Nov. 15, 1938. A. PRANGER ET AL 2,136,465

OIL SAVER

Filed Sept. 28, 1936 2 Sheets-Sheet 1

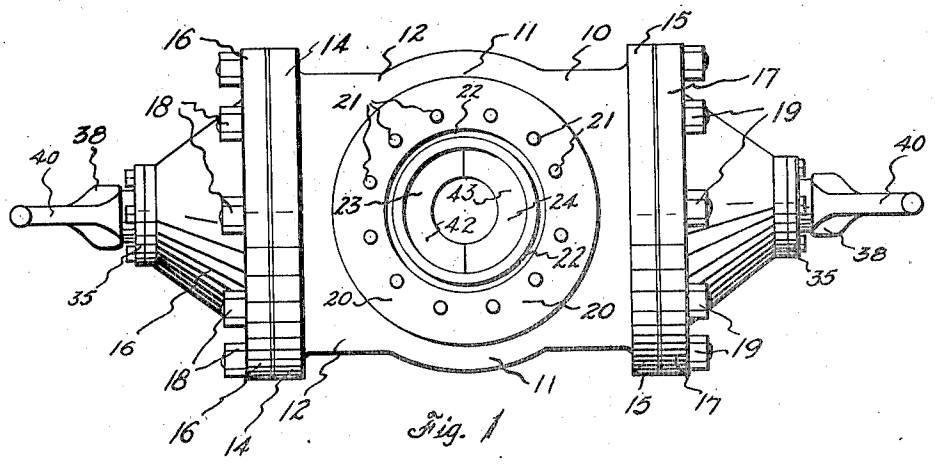


Fig. 1

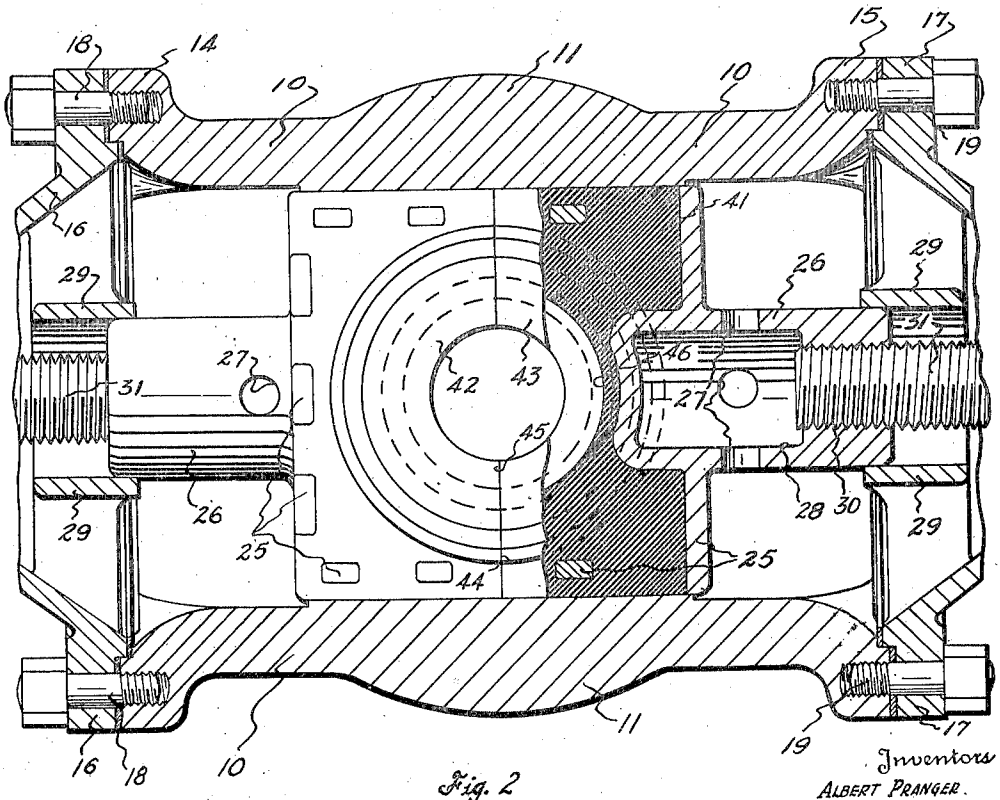


Fig. 2

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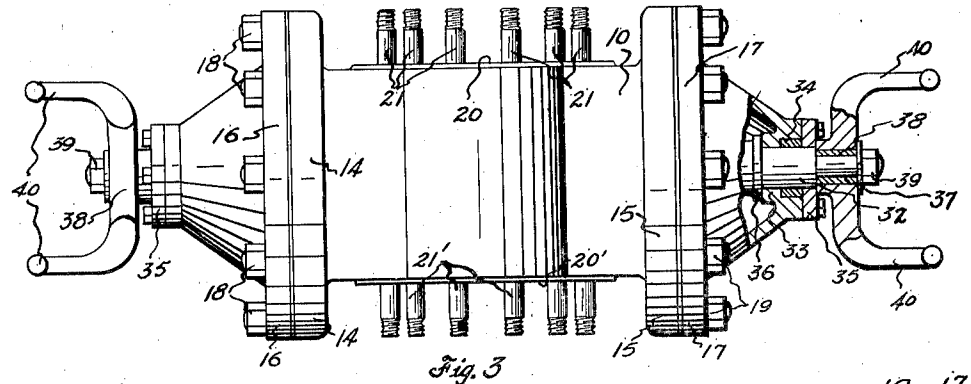


