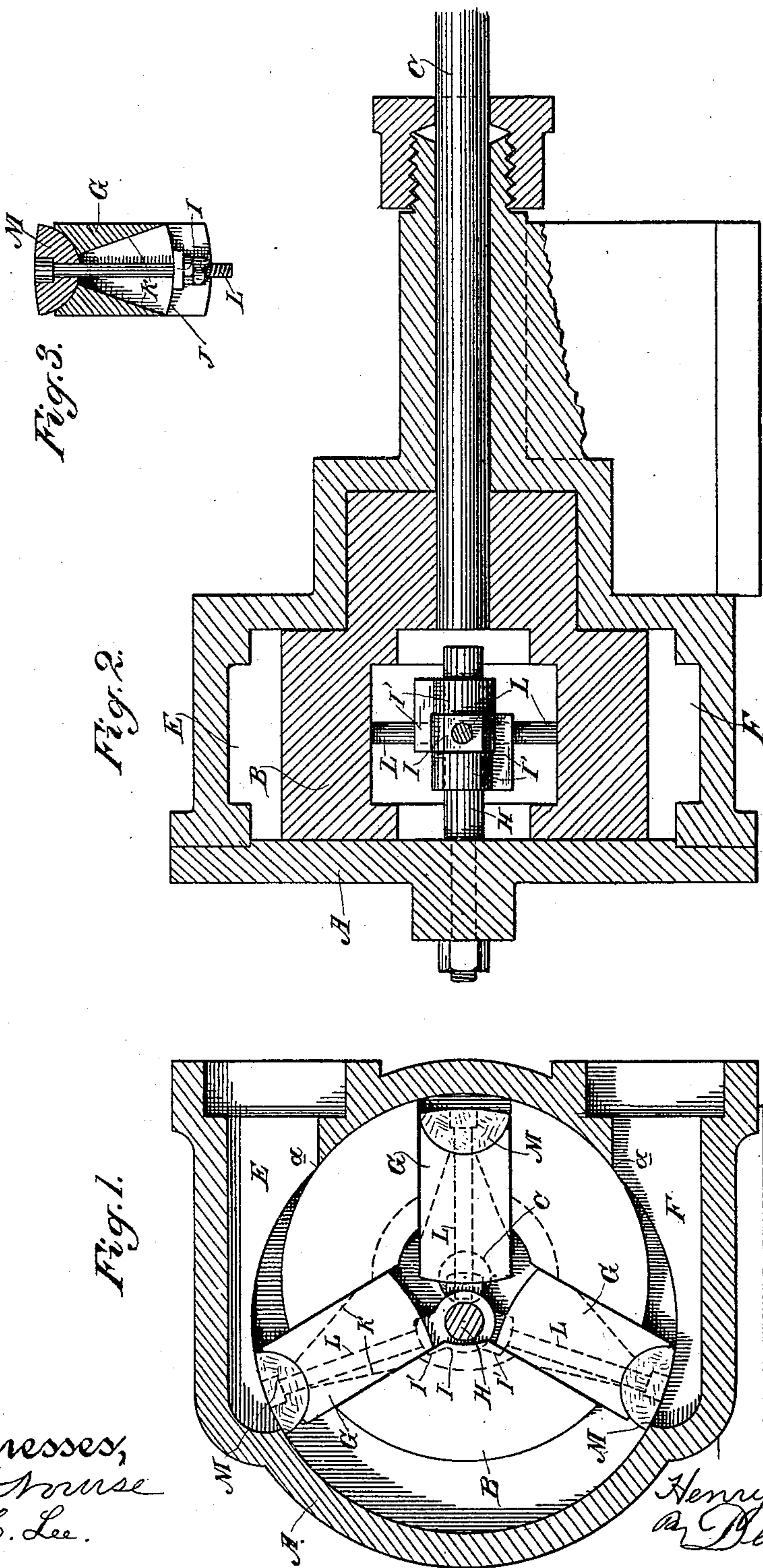


(No Model.)

H. RICHMANN.  
ROTARY AIR COMPRESSOR AND PUMP.

No. 459,527.

Patented Sept. 15, 1891.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

HENRY RICHMANN, OF SANTA CRUZ, CALIFORNIA.

## ROTARY AIR COMPRESSOR AND PUMP.

SPECIFICATION forming part of Letters Patent No. 459,527, dated September 15, 1891.

Application filed October 24, 1890. Serial No. 369,228. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY RICHMANN, a citizen of the United States, residing at Santa Cruz, Santa Clara county, State of California, have invented an Improvement in Rotary Air Compressors and Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in rotary pumps or engines.

It consists of an exterior case having the interior periphery formed in two intersecting arcs, a hub rotating about a shaft which forms the center of one of said arcs, so that the periphery of the hub rotates in close proximity or contact with said arc, a spindle projecting through the opposite head of the casing and in the center of the other arc, and radially-sliding pistons fitted to the hub, with packing-disks in their outer ends which form contact with the periphery of one of the two intersecting arcs which form the interior of the case, and certain details of construction.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical section taken in a plane transverse to the shaft. Fig. 2 is a section taken in a plane drawn through the center of the shaft and longitudinally therewith. Fig. 3 is a section of one of the pistons with the packing-disk and connecting-arm.

