J. C. PHELPS.

PLUNGER PACKING FOR ELEVATORS.

APPLICATION FILED SEPT. 17, 1909.

962,585. Patented June 28, 1910.

Fig. 1.

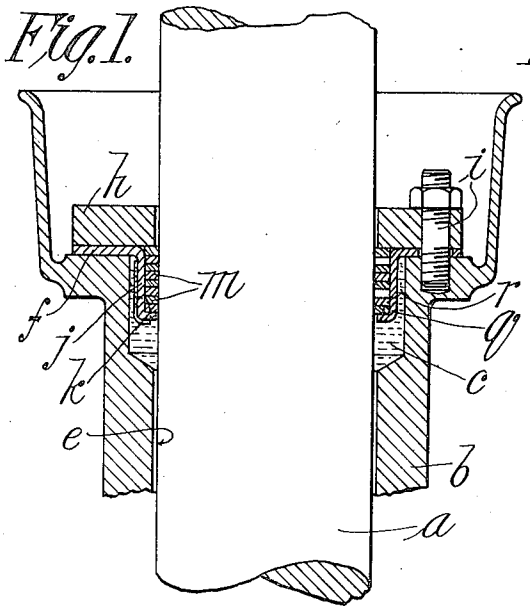


Fig. 3.

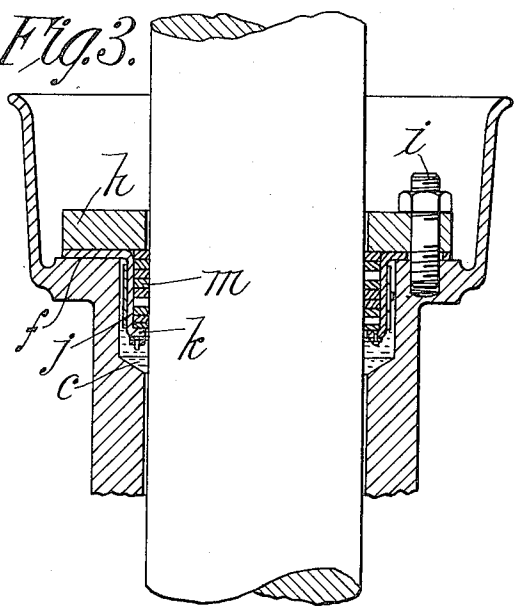


Fig. 2.

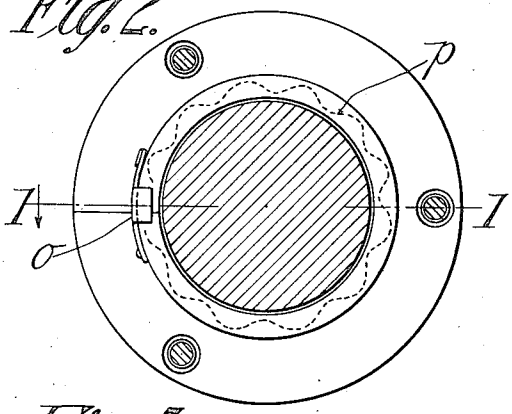


Fig. 4.

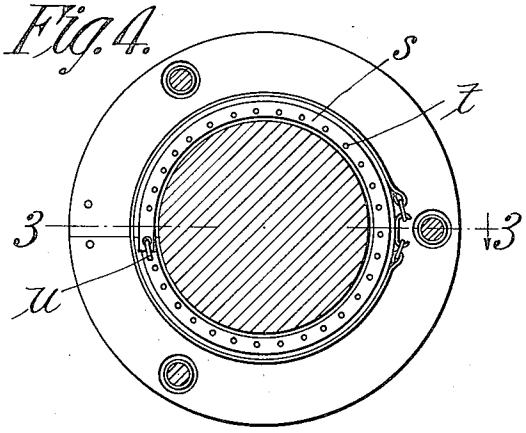


Fig. 5.

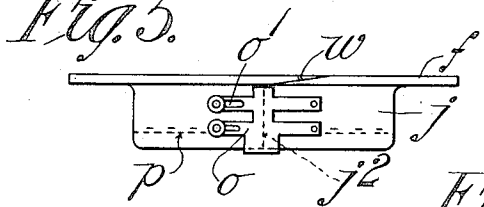


Fig. 6.

