May 17, 1949. H. B. YOUNG 2,470,540

PROTECTIVE SLEEVE FOR PUMP RODS

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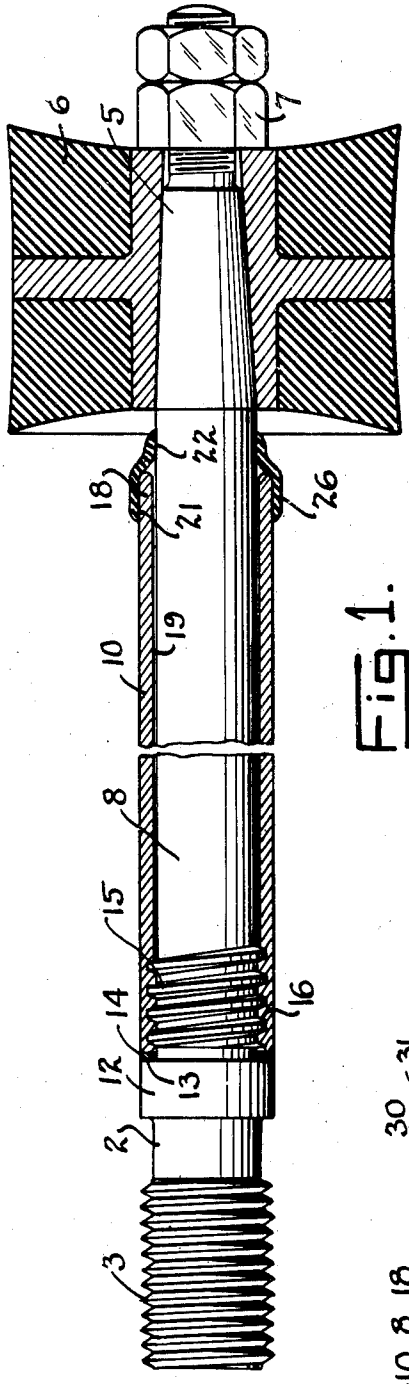


Fig. 1.

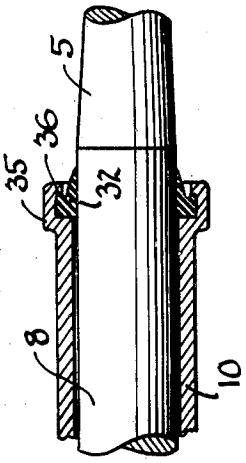


Fig. 3.

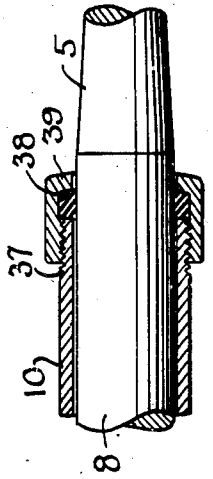


Fig. 4.

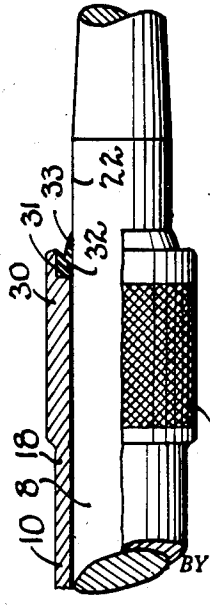


Fig. 2.

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PROTECTIVE SLEEVE FOR PUMP RODS

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10 Claims. (Cl. 74—579)

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The invention relates to a protective sleeve for pump rods and particularly that type of pump where the pump rod is immersed in the liquid being pumped so that there is a tendency to wear the rod where it passes through the end of the pump cylinder.

It is one of the objects of the invention to provide a protective sleeve for pump rods so that such sleeve will take the wear of the stuffing box at the end of the cylinder while maintaining a sleeve along the rod to prevent leakage.

Another object of the invention is to provide a protective sleeve for piston rods where the point of connection of the sleeve to the rod is adjacent the seal between the rod and sleeve so that the tension and compression on the sleeve will not affect such seal.

