Dec. 28, 1943. D. ERICKSON 2,337,805

PUMP ROD SHIELD

Filed Nov. 8, 1941

Fig. 1

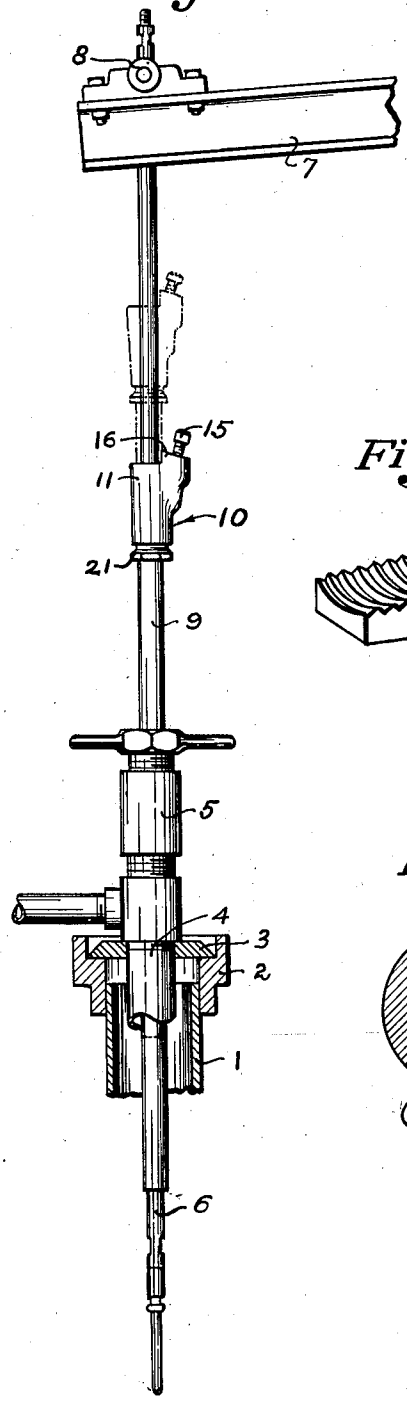


Fig. 2

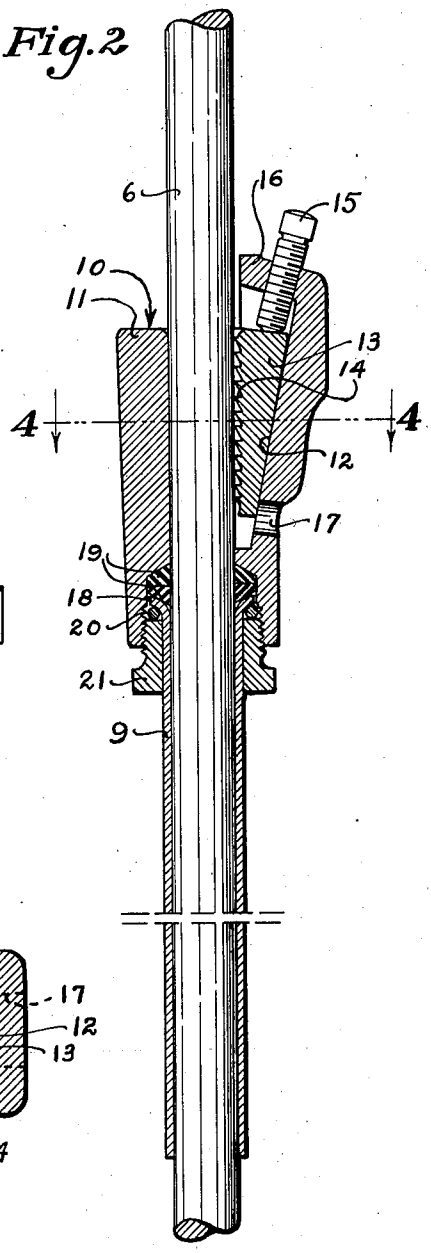


Fig. 3

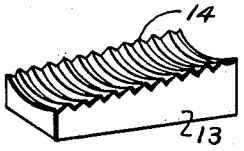
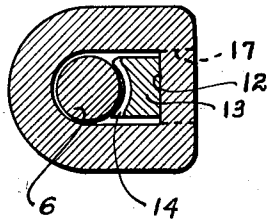


Fig. 4



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UNITED STATES PATENT OFFICE

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PUMP ROD SHIELD

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Application November 8, 1941, Serial No. 418,422

4 Claims. (Cl. 24—263)

This invention relates to an improvement in pump rod shields, particularly for use on polish rods or rods used in pumping deep wells, such as oil wells and the like, and also for use on pump rods generally, such as steam pumps, mud pumps, and other power driven pumps; as well as for use as a liner for any type of rod passing through a gland, that may be subject to wear.

