

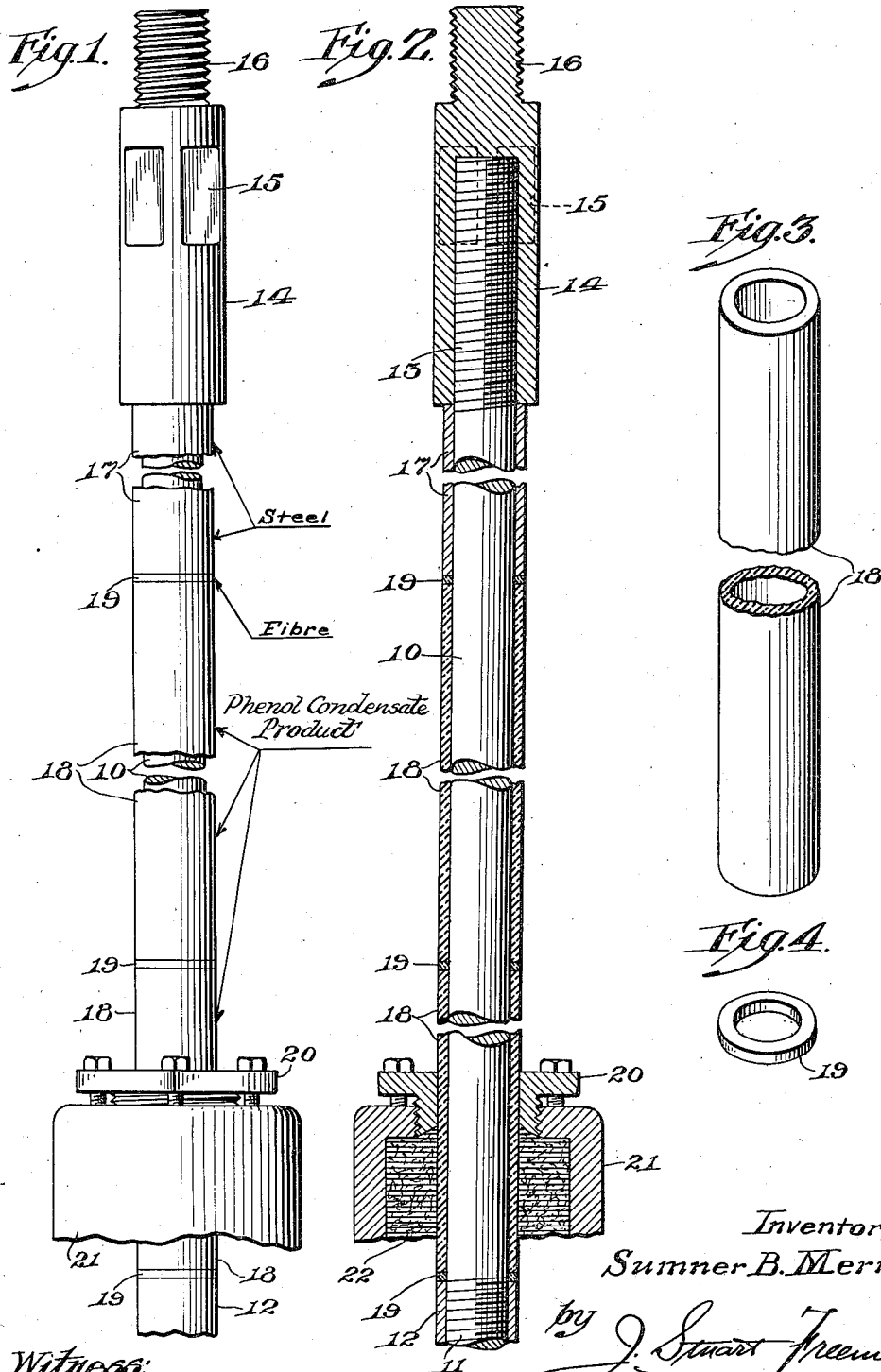
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POLISHED ROD FOR OIL WELL PUMPING

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## UNITED STATES PATENT OFFICE

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## POLISHED ROD FOR OIL-WELL PUMPING

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The object of the invention is to provide improvements in valve-operating rods broadly, but more especially in so-called polished rods for use in the pumping of oil wells.

In certain localities polished rods begin to corrode as soon as placed in operation, and the rate of corrosion is so rapid that in a few days it is clearly noticeable, while the rods are practically destroyed in from three to four weeks. This condition arises from the fact that salt water entering and uniting with the oil of a well attacks the metal rods, due to the many chemicals present in both the oil and the water. Consequently, the cost is high, both in rod replacement and because of the fact that wells are necessarily inactive while the rods are being changed.