Fig. 3

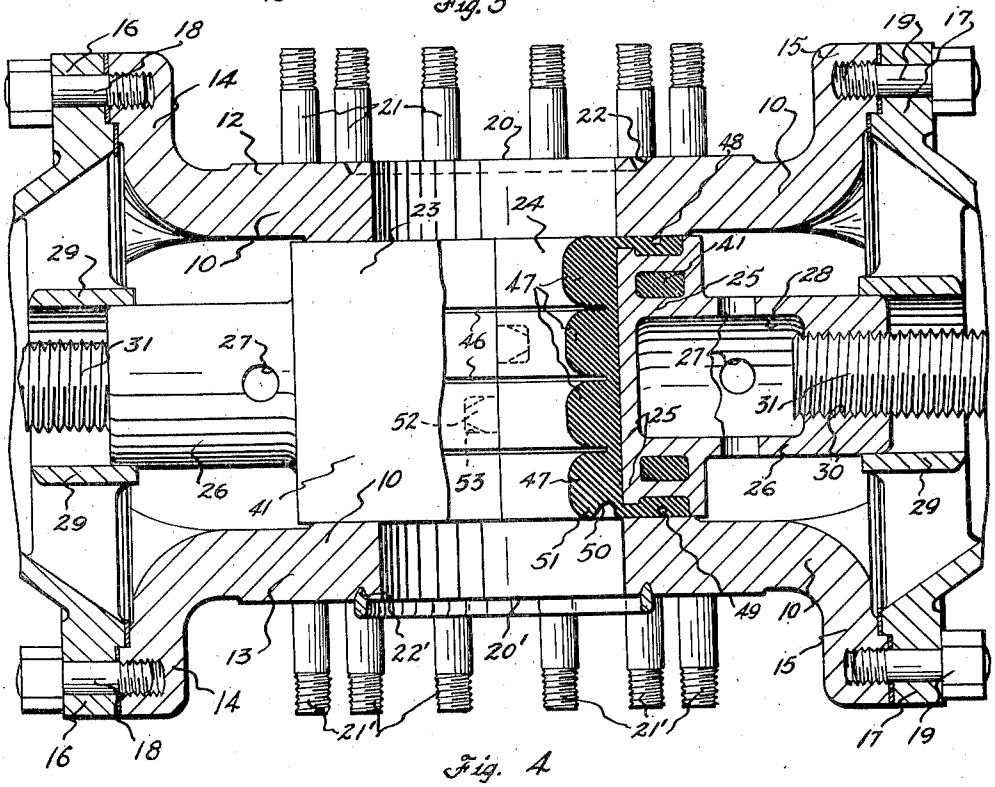


Fig. 4

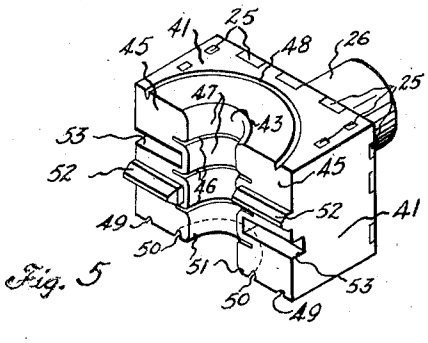


Fig. 5

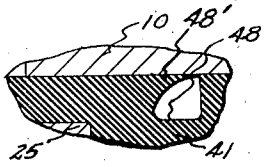


Fig. 6

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2,136,465

OIL SAVER

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Application September 28, 1936, Serial No. 102,963

3 Claims. (Cl. 251—51)

This invention relates to oil savers. More particularly, it has to do with devices for use in connection with oil wells and the like, to prevent the escape and waste of fluid produced and confined in the well under pressure.

One object of the invention is to provide a practical and highly efficient device which is effective under high fluid pressures for sealing off the space between an outer well casing tube and an inner tube, rod or other interposed element, either in well drilling operations or in the flow control of producing wells.

Another object is to provide a structure for the practical utilization of a durable packing material that will effectively resist and overcome the naturally deleterious and destructive action of well fluids that seriously affects and deteriorates the ordinary rubber materials more commonly employed heretofore in well packings.

A further object is to produce in particular a device specially applicable to a well casing head arrangement whereby to provide a dependable and durable seal therefor.

Other objects and advantages to be attained will hereinafter more fully appear in the following description.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Figure 1 is a top plan view of the housing of a device illustrative of a practical embodiment of the invention;

Figure 2 is a fragmentary horizontal, sectional view, on an enlarged scale, showing the interior structural features;

Figure 3 is a side elevation, on the same scale as Figure 1, of the housing with a portion of an end closure head packing extension broken away and in partial section;

