H. H. WATKINS.

OIL PUMP.

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1,421,629.

Patented July 4, 1922.

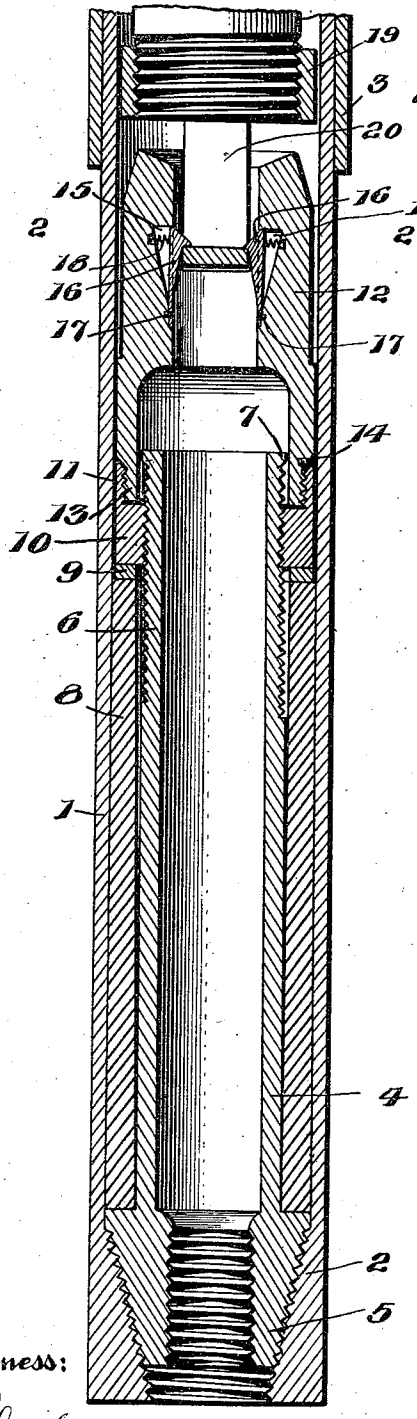
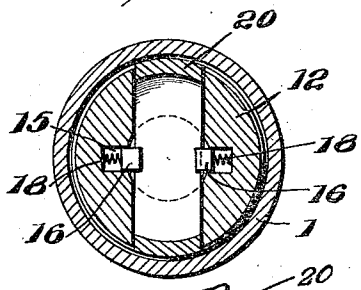


Fig. 1.

Fig. 2.



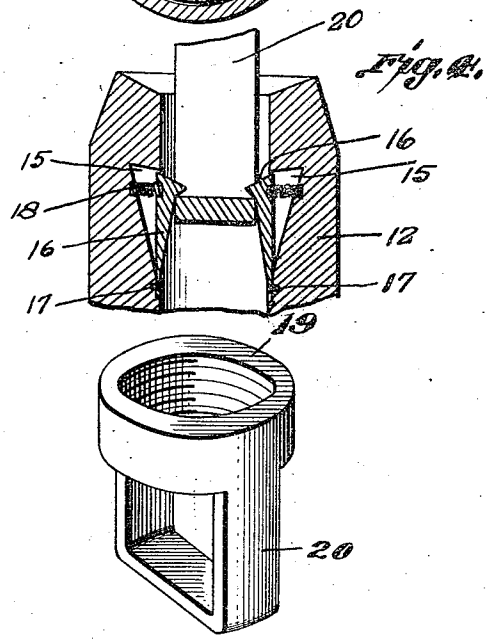


Fig. 3.

Witness:

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UNITED STATES PATENT OFFICE.

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OIL PUMP.

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To all whom it may concern:

Be it known that I, HERBERT H. WATKINS, a citizen of the United States, residing at Homer, in the parish of Claiborne and State of Louisiana, have invented certain new and useful Improvements in Oil Pumps; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to improvements in oil well pumps, having for an object to provide a novel form of standing valve therefor, capable of being readily removed from the working barrel of a pump while the same is at the bottom of a bore and replaced as may become necessary towards the proper functioning of the pump, thus, eliminating the necessity of pulling the tubing from said bore, and by consequence, effecting a material saving of oil, time and labor.

Another object of the invention may be stated to reside in providing the standing valve casing with an advantageous form of packing, whereby when said casing has been engaged with the working barrel, it will be caused to establish a fluid tight connection as between the casing and barrel and hence, will permit the passage of oil only through the standing valve.

Yet another object of the invention is to provide a novel form of working barrel, the same being so arranged as to permit of connection between it and the standing valve casing upon lowering of said standing valve casing into engagement therewith and the returning thereof in the proper direction.

