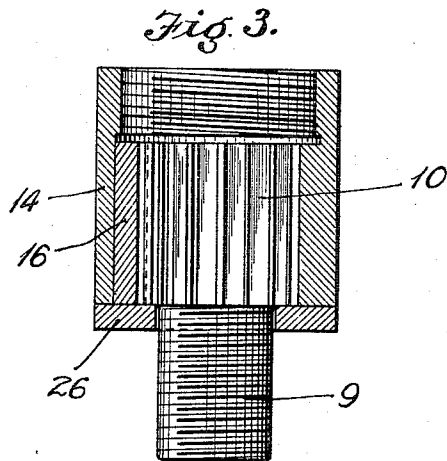
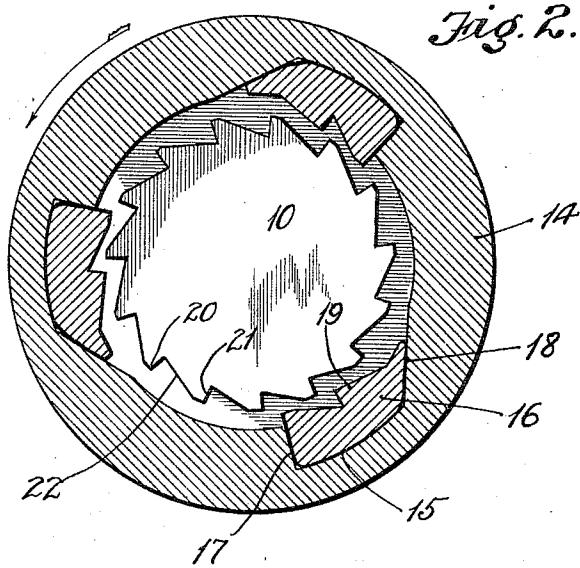
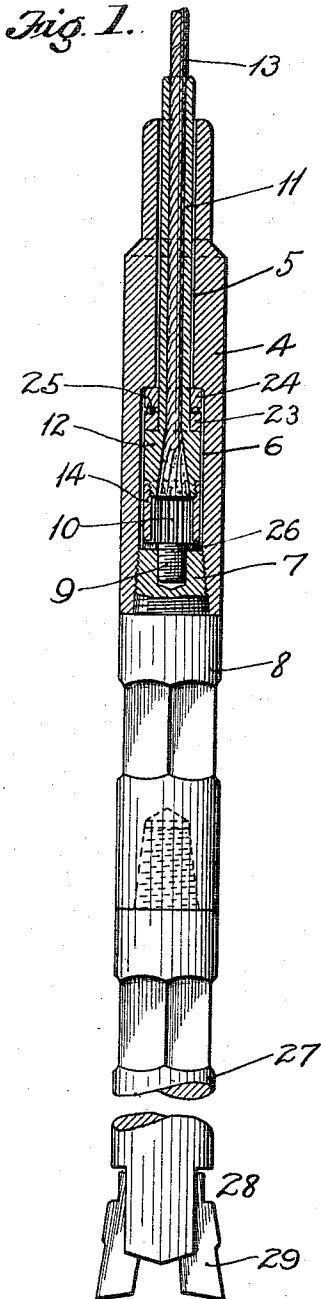


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 RATCHET ROPE SOCKET.  
 APPLICATION FILED JAN. 24, 1910.

998,641.

Patented July 25, 1911.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

FRANK J. SCHWEITZER, OF FULLERTON, CALIFORNIA.

## RATCHET ROPE-SOCKET.

998,641.

Specification of Letters Patent. Patented July 25, 1911.

Application filed January 24, 1910. Serial No. 539,663.

*To all whom it may concern:*

Be it known that I, FRANK J. SCHWEITZER, a citizen of the United States, residing at Fullerton, in the county of Orange and State of California, have invented new and useful Improvements in Ratchet Rope-Sockets, of which the following is a specification.

This invention relates to the formation of oil, gas, or water wells in which the tool employed is given a rotary movement during its operation in order to form an approximately cylindrical bore, and it is one of the objects of my invention to provide an improved form of ratchet device that will automatically rotate the tools during their operation.

In the annexed drawing which fully illustrates my invention, Figure 1 is a side elevation and partial longitudinal vertical section showing the usual form of socket with my invention, the ratchet device, in place. Fig. 2 is a horizontal cross section through the ratchet box showing the ratchet post in end elevation. Fig. 3 is a vertical central section through the ratchet box showing the post in elevation.

Referring more particularly to the drawing, 4 represents the upper half of the socket having a longitudinal bore 5 of reduced diameter and having an enlarged counterbore or chamber 6 formed in the lower end thereof. The lower end of the counterbore 6 is threaded to receive the threaded "pin" or neck 7 which forms the upper end of a substitute or coupling 8. In the upper face of the "pin" or neck 7 a threaded stud 9 is mounted, said stud forming part of a ratchet post 10, which extends upwardly in the interior of the counterbore or chamber 6, as indicated. In the bore 5 a sleeve 11 is rotatably mounted, the lower end of said sleeve being enlarged to form a cable socket 12 in which the lower end of a twisted wire cable 13 is received.

