Dec. 14, 1926. 1,610,748

R. J. P. E. COZETTE

ROTARY MACHINE

Filed Oct. 19, 1925 3 Sheets-Sheet 1

Fig. 1.

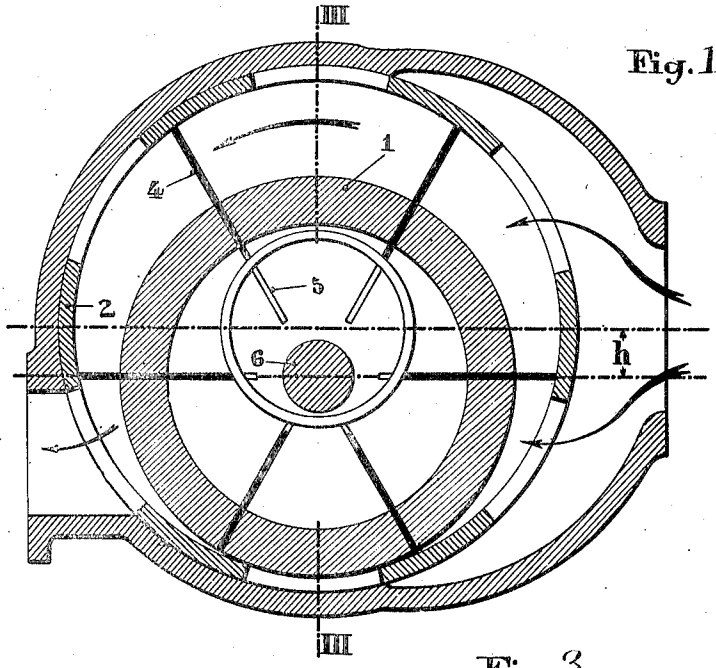
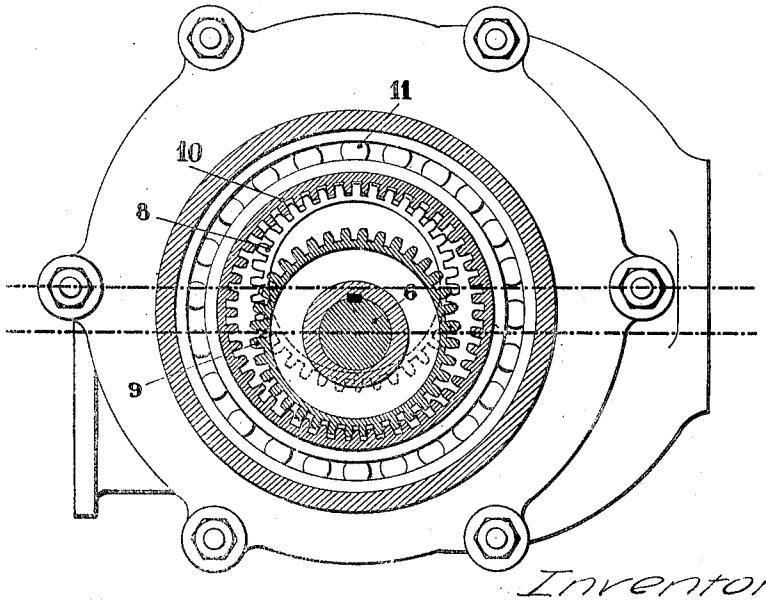


Fig. 3.



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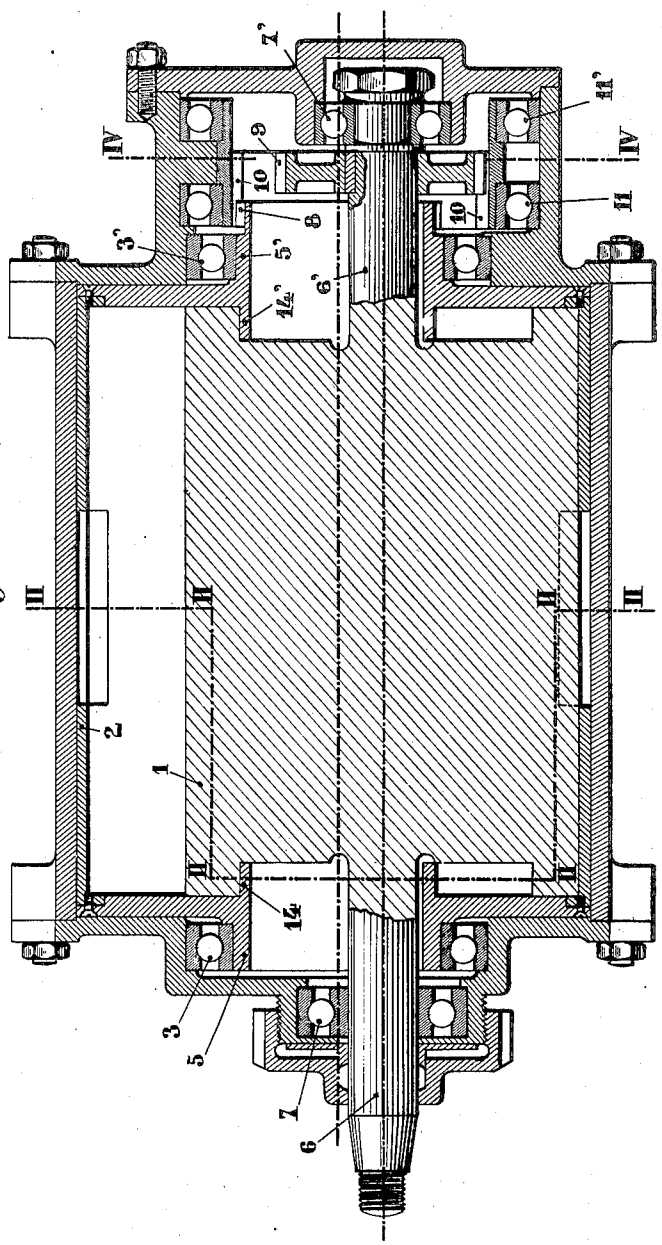
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Fig. 2.



