No. 647,951. Patented Apr. 24, 1900.

R. C. ENYART.

ROTARY PUMP.

(Application filed Oct. 17, 1898.)

(Model.)

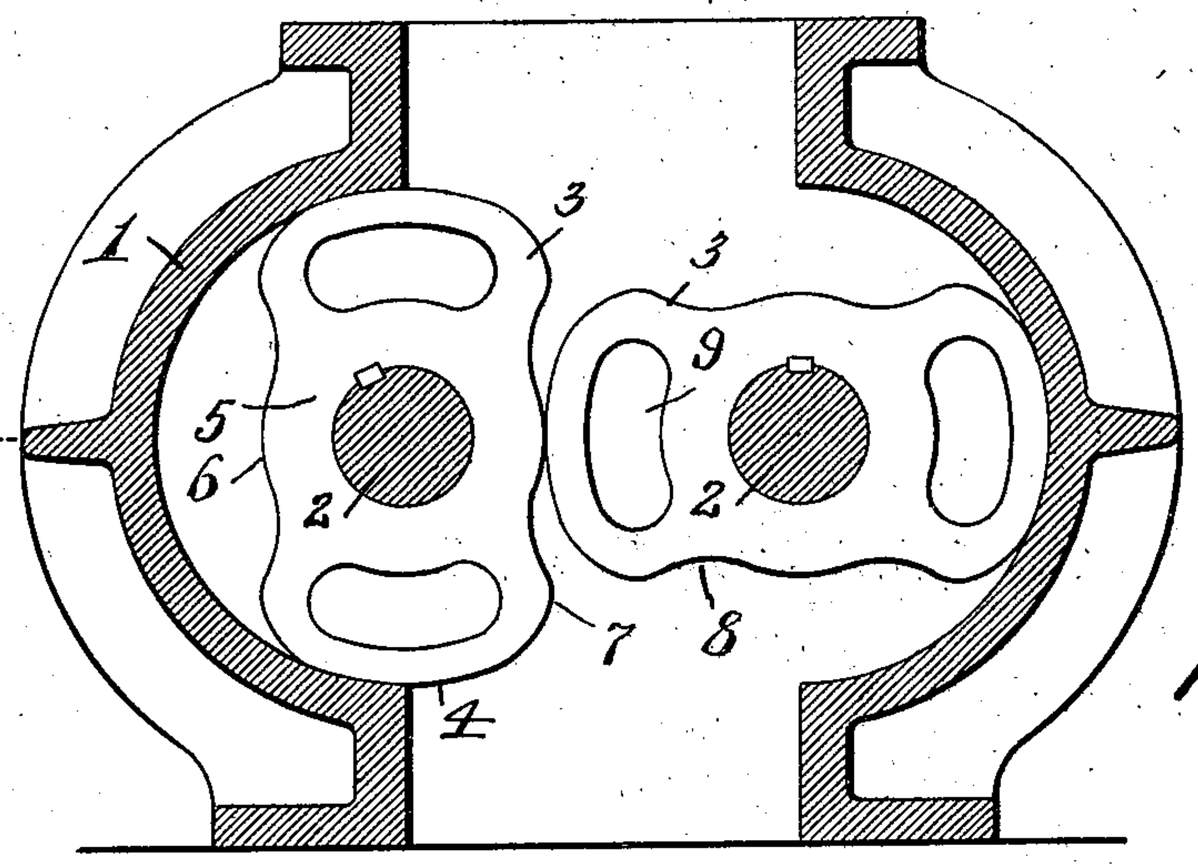

FIG. 1.

