June 24, 1930. O. R. P. BERGLUND 1,766,872

TIGHTENING MEANS FOR ROTARY MACHINES

Filed April 27, 1928

Fig. 1.

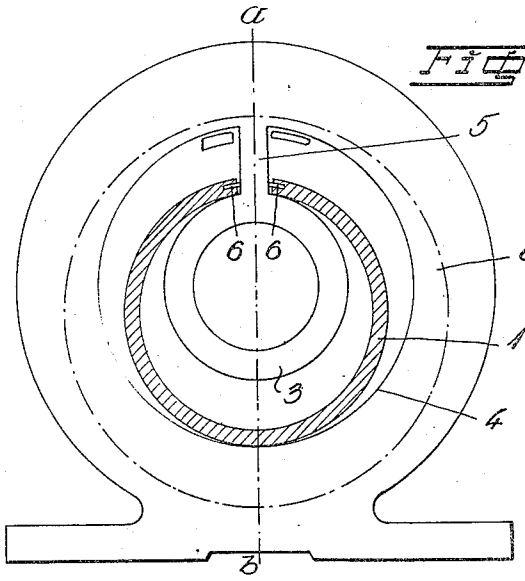
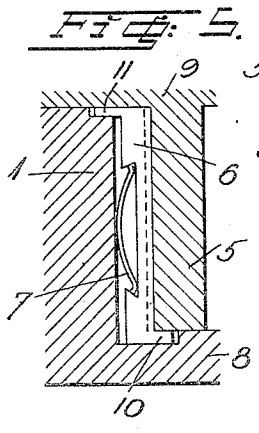


Fig. 2.

Fig. 5.



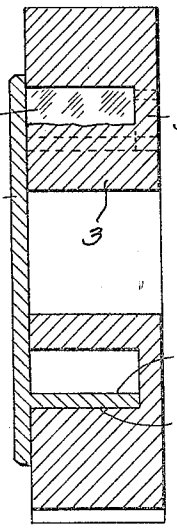
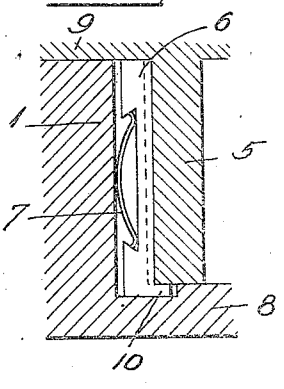


Fig. 4.



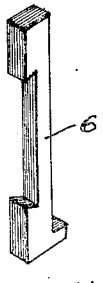
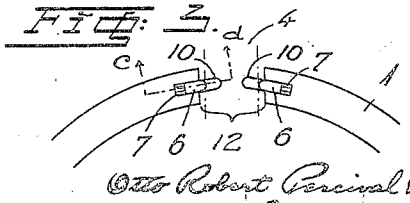


Fig. 6.

Fig. 3.



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UNITED STATES PATENT OFFICE

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TIGHTENING MEANS FOR ROTARY MACHINES

Application filed April 27, 1928, Serial No. 273,405, and in Sweden May 11, 1927.

In rotary machines serviceable as motors, pumps or compressors, where the driving or driven member or members (the piston or pistons) have a rotary or similar motion with respect to the part or parts cooperating therewith, the provision of an efficient tightening of the edges between the movable parts is one of the main conditions for obtaining a high efficiency. Hitherto, the most common arrangement for the provision of such tightening consisted in tightening strips inserted into the edges, said strips, when actuated by a pressure from the inside, being kept with the longitudinal edges bearing against the surfaces along which they are moving. The tightening effect thus obtained along the longitudinal edges of the strips will be practically complete and permanent, inasmuch as the longitudinal edges, according as they are worn, are being constantly reset by reason of the said pressure.

Again, at the ends of the tightening strips, which also bear against and move in contact with tightening surfaces, the wear has, after it has continued for a certain period, caused looseness, inasmuch as no resetting corresponding to the last-mentioned wear has occurred.

The present invention has for its object to provide a tightening effect also at the end portions of the strips, which is rendered possible by the wear at the ends being limited through the arrangement to be described hereinbelow.

The arrangement according to the invention is principally distinguished by the fact that the one or both ends of each tightening strip are provided with an abutment or the like projecting angularly to the tightening longitudinal edge of the strip, said abutment being inserted into the surface adjacent to the end of the strip, in such a manner that the inside of the abutment will be flush in plane with the said surface and bear against the part moving along the same surface.

The accompanying drawing illustrates the arrangement as applied, for instance, in such a rotary machine where the principal working parts consist of two concentric parts which are rigid relatively to one another, and of an annular piston which is movable eccentrically in relation to the concentric parts, said piston being provided with a cover plate bearing tightly against the edges of the said parts, against which the piston tightens tangentially and also against a partition extending transversally over the space therebetween, said partition entering a lateral opening provided in the eccentrically movable piston, the edges of said opening bearing against the partition and moving in contact therewith. In the case illustrated the tightening means in question is applied to the tightening strips inserted into the edges of the opening.