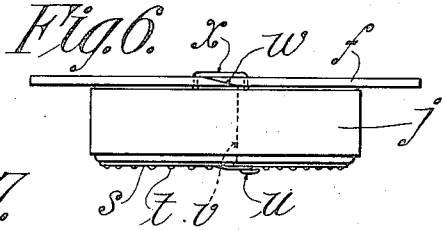
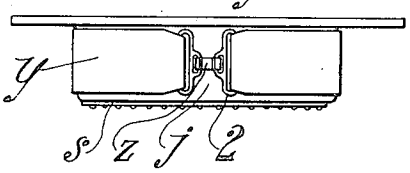


Fig. 7.



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PLUNGER-PACKING FOR ELEVATORS.

962,585. Specification of Letters Patent. Patented June 28, 1910.

Application filed September 17, 1909. Serial No. 518,165.

To all whom it may concern:

Be it known that I, JAMES C. PHELPS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Plunger-Packings for Elevators, of which the following is a specification.

This invention relates to improvements in packings and is designed for use in connection with plunger elevators that are operated by hydraulic pressure, or for use in piston-rods of pumps, or steam engines. It is a well known fact that during the operation of this class of elevators in which a very long plunger is employed, a great deal of vibration or swaying motion occurs in the plunger when the car is at the upper end of its run, causing the plunger to wear the packing and in time produce a leak.

The object of this invention therefore is to provide a plunger packing that is self-sealing in all positions of the plunger, and one that will automatically provide for any wear that may occur by the action of the plunger on the packing, due to wear or vibration.

Broadly, the invention consists of a flexible ring member proper provided with a gasket portion that is adapted to be clamped between the head or stuffing-box member which surrounds the plunger, and a clamping-ring for effecting a tight joint at the outlet end of the stuffing-box; the ring member proper being also provided with an inturned or flange portion for receiving a series of rings that bear against the plunger, and means for stiffening the flange portion,—the stuffing-box or head member being made large enough to contain the packing-rings and permitting water to enter the back or outer portion of the ring member whereby water pressure will force the rings inwardly toward the plunger, thus forming a water-tight seal which automatically adapts itself to all pressures during the upward and downward movements of the plunger.

In the drawings forming part of this application, Figure 1 is a vertical sectional view on the line 1—1 of Fig. 2, through the ring, illustrating the manner in which the packing is secured in place in the stuffing-box, and provision for water pressure in the rear part of the ring. Fig. 2 is a view looking upward at the lower edge of the ring. Fig. 3 is a view on the line 3—3 of Fig. 4 showing a slight modification of the ring. Fig. 4 is a view looking upward from below clearly illustrating the stiffening ring in this form. Fig. 5 is a view illustrating the means for drawing the rings together in the construction shown in Figs. 1 and 2. Fig. 6 is a side elevation of the structure shown in Figs. 3 and 4. Fig. 7 illustrates a side elevation of the elastic means for normally drawing the rings toward the plunger.

Referring to the drawings in detail, *a* designates the plunger, and *b* the stuffing-box or head member which is attached to the upper end of the pipe in the elevator well and through which the plunger runs.

c designates a recessed portion of the box for receiving the packing-ring and permitting water to enter the same through the opening *e*. The ring includes an annular gasket portion *f* that is adapted to be clamped between the box *b* and the ring *h* by means of the bolts shown at *i*. Integral with the gasket portion is a flexible depending ring member *j* of leather or other suitable material having an inturned lip or flange *k*.

m designates a series of packing rings of any suitable material, preferably leather, that are located between the inturned flange *k* and the gasket portion *f*, the upper one of the rings being in the same horizontal plane as the portion *f*.

Attached to the ring member *j* is a suitable clasp or fastening device (similar to an ordinary glove fastener) for retaining or holding the adjacent edges of the ring member *j* together, the adjacent edges being shown in dotted lines at j^2. This fastening device is shown in Fig. 5 and is designated by the letter *o* and is provided with slots o^1 for permitting the member *j* to contract when wear occurs and be forced inward by the water pressure behind the ring.

In order to maintain the lip or flange *k* in a rigid or stiffened condition, a series of stitches, shown at *p*, are employed, which

extend in a diagonal direction from the lower edge portion of the inturned flange *k* to the sides of the ring member *j*, as shown at *q* in Fig. 1. The object of this stitching is to maintain the packing-ring *m* in a fixed or immovable position during the descent of the plunger, since the frictional drag of the plunger on these rings tends to draw the rings and the flange member *k* downward with it. The water in the chamber *c* automatically forces the rings *m* into contact with the plunger *a*, as there is space enough back of the ring member *j*, as shown at *r*, for permitting the water to enter this space and thus force the rings *m* inward toward the plunger at all times.

