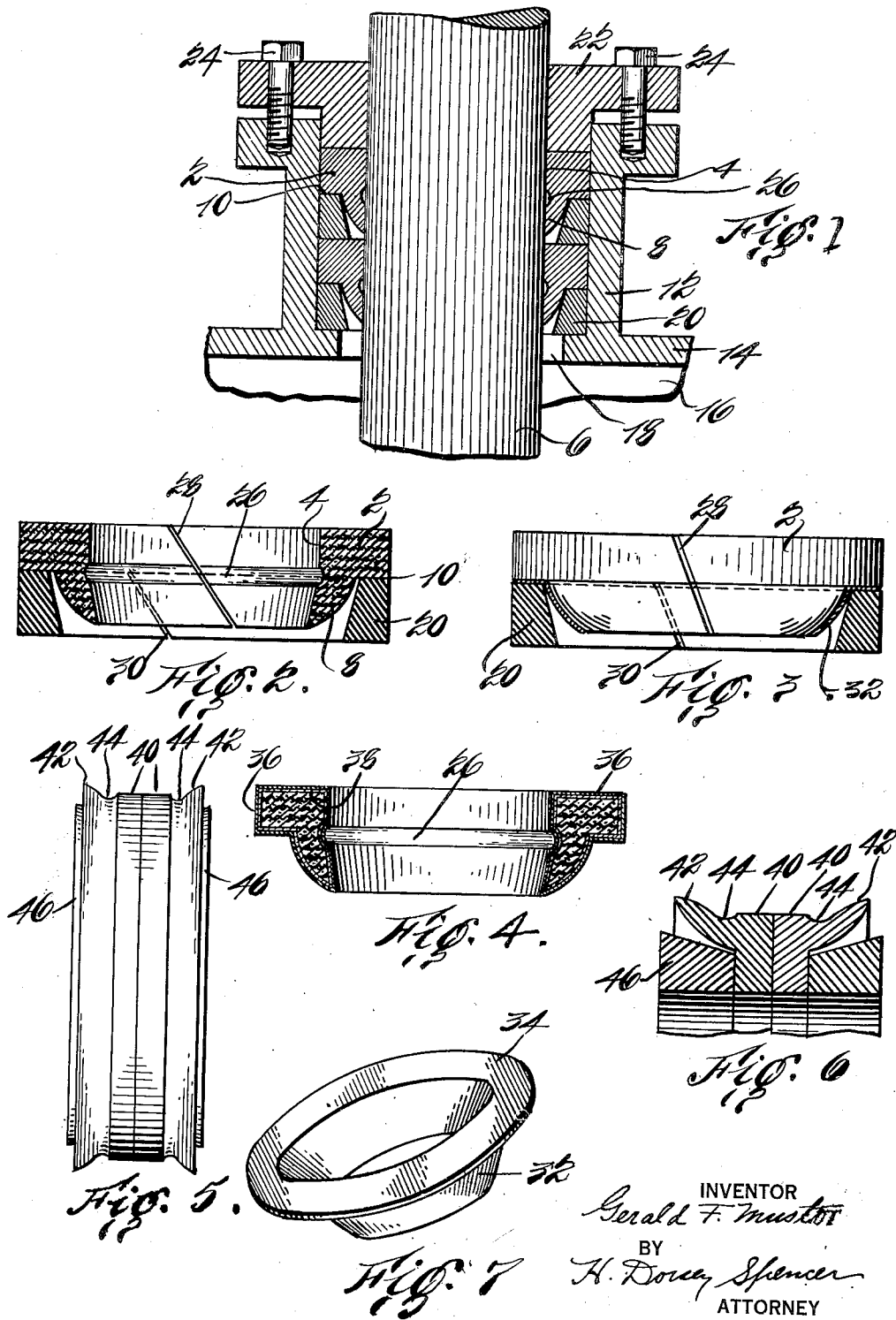


G. F. MUSTOR.
 PACKING.
 APPLICATION FILED DEC. 10, 1918.

1,313,202.

Patented Aug. 12, 1919.



