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H. T. SMITH

OIL WELL APPARATUS

Filed June 6, 1922

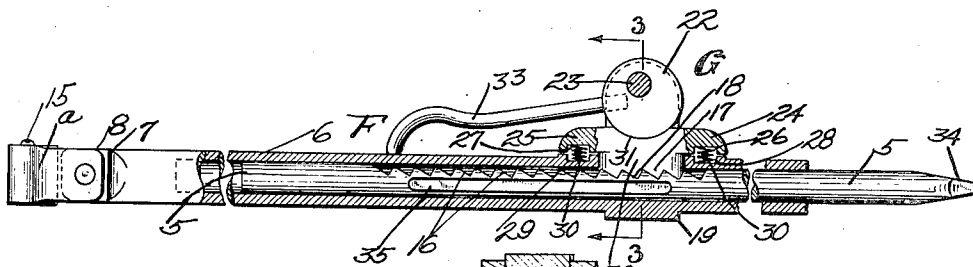
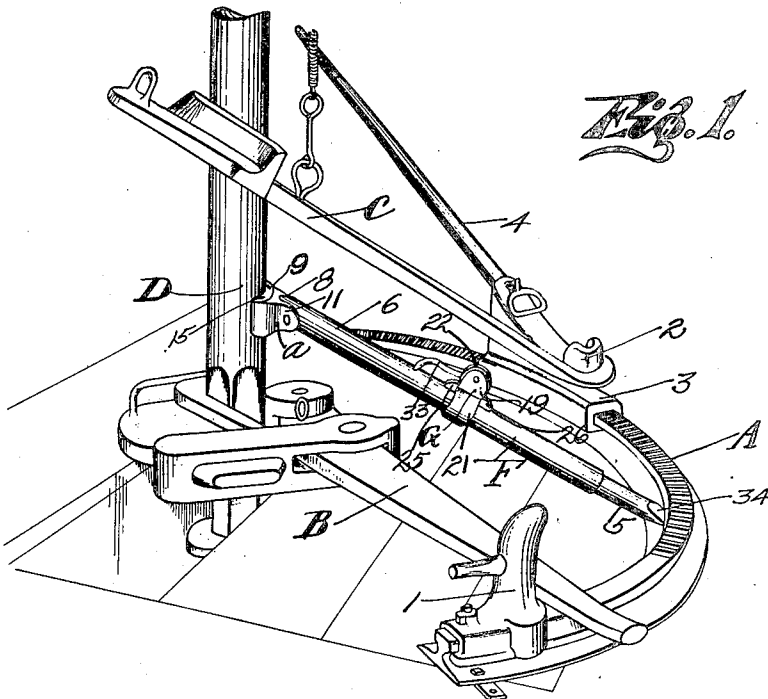


Fig. 2.

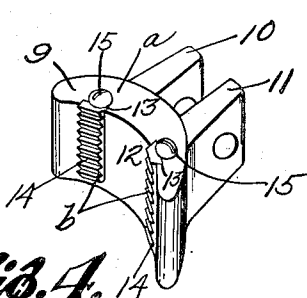


Fig. 4.

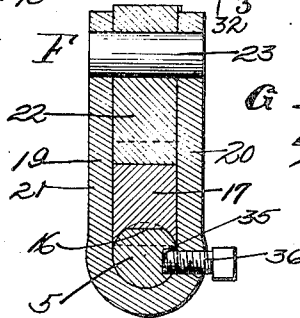


Fig. 3.

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UNITED STATES PATENT OFFICE.

HEWLET T. SMITH, OF OXNARD, CALIFORNIA.

OIL-WELL APPARATUS.

Application filed June 6, 1922. Serial No. 566,397.

To all whom it may concern:

Be it known that I, HEWLET T. SMITH, a citizen of the United States, residing at Oxnard, in the county of Ventura and State of California, have invented new and useful Improvements in Oil-Well Apparatus, of which the following is a specification.