Other objects will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawings and in the detailed following description based thereon, set out one possible embodiment of the same.

In these drawings;

Fig. 1 is a vertical longitudinal section through a standing valve casing and working barrel constructed in accordance with my invention;

Fig. 2 is a horizontal section taken on the line 2—2 of Figure 1 looking in the direction in which the arrows point,

Fig. 3 is a detail in perspective of the attachment provided the traveling valve of the pump, whereby connection between the usual sucker rods which carry said traveling valve and the standing valve casing may be effected, and

Figure 4 is an enlarged detail view of the detachable connection of the standing valve and piston rod.

Having more particular reference to the drawings, in connection with which like characters of reference will designate corresponding parts throughout, 1 indicates the working barrel of the pump having internal screw threads 2 formed at its lower end as clearly shown in the Figure 1. As will be understood, the upper end of this working barrel is connected in a manner common in the art, to the usual tubing, shown in fragment and indicated by the numeral 3.

The standing valve forming a part of my invention includes a hollow cylindrical casing 4 having an enlarged externally screw threaded lower end 5 adapted for engagement with the internally screw-threaded portion 2 of the working barrel 1, and an externally screw threaded upper portion 6 formed at its extreme upper end with a flange 7, the purpose of which will be hereinafter described. In this connection, it is to be noted that an annular shoulder is formed at the lower end of the standing valve casing 4 by reason of the arrangement of the enlarged externally screw threaded portion 5 thereof and this shoulder serves as an effectual abutment for a solid rubber packing sleeve 8 which is snugly engaged over the standing valve casing 4 and extends for the greater part of its length. A steel washer or other ware compensating device, indicated by the numeral 9, is also arranged over the upper end of the cylindrical standing valve casing 4, resting upon the adjacent upper end of the rubber packing 8, and receives thereon, the locking sleeve 10, said sleeve, as will be noted upon reference to the Figure 1, being formed with an annular flange 11 internally screw threaded and adapted to be turned into engagement with the externally screw-threaded portion 6 of the standing valve casing. Also, an internally screw-threaded annular flange is formed integral with the upper portion of

the locking sleeve 10 and co-extends therewith, as indicated at 11.

A hollow cylindrical head 12 is provided the standing valve casing 4, having a reduced externally screw threaded lower end portion 13 which is adapted to be turned into engagement with internally screw threaded annular flange 11, thus effecting coupling as between said casing 4 and said head 12, such connection being locked through the medium of a set screw 14 which is turned into engagement with the screw threaded portion 13, the head of this locking screw, of course, being arranged flush with the peripheral surface of the annular flange. In order to prevent complete disengagement of the locking sleeve 10 from the screw threaded portion of the standing valve casing 4, the upper end of this casing is preferably flanged, as previously indicated by the numeral 7, thus interrupting the external screw threads on said portion 6 and by consequence, offering an abutment, which will limit the upward rotary movement of the sleeve 10 with respect to the casing 4. Pockets 15 are formed in the opposite sides of the bore of the head 12 and serve to receive catches 16 therein, said catches being secured as at 17 to the lower portions of the pockets and having slightly bevelled inwardly disposed lips formed upon their free portions adapted to receive and engage therebetween, means hereinafter described. Coiled springs 18 are arranged in these pockets 15 and by engaging the upper portions of the several catches 16 serve to normally retain the same in their innermost positions.

Upon the lower end of the usual travelling valve casing, which I have fragmentally shown in the accompanying drawings and indicated for the purpose of convenience, by the numeral 19, I form a substantially U-shaped extension 20, such extension being of a size and shape as will permit of snug reception in the upper portion of the bore in the cylindrical head 12. Thus, it is to be understood that when the U-shaped extension 20 on the lower end of the travelling valve casing 19, is engaged in the lower portion of the bore in the head 12, the base or horizontal portion thereof will be engaged by the spring pressed catches 16 and therefore, that a lifting connection as between said traveling valve casing, which is secured to the usual sucker rods, and the standing valve casing will be effected. Before this lifting operation is begun, it is, of course, understood that the standing valve casing is first released from the barrel by turning the standing valve until the threaded lower end 5 thereof is out of engagement with the screw threads 2. The pressure upon the catches 16 is sufficient to hold them in engagement with the extension 20 for lifting the standing valve when the latter is released from the barrel. Also, the connection between the travelling and standing valve casing will be such as to prevent relative rotary movement between the same and in consequence, upon rotation of the travelling valve casing, corresponding motion will be imparted to the standing valve casing.