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PACKING.

1,313,202.

Specification of Letters Patent.

Patented Aug. 12, 1919.

Continuation in part of application Serial No. 237,746, filed June 1, 1918. This application filed December 10, 1918. Serial No. 266,044.

To all whom it may concern:

Be it known that I, GERALD F. MUSTOR, a citizen of the United States, residing at Brooklyn, New York, have invented certain new and useful Improvements in Packing, of which the following is a clear, full, and exact description.

This invention relates to packing for use in cylinders and the like, in stuffing boxes for pistons or other reciprocating rods, and also for use with plungers of hydraulic pumps or plunger elevators.

A general object of the invention is to provide an improved packing which by reason of its form and structure will tend to effect a sealing engagement with the surface to be packed and when used in a stuffing box such sealing engagement is effected independently of the gland pressure.

A particular object of the invention is to provide a packing which is so constructed that it will quickly adapt itself by reason of its resiliency to any change in diameter of the rod or other surface to be packed and so that the fluid pressure on the pressure side of the packing will tend to force the packing into tighter sealing engagement with such surface.

A still further object of the invention is to produce a packing which while effecting a very effective sealing does not introduce any undue friction.

In furtherance of these and other objects an important feature of the invention is the provision of a packing ring having a substantial base or body portion which is normally in contact with the surface to be packed, said ring having a flange which is both flexible and resilient extending in the direction of the fluid pressure, the flange normally exerting an elastic pressure against the surface to be packed so that any changes in diameter between the rod or the surface to be packed is immediately taken up, due to the elasticity of the flange, while at the same time, the pressure of the fluid also tends to cause a tighter engagement between the flange and the surface to be packed.

Another important feature of the invention is the provision of a packing ring such as that above referred to, together with a protecting ring of the same or of different material abutting the first ring, but not in any way interfering with the movement of the flange, due either to its elasticity or to the action of the fluid pressure.

Another important feature of the invention is the provision of a protecting ring so shaped that when in contact with the flange side of the main or pressure ring, it does not interfere with the action of the flange, but when said protecting ring is placed upon the other side of the main or pressure ring it presents sufficient bearing surface against said pressure ring to prevent any distortion thereof due to the fluid pressure.

Another important feature of the invention is the provision of a groove in the pressure ring situated approximately at the base of the flange which groove serves to prevent undue friction, at the same time acting as a retaining cavity for lubricants.

Another important feature of the invention is the provision of a flexible metal casing for the pressure ring to protect the same against injury when used with certain fluids.

Other objects and important features of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which

Figure I presents a sectional view of my improved packing used in a stuffing box of a plunger elevator, a portion of the plunger being shown in elevation.

Fig. II is a central sectional view through the pressure ring and protecting ring showing the antifriction groove in the pressure ring.

Fig. III is a part sectional, part elevational view of the pressure and protecting ring showing the pressure ring in elevation and the protecting ring in section; the protecting ring in this view having a flap which follows the general contour of the flange of the pressure ring.

Fig. IV is a central sectional view of the pressure ring showing the same inclosed in a flexible metallic cover.

Fig. V is an elevational view of my invention as applied to a piston packing.

Fig. VI is a sectional view taken along a radius of the rings shown in Fig. V.

Fig. VII is a detail of the auxiliary flap shown in Fig. III.

As hereinabove suggested an object of the invention is to provide a packing which by its elasticity tends to produce a tight sealing between the piston and the walls of the cylinder, or between the piston rod and the walls of a stuffing box, said sealing being independent of the gland pressure of the stuffing box. Where the gland pressure alone is relied upon to effect a tight sealing, undue friction is produced and the efficiency of the device is considerably decreased.