The object of the invention therefore has been to provide a suitable and efficient cylindrical tubular covering for that portion of the polished rod which is exposed to the oil and water passing thereby, and towards this end to provide a fluid-tight connection between adjacent sections of the covering, such connection being of a material which tends to swell and increase the tightness of the connection when immersed in and subjected to the effect of the surrounding water, yet is not attacked or in any way affected by the oil and various chemicals present.

Another object, having in mind the protective covering of the exposed portion of a polished rod, is to provide around the upper portion of such a rod a steel or equivalent sleeve, to serve as a medium for operatively connecting the usual actuating clamp to the rod, said sleeve being preferably though not necessarily of the same diameter as the outer surface of the protecting covering, and joined to the adjacent section of such tubular covering by means of a fluid-tight connection of the same or similar type to that used between the adjacent sections of said covering.

With these facts and objects in mind, the present invention comprises details of construction and operation such as are fully brought out in the following description, when read in conjunction with the accompanying drawings, in which Fig. 1 is an elevation of a polished rod with its sheathing;

Fig. 2 is a longitudinal diametrical section of the same; Fig. 3 is a perspective view of one of the tubular sections of sheathing; and Fig. 4 is a perspective view of one of the washers employed to form with the tubular sections a fluid-tight connection therebetween.

Referring to the drawings, the complete polished rod comprises the usual steel or similar metallic core 10 having its lower end 11 threaded or otherwise formed so as to operatively connect with the usual sucker rod represented by the fragmentary portion of a threaded member 12 secured to and in fixed position upon said rod. The upper end 13 of said rod is also threaded to receive the enlarged head 14 of a coupling having a wrench-engaging polygonal surface 15, while the opposite end portion of said head terminates in a reduced threaded portion 16, adapted to be connected to any desired form of reciprocating mechanism (not shown).

Between the coupling 12 and the oppositely positioned coupling head 14, the rod 10 is surrounded by a suitable length of steel tubing 17, forming a sleeve normally engaged by the usual actuating or lifting clamp, and by other sections of tubing 18 comprising non-porous, long-wearing material, such as phenol condensate product, glyptol, a urea-formaldehyde such as pollapas, or any other artificial or synthetic resin preferably of phenoplastic type, all of which are impervious to moisture and are unaffected by any of the chemicals carried by the oil and water normally flowing past the polished rod while in operation.

Positioned between the adjacent ends of neighboring tubular sections of protective material, between the steel sleeve and the adjacent tubular section, and between the lowermost protective tube and the sucker rod, or a coupling connected thereto, are washers or gaskets 19 of a material such as fibre of suitable form, which is sufficiently absorbent to take up a slight amount of water, and as a result swell laterally and bind more tightly against the adjacent sections of tubing, yet which material is substantially unaffected

by any of the fluids or chemicals in contact therewith as they flow from the well.

In assembling the several elements comprising this improved form of polished rod, the several tubular sections and intervening washers are placed upon the rod 10 as shown, with additional washers between the series of tube sections and the oppositely positioned steel sleeve and sucker rod coupling, after which the upper coupling 14 is tightened with respect to the sucker rod coupling, and directly against the steel section 17, so that the several tubes and washers are bound therebetween as tightly as may be possible. The lower end portion of the completed rod it will be noticed extends through a cap or plug 20 closing the otherwise open end of a stuffing box 21 filled with suitable packing 22, this box 21 comprising the entrance to any suitable cylinder containing the usual sucker rod and valve mechanisms for the control of the oil (and incidentally the water present), as it is raised from the well upon the reciprocation of the polished rod.

In considering the scope of this invention, it must be borne in mind that the effective protection of the core 10 is the paramount consideration. Consequently, while this protection has thus far been found to be most completely assured by the employment of washers at the ends of and between adjacent tubes, it is to be understood that a material advance in the art over prior practice can be attained by the mere use of the tubes 18 without the presence of the washers, in which case the adjacent ends of such tubes are preferably interlocked to provide substantially fluid-tight joints, as for instance by providing the ends of such tubes with complementary male and female, or equivalent, interengaging portions. Similarly, the union between the steel clamp-engaging sleeve 17 and the adjacent tube 18, as well as between the lowermost tube 18 and the sucker rod connection 12, may be of any desired interengaging construction, such for instance as complementarily formed conical surfaces which throughout their circumferential extent bind together in uniform relation, under the pressure exerted by the relative movement of the lifting head 14 and the sucker rod connection 12 towards each other.