The lower end of the cable socket is threaded so as to enable a ratchet box 14 to be attached thereto. This ratchet box is clearly illustrated in detail in Figs. 2 and 3. It is in the form of a sleeve or deep ring and the wall thereof is cut away on its inner face so as to form pockets 15 to receive ratchet shoes or pawls 16. These pockets 15 present abrupt walls or shoulders 17 at one side, and inclined faces 18 on the opposite side. The shoes 16 conform substantially to

the shape of the pockets in which they are received, as indicated, and on their inner faces they present teeth 19 which are adapted to engage with the teeth 20 of the ratchet post. I have illustrated three of these shoes but there may be more or less of them as desired. The teeth 20 present abrupt faces 21 and inclined faces 22, and the abrupt faces 21 are disposed in such a way that they are adapted to engage the teeth 19. It should be understood that the shoes 16 are loose in the pockets 15. When completely "pocketed" they will permit a relative rotation between the ratchet box and the post, but if they are not completely pocketed they will engage with the teeth of the post so as to prevent such a rotation. Attention is called to the fact that the inclined faces 18 are arranged so that if the shoes engage the post the shoes will tend to slide inwardly on the faces 18. In this way the shoes operate to check any tendency to relative rotation of the ratchet box in one direction, while they will permit it readily in the other direction.

In order to provide for the free rotation of the socket 4 on the sleeve 11 the upper side of the cable socket 12 is provided with a ball ring 23, and a similar ring 24 seats in the upper end of the chamber or counterbore 6, and between these two rings a ball race is formed receiving balls 25. In other words, an anti-friction bearing or ball bearing is formed at this point. At the lower ends of the post 10 and ratchet box an annular collar or washer 26 is provided against which the lower ends of the shoes 16 abut so that this collar affords means for supporting the shoes as will be readily understood. To the lower end of the substitute or coupling 8 a "string" 27 of tools is attached at the lower end of which an under reamer 28 is attached, said under reamer comprising oppositely disposed lugs or cutters 29.

In the operation of the tool it will be understood that, on account of the fact that the cable 13 is twisted, there is a tendency for the cable to swivel or twist at its lower end when it is reciprocated vertically in the manner suggested above. This tends to twist the ratchet box 14, and any twisting movement of the ratchet box in the direction of the arrow in Fig. 2 will be permitted by the ratchet post 10, but the ratchet post will tend to prevent a twist of the ratchet box

in the opposite direction. In this way a slight twist is retained in the cable at each reciprocation, and these twists are accumulated or stored up by the ratchet box so that  
5 eventually the cable is brought into a condition of torsion which is sufficient to give the socket and the string of tools a considerable twisting movement. In this way from time to time the reciprocation of the string of  
10 tools will result in producing a rotation of the under reamer, or other tools carried below the socket, and this rotation is always in the same direction so that the employment of an under reamer tool having the form  
15 described will result in producing a perfect bore for the well. Attention is called to the use of the ball bearing at the rings 23 and 24 which enables the lower end of the cable to twist with perfect freedom.

20 Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a ratchet rope socket, in combination, a cable socket adapted to be attached  
25 to the lower end of a cable, a ratchet socket supported on said cable socket, a ratchet post rigidly mounted coaxially with said socket, a ratchet box surrounding said post and having pockets in the wall thereof, and  
30 floating shoes having teeth coöperating with said post and received in said pockets and unattached therein, tending to prevent the rotation of said ratchet box in one direction while permitting the rotation thereof in the  
35 other direction.

2. In a ratchet rope socket, a ratchet box in the form of a ring having pockets on the inner face thereof, said ratchet box being adapted to connect directly with the suspending cable, floating shoes having teeth received  
40 respectively in said pockets, a ratchet socket, a ratchet post rigid with said socket and received in said ratchet box coaxially, said ratchet post having teeth adapted to be engaged by the teeth of said shoes, said pockets  
45 having inclined faces adapted to guide said shoes inwardly into said ratchet box when said shoes engage said post, said shoes being unattached in said pockets and adapted to permit the rotation of said ratchet box with  
50 respect to said post when said shoes are completely pocketed.

3. A ratchet rope socket, comprising a ratchet post having teeth therein, a ratchet box in the form of a ring disposed around  
55 said post and having pockets on the inner face of the wall thereof, floating shoes having teeth received in said pockets unattached thereto and adapted to clear the teeth of said ratchet post when completely pocketed, said  
60 shoes being adapted to engage the teeth of said post when partially pocketed.

In witness that I claim the foregoing I have hereunto subscribed my name this 15th day of January, 1910.

FRANK J. SCHWEITZER.

Witnesses:

JOHN J. HUFF,  
E. E. BALCOM.