April 23, 1940. P. S. BALDWIN 2,197,915

PACKING AND POWER TRANSMISSION UNIT

Filed Sept. 20, 1938

Fig. 2.

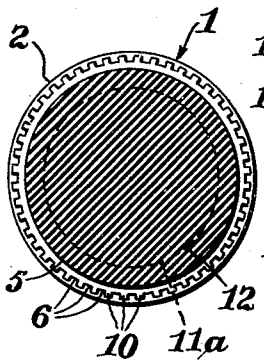


Fig. 1.

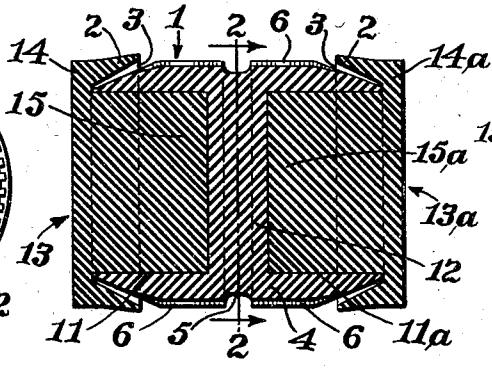


Fig. 4.

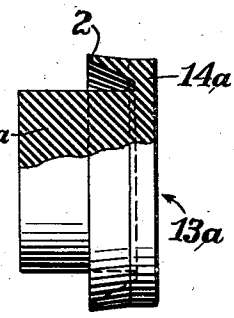


Fig. 3.

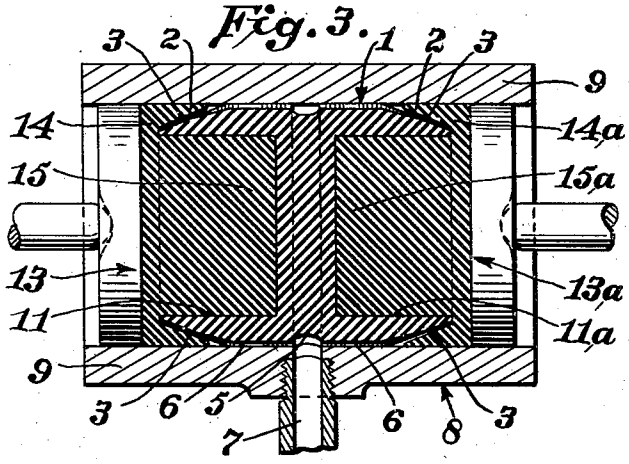
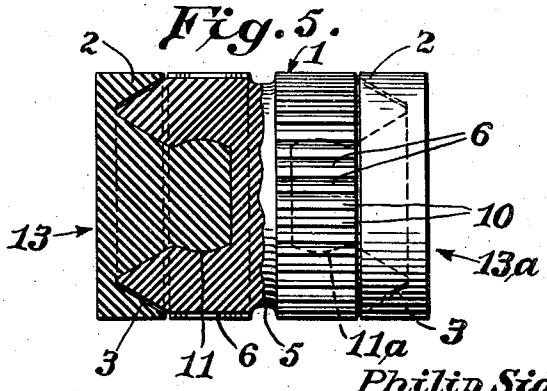


Fig. 5.



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PACKING AND POWER TRANSMISSION UNIT

Philip Sidney Baldwin, Florence, Italy

Application September 20, 1938, Serial No. 230,890

13 Claims. (Cl. 309—31)

This invention relates to improvements in the structure of the packing and power transmitting units shown in my application Serial No. 125,341, filed February 11, 1937.

Difficulties have been encountered in moulding the unit in one piece, and while it is possible to do so, it has been found that a unit built up of several interfitted parts presents less difficulty and is equally satisfactory. One of the objects of this invention is to provide such a unit built up of a number of separately moulded parts which will be held together and operate as a unit under fluid pressure.

It has been found that the fluid under pressure could be more quickly and easily directed around the effective radial surface of the unit to the space behind the lips by providing means for guiding the flow of the fluid to said lips. This permits the fluid to be readily discharged from the unit and prevents it being trapped behind the lips upon release of pressure. A further object of this invention, therefore, is to provide such guiding means for the unit.

Still a further object of this invention is to secure application of the fluid pressure simultaneously on the effective radial surface of the unit even though the unit is under axial mechanical compression, and not progressively from the center outwards towards the lips as would be the case were fluid guiding means not provided. This permits the unit simultaneously to contract radially and extend axially on the protractile stroke, and to contract axially and expand radially on the retractile stroke; the interfitted parts being clinched together under radial fluid pressure to expand and contract as a unit.

