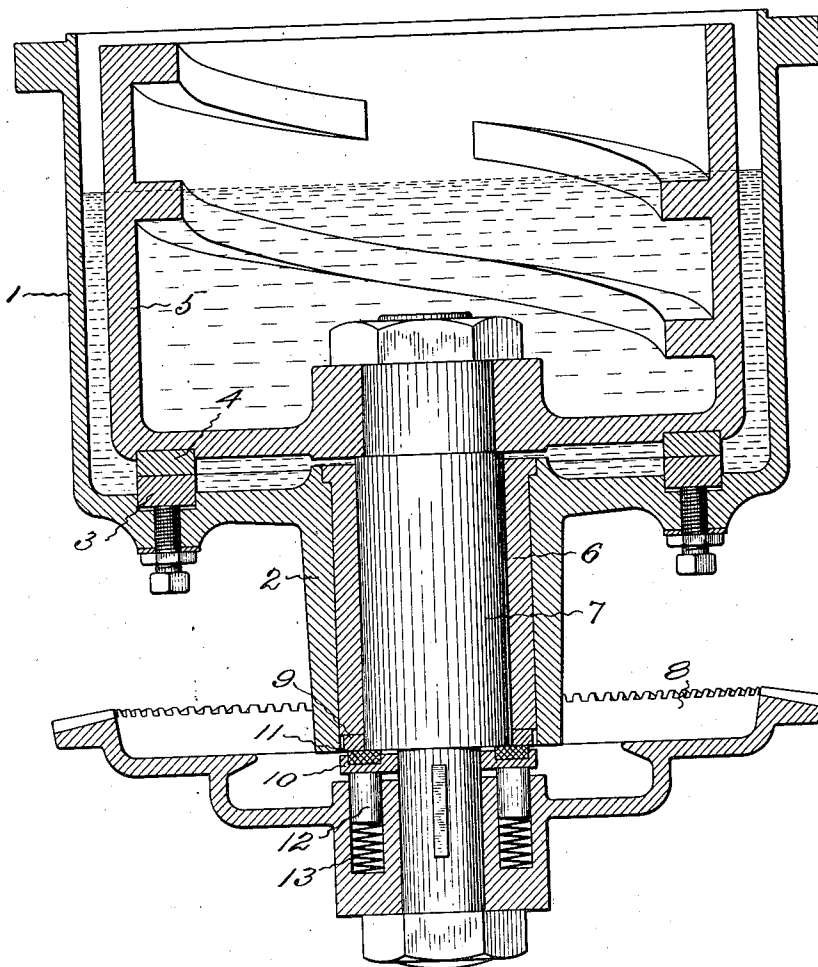


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No. 853,506.

PATENTED MAY 14, 1907.

A. H. EDDY.
SHAFT PACKING.
APPLICATION FILED JULY 3, 1906.



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TO CHARLES E. SHEPARD, OF HARTFORD, CONNECTICUT.

SHAFT-PACKING.

No. 853,506.

Specification of Letters Patent.

Patented May 14, 1907.

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To all whom it may concern:

Be it known that I, ARTHUR H. EDDY, a citizen of the United States, residing at Windsor, in the county of Hartford and State of Connecticut, have invented a new and useful Shaft-Packing, of which the following is a specification.

This invention relates to a means for packing a rotatory shaft or arbor which extends from the inside to the outside of a casing containing fluid.

The invention is applicable to various classes of machinery but it is particularly adapted for packing the shaft or arbor that extends through the walls of a receptacle containing liquid under considerable pressure such, for instance, as the rotatory shaft or arbor of an ammonia pump of the class shown and described in the United States Patent No. 815,911, issued to me March 20, 1906.

The object of the invention is to provide a means for packing the joint between the shaft and the bearing which will have long life and always be sufficiently tight to prevent leakage and waste of the liquid contained in the casing without exerting a great amount of friction.

This invention obviates the necessity of making the parts as closely fitting as has previously been deemed absolutely requisite, and permits the flow of just enough oil to properly lubricate the bearing and reduce the friction to a minimum. It also allows the escape of fluid from the interior should an excess of pressure arise from any cause in the casing, which feature may be utilized for cleaning out any fine grit that might work down into the joint between the shaft and its bearing.

This invention is embodied in an organization having a rotatory shaft supported by a suitable bearing and having a hard collar arranged to rotate with the shaft near one end of the bearing and a cushioning packing held against the joint between the collar and a shoulder on the shaft with a yielding pressure so that it will come and go under varying conditions and still keep the joint tight.

The invention is illustrated in the accompanying drawing as applied to the ammonia pump described in the patent above referred to and the view shows a central vertical sec-

tion of the cam-case, the cam cylinder in the case, the gear outside of the case and the shaft which extends through the case and joins the cam-cylinder and the gear of that pump.