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ROTARY MACHINE

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Fig. 4.

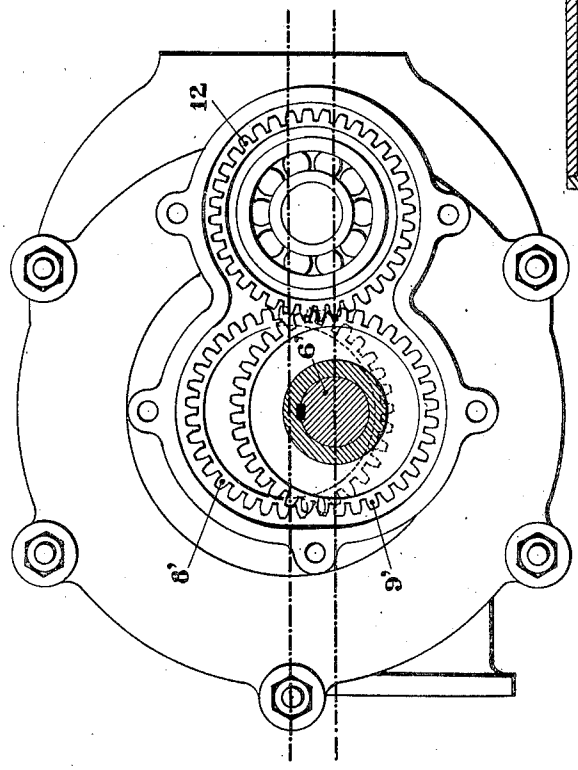


Fig. 5.

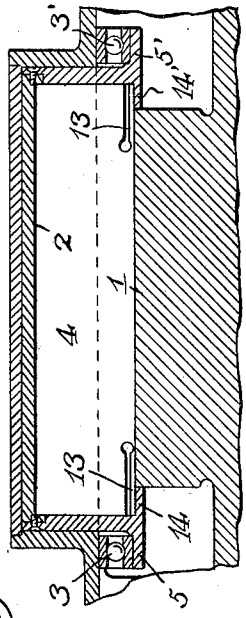
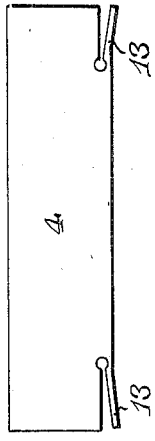


Fig. 6.



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UNITED STATES PATENT OFFICE.

RENÉ JEAN PAUL EMILE COZETTE, OF NEUILLY-SUR-SEINE, FRANCE.

ROTARY MACHINE.

Application filed October 19, 1925, Serial No. 63,514, and in France November 28, 1924.

This invention relates to improvements in rotary pumps having blades (and to compressors of the same type) which are intended to work at high speed.

Numerous arrangements of pumps of this type have already been put forward.

The apparatus forming the subject of the invention, and which is hereinafter described has been designed to definitely overcome former disadvantages.

In the accompanying drawing is illustrated, in an entirely diagrammatic manner, and only by way of example, one form of construction of the apparatus forming the subject of the invention.

Figure 1 is a cross section taken along the line II—II—II—II in Figure 2;

Figure 2 is a section taken along the line III—III in Figure 1;

Figure 3 is a section taken along the line IV—IV in Figure 2 showing a detail of a driving device;

Figure 4 is an arrangement view of Figure 3 showing a modification of the said driving device;

Figures 5 and 6, finally, show a detail of the blade arrangement.

The apparatus forming the subject of the invention is essentially characterized by the provision between the blades of the rotor and the stator, of a hollow cylindrical drum or casing turning with the rotor at the same speed as the latter. The purpose of this arrangement is to annul the effects of the centrifugal force, this result being obtained from the fact that, during the working of the apparatus, the blades do not bear against a fixed surface.

For the same reason, in the apparatus forming the subject of the invention, the rubbing of the outer edges of the blades is prevented, the effect of which is also to remove the difficulties of lubrication hereinbefore referred to.

In order to obtain this result, the apparatus may be constructed in the manner hereinafter described and illustrated in the drawing.