This invention relates to oil well apparatus, and more particularly to apparatus for screwing and unscrewing or jointing or unjointing tools used in oil well drilling in the so-called standard or reciprocating drilling method. In this method the tools are suspended by a cable from a walking beam and are given vertical reciprocation in the well, thus cutting, chipping or pounding away the formation and developing the well hole. The tools are connected together in what is called a "string," often including a plurality of such tools, such as bits, sinker bars, stems and jars. In order to screw these together or unscrew them and disconnect them, heavy and powerful wrenches are employed, and it requires considerable power to operate such wrenches. Ordinarily one such wrench is applied to the string of tools beneath a tapered joint, and the other wrench is applied to the tools above such tapered joint or coupling, which tapered joints or couplings it is to be understood are connected with the tools and have screw threads. One wrench is ordinarily held stationary, and the other wrench is operated to produce the rotation requisite to couple or uncouple the tools at such threaded taper joint. In connection with such use of the wrenches what is called a floor circle is ordinarily employed, this consisting of a toothed quadrant or segmental rack mounted upon the floor of the derrick at the mouth of the well. Mounted upon this rack is a toothed ratchet device to which is applied a lever by which the ratchet device is operated to cause it to traverse such segment or rack which is arranged with the string of tools at the center of the segment or quadrant. At one end of this rack is provided a stop against which bears one wrench, and the other, preferably the upper wrench bears against the ratchet device. Thus as the ratchet device is operated along the floor circle or toothed segment it carries with it the outer end of the upper wrench and either screws or unscrews the tools at the tapered joint. The pressure of the two

wrenches upon the ratchet device and the stop mentioned tends to cause the floor circle to wedge or slide inwardly upon the flooring of the derrick and thus reduce the leverage upon the wrenches so as to render the operation of the device difficult or impossible. It will be understood that the long leverage of the long wrench arms is relied upon to give easy and effective action in the lever-produced travel of the ratchet device. So the floor circle must remain at a position so that the ends of the wrench arms, or substantially the ends, bear against the stop and the ratchet device. To prevent this inward creeping of the floor circle and ratchet device, it has been the practice to use blocks or sticks of wood or other make-shift as props or spacers between the string of tools suspended at the mouth of the hole, on the one hand and the floor circle on the other hand. These frequently split and part and fly outwardly or upwardly, thus often causing injury to the operators and drillers, and tending to cause damage in the derrick. I have devised a positive and effective and reliable prop or brace or spacer which is disposed between the tools and the floor circle, and preferably two of these are employed, one adjacent to each end of the floor circle so as to more effectively brace the parts to which it is applied. This brace is adjustable, that is, it comprises a plurality of parts which are relatively adjustable so that different distances between the floor circle and the string of tools may be accommodated; and means is provided for holding the relatively adjusted parts in positions of such relative adjustment. The invention concerns the several parts and features mentioned and their combination and association and particularly the brace structure, all as hereinafter described, shown in the drawing, and finally pointed out in claims.

The invention consists in the novel and useful provision, formation, combination, association, application and relative arrangement of parts, members and features, all as hereinafter so described, shown and claimed.

The invention has for its objects to provide improvements of the nature stated which will be superior in point of relative simplicity and inexpensiveness of construction, taken in conjunction with reliability and positiveness in operation, durability,

convenience and effectiveness in use, and general superiority and efficiency and serviceability.

In the drawing:

5 Figure 1 is a perspective view of the flooring of an oil well derrick showing a string of tools, wrenches engaging opposite sides of the tool joint and a floor circle with its jack for said wrenches and whereby said
10 wrenches may either tighten or loosen the tool joint of the string of tools, with the improved floor circle brace in cooperation with the circle and string of tools, for bracing the floor circle;

15 Figure 2 is a fragmentary side view, certain parts being in cross section, of the improved circle brace;

Figure 3 is a cross sectional view of certain features of the brace, taken on the line 3—3 of Figure 2, and looking in the direction of the appended arrows; and

Figure 4 is a perspective view of the pivoted yoke member used in connection with the circle brace.

