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FLUID EXPANSION RUBBER TO BE USED ON SWABS,  
AGITATORS, AND PACKERS FOR OIL WELLS  
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Fig. 1.

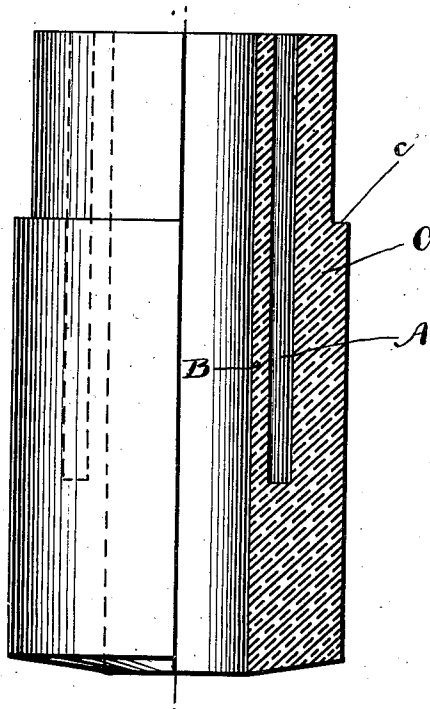


Fig. 3.

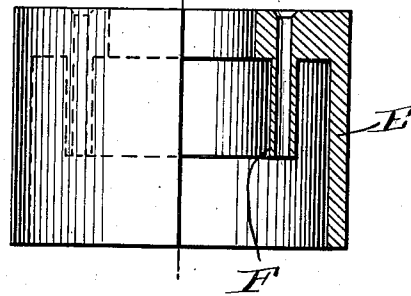


Fig. 2.

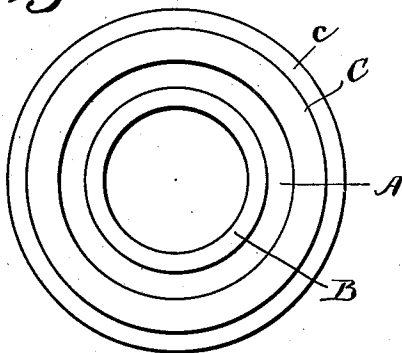


Fig. 4.

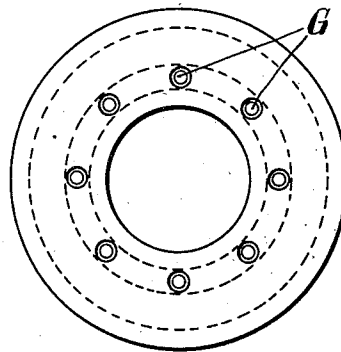
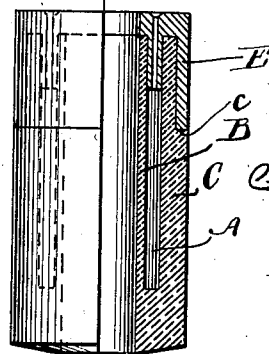


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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FLUID-EXPANSION RUBBER TO BE USED ON SWABS, AGITATORS, AND PACKERS FOR OIL WELLS.

Application filed June 13, 1924. Serial No. 719,872.

This invention relates to improvements in rubbers for packers, swabs, agitators and similar apparatus utilized in the drilling and operation of deep wells.

5 The invention relates to improvements in rubber for swabs, agitators, and packers, in which the weight and pressure of the fluid expands the rubber to fit the casing or pipe, when the swab is being withdrawn from the  
10 well, or when the swab is being used as an agitator and is on the upward stroke, or when the rubber is inverted to serve as a packer. By reason of the peculiar construction of the rubber, it eliminates all friction  
15 and vacuum when being lowered into the well or pipe, as the sides of the rubber do not come in contact with the walls of pipe or casing.

20 Other objects and features will more clearly hereinafter appear by reference to the accompanying drawing forming a part of this specification and wherein like numerals of reference designate corresponding parts throughout the several views, in which:

25 Figure 1 is a side elevation with the cap removed and part being in section;

Figure 2 is a top plan view;

Figure 3 is a view of the cap similar to Fig. 1;

30 Figure 4 is a top plan of the cap; and

Figure 5 is a side elevation of the assembled device partly in section.

35 In the present embodiment, the packer body is shown to comprise an integral tubular structure of suitable rubber composition. The body is formed with an annular chamber A which extends from the upper end downwardly to a point near the lower end. This chamber A partitions the greater portion  
40 of the body into inner wall section B and the outer wall section C, the latter being reduced for a portion of its length to form shoulder c.

45 A cap is provided for the upper extremity of the packer and functions both as a guard for the outer surface of the rubber and also as a spacer and fluid feed for the chamber A. This cap includes downwardly extending inner and outer spaced flanges E and F, the outer flange E being adapted to enclose the upper end of the rubber and seat  
50 against the shoulder c. The diameter of this flange is such as to be substantially flush with the outer diameter of the rubber or to extend slightly beyond the latter to form

a protection therefor against frictional engagement with the casing. The inner flange F as shown in Figure 5 is adapted to be positioned between inner and outer walls B and C to space the latter. This flange is provided with a plurality of ports or passages G forming a communication between the chamber and the atmosphere, thereby enabling the entrance and exit of fluid from  
60 the chamber to cause the expansion and contraction of the outer wall as may be desired. The cap body is formed with a central opening corresponding in diameter to the passage through the tubular body of the rubber.  
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When the present device is used as a swab in connection with oil wells, the open end of the chamber will be turned upward to enable the fluid to gain access thereto. The weight of the fluid entering through the ports G in  
75 the flange F will cause the expansion of the outer wall of the rubber and the engagement of the latter with the wall of the well. This rubber is also utilized in the upward position when operating as an agitator, the  
80 upward stroke of the device causing the fluid to expand and engage the wall. When utilized as a packer, the open end of the expansion chamber is directed downwardly to permit the fluid pressure in the well to act  
85 against the chamber walls. The construction of the rubber itself and the cap therefore is such as to eliminate the friction usually present in such devices during the movement in a well casing, the outer annular flange E of the cap being of sufficient diameter to prevent the engagement of the  
90 outer surface of the packer with the inner surface of the wall during non-working stroke of the device.  
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Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A packer comprising a cylindrical flexible body formed with an annular chamber, and a cap for said packer having an inner annular flange formed with passages to permit communication with said chamber, said cap also having an outer annular flange encircling one end portion of the cylindrical body.  
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2. In a device of the class described, a tubular flexible body formed with an annular chamber within its wall, said chamber being closed at one end and open at the other end,  
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a cap for said body formed with an annular extension adapted to normally seat in the upper end of said chamber and space the walls thereof, said extension being formed with a plurality of passages for effecting communication between said chamber and the atmosphere, and an annular flange on the cap encircling and confining one end portion of the tubular body.

10 3. In a device of the class described, a tubular flexible packer formed with a concentric annular expansion chamber within its wall, and having an externally reduced upper extremity, a cap for said packer hav-

ing an annular outer wall seating on the reduced portion and being provided with ports arranged to communicate with said chamber. 15

4. In a device of the class described, a tubular body comprising inner and outer spaced walls forming an expansion chamber, a cap having an outer flange engaging the outer face of said outer wall, an inner flange seated between said inner and outer walls, and ports formed in said inner flange for effecting communication between said chamber and the atmosphere. 20 25

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