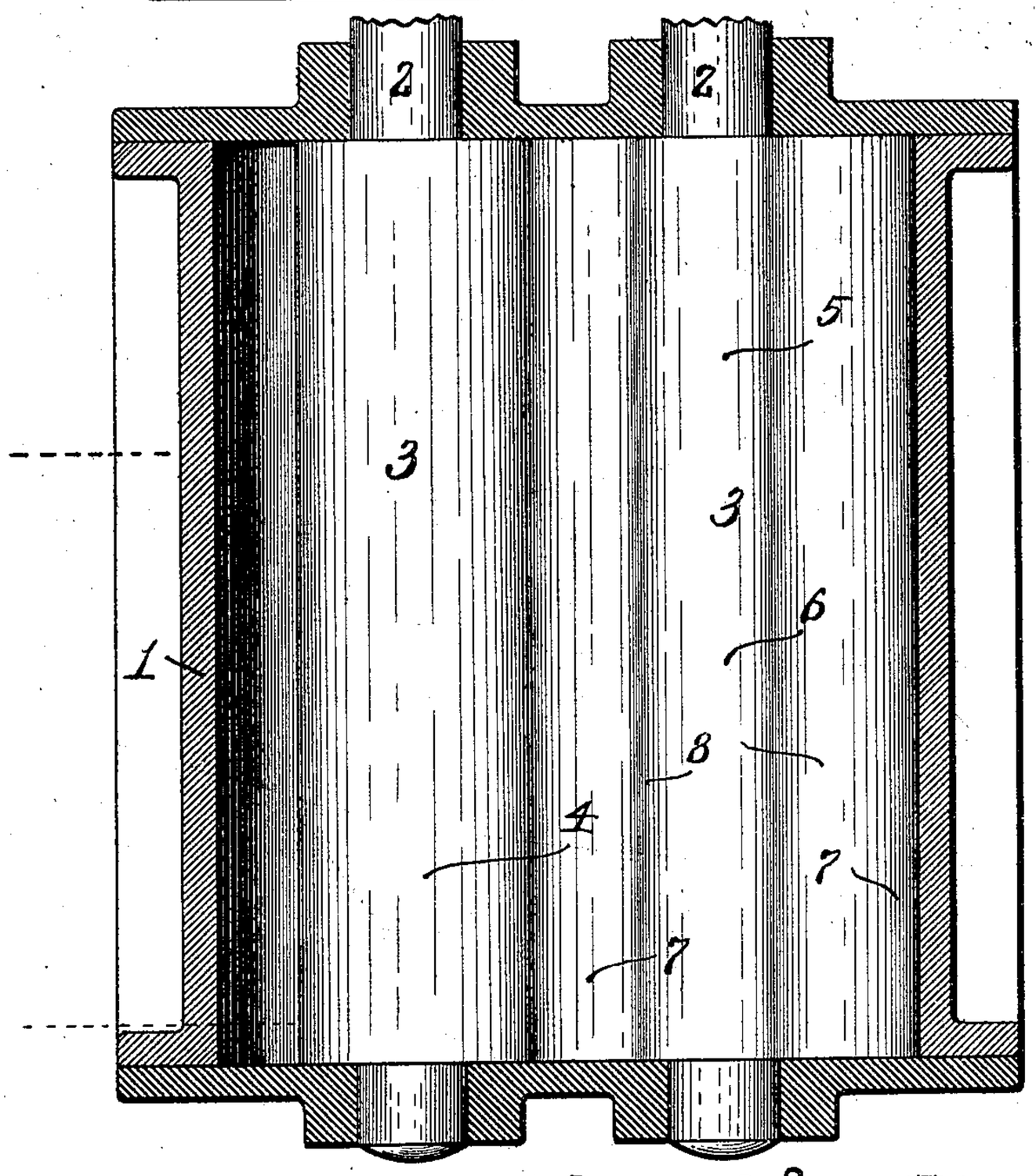

FIG. 2.

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UNITED STATES PATENT OFFICE.

RALPH C. ENYART, OF CONNERSVILLE, INDIANA, ASSIGNOR TO THE P. H. & F. M. ROOTS COMPANY, OF SAME PLACE.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 647,951, dated April 24, 1900.

Application filed October 17, 1898. Serial No. 693,699. (Model.)

To all whom it may concern:

Be it known that I, RALPH C. ENYART, of Connersville, Fayette county, Indiana, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention pertains to that class of rotary pumps employing a pair of lobed impellers working within an elliptic casing, the shafts of the impellers being geared together. Such machines when employed in dealing with liquids are termed "rotary pumps" and when employed in dealing with fluids are generally termed "blowers" or "exhausters."

I employ the term "pump" in its generic sense as comprehending machines dealing either with liquids or fluids.