25 Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawing, A designates the circle and B and C wrench members which are applied on opposite sides of the joint line of a string of tools D. The wrenches C and B include long lever arms the extremities of which are adapted to engage stops, the wrench B in
30 Figure 1 engaging a stop 1 associated with the circle, while the extremity of the lever arm of the wrench C engages a stop 2 carried on a traveling ratchet 3, which ratchet moves along the circle responsive to a back and forth movement of a forgie stick 4 associated with the ratchet. Thus
40 a moving of the stick 4 will likewise move the wrench C and either tighten the tool joint or loosen the same. As stated in the preamble the wrenches are of considerable weight, often times weighing from one hundred fifty to three hundred pounds each, and the stress imposed upon a circle when the wrenches are moved, or rather the wrench C is moved by the movement of
50 the jack traveling on the circle, causes the circle to creep inwardly and shorten the leverage on the wrenches, or at times even resulting in a breakage of the circle. In order to overcome this difficulty, I have
55 provided a particular form of circle brace designated in its entirety as F. This circle brace includes two relatively movable parts 5 and 6, the said parts telescoping each other. The part 6 is swaged inwardly at one end
60 as at 7, to form a lug 8, and to said lug is pivotally mounted a yoke member a, which is provided with a curved body portion 9, and with two spaced lugs 10 and 11, the lug 8 being received between said spaced lugs 10 and 11, and a pin passed through

aligned perforations in the lugs 8, 10 and 11. The yoke a is allowed a small amount of play upon the lug 8. The face 12 of the body 9 is provided with two transverse dove-tailed slots 13 and slip members b are re-
70 ceivable within said slots, said slips being formed with teeth 14 projecting beyond the face 12 of the body 9, and a retaining means 15 normally holds the slips in position within the dove-tailed slot. In
75 this connection particular attention is called to the fact that the dove-tailed slot does not extend entirely across the face 12, but terminates adjacent an edge of the body. The means 15 for retaining the slips in
80 position may, in the embodiment shown, include a screw member within a screw-threaded perforation of the body with the head of each screw engaging an end of each slip.
85

The member 6 is tubular in formation, and as stated, confines the member 5, which is provided with a plurality of transverse teeth 16, and means G, considered as an en-
90 tirety, is adapted to engage the member 5 and particularly the teeth portions, at certain times, to definitely hold the member 5 in certain positions relative to the member 6. The means G includes a cam or ratchet
95 17 provided with teeth 18, and the said means is carried by the member 6 by providing or integrally forming on the member 6 a clevis 19, which clevis encircles the member 6 and has its two arm portions as 20
100 and 21 adapted to confine a cam wheel 22. A pin member 23 passes through aligned perforations in the arms 20 and 21 and through a perforation in the cam wheel 22. The cam or ratchet 17 is provided with
105 lateral extensions 24 and 25 with the said extensions each formed with chambered portions 26 and 27. Said member 6 is likewise provided with chambered portions in alignment with the chambers 26 and 27,
110 as shown at 28 and 29. Within said chambers are expansible members such as springs 30. The cam is provided with a curved recess 31 adapted to receive the cam wheel 22. The body portion as 32 of the cam passes
115 through an opening in the member 6 to where the teeth on the body portion of the cam may engage teeth on the member 5, depending upon movement of the cam wheel. The cam wheel is provided with an arm
120 member 33, and by grasping said arm member the cam wheel may be turned and the cam will be raised so as to disengage the member 5, said cam being raised under influence of the spring members 30.
125

