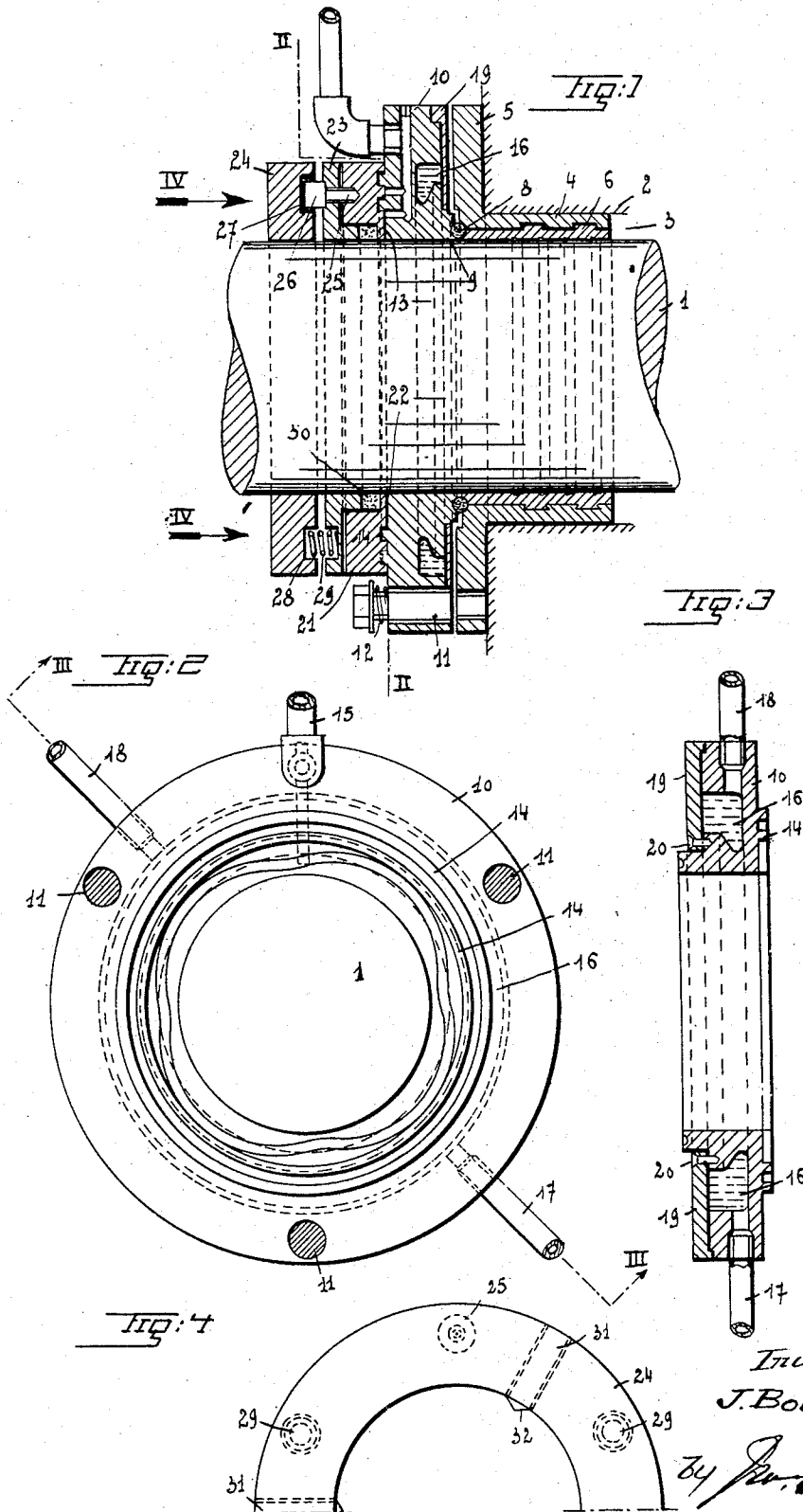


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METALLIC PACKING MEANS FOR THE SHAFTS OF CENTRIFUGAL
PUMPS AND OTHER ROTARY MACHINES
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METALLIC PACKING MEANS FOR THE SHAFTS OF CENTRIFUGAL PUMPS AND OTHER ROTARY MACHINES

