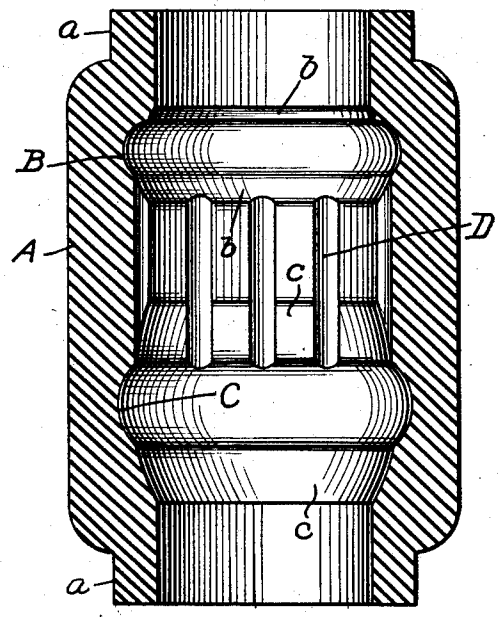
Sept. 9, 1930. L. M. McLEOD 1,775,403

SWAB RUBBER

Filed Oct. 15, 1928

FIG. 1.



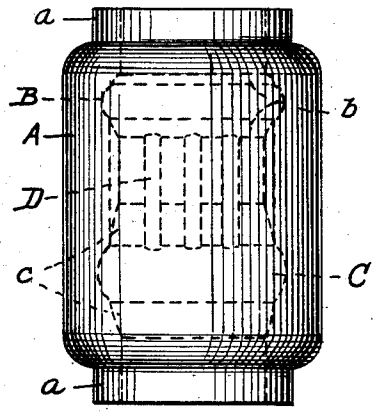


FIG. 2.

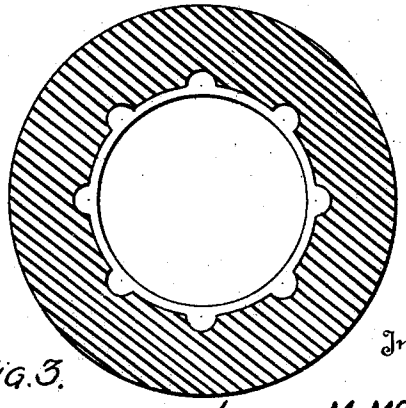


FIG. 3.

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SWAB RUBBER

Application filed October 15, 1928. Serial No. 312,673.

In the production of crude petroleum considerable difficulty is experienced in the swabbing of the wells, due to the inconsistent conditions existing in the various oil fields. In many wells the temperature is so excessive that the vulcanization of the rubber element of the swab is brought about and this is particularly true in India, Venezeula, and other tropical oil fields. The use of asbestos has been attempted in combating this condition; however, the result has not been wholly successful. In addition to the heat encountered, it is a well known fact that particularly in certain districts it is not practical to drill a deep well in vertical alignment. In many cases such wells deviate from the original vertical axis as much as forty feet in a 5000 foot well. The necessary angular arrangement of the casing due to a well of this character creates a pinching action on an expansible rubber which may be utilized in the swabbing.

A somewhat similar condition exists also where the casing is pinched or is formed with a narrow spot or a bottle neck is encountered as in a normal arrangement of casing.

It is to combat conditions such as have been noted above that the present invention has been conceived, the arrangement being such that any irregular formation of the casing, due to inherent defects, or due to the conventional bottle neck formation, or to an angular arrangement necessitated by a crooked hole, is accommodated by a variation in the expansion of the plurality of chambers included in the present structure and brought about by the fluid passing from one chamber to the other as the swab passes the obstruction or defect. The variation in elasticity of the swab body will not only act as a relief in passing obstructions, but will also provide an escape in cases where an overload is being lifted by the swab.

Reference will be had to the accompanying drawings forming a part of this specification, and wherein like characters of reference designate corresponding parts throughout the several views, in which:

Fig. 1 is a vertical section;

Fig. 2 is a side elevation;

Fig. 3 is a transverse section.

To provide for the accommodation of the conditions outlined, a swab rubber has been designed of the double concave, integral type and comprises a body of suitably prepared rubber, reinforced or otherwise, formed with a uniform outer diameter indicated by reference character A, except at the upper and lower extremities which are reduced as at *a* for the reception of the collars essential for the mounting of the same. The body of the present swab rubber is formed with upper and lower cavities B and C respectively, the upper cavity being substantially 40% smaller than the lower cavity C and communicating with the latter through the flutes or grooves D.

By this arrangement when a restricted passage is encountered at the point of the lower cavity, which point necessarily will be expanded to a greater extent than any other portion of the structure, the swab is free to be contracted in that the external pressure will cause the liquid contained in the lower cavity to flow through the communicating passages to the upper or smaller cavity. The result of this structure is that a more flexible assembly is provided capable of longer wear and greater use under more varied circumstances and free from such faults as the loss of the rubber or the destruction of the same for the numerous reasons encountered in the production of oil.

It might be of interest to note again that the expansion of the swab rubber is lateral and not longitudinal, the longitudinal expansion being avoided by the caps which enclose the extremities of the body, as indicated above, and which are fixed to a mandrel as conventional in the art.

What I claim as new and useful and desire to secure by Letters Patent of the United States is:

1. A swab rubber comprising a body having an elongated bore enlarged at spaced points in its length to form expansible chambers, the expansible portions being connected by a plurality of channels.

2. A swab rubber comprising a body designed for lateral extension and formed with a longitudinal extending central bore, the

walls forming the said bore being reduced in thickness annularly to form spaced chambers, and longitudinally extending channels communicating with said chambers.

3. A swab rubber comprising a body designed for lateral expansion and formed with a central longitudinal bore, the walls of said bore at spaced points being reduced in strength to cause irregular expansion of said body at said reduced points, and channels connecting said reduced portions.

4. A swab rubber comprising a body having an elongated bore enlarged at spaced points in its length to form expansible chambers, the expansible portions being connected by a plurality of channels, and the bore being of greater diameter between the annular channels.

5. A swab rubber comprising a body designed for lateral expansion and having a longitudinal bore, the extremities of the body being reduced externally and the walls forming the bore being annularly grooved to form spaced chambers, one of which is of greater diameter than the other, and a plurality of parallel longitudinally extending grooves connecting the chambers.

In testimony whereof I affix my signature.

LORNE MACLEAN McLEOD.