Another object of the invention is to provide a pump rod having a threaded area thereon in combination with a stop shoulder so as to receive a protective sleeve thereon.

Another object of the invention is to provide a protective sleeve to be threaded on to a pump rod and sealed at each end to the rod.

Another object of the invention is to provide a resilient seal for protective sleeves for pump rod to prevent leakage along the rod.

Still another object of the invention is to provide a liptight packing at the end of a pump rod protective sleeve.

Still another object of the invention is to provide a gland type packing at the inner end of a pump rod protective sleeve.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawings wherein:

Fig. 1 is a side elevation of a pump rod and illustrating the piston and protective sleeve thereon in section.

Figs. 2, 3 and 4 are sectional views of modified forms of the seal to be applied to the inner end of the protective sleeve.

A pump rod 2 is usually provided with the threaded end 3 whereby the rod is attached to the power end of the pump while the other end of the pump rod is arranged with a tapered portion 5 which receives the piston 6 and the retainer nuts 7.

The intermediate portion 8 of the rod is arranged to pass through the stuffing box of the pump cylinder in which the piston 6 works to perform the pumping operation as the piston is reciprocated.

The area 8 passes through the stuffing box

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with a reciprocating motion with each stroke of the pump and is soon subjected to tremendous wear. In the case of slush pumps for circulating drilling fluid in the rotary method of drilling wells, the fluid is made up of water, mud, sand and other foreign matter so that it is quite abrasive. High pressures are maintained and the stuffing box about the pump rod must be tightened frequently to prevent leakage, but the tightening of the stuffing box applies friction and pressure to the rod which results in wear and destruction of the rod.

The present construction provides a protective sleeve 10 which may be made up of any suitable material, but preferably a material which is harder and more wear resistant than would be the rod 8 due to the fact that the rod 8 must transmit the power of the pump and must be of a material adopted to receive shock and which will withstand repeated compression and tension stresses.

The sleeve 10 is arranged for attachment to the rod 8 by being slipped over the tapered end 5. The rod is provided with an outstanding flange 12 which presents a radial shoulder 13 which acts as a stop shoulder to receive a gasket 14 positioned around the rod 8.

The rod adjacent this stop shoulder 13 is provided with a thread 15 which is arranged to receive the internal thread 16 on the inside of the protective sleeve 10. When the sleeve 10 is screwed up tightly it will compress the gasket 14 and provide a seal at the power end of the rod.

It will be noted that the threads 15 are closely adjacent the stop shoulder 13 so that as the rod reciprocates and carries the sleeve 10 with it any compression and tension applied to the rod will be absorbed at the threads and will not exert a compression or tension at the area of the gasket 14 which would cause leakage.

The inner end 18 of the protective sleeve terminates adjacent the piston 6 and will be disposed inside of the pump cylinder and subjected to the pressure of the pump liquid at all times so that it is desirable to provide a seal at this inner end of the sleeve which will prevent leakage through the space 19 on the inside of the sleeve around the periphery of the rod.

A seal ring 26 has been shown in Fig. 1 as being composed of a resilient material such as rubber or the like which will fit snugly on the periphery 21 on the end of the sleeve and about the periphery 22 of the rod. This ring may be of any desired thickness or length which will withstand the pressure tending to drive it into the space 19.

With the construction and arrangement shown it seems obvious that the sleeve will be securely anchored to the rod and seals will be provided both inside and outside of the pump cylinder, but yet the sleeve will be readily replaceable in event of wear and a substantial saving will be accomplished as regards the pump rods.

Fig. 2 shows a modification of the inner end 18 of the sleeve 10 in that the end is thickened at 30 and recessed at 31 to receive a lip type seal ring 32 having the lip portion 33 thereon normally adhering to the periphery 22 of the rod due to the inherent resiliency of the rod. The periphery of the rod may be knurled at 34 to facilitate attachment and removal of the rod.