Referring to the construction shown in Figs. 3, 4, 6, and 7: the flange and ring members in these figures are the same in construction as the flange and ring members *f* and *j* in Figs. 1, 2, and 5, and are therefore designated by the same reference letters. The packing-rings that engage the plunger are also of the same construction, but the lower edge *k* of the members *j* is provided with a metal ring *s* of brass or other suitable material that is riveted to the inturned flange portion *k*, as shown at *t*. The ends of the ring *s* are hooked together by means of the element shown at *u* which coincides with the lapped edge portions of the part *j*, as indicated by the dotted line *v*. The gasket portion *f* of the ring is provided with a beveled joint, as shown at *w*, and is secured together by means of the staple *x* (see Fig. 6).

In order to normally constrict or draw the depending ring portion *j* toward the plunger, an elastic member *y* is employed which preferably consists of a rubber band which surrounds the flexible depending ring portion *j* and its ends are held together by means of the link *z* and the elongated eyelet members 2 which are secured in the ends of the member *y*. This band serves the purpose of exerting a hoop-tension on the ring *j* and the packing rings *m*, thereby assisting the water pressure which enters the chamber *c* to effect a water-tight seal between the plunger *a* and the rings *m*.

The metal band *s* in the construction shown in Figs. 3, 4, 6, and 7, serves the same purpose as the stitching shown at *p* in Figs. 1 and 2, that is to stiffen or maintain the flanged portion *k* of the ring *j* during the downward movement of the plunger, or, as stated, the frictional drag of the plunger on the rings *m* has a tendency to draw the rings downward with it, but during the upward movement of the plunger the tendency is to carry the rings *m* upward against the clamping-ring *h*, which effectually prevents any movement of the rings in this direction.

During both the upward and downward movements of the plunger, the water pressure that enters the chamber *c* automatically moves the plunger-packing inward against the plunger.

It should be stated that the beveled joint *w* of the flanged portion *f* is provided with a leather cement which makes a tight joint and at the same time permits the flange to be opened should occasion require.

From the above description, it will be seen that the above described invention consists in reality of a stuffing-box or packing for the plunger in which the portion *j* is a flexible receptacle for the rings *m*, and which is adapted to yield by reason of the water pressure behind the same, thus permitting the rings *m* to be forced against the plunger at all times.

What I claim, is:—

1. A packing for plungers comprising a ring member having a gasket portion, the lower edge of the ring member being inturned, and a series of packing-rings interposed between the gasket portion and the inturned portion of the ring member, and means for stiffening the inturned portion of the ring member substantially as described.

2. A packing ring for elevator plungers comprising a ring member proper, said ring member being provided with a gasket portion and an inturned portion, a series of packing rings located between the gasket and inturned portion, means for rendering the inturned edge rigid, and means for constricting the ring member, whereby packing rings are forced toward the plunger, substantially as described.

3. In a plunger packing for elevator plungers, a series of rings for engaging the plunger, means for retaining the series of rings in place, and means for normally imparting a constricting or hoop tensional stress to the rings, whereby a tight joint is effected between the rings and the plunger.

4. In a plunger packing, a stuffing-box provided with a recessed portion, a packing-ring having a flange member adapted to be clamped to the stuffing-box, and a depending portion entering the recessed portion, a series of rings located between the depending portion and the plunger, the recessed portion being of such dimensions that hydraulic pressure may be imparted to the outer surface of the depending ring portion, and means for stiffening said depending portion, substantially as described.

5. A flexible receptacle for receiving a series of packing rings, a plunger engaged by the rings, said receptacle including a gasket portion and an inturned edge portion, the rings being located on the edge portion, the flexible receptacle being located in a chamber for receiving a liquid under pressure, whereby the rings are forced against the plunger, as described.

6. In a plunger packing, a stiffening box provided with an annular recessed portion, a flexible ring member located in the recessed portion and adapted to have hydraulic pressure imparted to its outer surface, means for clamping the ring member to said box, and means for imparting hoop tension to the ring member, substantially as described.

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