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The present invention has for its object to provide improved metallic packing means for the shafts of centrifugal pumps and other rotary machines such as steam engines, in which it is necessary to obtain a perfect tightness at the support of the rotary shaft. In rotary machines generally and particularly in centrifugal pumps, use has generally been made at the exit of the rotary shaft of packing secured by a stuffing box. The disadvantages of such system are well known. The packing or joint of hemp or other material rapidly wears out, and at the end of a very short time the water travels along the shaft. Moreover the shaft itself is subjected to relatively rapid wear, so that the repair of the pump requires a considerable amount of time and the difficult replacement of used parts necessitate delicate maneuvering.

The present invention has for its object to obviate these disadvantages and to provide a metallic joint which, while procuring perfect tightness, avoids all wearing of the rotary parts of the machine and more particularly of the shaft to which the joint is applied.

With this object in view, the invention essentially consists in the special arrangements and combinations of parts as herein after fully described and pointed out in the appended claims.

Referring to the annexed drawing which shows, as an example one embodiment of the invention:

Fig. 1 is a vertical section of the metallic joint taken through the axis of the shaft of the pump.

Fig. 2 is a section on the line II—II of Fig. 1.

Fig. 3 is a vertical section taken on the plane III—III of Fig. 2.

Fig. 4 is the front view of the part situated at the left hand extremity of the device, when looking in the direction of the arrow IV of Fig. 1.

In these figures 1 designates the shaft, for example, of a centrifugal pump whose body 2 has a housing 3 in which is disposed a sleeve 4 rigid with a collar 5 secured to the body 2 of the pump by studs, not shown, in

the drawing. In the interior of this sleeve 4 is housed a wearing ring 6 of white metal or other anti-frictional metal, having grooves 7 opposing the passage of water. The rubber joint 8 is held against this ring 6 by an extension 9 of a plate 10 secured to the collar 5 by studs 11 with springs 12 secured so as to allow a certain displacement of the plate 10 with respect to collar 5. The face 13 of the plate 10 is made perfectly plane and is ground and has projecting rings 14. This face 13 is lubricated by a lubricator 15, of any conventional appropriate type.

In the body of the plate 10, a chamber 16 for circulating water is formed for the cooling of the face 13. This chamber 16 is in communication with an inlet water pipe 17 and an outlet water pipe 18. It is accessible by the displacement of a cover 19 fixed to the plate 10 by screws 20.

The assembly of the parts mentioned is rigid with the body 2 of the pump. A ring 21 having a machined face 22, adapted to serve as a frictional surface along with the face 13 of plate 10, is held rigidly with a ring 23 and a ring 24 by three screws 25 passing through holes of the ring 23 and engaged in threaded holes of the ring 21 the heads 26 of these screws are engaged into cavities 27 of the ring 24 and these cavities are covered internally with an elastic material such as rubber for example and provided in the face of this ring turned towards the ring 23. On the face turned towards the part 23, the ring 24 has three seats 28 for springs 29 whose object is to exert a constant pressure on the ring 23 to press it against the ring 21 and thus hold the hemp joint 30 between the ring 21 and ring 23 on the periphery of the shaft 1. The parts 21, 23 and 24 held together by the screws 25 form a unit with the shaft 1, due to fixing screws 31 disposed on the periphery of the ring 24 and having their ends 32 engaged in cavities in the shaft 1.