In using my improved packing in plunger pumps or plunger elevators, for example, I provide a pressure ring 2 of suitable resilient packing material, such material being the ordinary laminated fabric and friction packing. This pressure ring has a cylindrical body portion having a surface 4 which engages and closely fits the piston rod or plunger at which may be considered its normal or average diameter for it is well known that plunger rods of elevators due to unequal wear, vary somewhat in diameter at different parts throughout its length and to provide for an effective sealing between the packing and plunger at such portions of the plunger as are smaller in diameter than normal, I provide the ring with a flange 8 which is integral with the pressure ring and constitutes an extension of the surface 4 thereof. This flange 8 curves toward the surface to be packed and is normally of a diameter slightly smaller than the smallest part of the plunger 6, when the pressure ring is used in a plunger elevator. The flange does not occupy the entire width of the ring but only a portion thereof so that a shoulder 10 is formed at the juncture of the flange and main body portion of the ring.

In the form of device shown in Fig. I, the packing is shown employed in the stuffing box 12, of a plunger elevator. The stuffing box is formed as a cap 14 upon the cylinder 16, in which the piston of the plunger works, and there is a free passage 18 about the plunger in which fluid may pass into engagement with the pressure side of the packing. In order to protect the flange 8 from injury under gland pressure, a protecting ring 20 is provided. This may be of the same material as the pressure ring or it may be of hard rubber, metal or other suitable material. It is usual to employ more than

one packing ring and, as shown, two packing rings and two protecting rings are disclosed in Fig. I. When thus assembled the stuffing box gland 22 is screwed down by means of the screws 24 to give the desired pressure.

The protecting ring 20 performs a three-fold function. It will be noted that the inner sides of the ring 20 slant at a different angle from that of the sides of the flange 8 so that there is no tendency to injure the flange 8 nor in any way to prevent its movements. It will also be noted that the dimension of the ring 20 along the axis of the rings is greater than the corresponding dimensions of the flange 8 of the pressure ring, so that when the gland is tightened there is no tendency to disturb the flanges of the pressure rings. It will further be noted that the diameter of the ring 20 varies at its upper and lower sides, as shown in Fig. I, the larger diameter being on that side which is in contact with the shoulder 10 of the pressure ring, while the smaller diameter of the protecting ring is on that side which engages the top of the pressure ring. By thus presenting a larger surface against said ring any tendency on the part of the fluid to bulge out the upper surface of the pressure ring in contact with the plunger rod, is prevented.

With the construction thus far described, any fluid entering the passage 18 will tend to press the flange 8 of the lower pressure ring into tighter sealing engagement with the plunger and if any liquid gets by the first pressure ring it will act in a similar manner on the second ring. It is found in practice that two rings give a very effectual sealing, although in some cases more may be used if desired.

In order to reduce the friction to a minimum, I provide a shallow groove around the periphery of the pressure ring at approximately the base of the flange. This groove is shown at 26 in the drawing. Not only does this groove prevent undue friction, but it also serves as a lubricant retaining means.

Prior to being placed in working position, the ring 2 has the shape like that shown in Fig. II, the flanges 8, by their resiliency forming a slight angle with the face 4 of the ring. When the ring is placed in close contact with the plunger the flanges 8 straighten out as shown in Fig. I, so that they are in substantial alinement with face 4 of the body portion of the ring, and there is a constant tendency on the part of the flange to make close contact with the plunger. This reserve elasticity is highly important because when a portion of the plunger having a diameter less than normal passes the pressure ring,

there is immediate contraction on the part of the flange 8 at this point which effectually seals the joint against any escape of fluid past the ring. The fluid also exerts pressure against the walls of the flange to press it more tightly into sealing engagement.

In order to more conveniently apply the rings, in plunger elevators, they are usually slit diagonally, as shown at 28 and 30, Figs. II and III, a slit, 28 of the pressure, being usually placed diametrically opposite or approximately so, to the slit 30 of the protecting ring. In some cases it may be desirable to more effectually cover the slit in the pressure ring, and to this end I may provide the construction shown in Fig. III, wherein is shown a separate flap 32, formed integral with or cemented to, or otherwise fastened to the protecting ring 20. This flap may be conveniently formed as shown at Fig. VII, having a flange 34, which may be cemented or otherwise fastened to the face of the ring 20, with the slit therein opposite the slit 28, in the flange of the pressure ring.