The case 1 illustrated is preferably a cylinder of cast iron having an integral hub 2 extending downwardly from its bottom. A ground hard steel bearing ring 3 is desirably arranged so as to be adjustable in the interior of the case for supporting the corresponding bearing ring 4 in the bottom of the cam cylinder 5. In the opening through the hub it is desirable to fix a hard sleeve 6 which is slightly shorter than the hub so as to leave a recess at the lower end. Extending through and fitting the sleeve so it may rotate freely is a shaft 7. The cam cylinder in the case is secured to the upper end of the shaft and the gear 8 below the case is secured to the lower reduced end of the shaft.

Fitting the shaft near the shoulder caused by the reduction in the diameter of the shaft is a ground ring 9. This ring occupies the recess in the lower end of the hub and rotates with the shaft against the ground lower end of the sleeve that extends through the hub. On the reduced portion of the shaft is a packing case 10 containing a cushioning packing 11 that is arranged to close the joint between the shaft and the ring that rotates with it. This packing case is held up for the purpose of causing the packing to perform its work by plungers 12 arranged in sockets in the hub of the gear, the plungers being thrust upwardly from the sockets by springs 13. There may be six or eight of these spring plungers, if desired. The strength of these springs is such as to hold up the packing with the tension necessary to overcome the maximum pressure of the fluid within the case. For instance, if the maximum pressure desired in the case is sixty pounds per square inch the springs are of such stiffness that they will hold up the packing with a force equal to the pressure of sixty pounds per square inch on the packing.

When the gear rotates the shaft and the cam-cylinder, the plungers, packing-case, packing and ring rotate with the shaft. The ring is pressed up against the lower end of the bushing with a yielding force so that the friction between the rotating parts, that is,

the upper face of the ring and the face of the lower end of the bushing is no more than is necessary to keep the parts tight.

The pump for which this invention is particularly designed contains oil to about the level shown in the drawing. The spring plungers hold up the cushioning packing with such force that no leakage can occur through the joint between the shaft and the ring on the lower end of the larger part of the shaft. Just enough oil will ooze out between the face of the ring and the end of the bushing to lubricate these surfaces and this is caught by the recess in the gear but it amounts to a very small quantity during a long period of time.

In this construction the elastic or cushioning packing is arranged to pack the joint between the shaft and the ring which rotate together so that there is no frictional wear on this packing and there can be some come and go of the shaft without any leakage. Should the pressure in the case for any cause rise above the maximum the excess will force the packing down and permit the oil to escape and thus relieve the pressure.

With this construction it is not as necessary to adjust the supporting rings to assure an exact distance between the plane of the rings and the plane of the end of the sleeve for the cushioning packing permits of some variation, and by reason of the use of this form of packing it is not necessary for the shaft to fit the sleeve so tightly as to cause an undue amount of friction. If any fine grit should work down between the shaft and the sleeve it can be flushed out without dismantling the machine by simply causing an excess of pressure in the case and forcing the oil out past the packing.

The invention claimed is:—

1. The combination of a case, a shaft extending from the interior to the exterior of the case, a packing covering the outer end of the joint between and thrusting against both the shaft and its bearing in the case, and springs thrusting the packing longitudinally of the shaft against the shaft and its bearing each side of the joint between them, substantially as specified.

2. The combination of a case, a shaft extending from the interior to the exterior of the case, a ring on the shaft at the outer end of the joint between the shaft and its bearing in the case, a cushioning packing covering

the joint between and thrusting against both the ring and the shaft, and springs thrusting the packing longitudinally of the shaft and against the shaft and the ring each side of the joint between them, substantially as specified.

3. The combination of a case, a shaft extending from the interior to the exterior of the case, a ring on the shaft at the outer end of the joint between the shaft and its bearing in the case, a cushioning packing covering the joint between and thrusting against both the ring and the shaft, a case supporting the packing, and springs thrusting the case and packing longitudinally of the shaft and against the shaft and the ring each side of the joint between them, substantially as specified.

4. The combination of a case, a bushing extending through the case, a shaft extending through the bushing, a ring on the shaft at the outer end of the bushing, a cushioning packing covering the joint between and thrusting against both the ring and the shaft, and springs thrusting the packing longitudinally of the shaft and against both the shaft and the ring each side of the joint between them, substantially as specified.

5. The combination of a case, a shaft extending through the case, a shaft extending through the bushing, a ring on the shaft and occupying a recess in the case at the outer end of the bushing, a cushioning packing covering the joint between and thrusting against both the ring and the shaft, and springs thrusting the packing longitudinally of the shaft and against both the shaft and the ring each side of the joint between them, substantially as specified.

6. The combination of a case, a shaft extending from the interior to the exterior of the case, a packing covering the outer end of the joint between and thrusting against both the shaft and its bearing in the case, a cam-cylinder attached to the shaft in the case, a gear attached to the shaft outside of the case, and springs carried by the gear and thrusting the packing longitudinally of the shaft and against the shaft and its bearing, substantially as specified.

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