It has been the practice heretofore to employ shields for such polish rods, but difficulty has been encountered in attaching them to the pump rods for ready removal therefrom when it is desired to transfer the shield from one rod to another, and to secure the same in place against the leakage of oil or fluid between the shield and the polish rod.

The object of this invention is to provide for the practical and effective securing of the shield to the polish rod, with a detachable connection therebetween, so that the shield may be transferred from one rod to another, and adjustably secured in place to accommodate use in different conditions, and yet sealed against leakage while in place.

This object is accomplished preferably by connecting the shield with the polish rod by means of a clamping unit which provides for adjustment of the shield on the rod as well as a detachable connection therewith, and provision is made for sealing the space therebetween by means of packing, to prevent the leakage of fluid.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a portion of a pumping unit of an oil well, showing the invention applied, with parts in section;

Fig. 2 is a vertical sectional view through the shield and clamping unit applied to the polish rod;

Fig. 3 is a detached, perspective view of the clamping wedge; and

Fig. 4 is a cross section through the polish rod and clamping unit on the line 4—4 of Fig. 2.

The invention is adapted for use primarily on a polish rod used in the pumping of deep wells which are previded usually with a casing 1, extending downward therein and having a casing head 2 at the upper end of said casing. A supporting ring 3 is seated in the casing head 2 and normally supports the tubing 4 that extends downward through the casing 1 to the pump that is located in the lower portion of the well for directing the pumped oil or other fluid upward therethrough.

A stuffing box 5 is secured to the upper end of the tubing 4, through which the usual polish rod 6 extends in passing downward through the tubing to the pump for operating the latter. The upper end of the polish rod 6 is secured to a power unit for reciprocating said polish rod, which is shown as a walking beam 7 pivotally supporting and operating the polish rod by means of a connection 8.

A tubular shield 9 surrounds the portion of the polish rod 6 immediately above the stuffing box 5 and extends slidably through the stuffing box, so as to cover and protect the exposed portion of the polish rod. The shield 9 is secured to the polish rod 6 by means of a clamping unit 10, so as to reciprocate with said polish rod, and the clamping unit 10 is constructed for adjustably securing the shield in place thereon.

As shown more in detail in Fig. 2, the clamping unit 10 is constructed with a body 11 that encircles the polish rod. At one side of the polish rod, the body 11 is provided with a longitudinally extending inclined surface 12 arranged at an acute angle to the axis of the rod and slidably receives a wedge 13 between said surface 12 and the adjacent side of the polish rod. The engaging face of the wedge 13 is provided with transverse teeth 14 therein to prevent relative slippage between the body 11 and the polish rod and to clamp said body securely on the polish rod.

The wedge 13 is held in engaged position by means of a set screw 15 that is threaded through an overhanging shoulder 16 formed on the body 11, in position to bear against the upper end of the wedge and press the same firmly against the polish rod. A hole 17 is formed in the body 11 adjacent the lower end of the wedge 13 to permit the insertion of a tool, such as a screw driver, into engagement with the lower end of the wedge 13 to loosen the latter by prying it away from its wedging position against the polish rod, when it is desired to adjust or remove the shield 9 therefrom.

The shield 9 projects into the lower end of the body 11, and has an outwardly directed flange 18, one side of which bears against packing 19 that is interposed between said flange 18 and the lower portion of the body, while also surrounding the polish rod 6. The underside of the flange 18 has a ring 20 bearing thereagainst, said ring being interposed between the flange 18 and the end of a packing nut 21 that is screwed into the lower end of the body 11. As the packing nut 21 is

screwed upward against the ring 20, the latter acts to press the flange 18 securely against the packing 19, compressing the latter tightly against the polish rod 6, as well as against the body 11, so as to form a tight joint therebetween and prevent the leakage of fluid under high pressure and between the shield 9 and the polish rod 6. At the same time, the ring 20 maintains the curvature of the flange 18 and presses the same against the packing without relative rotation as a result of the turning movement of the nut 21.