Figure 4 is a vertical section of the parts shown in Figure 2 and on the same scale;

Figure 5 is a detail isometric view of one of the packing blocks detached; and

Figure 6 is a fragmentary section, on an enlarged scale, showing detail of the undercut grooving of the resilient material of the packing block elements.

Referring now to the drawings, the numeral 10 designates the housing of the device generally. As shown, the housing body is a one-piece casting, preferably steel of high tensile strength, accurately machined on the outside to receive standard flanged fittings and also machined on the inside to produce effective sealing surfaces for the movable packing elements to withstand high pressures.

The housing, as shown, and which is an ideal form, is generally round in cross section, except that its middle portion 11 is substantially rectangular interiorly and flat throughout at the top and bottom on the outside, as at 12, 13.

At opposite ends, the housing body 10 is annularly flanged, as at 14, 15, respectively, and to said flanged portions, heads 16, 17, are respectively secured by bolts 18, 19.

The housing body 10 is provided at its top with a machined face 20 and an annular series of securing bolts or studs 21 for the attachment of a standard flanged pipe fitting (not shown), said machined face 20 being provided with an annular groove 22 for the reception of a standard metallic gasket ring (not shown). A similar pipe fitting face 20', studs 21' and groove 22' are provided at the bottom of the housing body.

Slidably fitted within the housing body 10 are two opposed packing blocks 23 and 24, said blocks each comprising a metallic body frame 25 which is cast or otherwise made in generally hollow form or cage-like and provided with a hollow cylindrical shank extension 26, said shank extensions having apertures 27 establishing communication between the chambered portion 28 thereof and the surrounding space in the body 10 and heads 16, 17.

