March 27, 1951 C. D. PENDLETON 2,546,403

PRESSURE RESPONSIVE DEVICE

Filed March 13, 1948

Fig 1

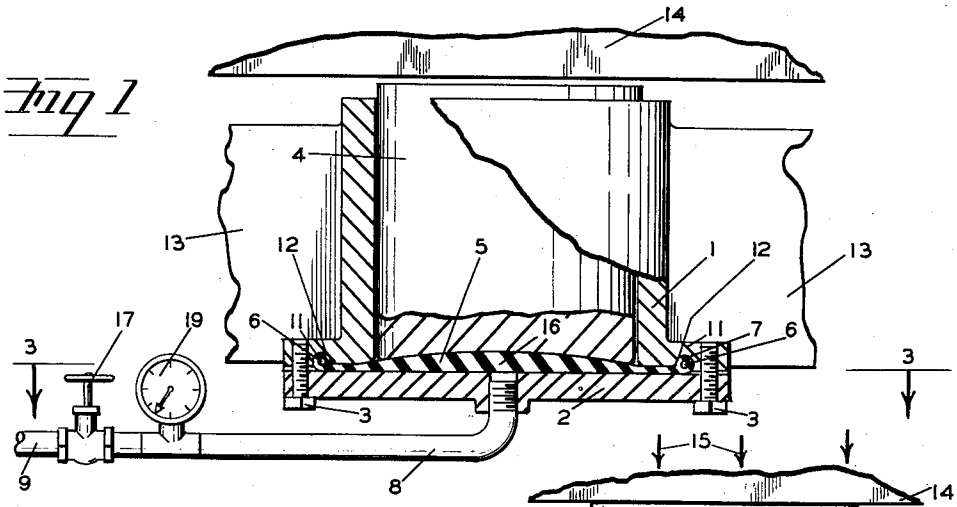


Fig 2

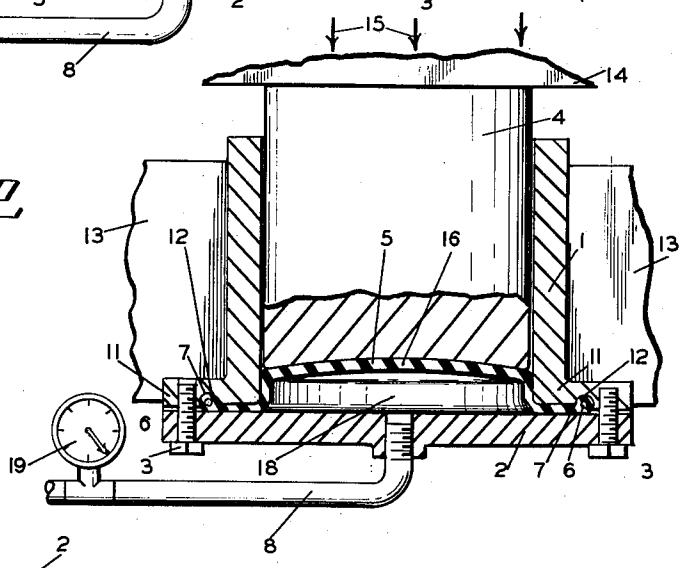
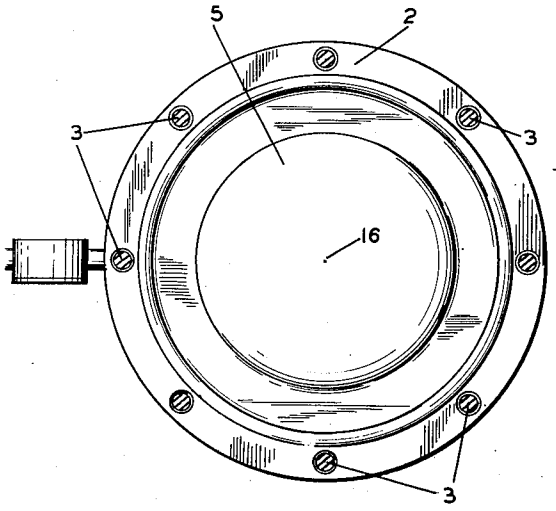


Fig 3



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PRESSURE RESPONSIVE DEVICE

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3 Claims. (Cl. 137—157)

1

This invention relates to a pressure responsive device wherein liquid pressure is applied on one side of a rubbery diaphragm, stretching it a considerable amount to perform useful work; the diaphragm afterwards returning to its normal unstretched position. Such devices have often been proposed but they have one weak point—the diaphragm must be held at or near to its perimeter, by compression between two flanges (usually), it being found impossible to equalize the holding grip sufficiently to avoid greatly shortening the life of the diaphragm.

The object of the invention, in short, is to take advantage of the obvious virtues of the diaphragm and cancel or greatly modify its tendency to tear loose at its edge, especially when subjected to a considerable stretch.

