Jan. 11, 1927. 1,614,381

G. E. MORELAND

SUCKER ROD CENTRALIZER

Filed Dec. 15, 1925

Fig. 1

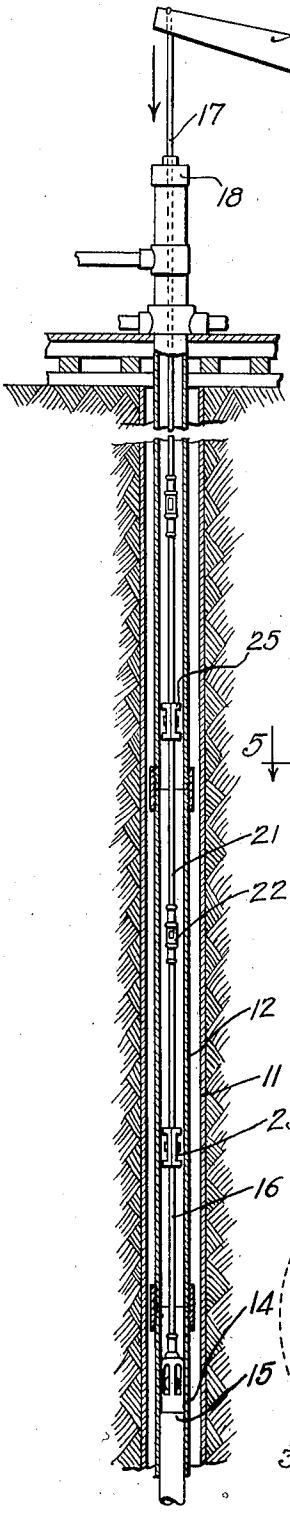


Fig. 2

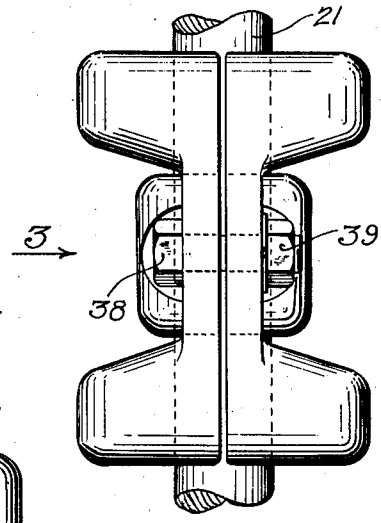


Fig. 3

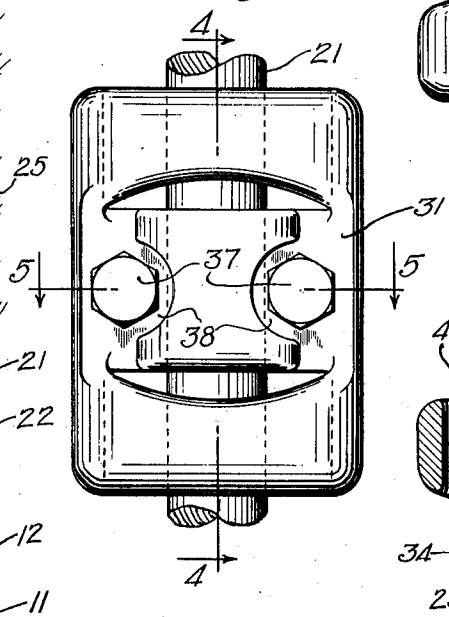


Fig. 4

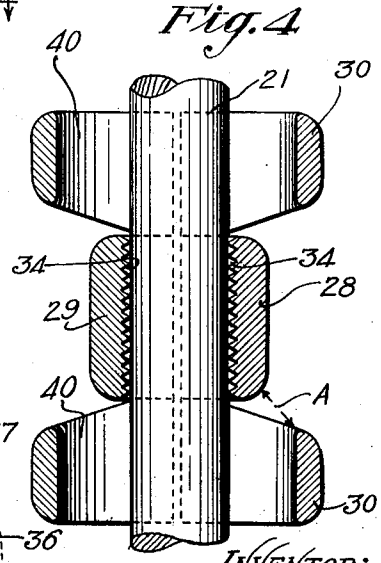
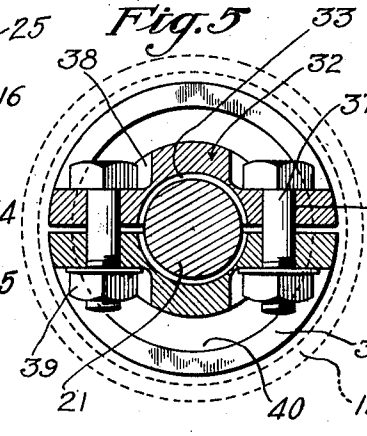


Fig. 5



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UNITED STATES PATENT OFFICE.