In the heads 16 and 17 of the housing body 10, are provided central cylindrical guide portions 29 in which the shank portions 26 of the packing blocks 23 and 24 are slidably fitted, said shank portions 26 being internally screw-threaded, as at 30, to receive the adjusting screws 31, which latter are swiveled, as at 32, in the outer bearing portions 33 of the heads 16 and 17.

The bearing portions 33 of the heads 16 and 17 are preferably provided with suitable self-tightening packings 34 and cooperating retainer caps 35. As shown, the screw members 31 are each provided with a thrust collar 36 abutting the inner end of the bearing portion 33, while the outer portion of the screw member 31 is reduced in diameter and has keyed thereon, as at 37, a handle member 38 which is retained by a nut 39, said handle member preferably having the two crank arm extensions 40, as shown.

Molded on the hollow but rigid cage-like body 25 of each of the packing blocks 23 and 24, is a

body of elastic compressible material 41, preferably a material now generally used in the art to which the invention is more particularly adapted, called "Duprene", which has all the elastic qualities of heretofore used rubber materials but is further resistant to the deleterious action and effect of the well fluids encountered in the use thereof. This is an important advantage in the present invention.

The packing blocks 23 and 24 are of general rectangular external form and they are made so as to normally have a sliding fit within the correspondingly machined rectangular inner face portions of the housing body 10. Preferably, portions of the body frame 25 are exposed and flush with the faces of the blocks.

The meeting portions of the two packing blocks 23 and 24 are provided with central generally semi-circular recessed portions 42, 43, respectively, and transverse square and flat-faced meeting portions 44, 45, on opposite sides of said semi-circular recessed portions.

The semi-circular recessed portions 42, 43, of the resilient compressible bodies 41, are grooved annularly, as at 46, thereby producing, in effect, a plurality of separate annular ribs or collars 47 to engage about the interposed tube or element to be packed off in the housing 10. So, too, it is preferable to provide the resilient compressible body portions 41 with semi-circular grooves 48, 49, at top and bottom thereof, respectively. It is further preferable to undercut the inner side walls of the grooves to provide an annular lip 48' which is forced into sealing contact with the adjacent face of the housing 10 by the fluid pressure in the well (see Figure 6 of the drawings).

The annular grooving 46 of the portions 42 and 43 of the respective packing blocks 23 and 24, to produce a multiplicity of engaging collars 47, permits tubing or elements with coupling enlargements or other surface protuberances to be moved forcibly between the packing blocks 23 and 24 and at the same time assures the effective sealing against the flow of the well fluids under pressure around the interposed tube or element while the annular top and bottom grooving 48, 49 of said resilient compressible material affords a most effective seal between the contiguous machined faces of the housing body 10 and said packing blocks 23 and 24 as each rib or collar portion 47 separately engages the tube or element located therebetween.

Preferably, the lowermost rib or collar portion 47 of each packing block 23 and 24 is provided with a semi-circular groove 50 in the underside thereof, thereby producing, in effect, an annular tongue portion 51 which is compressed by the well pressure tightly about the interposed tube or element when the device is applied in use.

As shown more clearly in Figure 5 of the drawings, the meeting squared face portions 44 and 45 of the packing blocks 23 and 24 are respectively provided with transverse rib portions 52 and grooves 53, arranged in staggered relation on opposite sides of the blocks, whereby, when said blocks are brought together in engaging relation to the interposed tube or element to be packed off, the rib portions 52 of the one block enter the correspondingly grooved portions 53 of the opposite block whereby to afford a more effective seal between the squared meeting faces of the two blocks, and by which arrangement the necessity of making the blocks separately in rights and lefts is obviated.