In actual operation the circle brace has its yoke member engaging one string of tools, as shown in Figure 1, and the slip members b prevent a slippage of the yoke. The member 5 is formed with a foot portion
130 34 which is received within a groove in the

circle. The members 5 and 6 are moved relatively to the desired extended position, whereupon the cam wheel is turned so as to lock the cam to the member 5, as shown in Figures 1 and 2, whereupon the forgie stick may be moved to cause the ratchet member to travel upon the circle and either tighten or loosen the tool joint. As stated, the circle brace F will help to resist stress in the circle and prevent inward creep thereof during operation of the ratchet. In the adaptation of the invention the member 5 is provided with a groove 35 and a screw member 36 passes through a threaded perforation in the clevis 19 and has a portion of its stem within said groove, and whereby movement of the member 5 relative to the member 6 is limited and likewise axial movement of the members is prevented.

It will be obvious that many variations and modifications of the structure may be resorted to in adapting the device to varying conditions of use and service, all without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; said locking means comprising a cam member carried by one of the telescoping members and adapted for engagement with the other telescoping member, and a cam wheel for actuating said cam member.

2. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; said locking means comprising a cam member carried by one of the telescoping members and adapted for engagement with the other telescoping member, and a cam wheel for actuating said cam member; means being provided for automatically releasing said cam member from engagement with one of the telescoping members responsive to movement of the cam wheel.

3. In well apparatus, a floor circle brace, comprising two telescoping members and means for maintaining the same in position of relative adjustment; a yoke member joined with one of said telescoping members for engagement with a string of tools, said yoke member being provided with a curved face portion, and slip members carried by said yoke and outwardly projecting from said curved face portion of the yoke.

4. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; one of said telescoping members being provided with a yoke member, said yoke member being

formed with dove-tail slots in the working face thereof, there being slip members formed with teeth receivable within said dove-tail slots, and means carried by the yoke for maintaining said slips within said slots.

5. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; one of said telescoping members being formed with a slot, a clevis member carried by said telescoping member adjacent the slotted portion, said locking means including a cam member having a body portion projecting through the slot in said telescoping member and a cam wheel carried by the clevis for actuating the cam member responsive to movement of said cam wheel.

6. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; one of said telescoping members being formed with a slot, a clevis member carried by said telescoping member adjacent the slotted portion, said locking means including a cam member having a body portion projecting through the slot in said telescoping member and a cam wheel carried by the clevis for actuating the cam member responsive to movement of said cam wheel; said second telescoping member being provided with a plurality of transverse teeth, said cam being provided with teeth adapted to engage the teeth on the second telescoping member for locking the telescoping members in position.

7. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; one of said telescoping members being formed with a slot, a clevis member carried by said telescoping member adjacent the slotted portion, said locking means including a cam member having a body portion projecting through the slot in said telescoping member and a cam wheel carried by the clevis for actuating the cam member responsive to movement of said cam wheel; said second telescoping member being provided with a plurality of transverse teeth, said cam being provided with teeth adapted to engage the teeth of the second telescoping member for locking the telescoping members; there being means for automatically moving the cam from engagement with the teeth of the second telescoping member responsive to movement of the cam wheel.

8. In well apparatus, a floor circle brace, comprising two telescoping members, and locking means for maintaining the same in position of relative adjustment; one of said telescoping members being formed with a slot, a clevis member carried by said tele-

scoping member adjacent the slotted portion,
said locking means including a cam member
having a body portion projecting through
the slot in said telescoping member and a
5 cam wheel carried by the clevis for actuating
the cam member responsive to movement of
said cam wheel; said second telescoping
member being provided with a plurality of
transverse teeth, said cam being provided
10 with teeth adapted to engage the teeth of the
second telescoping member for locking the
telescoping members; there being means for
automatically moving the cam from engage-

ment with the teeth of the second telescoping member responsive to movement of the 15
cam wheel; there being a handle member
joined with said cam wheel for actuating
the same.

In testimony whereof, I have signed my
name to this specification in the presence of 20
two subscribing witnesses.

HEWLET T. SMITH.

Witnesses:

N. E. BRIGHT,
A. J. MURRAY.