The operation of my improved pump may be reviewed as follows:

If desired, the working barrel 1 may be lowered to the bottom of the oil well 4, having connection, as hereinbefore stated, to the usual tubing 3. With the working barrel 1 resting upon the bottom of the bore, the standing valve casing 4 with its packing 8, locking sleeve 10 and cylindrical head 12 in assembled relation, are introduced into the upper end of the tubing 3 and lowered into the valve, it being borne in mind, that the lower end of the travelling valve casing 19 is received in the upper end of the head 12 and is held in such engagement by means of the spring pressed catches 16. With lowering of the standing valve casing 4 into the working barrel 1, the sucker rods (not shown) are then rotated in a direction to cause the screw threaded portion 5 of the standing valve casing 4 to engage with the internally screw threaded portion formed on the lower end of the working barrel 1. When the screw threaded portion 5 of the standing valve casing has been completely engaged with the working valve, further rotation of the casing 4, of course, will be prevented, and with continued rotation of the sucker rods. the locking sleeve 10, which was previously arranged at the upper portion screw threaded part 6 of the standing valve casing will be then turned downwardly over these screw threads and will exert a gradual pressure upon the hollow cylindrical packing 8, thereby spreading said packing laterally and effecting a fluid tight connection between the standing valve casing 4 and the working barrel 1, thus permitting the passage of oil only through the standing valve. With the standing valve casing now in position with the working valve 1, it becomes desirable to disengage the travelling valve casing 19 from the standing valve casing head 12 and to effect this, an upward pull is imparted thereto by the sucker rod connection. As the lower end of the standing valve is in locking engagement with the barrel 1, the force of the upward pull upon the U-shaped extension 20 will counteract the pressure exerted by the expansible coiled springs upon the bevel lip of the catches 16 and by consequence, said catches will be moved outwardly into their respective pockets, thereby disengaging the base or horizontal part of the extension 20 and permitting the free withdrawal of the traveling valve casing. In

the event that it becomes necessary to remove the standing valve casing from the working barrel while such barrel is in its lowered position in a well, the travelling valve casing is lowered until the U-shaped extension 20 on its lower end is engaged by the spring pressed catches 16 arranged in the hollow cylindrical head 12, whereupon, the sucker rods are rotated in a direction opposite to the first explained rotary movement, in order to effect disengagement of the screw threaded portion 5 of the standing valve casing with the screw threaded portion 2 of the working barrel 1. Previous to the disengagement of the screw threaded portion 5 of the standing valve casing 4 with the working valve 1, however, the locking sleeve 10 will have been turned to its uppermost position upon the screw threaded portion 6 of said standing valve casing, allowing the rubber packing 8 to return to its normal position, and thus prevented from exerting pressure upon either the valve casing 4 or the working barrel 1. By reason of the flange 7, the locking sleeve 10, of course, will be prevented from having any further rotary movement and therefore, continued rotary motion of the sucker rods will be directed to the standing valve casing 4 in order that the screw threaded lower end of portion 5 thereof will be turned out of engagement with the portion 2 of the working barrel 1. With the standing valve casing 4 disengaged from the working barrel and the rubber packing 8 in its non-pressure exerting position, said standing valve casing may be then freely drawn upwardly out of the working barrel and the tubing 3, whereupon it may be repaired and again lowered into engagement with the working valve 1 in the manner heretofore described.

Manifestly, the construction shown is capable of considerable modification and such modification as is within the scope of my claims I consider with the spirit of my invention.

I claim:

1. In combination with an oil pump, a working barrel having an internally screw threaded portion, a hollow cylindrical standing valve casing provided with an externally screw threaded portion engageable with the screw threaded portion of the working barrel, a head for said standing valve casing, internal spring pressed catches carried by said head, and a travelling valve casing having a substantially U-shaped extension formed on its lower end receivable in said head and adapted to be engaged by said spring pressed catches, as and for the purpose set forth.

2. In combination with an oil pump, a working barrel having an internally screw threaded lower portion, a standing valve casing having an enlarged externally screw-threaded lower end adapted for engagement with the screw threaded portion of the working barrel, said enlarged screw threaded portion of the casing providing an annular shoulder at the lower portion thereof, hollow cylindrical packing means arranged over the cylindrical standing valve casing and resting on said annular shoulder, the upper portion of the standing valve casing being externally screw threaded, a locking sleeve turned into engagement with said upper screw threaded portion, means on the upper end of the standing valve casing for limiting upward rotary movement of said locking sleeve with relation thereto, a head engaging said locking sleeve, oppositely disposed spring pressed internal catches arranged on said head, and a travelling valve casing having a substantially U-shaped extension formed on its lower end adapted for snug reception in said head and to be engaged by said spring pressed catches, as and for the purpose set forth.

In witness whereof I have hereunto set my hand.

HERBERT H. WATKINS.