This arrangement makes it possible to insert the polish rod and shield through the stuffing box 5, whereby the stroke of the walking beam 7 may be adjusted as desired. After this adjustment of the walking beam, the shield 9 may be moved up or down relative to the polish rod 6, the wedge 13 being loose from the polish rod, to provide the proper position of the shield relative to the stuffing box, according to the stroke of the polish rod, thus allowing the shield to be of minimum length for the particular stroke desired. Thereafter, the shield may be clamped securely on the polish rod by tightening the set screw 15 which presses the wedge 13 securely into clamping relation with the polish rod, holding it in place thereon.

This arrangement also makes possible the use of smaller polish rods than have been conventional heretofore in combination with a shield. By using a smaller polish rod, the cost thereof may be reduced materially, and even the worn or unfinished rods may be used, which have been impractical heretofore due to the rough surface thereof which would cause rapid wear on the packing. The present shield would provide a smooth bearing surface in contact with the packing, at all times, thus obtaining longer wear of the packing in the stuffing box.

The shield may be made of stainless steel, copper, or non-corrosive material, whereby a great saving is effected in the amount of material required over what has been necessary heretofore in constructing the entire polish rod from such stainless steel or other non-corrosive material, and yet the same efficiency is obtained. The pitting or corrosive action of salt water, alkali and acid upon the polish rod causes minute pits or roughness in the polish rod, which wears out the packing rubbers or rings very rapidly. Therefore, by using a non-corrosive shield, much longer wear is obtained from the packing rubbers. In event the shield becomes worn it is rather inexpensive to replace in comparison with the cost of replacing an entire polish rod.

The detachable and adjustable connection of the shield with the polish rod makes it possilble to move the shield bodily lengthwise relative thereto, so as to accommodate for the desired stroke of the rod, and yet it makes possible the transfer of the shield from one rod to another as may be desired.

I claim:

1. A pump rod shield structure comprising a body having an opening therethrough adapted to receive a polish rod and to support a shield therefor, said body having an offset portion at one side thereof forming a guideway at one side of the opening, said guideway having an outer wall inclined in an upward and outward direction from said opening and having lateral walls on opposite sides of said outer wall, said outer wall having an inturned lug overlying said guideway, a wedge slidably mounted in said guideway, said wedge and back wall having plane abutting faces and the wedge having a concave toothed inner face to engage the polish rod, and a screw threaded through the inturned lug for adjustment of the wedge.

2. A pump rod shield structure comprising a body having an opening therethrough adapted to receive a polish rod and to support a shield therefor, said body having an offset portion at one side thereof forming a guideway at one side of the opening, said guideway having an outer wall inclined in an upward and outward direction from said opening and having lateral walls on opposite sides of said outer wall, said outer wall having an inturned lug overlying said guideway, a wedge slidably mounted in said guideway, said wedge and back wall having plane abutting faces and the wedge having a concave toothed inner face to engage the polish rod, and a screw threaded through the inturned lug for adjustment of the wedge, said offset portion having a lateral opening therethrough adjacent the lower end of the inclined wall for insertion of a tool through said lateral opening to loosen the wedge.

3. A pump rod shield structure comprising a one-piece body having an opening therethrough adapted to receive a polish rod and to support a shield therefor, said body having an offset portion at one side thereof forming a guideway at one side of the opening and in open communication therewith, the opposite side of the opening being semi-circular in cross section, said guideway having an outer wall inclined in an upward and outward direction from said opening and having lateral walls on opposite sides of said outer wall, said outer wall having an inturned lug overlying said guideway, a wedge slidably mounted in said guideway, said wedge and back wall having plane abutting faces and the wedge having a concave toothed inner face to engage the polish rod, and a screw threaded through the inturned lug for adjustment of the wedge.

4. A pump rod shield structure comprising a one-piece body having an opening therethrough adapted to receive a polish rod and to support a shield therefor, said body having an offset portion at one side thereof forming a guideway at one side of the opening and in open communication therewith, the opposite side of the opening being semi-circular in cross section, said guideway having an outer wall inclined in an upward and outward direction from said opening and having lateral walls on opposite sides of said outer wall, said outer wall having an inturned lug overlying said guideway, a wedge slidably mounted in said guideway, said wedge and back wall having plane abutting faces and the wedge having a concave toothed inner face to engage the polish rod, and a screw threaded through the inturned lug for adjustment of the wedge, said offset portion having a lateral opening through said outer wall adjacent the lower end of the wedge for insertion of a tool therethrough to loosen the wedge.

DAVID ERICKSON.