In practice it has been found that tubes of phenol condensate product and washers of vulcanized fibre are most satisfactory for the purposes here encountered. However, while these substances are the best used thus far, or known at the present moment, it is to be understood that the scope of the appended claims is to be considered as including any other substances in such classes as those mentioned which will perform the same function with substantially the same degree of efficiency, and with this fact in mind the appended claims have been drawn.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. A polished rod, comprising a core, a normally fixed radial extension upon each of the opposite ends of said core, a tube surrounding said core between said extensions, and one or more washers also surrounding said core between said extensions, said washers swelling when immersed in a liquid and creating a fluid-tight joint between said extensions and said tube.

2. A polished rod, comprising a core, a normally fixed radial extension upon each of the opposite ends of said core, a series of tubes surrounding said core between said extensions, and washers between consecutive tubes and between the end tubes and said extensions, said washers swelling when immersed in a liquid and creating a fluid-tight joint between said tubes and between said tubes and said extensions.

3. A polished rod, comprising a core to be protected, a relatively fixed stop upon one end of said rod, a section of tubing surrounding said rod, a head carried by the opposite end of said rod and adapted to be drawn towards said stop, and one or more washers surrounding said core between said head and said stop and swelling when immersed in a liquid, thus creating a fluid-tight joint between said tube section, said stop and said head.

4. A polished rod, comprising a core to be protected, a relatively fixed stop upon one end of said rod, a series of sections of tubing surrounding said rod, a head carried by and in threaded cooperation with the opposite end of said rod and adapted upon being rotated to be drawn towards said stop, and a washer between each pair of adjacent tube sections, and between the end tube sections and said stop and head respectively, said washers upon swelling, when subjected to a liquid, creating a fluid-tight joint between said tube sections, said stop and said head.

5. A polished rod, comprising a core, a pair of tubes surrounding said core, an expandible washer between said tubes, and means to compress said tubes against the opposite sides of said washer.

6. A polished rod, comprising a core, a pair of tubes surrounding said core, an expandible washer between said tubes, and a pair of relatively movable members secured to said rod and upon being drawn together being operative to bind said washer between said tubes, to create a fluid-tight joint.

7. A polished rod, comprising a core, a pair of tubes surrounding said core, an expandible washer between said tubes, a pair of relatively movable members secured to said rod and upon being drawn together being operative to bind said washer between said tubes, to create a fluid-tight joint, and

washers between said tubes and each of said members, to create additional fluid-tight joints.

8. A polished rod, comprising a core normally attached at one end to a sucker rod connection, a longitudinally adjustable head upon the opposite end of said core, a metallic sleeve surrounding said core and adapted to be gripped by an actuating clamp, a protective tubular section also surrounding said core, and expansible washers between said tube and said sucker rod connection and between said tube and said sleeve.

9. A polished rod, comprising a core normally attached at one end to a sucker rod connection, a longitudinally adjustable head upon the opposite end of said core, a metallic sleeve surrounding said core adjacent to said head and adapted to be gripped by an actuating clamp, a protective tubular section also surrounding said core, and expansible washers between said tube and said sucker rod connection and between said tube and said sleeve, said head and connection when drawn together being operative to compress said washers and form fluid-tight connections to prevent fluids from reaching said core.

10. A polished rod, comprising a core normally attached at one end to a sucker rod connection, a longitudinally adjustable head upon the other end of said core, a metallic sleeve surrounding said core adjacent to said head and adapted to be gripped by an actuating clamp, a series of protective tubular sections also surrounding said core, and expansible washers between adjacent tubular sections, and between said sections and said sleeve and said sucker rod connection, relative movement of said head with respect to said connection being operative to bind said washers to form fluid-tight joints to prevent fluids from reaching said core.

11. A polished rod, comprising a core, relatively adjustable radial extensions upon the opposite ends of said core, and a tube surrounding said core between said extensions, relative adjustment of said extensions towards each other operating to create a binding cooperation between the ends of said tube and said extensions, to prevent fluid from penetrating thereby to said core.

12. A polished rod, comprising a core, relatively adjustable radial extensions upon the opposite ends of said core, a plurality of tubes surrounding said core between said extensions, relative adjustment of said extensions towards each other operating to create a binding cooperation between adjacent ends of said tubes and between said tubes and said extensions, to prevent fluid from penetrating thereby to said core.

13. A polished rod, comprising a core, a pair of tubes surrounding said core, and means to compress said tubes together at their

adjacent ends to form a unitary fluid-tight protection for said core.

14. A polished rod, comprising a core normally attached at one end to a sucker rod connection, a longitudinally adjustable head upon the opposite end of said core, a metallic sleeve surrounding said core and adapted to be gripped by an actuating clamp, and a protective tubular section also surrounding said core and cooperating with said sleeve, said head and said connection, whereby relative movement of said head and said connection towards each other operates to provide a fluid-tight union between the said elements and thus providing a fluid-tight protection for said core.

In testimony whereof I have affixed my signature.

SUMNER B. MERRICK.