Since my improved packing is designed for a variety of uses, it may at times happen that the fluid to be used, as for example in the case of pumps, may be such as to so act upon rubber, which is the usual friction material contained in the packing, that the life of a ring is extremely short. In order to increase the life of the ring under such conditions, and at the same time preserve the advantageous features of the ring, I provide a flexible metallic covering. This may be put on in any desired and approved way, and is of sufficient thickness not to detract to any considerable extent from the resiliency and flexibility of the flange of the pressure ring. Such a ring is shown at Fig. IV in which two layers of metal, 36 and 38, are actually disclosed, although more layers of metal may be used in some cases if found necessary or desirable, or in some cases only one layer may be enough.

It was stated in the early part of this specification that my invention was not confined to piston rods of pumps or plunger elevators, but could also be used as a piston packing. Its use in this branch of the art as illustrated in Fig. V and from an inspection of said figure it will be noted that the main or body portion of the pressure ring 40, corresponding to the main body portion 2, has its surface normally in engagement with the inner walls of the cylinder. This pressure ring also has a flange 42 corresponding to the flange 8 of the pressure ring 2 already described, which flange 42 normally curves outwardly to engage the surface to be packed, in this case the surface of the cylinder, and its elastic tendency is outwardly toward the cylinder walls.

The shape of this ring, as shown in Fig. V, is as it would appear before being placed within the cylinder. After being placed within the cylinder the flange 42 of course aligns with the face 40 leaving the shallow groove 44 at the base of the flange 42, said groove having the same position as the groove 26 already described and functioning in like manner. When used on a piston it is convenient to use the rings in pairs placed face to face, as shown in Fig. V. Protecting rings 46 are also shown which serve generally the functions performed by the ring 20 already described, although when used in a cylinder it may not be necessary to have the inner and outer surfaces of the protecting rings of different diameters, although they have been so shown in Fig. VI. This form, however, would be necessary if more than one set of pressure rings were used.

This application is a continuation as to common subject-matter, of my application No. 237,746, filed June 1st, 1918, for plunger packing.

Having thus described my invention, what I desire to claim and secure by Letters Patent is:

1. A packing comprising a pressure ring having a substantial body portion adapted to contact the surface to be packed and a flange which is both flexible and resilient constituting an extension of the contact wall thereof, said flange extending toward the pressure side of the packing with the side walls thereof exposed to the fluid pressure and normally exerting elastic pressure against the surface to be packed.

2. A packing comprising a pressure ring having a substantial base or body portion adapted to contact the surface to be packed and a flexible and resilient flange constituting an extension of the contact wall thereof, the ring having an anti-friction groove around its inner wall adjacent the base of the flange.

3. A packing comprising a ring having a substantial body portion adapted to contact the surface to be packed and a flange integral with the ring body and constituting an extension of the contact wall of the ring, said flange being flexible and resilient and normally exerting elastic pressure against the surface to be packed and extending toward the pressure side of the packing with the side walls thereof exposed to the fluid pressure, an anti-friction groove around the wall adjacent the base of the flange, and a protecting ring surrounding the flange and bearing against the body portion of the pressure ring, but not in contact with the flange.

4. A packing comprising a ring having a substantial body portion adapted to contact the surface to be packed and a flange inte-

gral with the ring body and constituting an extension of the contact wall of the ring, said flange being flexible and resilient and normally exerting elastic pressure against
6 the surface to be packed and extending toward the pressure side of the packing with the side walls thereof exposed to the fluid pressure, and a protecting ring surrounding the flange and bearing against the body portion
10 of the pressure ring, but not in contact with the flange thereof.

5. A packing, comprising a pressure ring

having a substantial base or body portion, a flexible and resilient flange constituting an extension of said body portion, and a protecting ring having a split flap, said protecting ring adapted to bear against the pressure ring, the flap of the protecting ring conforming to the flange of the pressure ring, the split in the flap being opposite the split in the flange of the pressure ring. 15 20

Signed at New York, N. Y., this 3rd day of December 1918.

GERALD F. MUSTOR.