The only joint subjected to friction in this arrangement is constituted by that formed between the ground and lubricated faces 13, 22. The projections presented by this joint at the rings 14 render the passage of water impossible. Moreover the water is retained

by the grooved ring 6 and by the packing 8. Since the three parts 21, 23 and 24 are rigid with the shaft 1 and rotate therewith, as does the hemp joint 30, loss of water along the shaft 1 is not possible. The only parts sub-
 5 jected to wear are the ring 21 and plate 10, but this wear is continually compensated by the advance of the ring 21 and ring 23 under the action of the springs 29 bearing on the ring
 10 24 secured to the shaft 1. The ring 6 is also subjected to wear, but this wear has no influence on the tightness of the joint, and losses of water are completely obviated. In any case replacement of the ring 6 is easy. It is
 15 only necessary to undo the three fixing screws 31 of the ring 24 and the studs which fix the plate 10 to allow sliding of the whole joint along the shaft 1. It is then a simple matter to remove and replace the ring 6.

20 The metallic joint remains quite tight even if for any cause the shaft 1 of the pump is slightly out of alignment. The plate 10 may move slightly with respect to the collar 5, due to the springs 12 of the studs 11, and to
 25 the rubber joint 8, which acts as a ball joint and allows the plate 10 to follow the movements of the shaft 1 and thus to be in perfect contact with the ring 21 secured to the shaft.

30 It will be understood that with the above described construction, it is possible to obtain an elastic driving of the rings 23 and 21 through the screws 25 which are engaged with their heads in an elastic material, whilst
 35 securing nevertheless a uniform pressure of these pieces against the plate 10 on account of the three springs 29 which are located between the ring 24 and the ring 23.

Tightness of rotary steam engines is also
 40 obtained by the above metallic joint, and the joint may be used in all rotary machines whatever the part at which tightness is to be obtained.

What I claim is:

45 1. In a metallic joint for a rotating shaft, in combination with the shaft and a body in which the said shaft rotates, a fixed unit bodily connected to the said body, a wearing
 50 ring housed in the fixed unit, a plate bearing against the said wearing ring, the said plate having a face perpendicular to the axis of the shaft, an annular chamber formed in the plate, means for delivering a cooling fluid to said chamber, and a movable unit direct-
 55 ly keyed to the shaft to turn with it, the said movable unit having also a face perpendicular to the axis of the shaft and means whereby the said face of the movable unit is pressed in frictional contact against the face of the
 60 plate perpendicular to the axis of the shaft.

2. In a metallic joint for a rotating shaft in combination with the said shaft and a body in which the said shaft rotates, a fixed unit bodily connected to the said body, a
 65 wearing ring housed in the fixed unit, a plate

surrounding the shaft, the said plate having a face perpendicular to the axis of the shaft, a rubber joint located between the said plate and the wearing ring, means whereby the
 70 plate is pressed against the said rubber joint, said plate being formed with a water chamber, means for circulating cooling water through the said chamber, a ring acting against the face of the said plate in frictional
 75 contact, a second ring keyed to the rotating shaft, a third ring located between the first and second ring and means whereby an elastic driving is secured between the first and the second ring.

3. In a metallic joint for a rotating shaft, 80 in combination with the said shaft and a body in which the said shaft rotates a fixed unit bodily connected to the said body, a wearing ring housed in the fixed unit, a plate
 85 surrounding the shaft, the said plate having a face perpendicular to the axis of the shaft, a rubber joint located between the said plate and the wearing ring, means whereby the plate is pressed against the said rubber joint,
 90 said plate being formed with a water chamber, means for circulating cooling water through the said chamber, a ring acting against the face of the said plate in frictional contact, a second ring keyed to the rotat-
 95 ing shaft, a third ring located between the first and second ring, cavities provided in the second ring, an elastic material located in the said cavities, screws engaged with their heads in these cavities, the said screws pass-
 100 ing through holes in the third ring and being screwed in the first ring whereby an elastic driving is secured between the first and the second ring.

In testimony whereof I have affixed my
 105 signature.

JULES BODART.

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