For a more complete understanding of the invention, reference is made to the accompanying drawing, illustrating several forms of the invention. All like reference characters refer to like parts throughout the several views.

Figure 1 is a central vertical sectional view of the improved unit,

Figure 2 is a central horizontal section thereof,

Figure 3 is a central vertical section showing the unit of Figure 1 incorporated in the wheel cylinder of a hydraulic brake,

Figure 4 is a side elevation of one of the cap members, partially in section.

Figure 5 shows a modified form of the unit construction, partly in section and partly in elevation.

The unit is generally designated as having a resilient and elastic body 1, lips 2, and a fluid receiving space 3, the lips 2 being slightly offset from the wall 4. The external wall 4 of the unit is provided with a circumferential recess 5 which may be placed at any point on said wall between the lips at each end of the body, but is preferably arranged centrally between the spaced lips as shown in the drawing. A series of channels 6, axially disposed, are formed around the entire external wall of the unit, intercommunicating with and extending from the recess 5 to the spaces 3 behind the lips 2. Thus, when fluid under pressure is introduced into conduit 7 and wheel cylinder 8, it flows directly into recess 5 and immediately surrounds the unit, flowing from the recess 5 through channels 6 and into spaces 3, pressing lips 2 against the cylinder wall 9 to form a fluid seal. Pressure then takes effect radially against the body of the unit, as described in my Patent No. 2,048,771, distending and elongating it in an axial direction to actuate the brake shoes (not shown). By means of the recess 5 and channels 6 the fluid is distributed more quickly and evenly around the unit, so that pressure can take effect substantially simultaneously around the entire outside wall 4 which is the effective radial surface of the element, clinching the component parts of the unit together and causing them to expand and contract as a unit. Were fluid pressure not distributed simultaneously over the radial surface as described but progressively from the centre outwards, the plug portions 15 and 15*a* of the cap members would be forced out of their respective sockets and fluid would be trapped in the body of the unit.

In the form of unit shown in Figure 1, the device is of a three piece construction. In this form, the body 1 has oppositely disposed sockets 11, 11*a* moulded in the ends, and these sockets are separated by a partition 12. Cap members 13, 13*a*, respectively, are seated in these sockets. The cap members have enlarged portions 14, 14*a*, respectively, and reduced plug portions 15, 15*a*, respectively, the plug portions extending into and frictionally engaging the entire surface of the walls of their respective sockets. In all forms of the invention, the fit of the plugs in the sockets should be so close as to force out the air therein when the plug is inserted, and this can be accomplished by twisting the plug as it is inserted. In the finished element, the fit is so close as to require considerable force to dislodge the plug from the socket against the suction created therein by a direct outward pull. The enlarged portion of each cap member is seated on the mouth of the socket, as shown, and each cap has a skirt or lip 2 which overhangs the

external wall 4 and is slightly spaced therefrom to provide the space 3. The entire unit is made of rubber, rubber substitutes, or other suitable resilient elastic material.

In the modified form shown in Figure 5, the sockets 11, 11a are made bulbous-like, and the plug portions of the cap members are made of corresponding shape and size to secure a good friction fit between the parts. In this form, the lip 2 is not offset from the outside wall 4, the waist portion or outside wall of the unit being designed to have a closer fit in its cylinder container.

The unit is designed to be mechanically compressed axially in its cylinder container. In Figure 4 it is compressed under tension of the brake shoe return spring (not shown). This initial tension causes the unit to expand radially and plug the cylinder around the two ends of the cap members and positively prevents air being drawn into the cylinder at these points. Obviously, fluid pressure applied to the unit takes effect directly on the annular end surfaces of the lips and, were the unit not under mechanical compression, would force the lips outwards with the opposed pistons before fluid pressure could take effect on the radial surface of the element. The mechanical pressure resists this direct axial fluid pressure and permits the fluid pressure to be initially built up on the element radially to extend it axially as described.

Changes may be made in the construction without departing from the scope of the invention as defined by the appended claims.

Having thus described my invention, I claim:

1. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a wall, a fluid sealing lip on said unit projecting over said wall, said unit having a fluid receiving space behind said lip to accommodate a flow of fluid between said lip and wall, and means in said wall, extending behind said lip, for guiding fluid under pressure along the wall to said space.

2. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a wall, a fluid sealing lip on said unit projecting over said wall, said unit having, a fluid receiving space behind said lip to accommodate a flow of fluid between said lip and wall, and channels in said wall, extending into said space, for guiding fluid under pressure along the wall to said space.

3. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a wall, a fluid sealing lip on said unit projecting over said wall, said unit having a fluid receiving space behind said lip to accommodate a flow of fluid between said lip and wall, and spaced ribs along said wall, extending behind said lip, for guiding fluid under pressure along the wall into said space.

4. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a wall, a fluid sealing lip on said unit projecting over said wall at each end thereof, said unit having a fluid receiving space between each lip and wall to accommodate a flow of fluid between each lip and wall, and means in said wall, extending to said lips, for guiding fluid under pressure along the wall to said spaces.

5. A packing and power transmitting unit for hydraulic systems comprising a resilient body, said body having a wall with spaced fluid sealing lips projecting over said wall, said unit having a fluid receiving space behind each lip to accommodate a flow of fluid between said lip and wall, a recess in said wall between said lips, and means on said wall, extending from said recess to said lips, for guiding fluid under pressure along said wall to said spaces.

6. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a cylindrical wall with spaced fluid sealing lips projecting over said wall, said unit having fluid receiving spaces behind said lips to accommodate a flow of fluid between said lips and wall, an annular recess in said wall between said lips, and means on said wall, extending from said recess to said lips, for guiding fluid under pressure along said wall to said spaces.

7. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a socket at each end thereof and a resilient cap member for each socket, each cap member having an enlarged portion and a reduced plug portion, said plug portion extending into and frictionally engaging the wall of its corresponding socket, said enlarged portion extending above the upper edge of the socket and having a lip overhanging the external wall of the resilient body, said lip being spaced from the body so as to provide a space between the lip and wall to accommodate a flow of fluid therebetween.

8. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a socket at each end thereof and a resilient cap member for each socket, each cap member having an enlarged portion and a reduced plug portion, said plug portion extending into and frictionally engaging the wall of its corresponding socket, said enlarged portion extending above the upper edge of the socket and having a lip overhanging the external wall of the elastic wall, said lip being spaced from said external wall so as to provide a space between the lip and wall to accommodate a flow of fluid therebetween, and means on said body extending to each lip, for guiding fluid under pressure along said wall to said spaces.

9. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a socket at each end thereof and a resilient cap member for each socket, each cap member having an enlarged portion and a reduced plug portion, said plug portion extending into and frictionally engaging the wall of its corresponding socket, said enlarged portion extending above the upper edge of the socket and having a lip overhanging the external wall of the resilient wall, said lip being spaced from said external wall so as to provide a space between the lip and wall to accommodate a flow of fluid therebetween, and ribs on said wall extending longitudinally thereof to each lip for guiding fluid under pressure to said space.

10. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a socket at each end thereof and a resilient cap member for each socket, each cap member having a plug portion extending into and frictionally engaging the wall of its socket, and a portion extending above the upper edge of each socket and having a lip overhanging the external wall of the resilient body, said lip being spaced from said external wall so as to provide a space between the lip and wall to accommodate a flow of fluid therebetween, a recess in the wall of said body and means on said wall extending from said

recess to each lip, for guiding fluid under pressure along said wall to each space.

11. A packing and power transmitting unit for hydraulic systems comprising a resilient body having bulbous-like sockets at each end thereof, and a resilient cap member for each socket, each cap member having an enlarged portion of a diameter substantially coextensive with the external diameter of the body, and a reduced bulbous-like plug portion, said plug portion extending into and frictionally engaging the wall of its corresponding socket, the enlarged portion being seated on the end of the body, said enlarged portion having a lip overhanging said wall providing a space between said lip and wall to accommodate a flow of fluid therebetween.

12. A packing and power transmitting unit for hydraulic systems comprising a resilient body having a wall, a fluid sealing lip on said unit projecting over said wall, said unit having a fluid receiving space behind said lip, fluid guiding means arranged around said wall, and means on said wall connecting said fluid guiding means with said space, for guiding fluid from said first mentioned means to said space.

13. A packing and power transmitting unit adapted to be compressed radially and extended axially in a hydraulic system, comprising a resilient body having a wall, a sealing lip on said unit overhanging said wall and spaced therefrom to provide a fluid receiving space behind said lip to accommodate a flow of fluid between said lip and body, and means formed in said wall for guiding fluid under pressure to said space.

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