Fig. 3 shows a slightly different modification where the enlarged portion 35 is of such a size to receive the seal ring 32 and has an overhanging flange 36 thereon to retain the packing in position.

Fig. 4 shows a modification of the seal ring wherein the end of the sleeve is threaded at 37 and has a seal ring 38 abutting the end and confined in position by a cap 39 screwed on to the threads 37.

Broadly the invention contemplates a replaceable protective sleeve for pump rods which can be readily applied and attached and which will maintain a seal against leakage.

What is claimed is:

1. A reciprocating pump rod and sleeve therefor fitting closely about the rod including means to thread the sleeve on the rod, and a resilient seal to prevent leakage along the rod inside of said sleeve, said seal comprising a lip type packing disposed in the end of said sleeve.

2. A reciprocating pump rod and sleeve therefor fitting closely about the rod including means to thread the sleeve on the rod, and a resilient seal to prevent leakage along the rod inside of said sleeve, said seal comprising a lip type packing disposed in the end of said sleeve, and confined by an inwardly turned flange.

3. A reciprocating pump rod and sleeve therefor fitting closely about the rod including means to thread the sleeve on the rod, and a resilient seal to prevent leakage along the rod inside of said sleeve, said seal comprising a packing at the end of said rod, and a cap member to compress and confine the packing.

4. The combination of a reciprocating pump rod, a protective sleeve therefor, a shoulder on said rod, an end on said sleeve adjacent thereto, a seal gasket disposed between said end and shoulder, complementary threaded areas on said rod and in said sleeve to anchor the sleeve to the rod and to maintain the sleeve against said gasket, and a seal for the other end of said sleeve to seal off the pumped liquid.

5. A protective sleeve for reciprocating pump rods which have an externally threaded area thereon, said sleeve comprising, a hollow sleeve body, an internally threaded end of the body adapted to engage the threaded area of the pump rod, said sleeve extending around the unthreaded area of the pump rod as a reinforcing element therefor, and a resilient non-metallic seal on the other end of said sleeve and adapted to extend beyond said sleeve end and to firmly seal against said pump rod.

6. A protective sleeve for reciprocating pump rods which have an externally threaded area thereon, said sleeve comprising, a hollow sleeve body, an internally threaded end of the body adapted to engage said threaded area of said pump rod, said sleeve extending around the unthreaded area of said pump rod as a reinforcing element therefor, and a resilient, non-metallic seal on the other end of the sleeve and adapted to extend beyond said sleeve end and to firmly seal against said pump rod.

7. The combination of a reciprocating pump rod and a protective sleeve therefor, a coarse thread on the periphery of said rod adjacent the power end, a stop shoulder beyond said thread, a coarse thread in one end of said sleeve, a gasket clamped between said end of said sleeve and said stop shoulder by the tightening of said threads, and a resilient non-metallic seal about the other end of said rod and in communication with said sleeve so that the liquid under pumping pressure will not leak between said rod and said seal.

8. A reciprocating pump rod and reinforcing sleeve therefor, including means to thread one end of said sleeve on the rod, said rod being reinforced by the sleeve, and a resilient, non-metallic seal at the other end of said sleeve to prevent leakage along said rod inside of said sleeve, said seal comprising a circular band to adhere to said sleeve and said rod.

9. The combination of a piston rod and a protective, reinforcing sleeve therearound, a stop shoulder on the rod, an end on said sleeve adjacent thereto, a sealed member between said shoulder and end, means to connect the sleeve to the rod adjacent said end so that compression or tension forces are not transmitted between said rod and said sleeve, and a resilient, non-metallic seal about the other end of said rod and in communication with said sleeve so that liquid being pumped will not leak between said rod and said seal.

10. A piston rod, a protective sleeve fitting closely thereon, means at one end to affix said sleeve to said rod so that any expansion or contraction axially of said rod may occur independently of said sleeve, and a resilient non-metallic seal about the other end of said rod and in communication with said sleeve so that the liquid will not leak between the rod and seal.

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