In the drawing, Fig. 1 shows a rotary machine viewed in the direction of the axis of rotation and provided with the arrangement according to the invention. Fig. 2 shows a cross section on line *a*—*b* in Fig. 1. Fig. 3 shows to an enlarged scale and viewed in the axial direction, the part of the piston provided with the lateral opening. Fig. 4 also shows to an enlarged scale and at right angles to the axis of rotation, a section on the line *c*—*d* in Fig. 3. Fig. 5 shows a detail. Fig. 6 shows a modification in which the tightening grip is composed of laminæ.

1 designates the eccentrically movable piston, and 3, 4 are the concentric parts cooperating therewith. 5 is the partition dividing the space between the said parts, said partition entering the lateral opening 12 provided in the piston 1 (Fig. 3). The edges of this opening are situated on both sides of the partition and tighten against the same by means of strips 6 inserted into the edges. In the embodiment disclosed in the drawing, the longitudinal edges of the strips are kept bearing against the partition 5 by means of springs 7. 8 is the cover plate, which, preferably, is made integral with the piston 1. Each one of the strips has to tighten against the partition 5 not only at the longitudinal edges but also at the end portions. One end of the strips abuts on the cover plate 8 and the other on the opposite wall 9 of the casing. The end of the strip 6 directed toward the cover plate 8 is provided, according to the

invention, with an abutment 10 projecting angularly to the strip, said abutment being inserted into a corresponding recess in the cover plate 8. The inside of the abutment is flush with the inner surface of the cover plate and bears against the edge of the partition 5 bearing against the said inside. The latter edge and the inner surface of the cover plate 8 are movable relatively to each other and will thus be worn. According as the wear progresses, the strip 6 would, if it were not provided with the abutment 10, become shorter than the distance between the cover plate 8 and the opposite wall 9 and, consequently, leakage could occur at the end portions of the strip. This is prevented by the provision of the abutment 10 which constantly bears with its inner side against the edge of the partition 5 and is thus worn in the same degree as the inner surface of the cover plate 8 bearing against the said edge. Thus, there can never be produced any space, that is to say, any leak at the end of the strip. Instead, the strip will, so to say, be elongated according as the wear progresses. In other words, the wear will be eliminated, so that a tightening effect is always maintained.

With respect to the constructive embodiment of the arrangement, the same may be modified according to the different cases where the invention is brought into use. Thus it is also possible to provide both ends of the strip with tightening abutments arranged and acting in the manner described. Moreover, each separate strip may be divided longitudinally into a plurality of strips, that is to say, each separate strip may consist of a number of adjacent laminæ each of which is in such case provided with one or more tightening abutments arranged in accordance with the invention. In place of springs 7, a fluid of a suitable nature may be used to exert a pressure on the strips.

According to Fig. 5, the strip 6 may be provided at the side opposite to that of the abutment 10 and at the end bearing against the part 9, with an abutment 11 inserted into the part 1. This arrangement has for its object, with the use of springs adapted to actuate the strips, to enable the abutment 11, in the event of a bursting spring, to prevent parts of the spring from penetrating outwardly into contact with the bearing surface at the part 9. In other words, without the provision of the said abutment 11, the said bearing surface, together with the channels etc. provided therein, would be liable to damage by a bursting spring.

What I claim is:—

1. Tightening means for rotary machines of the type having a casing, a rotor movable therein and a cover carried by the rotor comprising a tightening strip provided at at least one end with an abutment projecting angularly to the longitudinal bearing face of said strip, said abutment being disposed in a recess in the cover adjacent the end of said strip and arranged to bear against the casing whereby the wear between said surface and said member will be uniformly transferred to the abutment of said strip.

2. Tightening means for rotary machines as defined in claim 1 wherein said strip comprises a plurality of rods or laminæ adjacent to one another, each of such rods or laminæ being provided with an abutment projecting angularly from at least one end thereof.

3. In a rotary machine having an eccentrically movable annular piston cooperating with two concentric parts between which a working space is provided, a cover plate at one end connected with the piston and covering said space, and a partition extending through a lateral opening provided in the piston and dividing said space, tightening strips inserted in the edges of said lateral opening and bearing against said partition, an angularly projecting abutment at the end of each of said strips which is directed toward said cover plate, said abutment being inserted in a recess in the cover plate and bearing against the edge of said partition which is in contact with said cover plate.

4. In a rotary machine having an eccentrically movable annular piston cooperating with two concentric parts between which a working space is provided, a cover plate at one end connected with the piston and covering said space, and a partition extending through a lateral opening provided in the piston and dividing said space, tightening strips inserted in the edges of said lateral opening and bearing against said partition, an angularly projecting abutment at the end of each of said strips which is directed toward said cover plate, said abutment being inserted in a recess in the cover plate and bearing against the edge of said partition which is in contact with said cover plate and an abutment at the opposite end of each of said strips projecting in the opposite direction from the first-mentioned abutment, said last-mentioned abutment being inserted in a recess in said piston.

In testimony whereof I affix my signature.

OTTO ROBERT PERCIVAL BERGLUND.