A is the outer case of my pump, the interior of which is bored so as to form the arcs of two circles, which intersect each other, as shown at *a*. In the present case I have shown one of these arcs as of smaller diameter than the other; but the device may be operated with both arcs of the same size.

B is a hub fixed upon a shaft C, which extends out through one end of the casing and is journaled therein, so as to form the center of the smaller arc of the casing, and the hub is of such diameter as to approximately fit upon one side within this smaller arc. The larger arc, being eccentric to these, forms a crescent-shaped space around the remaining portion of the hub. Into one side of this space opens the admission-port E and from the opposite side the eduction-port F. The hub has radial channels formed in it extending from its center outwardly, and within these channels are fitted the sliding pistons

G. As many of these channels and pistons may be employed as may be desired or operative, as two, three, or four. In the present case I have shown three. Through the opposite end of the casing and in the center of the larger arc is fixed a spindle H, and upon this spindle are fitted the sleeves or collars I. The inner ends of the pistons are made convex, as shown at J, and these convex ends are in contact with the outer sides of the sleeves I. The interior of the pistons are slotted, as shown at K, forming tapering slots, which are widest at their inner ends and decrease toward the outer ends, as shown in section, Fig. 3. Through these slots pass the arms L, the inner ends of which are secured to the respective sleeves or collars I, which correspond with them, and are journaled upon the central shaft H, as before stated. To the outer ends of these arms are secured the packing-disks M. The outer faces of these disks have a curvature corresponding with the periphery of the larger arc of the case, and the interior sides are made semicircular and fit correspondingly-shaped concavities in the ends of the pistons. The rotation of the hub about the center of the smaller arc while the pin which carries the sleeves before described is in the center of the larger arc causes this pin to force the pistons out, so as to fit the outer faces of the packing-disks against the inner curve of the larger arc of the casing, and they continue this contact while passing through this portion of the arc and within the crescent which forms the available space within the pump. As soon as they pass the intersecting-point *a*, where the two arcs unite, these pistons and the packings are withdrawn, so that they continue their rotation through the smaller arc out of contact with it and are not forced out to form contact again until they are within the circle of the larger arc. By this construction the piston and packing contact is only made in that portion of the casing where the effective work is to be done, and as soon as they pass out of this and beyond the eduction port or passage the packing is drawn away from the side of the casing, as before described.

By reason of the eccentricity of the hub-center and the stationary pin which carries the sleeves it will be seen that the arms ex-



tending from these sleeves to the packing-disk will be oscillated within the slots K in the pistons, and the packing-disks will thus be oscillated within the semicircular concav-  
 5 ity in the ends of the pistons, so as to present their outer faces always in perfect contact with the arc within which they travel. Where three pistons are used, as here shown, the sleeves I, which fit around the stationary pin  
 10 or spindle H and which serve to operate the pistons, are in the form of three collars, the two outer collars having ends I' projecting at right angles beyond the center, one from each side, while the center collar is simply  
 15 a plain one lying between the other two. It will be seen from this construction that the arm which carries one of the packing-disks may be screwed or fixed directly into the central collar or sleeve, while the arms from the  
 20 other two disks by screwing into the overlapping projections of the other disks or collars may be kept in an exact central line, which is preferable, as producing a more perfect action of the parts.

25 It will be manifest that this mechanism may be used as a suction or a force pump, either for fluids or liquids, and it may also be used as an engine by introducing any suitable medium under pressure, without materially  
 30 altering the construction herein shown.

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

1. A rotary pump or engine consisting of  
 35 the casing, the interior of which is formed of two arcs having different centers, a hub journaled in the center of one of said arcs, so that its periphery revolves in contact with the interior of said arc, pistons sliding radially in  
 40 correspondingly-formed channels in the hub, a

spindle projecting through the opposite end of the casing and in the center of the other arc and having sleeves or collars surrounding it and turning with the hub, packing-disks fitting the  
 45 outer ends of the pistons, and arms connected with the packing-disks and extending through the pistons and connected with the collars upon the central pin, whereby said disks are kept in contact with the arc through which  
 50 they revolve and are withdrawn from contact with the arc in which the hub rotates, substantially as herein described.

2. A rotary pump or engine consisting of a casing, the interior of which is formed of two  
 55 arcs having different centers, a hub journaled in the center of one of the arcs, so that its periphery revolves in contact with the interior of said arc, pistons sliding radially in corresponding channels in the hub and hav-  
 60 ing tapering channels formed within them, semicircular concavities formed in the ends of the pistons, correspondingly-shaped disks fitting said concavities and having their outer  
 65 faces curved to fit the interior of the casing, arms fixed to the disks and extending through the channels in the pistons, a spindle fixed in the center of the arc not occupied by the re-  
 70 volving hub, and collars fitted to said spindle and corresponding with each of the arms from the packing-disks, said arms being connected with the collars and acted upon by them, so as to keep the faces of the packing-disks fitted to the interior of the casing, substantially as herein described.

In witness whereof I have hereunto set my  
 hand.

HENRY RICHMANN.

Witnesses:

M. A. GRAHAM,  
 S. H. NOURSE.