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W. L. BALD

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HYDRAULIC OIL WELL PACKER

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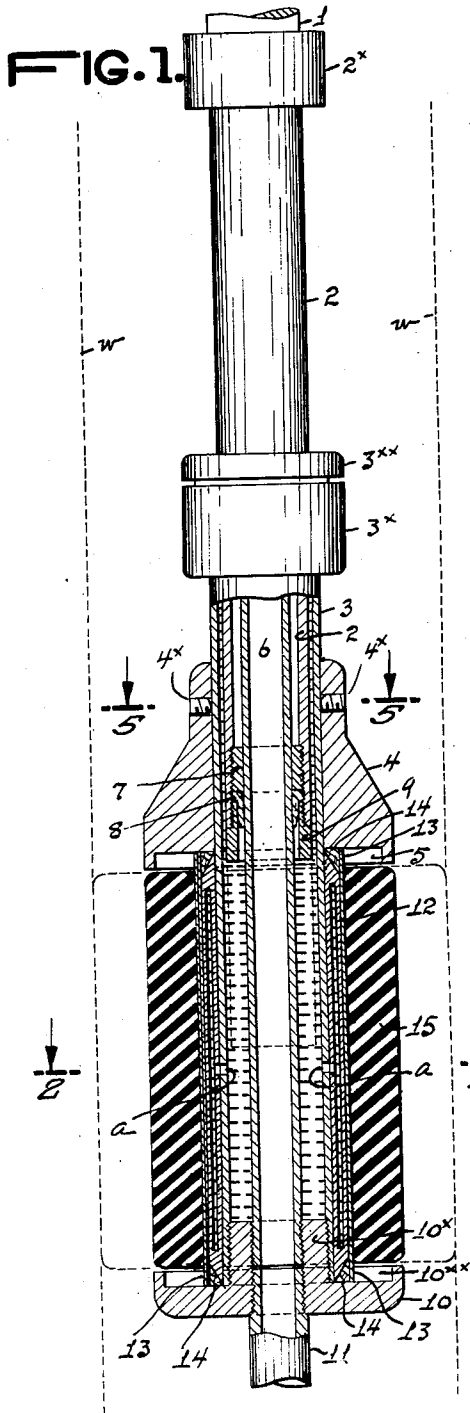


FIG.2.

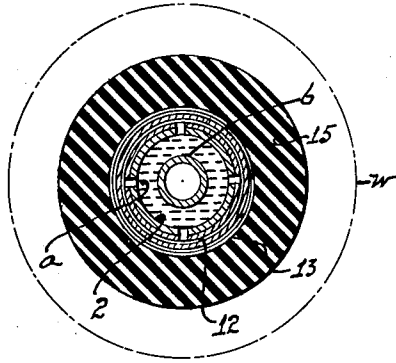


FIG.3. FIG.4.

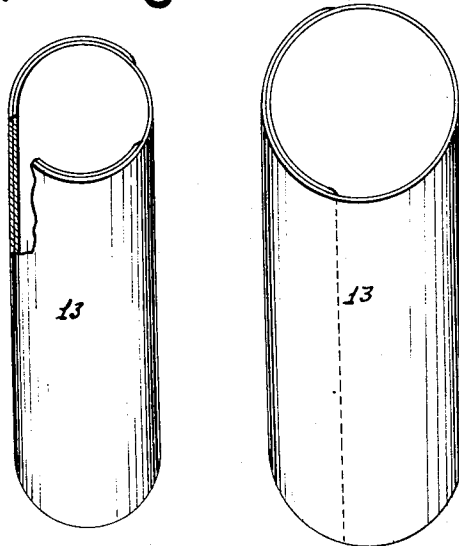
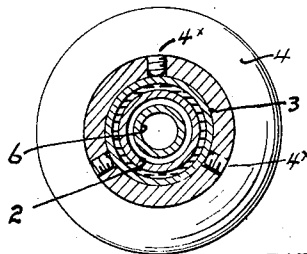


FIG.5.



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HYDRAULIC OIL WELL PACKER

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4 Claims. (Cl. 166—10)

The object of the present invention is to provide an oil well packer adapted to shut off the flow of fluid at a desired point, and so constructed as to improve devices of the kind heretofore proposed, particularly in the ability of the device to withstand very high pressure differentials.

The improvements relate primarily to means for preventing the blowing out of the pressure bag employed in such devices by a metallic expanding member which easily expands under the influence of the pressure bag.

Further objects of the invention will be described with reference to the accompanying drawing, in which—

Figure 1 is a longitudinal section showing by dotted lines the interior wall of a well and an embodiment of the invention within the well, the embodiment being shown partly in longitudinal section.

Figure 2 is a horizontal section taken on the line 2—2, Figure 1.

Figure 3 is a perspective view, partly broken away, showing the metallic expanding sleeve in retracted position.

Figure 4 is a view similar to Figure 3, showing the metallic expanding sleeve in expanded position.