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SUCKER-ROD CENTRALIZER.

Application filed December 15, 1925. Serial No. 75,540.

My invention relates to well pumping and particularly to a centralizing means for a string of sucker rods which is employed in such apparatus.

In the oil pumping industry a pump plunger, which is situated in a barrel near the lower end of a well, is reciprocated by a string of sucker rods. The string of sucker rods extends to the surface of the ground through a pump tubing which supports the pump barrel, this pump tubing also extending to the surface of the ground. The upper end of the string of sucker rods comprises a polish rod which extends through a stuffing box secured at the upper end of the pump tubing, and this polish rod is attached to a walking beam whereby the pump plunger is reciprocated by means of the interconnecting string of sucker rods. The string of sucker rods consists of sucker rods which are about twenty feet in length and sucker rod couplings, by means of which the sucker rods are connected together. Each of the sucker rods has a head formed at the ends thereof from which threaded pins extend, and the couplings have threaded sockets formed in the ends thereof into which the threaded pins are threaded.

No oil well is absolutely vertical and straight, and as a result the sucker rods tend to rub against the inner wall of the tubing at one or more points. This rubbing being concentrated along the line of contact of the small diameter rod or rod head with the interior of the tubing, and also often concentrated at the point where the tubing bends sharply, not only tends to wear the rods but also to wear holes in the tubing.

It is an object of my invention to entirely prevent any wear on the rods proper by the use of centralizing means attached thereto, and to greatly reduce the wear on the tubing by distributing this wear over a larger arc of the tubing and over a length equal to the length of stroke of the pump.

It is also quite common for the rods and tubing to become injured by the rods whipping about in the tubing as the stress is applied to and released therefrom, and it is a further object of my invention to so apply a centralizing means as to prevent any substantial amount of such whipping.

It is a further object of this invention to provide a centralizing means of this character which will not materially interfere with the flow of oil through the pump tubing.

Other objects and advantages of the invention will become evident in the following description and in the drawing in which my invention is illustrated.

Referring to the drawing,

Fig. 1 is a vertical diagrammatic section illustrating my invention in use.

Fig. 2 is a view of the centralizing means of my invention.

Fig. 3 is a view taken as indicated by the arrow 3 of Fig. 2.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Fig. 5 is a section taken on the line 5—5 of Fig. 3.

In Fig. 1 of the drawing, 11 indicates a well into which a pump tubing 12 is extended. A pump barrel 14 is secured to the lower end of the pump tubing 12 and a pump plunger 15 is adapted to reciprocate in the pump barrel 14. Connected to the upper end of the pump plunger 15 is a string of sucker rods 16 which extends upward through the pump tubing 12 to a point above the surface of the ground. The upper end of the string of sucker rods 16 is provided with a polish rod 17 which extends through a stuffing box attached at the upper end of the pump tubing 12. A walking beam 20 is connected to the polish rod 17 and is adapted to reciprocate the string of sucker rods 16 which reciprocates the pump plunger 15 in the pump barrel 14. The string of sucker rods 16 is composed of sucker rods 21 which are about twenty feet in length and sucker rod couplings 22 by means of which the sucker rods 21 are connected together.

Centralizing means 25 are secured on the string of sucker rods 16, both close to the couplings and intermediate thereof for the purpose of distributing the wear evenly over a considerable area of the pump tubing, and for counteracting any tendency of the rods to whip around inside the tubing as tension is applied to and released therefrom. The details of the centralizing means 25 of my invention will now be described.