The rotor 1 is enclosed by a cylindrical drum 2 mounted upon two ball bearings 3 and 3′, and the blades 4 are guided, in the known manner, in diametral grooves 5 formed in the rotor. As stated above, the rotor and the casing 2 have to turn at the same speed for the objectionable effects of friction to be overcome. As the rotor and the casing move in the same direction, the blades 4 tend to carry along the casing in the said direction and at the same speed. It would be possible to be satisfied with this driving effect. However, in order to prevent any untimely relative displacement of the members in question, it is expedient to provide a suitable mechanical connection between them.

This connection may be obtained, for example, by means of the gearing device shown in Figures 3 and 4, which is hereinafter described.

The casing 2 is supported at each end upon cylindrical shafts of large diameter 5 and 5′, upon which are mounted the ball bearings 3 and 3′. These shafts are hollow and allow the passage of the shafts 6 and 6′ which support the rotor and which are mounted upon ball bearings 7 and 7′.

The shaft 5′ is extended in a cylindrical part upon which is cut a gear 8; upon the shaft 6′ is cut a toothed wheel 9 of the same diameter and the same modulus as the wheel 8. The wheels 8 and 9 engage with a toothed crown wheel 10 loosely mounted upon the two ball bearings 11 and 11′. This arrangement forms a train of hypocyclic gears which drives the rotor 1 and the casing 2 at the same angular velocity and in the same direction of rotation.

In the modification shown in Figure 4, the two wheels 8′ and 9′, similar to the wheels 8 and 9, engage with a relay pinion 12 turning in an opposite direction to the wheels 8′ and 9′.

These mechanisms are only described by way of examples of solutions of the problems considered, but it is naturally understood that it is possible, without altering the economy of the invention, to substitute in them all other devices such as helical gear, bevel gears, Oldham joints, etc.

The drum 2, is, as shown in Figures 1 and 2, pierced by apertures suitably disposed to effect the distribution: on account of the effect of the rotation of the drum, these apertures coincide, at the proper movements, with the suction and exhaust orifices.

The provision, according to the invention, of a rotating cylindrical drum 2 interposed between the rotor and the stator has the effect, as explained, of overcoming the disadvantages resulting from the action of the centrifugal force when working at a high speed.

The apparatus forming the subject of the invention also differs from known apparatus of the same type by the provision of a device intended to permit working at low speeds, at which the action of centrifugal force upon the blades is not sufficient to drive the said blades towards the periphery and to effect as a consequence the fluid-tightness which is indispensable for the good working of the apparatus. This device consists essentially of an arrangement of springs suitably interposed between the body of the rotor and the lower or inner edges of the blades, the said springs always tending to push the blades outwards and to keep them pressed against the cylindrical drum 2, even when the speed of rotation of the apparatus is low. The springs in question may be of any suitable shape and be interposed in any suitable manner between the body of the rotor and the blades. However, the arrangement hereinafter described which forms one of the features of the invention has particular advantages. The lower edge of the blades 4 is split or notched over a certain part of its length so as to form, as shown in Figure 6, two tongues 13 forming springs. Further, the shafts 5 and 5′ of the casing are extended, in the interior of the latter, by hollow bosses 14, 14′. These bosses surround the shaft of rotation of the blades. The elastic tongues 13, 13, of each blade bear upon the outer surface of the said bosses, the effect of which is to produce the displacement of the blades in their grooves, from the centre to the periphery, and consequently to ensure the working of the apparatus whatever be the speed of rotation.

Naturally, the special spring device is only given by way of example, although it forms a feature of the invention, and without altering the economy of the latter any other constructional arrangements may be adopted.

What I claim is:

1. A rotary machine comprising, a rotor, a stator, blades on the rotor, the rotor being mounted eccentrically in the stator, diametrical grooves in the rotor for movably receiving the blades, a hollow cylindrical drum positioned between the stator and the blades, and gearing for rotating the rotor and the drum at the same speed.

2. A rotary machine comprising, a rotor, a stator, blades on the rotor, the rotor being mounted eccentrically in the stator, diametrical grooves in the rotor for movably receiving the blades, a hollow cylindrical drum positioned between the stator and the blades and hypocyclic gearing for rotating the rotor and the drum at the same speed.

3. A rotary machine comprising, a rotor, a stator, blades on the rotor, the rotor being mounted eccentrically in the stator, diametrical grooves in the rotor for movably receiving the blades, a hollow cylindrical drum positioned between the stator and the blades, elastic means for pressing the blades against the inner surface of the drum and including tongues formed upon the inner edges of the blades.

4. A rotary machine comprising, a rotor, a stator, blades on the rotor, the rotor being mounted eccentrically in the stator, diametrical grooves in the rotor for movably receiving the blades, a hollow cylindrical drum positioned between the stator and the blades, elastic means for pressing the blades against the inner surface of the drum and including tongues formed upon the inner edges of the blades, the tongues being parallel to the length of the respective blades, shafts formed on the drum, and inwardly extending bosses on the shafts positioned to bear against the tongues.

In testimony whereof I have signed my name to this specification.

RENÉ JEAN PAUL EMILE COZETTE.