Figure 5 is a horizontal section taken on the line 5—5, Figure 1.

In the drawing, I have indicated by the dotted lines *w* the interior wall of the well. It will be seen that the packer comprises a tubular drill stem 1 which may be threaded or otherwise secured in the head 2x of a tubular ram 2, the ram passing through the packing head 3x of the fluid barrel 3. Member 3x will be provided with a packing gland nut 3xx. Secured to the fluid barrel by means of the set screws 4x is a cap 4 having a downwardly extending flange which provides a shallow chamber at 5.

Axially disposed within the tubes is an influx tube 6 which forms an inner bearing member for the ram 2, the latter near its lower end being interiorly threaded to receive the plug 7 underlying which is a headed packing ring 8 below which is a ring-like head 9 threaded within the ram 2 and engaging the packing ring 8.

The lower interior wall of the barrel 3 is threaded to receive the upwardly extending plug area 10x of a bottom cap 10 and the said bottom cap with its plug area 10x is formed with a threaded aperture to receive the threaded lower end of the influx tube and the upper threaded end of the intake pipe 11. Bottom cap 10 is

formed with a shallow upwardly extending flange bounding a chamber at 10xx.

Within the chambers 5 and 10xx are the ends of the pressure bag 12, the pressure bag being hollow and its inner wall surrounding and abutting the barrel 3. Apertures at *a* in the barrel communicate with apertures leading through the inner wall of the pressure bag to its interior so that fluid ejected through apertures *a* by action of the ram will expand the pressure bag.

Surrounding the pressure bag is a metallic expanding sleeve 13 which is shown in detail in Figures 3 and 4 and at the lower and upper ends of the expanding sleeve there is interposed between the same and the pressure bag a suitable packing 14. Surrounding the metallic expanding sleeve is an outer sealing sheath 15 which is expandible and which may be composed of a synthetic rubber-like composition or other durable and expanding material.

Method of operation

In Figure 1 the ram 2 is in upper position and the three expanding members comprising the pressure bag, the metallic expanding sleeve and the sealing sheath are in retracted position. The device may be lowered to a desired point within the well whereupon the barrel will be held in a position of rest and the ram downwardly moved by a position actuation or by gravity under the influence of its weight and the weight of parts attached to it, forcing fluid content within the barrel outwardly through the ports at *a* and into the pressure bag, causing the latter to expand. The metallic expanding sleeve will cause said outer expanding movement of the bag to be uniform throughout its length notwithstanding that the bag and pressure sleeve 15 through repeated use have developed relative weakness or less resistance against expansion at any intermediate points which might cause the pressure bag to blow up. Thus the three expanding members move outwardly until the sealing sleeve firmly contacts with the inner wall of the well with equal pressure throughout its area, a condition not assured by devices heretofore proposed.

By taking an upper lift upon the ram the pressure bag will contract, the fluid reversing the movement theretofore made by it, and the action of the bag is augmented and made positive by the retraction of the metallic expanding sleeve and thereby the bag will be brought back to initial position with its outer wall lying truly parallel with the wall of the barrel. By means of the invention the device will withstand many

times the pressure possible with devices heretofore proposed and will have substantially greater life.

The metallic expanding sleeve is preferably constructed of a sheet of spring metal or metal alloy, the sheet being bent into tubular formation with its longitudinal margins overlapping as shown in Figures 3 and 4. Although I prefer that a unitary metallic expanding sleeve be employed, it will be understood that a plurality of end-abutting sleeves may be used, if desired.

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

1. A well packer comprising a chamber member adapted to contain a fluid, an expansible member surrounding said chamber member and communicating with the interior of the latter, a metallic expansible sleeve surrounding the first-named expansible member, an expansible sealing sheath surrounding the said metallic expansible member, and means for compressing a fluid contained within the chamber member.

2. A well packer comprising a chamber member adapted to contain a fluid, an expansible member surrounding said chamber member and communicating with the interior of the latter, a spirally formed metallic expansible sleeve surrounding the first-named expansible member, a flexible sealing sheath surrounding the said

metallic expansible member, and means for compressing a fluid contained within the chamber member.

3. A well packer comprising a chamber member adapted to contain a fluid, an expansible member surrounding said chamber member and communicating with the interior of the latter, a metallic expansible sleeve surrounding the first-named expansible member, said sleeve comprising a sheet of spring metal bent into tubular formation with the longitudinal margins of the sheet in lapped relationship, an expansible sealing sheath surrounding the said metallic expansible member, and means for compressing a fluid contained within the chamber member.

4. A well packer comprising a chamber member adapted to contain a fluid, an expansible bag surrounding said chamber member, ports in the chamber member and bag for flow of liquid from the chamber member into the bag, a metallic expanding sleeve surrounding the bag comprising a plate bent into tubular formation with its longitudinal margins overlapping, means within the chamber member for compressing a fluid contained therein, compressible well sealing means carried exteriorly of the metallic expanding sleeve, means for compressing a fluid contained within the chamber member.

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