A drawing accompanies and forms a part hereof in which the invention is illustrated in its best form, as now advised, and a schematic set-up, wherein the invention is used, as on a logging truck, shows one valuable way in which it can be employed; but it is not intended to indicate a limit to its usefulness.

In the drawing:

Fig. 1 is a side view of a hydraulic ram employing the invention, the cylinder and a part of the ram being broken away to show a section of the new packing, in non-active position;

Fig. 2 is the same structure as shown in Fig. 1, save that the ram has been pumped up to load sustaining position; and

Fig. 3 is a section of Fig. 1, taken on the plane 3—3, Fig. 1.

Explaining the drawings in greater detail, numeral 1 is a plain metal cylinder having a lower cap closure 2, that is detachably attached to the cylinder by adequate means such as bolts 3, which engage with a flanged portion 11, of the cylinder 1. A ram 4, is a sliding fit in the cylinder 1.

A highly resilient diaphragm packing of neoprene synthetic rubber or equal, is designated by numeral 5. It is preferably made thicker in its median area as shown in Fig. 1 and the ram 4 will be concaved to receive the thickened portion without initial compressive stress on the diaphragm 5. The diaphragm 5 is circular in form, of materially greater diameter than the ram 4 and has a metal wire ring 6, embedded in and vulcanized firmly to the inside of the rubber bead 7, which surrounds it. The flange 11 is machined at 12, into a groove that firmly holds the bead 12 and its contained wire ring 6, when the bolts such as 3, are screwed home,

2

thus holding the diaphragm by its perimeter and concurrently sealing the cap 2 to the cylinder 1. The operation of the device is at once obvious from the illustrations in Figs. 1 and 2.

A conduit 8, is in communication with the lower side of the diaphragm 5, and will be fed from a pump and reservoir diagrammatically indicated by the pipe 9, which is broken off.

To avoid time consuming hard labor, the rams will be pumped up before the load is applied; the distance, maximum, being not over three-quarters of an inch, though the larger the diameter of the ram, the relatively greater distance of lift there will be available.

The layout includes schematic indications as follows: Numeral 13 represents a solid part of a truck frame and 14 represents a load carrying bunk upon the truck frame, upon which logs or the like are loaded, as indicated by arrows 15 in Fig. 2.

It will be observed in Fig. 2 that the ram 4, has been raised by the forced introduction of hydraulic fluid beneath it, which has stretched the diaphragm 5, somewhat thinning its initially thick median area 16, so that the ram 4 may raise without thinning the diaphragm disadvantageously. The thinning in the drawing is somewhat exaggerated to bring it out.

The diaphragm does not slide over the inside surface of the cylinder 1, but is like it was unreeled from a store of rubber. When the ram 4 is raised, preferably before load is applied to save unnecessary hard labor, then the valve 17 will be closed, entrapping the fluid in the created fluid chamber 18. The pressure gauge 19, will be calibrated to indicate applied load as indicated by the arrows 15 and if there are, say four of the rams, one under each end of the customary two bunks, the total load will be the sum of four gauge readings. As soon as that is noted, each of the rams may be dropped by opening their respective control valves.

I claim:

1. In a pressure responsive device, a cylinder, said cylinder being formed with an integral flanged end, a finished annular groove in said flanged end, a detachable head therefor, bolt means for securing said head to said flanged end, a beaded diaphragm of resilient rubbery material mounted between said head and said cylinder, an annular metal ring vulcanized within said bead, said bead being of a diameter that the bead will match said annular groove to hold the diaphragm by its perimeter when the same is held to the head by said bolt means, and

means for introducing hydraulic fluid between said head and said diaphragm to apply pressure against said diaphragm.

2. In a pressure responsive device comprising a cylinder, said cylinder formed with an integral flanged end, a semi-circular annular groove in said flanged end, a stretchable rubbery diaphragm moulded with an integral bead perimeter, said bead being of a size and shape to match the annular groove, a metal ring embedded in said bead, a head matched and held against said diaphragm by bolts or the like to compress said metal containing bead against said semi-circular groove, and the said diaphragm arranged to receive hydraulic pressure on one side.

3. In a pressure responsive device, a cylinder having a flanged end, a detachable head secured to said flange, a groove in said flanged end, said head being planar, an elastic diaphragm formed

with an integral bead portion forming its perimeter secured to said flange by said head, said bead of the same perimeter as said groove to fit therein and a metal ring vulcanized within said bead.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,479,733	Quinn	Jan. 1, 1924
1,791,717	De Vito	Feb. 10, 1931
1,964,745	Sauzedde	July 3, 1934
2,272,304	Lohman	Feb. 10, 1942
2,372,302	Swindin	Mar. 27, 1945
2,437,552	Quiroz	Mar. 9, 1948