By machining the interior faces of the housing body 10 and fitting the corresponding external rectangular faces of the packing blocks 23 and 24 normally accurately thereto, and slidably fitting the shank portions 26 of the body frame 25 in the central guide portions 29 of the heads 16 and 17, respectively, proper alinement is assured and binding of the packing blocks 23 and 24 in the housing is practically prevented and at the same time any tendency to bend the adjusting or take-up screws 31 is avoided, by which arrangement an effective seal is provided to prevent the escape of the well fluids under pressure. So, too, a more effective sealing between the interposed tube or other element and the engaging faces of the packing blocks 23 and 24 is afforded by the provision of the annular grooves 46 and plurality of engaging ribs or collars 47, together with the under-grooving 50 and annular lip formation 51 of the lowermost rib or collar portion 47, as hereinbefore described.

Obviously, the device admits of considerable modification within the spirit and scope of the invention as defined in the appended claims. The invention, therefore, is not limited to the specific construction and arrangement shown in the accompanying drawings.

What we claim and desire to secure by Letters Patent, is:

1. In an oil saver, a body housing having top and bottom openings for the passage of an element therethrough to be packed off, and a pair of opposed packing blocks slidably fitted in said body housing, each packing block comprising a cage-like body frame having a shank extension provided with operating screw actuating means whereby said blocks may be moved towards and from each other to engage and disengage the interposed element within the body housing, and a body of resilient compressible material molded into and covering said cage-like body frame, the top, bottom and side faces of said body of resilient compressible material being shaped to slidably fit corresponding interior face portions of said body housing and the meeting portions of said pair of packing blocks being provided with interfitting ribs and grooves and formed with central semi-circularly recessed portions having a series of annular grooves providing separate annular collar portions to surroundingly engage the interposed element within the body housing with sealing effect, the top and bottom faces of said resilient compressible body being annularly grooved and the lowermost of said annular tube engaging collars being also annularly grooved on its underside.

2. In an oil saver, a body housing of generally rectangular interior form and machine faced, and having central openings in its top and bottom for the passage of an element therethrough to be packed off, the top and bottom of the body housing being externally machine faced surrounding said central openings and having provision for the attachment of outer tube fittings, the opposite transverse ends of said body housing having outwardly tapered hollow end closure members fitted with machine faced meeting portions, said closure members having machine finished inner guide portions and axially alined outer bearing portions, opposed packing blocks in said body housing, said blocks comprising metal body members having internally screw-threaded shank extensions fitted slidably in said guide portions of said closure members, screw members fitted cooperatively in said shank extensions and swiveled rotatably but without endwise movement in said outer

bearing portions of said closure members, and manipulating handles on said screw members, said packing blocks each having an integrally molded body of resilient compressible material of generally rectangular exterior form slidably fitted to the rectangular machine faced portions of the body housing and generally flat faced meeting portions recessed semi-circularly to fit about the interposed element inserted for packing in said body housing, said semi-circularly recessed portions of the resilient compressible packing block body being annularly grooved to produce a multiplicity of separately acting element engaging collars, the lowermost of said collars having an annular groove in its under side producing an annular fluid pressure compressible lip and the top and bottom faces of the packing block body having semi-circular grooves therein, the inner walls of said semi-circular grooves being undercut to produce annular lips to engage the adjacent face of the housing.

3. In an oil saver, a body housing having an opening in top and bottom for the passage of an element therethrough to be packed off, opposed packing blocks slidably fitted in said body housing, and means for moving said blocks towards and from each other and for holding them in their respective positions, said blocks each comprising a rigid body frame and a body of resilient compressible material formed within and covering the frame, the meeting portions of said blocks having interfitting ribs and grooves and central semi-circular recesses to fit about an interposed element inserted in the body housing, said recessed portions being annularly grooved to produce separate element-engaging collar portions on said blocks, the blocks having semi-circular grooves in their top and bottom faces and the lowermost of said collar portions having annular grooves in their undersides producing annular fluid pressure compressible lips.

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