My improvement has for its object to increase the strength, tightness, smoothness of working, and durability of such pumps, and the improvement will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical section of a rotary pump embodying my improvement, while Fig. 2 is a horizontal section of the same, the impellers appearing in plan in the latter view.

In the drawings, 1 indicates the usual casing, generally elliptical in cross-section of chamber and having flat heads and opposite openings for the inflow and outflow of the liquid or fluid; 2, the two parallel impeller-shafts journaled in the heads and having their axes at the centers of the side arcs of the casing, these two shafts to be arranged for being turned by power in the usual manner; 3, the two lobed impellers, each fast on its appropriate shaft, the ends of the impellers engaging against the inner faces of the heads of the casing; 4, the outer extremities of the lobes of the impellers, the same being formed by circular arcs struck from the centers of the shafts with a radius equal to the distance from the center of the shaft to the circular arc defining the nearer inner side wall of the casing; 5, the hubs of the impellers surrounding the shafts and extending from head to head of the casing, the diameters of the hubs being substantially equal to the transverse width of the outer extremities of the lobes; 6, the peripheries of the hubs, the same being formed with convex curves concentric with the shafts; 7, minor convex curves at each end of the curves 4 and forming the side extremities of the lobes; 8, concave curves joining the convex curves 6 and 7, and 9 chambers extending longitudinally through the lobes for the purpose of lessening the weight of the impellers. It will thus be seen that the extremities of each of the arcs 6, technically known as the "waist-arcs," are joined to the adjacent extremities of the arcs 4, known as the "lobe-arcs," by concavo-convex curves which blend smoothly at their respective ends with said waist and lobe arcs. Furthermore, it will be observed that the concave portion 8 is a curve with a constantly-decreasing radius from the point where it blends with the waist-arc to the point where it joins the convex portion 7 and that said convex portion 7 is a curve with a constantly-decreasing radius from the point where it blends with the lobe-arc to the point where it joins said concave portion 8. This point where the curves 7 and 8 join may be conveniently located on the pitch-circle of the impeller and forty-five degrees from the radii passing through the centers of the lobe and waist arcs, respectively.

The peculiar form of impeller shown results in a hub of greater diameter, its diameter being substantially equal to the greatest transverse dimension of the impeller, thus giving great strength at the waist where the shaft is inserted and at the same time yielding large contact of area against the head of the casing around the shaft; but these advantages are minor. The curve 4 having the same radius as the inwall of the casing it follows that an extended bearing is secured between the inwall of the casing and the extremity of the impeller, resulting in superior non-liability to leakage and in long life of machine. When a lobe makes contact with the opposing impeller, the contact, once taken up, is continued absolutely progressively and uninterruptedly throughout the period of engagement of that lobe, there thus being a total avoidance of pockets in which liquid or fluid can become entrapped. Machines of this type are used largely, if not mostly, for

pumping liquids which are incompressible, and if the contacts between the impellers are discontinuous and pockets are formed these pockets are subject to decrease in size, the result being that the incompressible liquid puts the machine under enormous strains and results in destructive hammer-blows, putting serious limits upon practical speeds of working.

In the present construction there is an absence of pocketing and resulting strains and hammer-blows, and high speeds are available in practice. It has heretofore been deemed impossible in rotary pumps to secure extended inwall-contacts along with an absence of pocketing between impellers, and my present machine has opened up possibilities of utilization of rotary pumps not possible under the conditions imposed by the state of the prior art.

What I claim is—

In a pump the combination of a pair of parallel shafts, a casing having concave inwalls concentric with said shafts, two similar impellers fast one on each shaft, each of said impellers having oppositely-disposed lobe-sections bounded by arcs concentric with its shaft and a waist-section also concentric with its shaft and of a diameter substantially equal to the greatest transverse width of the lobes, the extremities of the waist-arcs being joined to the adjacent extremities of the lobe-arcs by a concave-convex curve which blends at its extremities with said arcs, the concave portion of which curve extends with a constantly-increasing radius from a point on the pitch-circle of the impeller forty-five degrees from the radii passing through the centers of the lobe and waist arcs to the point of blend with the waist-arc, and the convex portion of which curve extends with a constantly-increasing radius from said point on the pitch-circle to the point of blend with the lobe-arc.

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Witnesses:
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