With reference to Figs. 2 to 5 inclusive, the centralizing means 25 consists of a pair of complementary parts 28 and 29. Each of the parts 28 and 29 has outer semi-cylindri-

cal rims 30 which are connected together by a a web 31. The central portion of each of the webs 31 is provided in the form of a hub portion 32 providing a semi-cylindrical channel 33. The walls forming each of the channels 33 are provided with gripping teeth 34. Openings 36 are formed in each of the channels 33 at each side of the hub portions 32 through which openings 36 bolts 37 extend. The hub portions 32 are recessed, as indicated at 38, to make room for the heads of the bolts 37 and for the nuts 39 which are advanced on the threaded ends of the bolts.

The complementary parts 28 and 29 are secured together by the bolts and nuts 37 and 39 around the sucker rods 21. The gripping teeth 34 formed in the channels 33 are forced into the surface of the sucker rod 21 as the nuts 39 are screwed home, thus rigidly securing the centralizing means 25 in place and preventing it from slipping on the rod. When the complementary halves 28 and 29 are secured together on a sucker rod 21, as shown in the drawing, the outer rim portions 30 constitute a complete annular rim and the hub portions 32 constitute a complete hub. The rim portions 30, as shown best in Figs. 3 and 4, have the central parts thereof narrower than the ends thereof. This has the effect of providing a wider space between the hub and the rim, as indicated at A in Fig. 4, and allowing a freer flow of oil through the centralizing means. The outer rim portions 30 may be made fairly thin so that openings 40 provided therethrough will be large. The different portions of the centralizing means 25 are rounded as shown in the drawing, so that there will be no corners and so that there will be only a minimum of attritional wear thereon by any sand or other abrasive which may be carried in the oil. The outer diameter of the outer rim portions 30 is slightly smaller than the inner diameter of the pump tubing 12, this being shown in Fig. 5.

The centralizing means 25 of my invention maintains the string of sucker rods in substantial alignment at all times, centralizing the string of sucker rods inside the pump tubing 12. During the down stroke of the string of sucker rods, bowing is prevented by the centralizing means of my invention. It is impossible for the string of sucker rods to bow to any extent, since only a slight bending motion in the string of sucker rods will bring the outer rim portions 30 of the centralizing means into engagement with the inner face of the pump tubing 12, and the string of sucker rods will be restrained from further bowing.

I claim as my invention:

1. A sucker-rod centralizing unit adapted for securance to a sucker-rod and formed to provide a hub-portion embracing said rod and an end rim spaced from said rod, said end rim being spaced from said hub and connected thereto at circularly spaced intervals, whereby fluid may circulate past said hub-portion and between said end rim and said rod.

2. A sucker-rod centralizing unit adapted for securance to a sucker-rod and formed to provide a hub-portion embracing said rod, a transverse web extending from said hub-portion and an end rim joined to said web portion and spaced from said hub-portion and said rod to permit free circulation of fluid past said hub-portion and between said rim and said rod.

3. A device as defined in claim 1 in which said unit is longitudinally split to form complementary members adapted to be transversely applied to a continuous portion of a sucker-rod; and means for drawing said members towards each other to grip said rod.

4. A device as defined in claim 2 in which said unit is longitudinally split to form complementary members adapted to be transversely applied to a continuous portion of a sucker-rod; and means for clamping said members to said rod.

5. A device as defined in claim 1 in which said unit is longitudinally split to form complementary members adapted to be transversely applied to a continuous portion of a sucker-rod and in which the hub-portion of each member is provided with gripping teeth; and means for drawing said members towards each other to cause said teeth to grippingly engage said rod.

6. A sucker-rod centralizing unit adapted for securance to a sucker-rod and formed to provide longitudinally spaced end rims and an intermediate hub-portion embracing said rod, said rims being spaced from said rod and said hub-portion and joined to said hub-portion at circularly spaced intervals, whereby fluid may freely flow between each rim and the sucker-rod and past said hub-portion.

7. A device as defined in claim 6 in which said unit is longitudinally split to form complementary members adapted to be transversely applied to a continuous portion of a sucker-rod; and means for clamping said members to said rod.

8. A device as defined in claim 2 in which said unit is longitudinally split to form two complementary members adapted to be transversely applied to a continuous portion of a sucker-rod; and clamping bolts extending through the complementary web-portions on opposite sides of said hub-portion for drawing said members towards each other into gripping engagement with the rod.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 9th day of December, 1925.

GEORGE E. MORELAND.