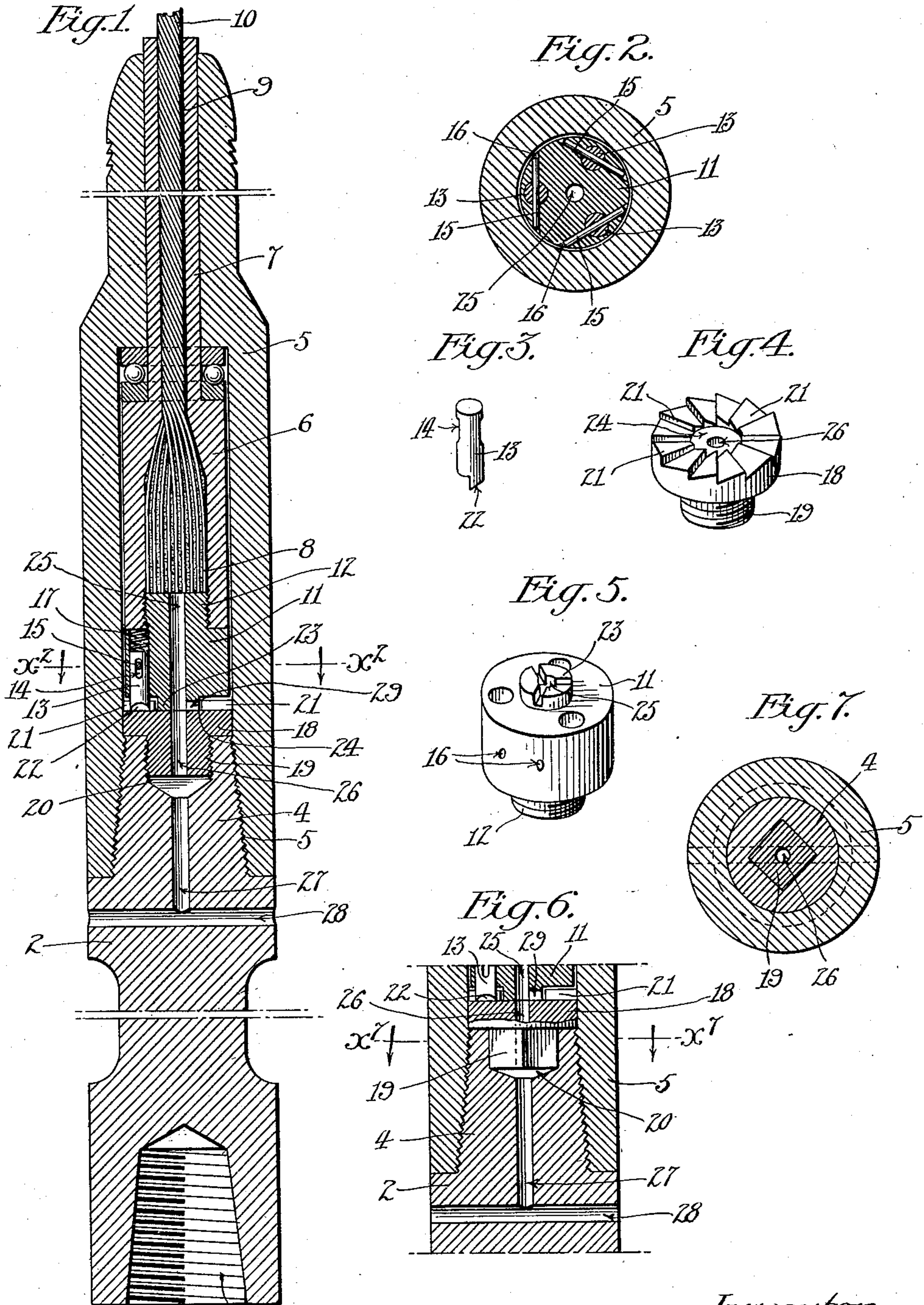


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C. DANIEL.
RATCHET SWIVEL ROPE SOCKET.
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Witnesses:
Frank L. Graham
M. Manfield

Inventor,
Charles Daniel.
By
Townsend Lyon Hackley Knight
His atty.

UNITED STATES PATENT OFFICE.

CHARLES DANIEL, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO EDWARD DOUBLE, OF LOS ANGELES, CALIFORNIA.

RATCHET-SWIVEL ROPE-SOCKET.

No. 897,196.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES DANIEL, a citizen of the United States of America, residing in the city of Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Ratchet-Swivel Rope-Sockets, of which the following is a specification.

10 This invention relates to means for connecting wire rope with drilling tools for use in drilling Artesian or oil wells and particularly to the provision of a ratchet swivel rope socket which shall be extremely simple and
15 cheap in construction, positive and efficient in operation and extremely durable, and in which wear of the ratchet parts is reduced to a minimum.

The invention consists in a socket proper
20 provided with a central chamber, the lower end of the socket provided with an internal thread adapted to screw upon the stem of a "sub," the upper portion of the socket provided with a central bore of smaller diameter
25 than said chamber and communicating thereto through the upper end of the socket, a swiveled member revolubly mounted in said chamber and having a stem extending through said central bore, a ratchet being
30 provided between the end of said sub and said swiveled member, one portion of said ratchet being fixed against revolution independent of said sub, and the other portion of said ratchet being fixed in said swivel
35 member.

The invention consists further in the constructions and combinations of parts herein-after described and particularly pointed out in the claims and will be more readily understood by reference to the accompanying
40 drawings forming a part of this specification in which:—

Figure 1 is a longitudinal sectional view of a ratchet swivel socket embodying my invention. Fig. 2 is a sectional plan view thereof
45 on line x^2-x^2 of Fig. 1. Fig. 3 is a side elevation of one of the ratchet pawls. Fig. 4 is a perspective view of the ratchet plate member. Fig. 5 is a perspective view of the
50 ratchet pawl carrier, the same being shown in inverted position. Fig. 6 is a partial longitudinal sectional view of a modified form. Fig. 7 is a sectional plan view on the line
 x^7-x^7 of Fig. 6.

55 As shown in the drawings, 2 represents the

"sub" provided with the usual socket 3 adapted to be attached to the string of tools to be operated in the well. The sub 2 is provided with a threaded stem 4 upon which is adapted to be screwed the socket proper 5
60 which, as shown, is provided with a central chamber open at the lower end and opening through the upper end of the socket 5 through a bore of less diameter than the diameter of the main chamber.

65 6 represents the swivel member which, as shown, has a stem 7 extending through the bore of the top of the socket 5. A ball bearing is preferably formed between the upper end of the swivel 6 and the upper wall of the
70 chamber of the socket 5. As shown, this ball bearing may be of the ordinary or any preferred construction. The swivel 6 is provided with a socket 8 and bore 9 so that the wire rope or cable 10 may extend downwardly
75 through the bore 9, and be expanded in the socket 8 and held therein by expanding the strands of wire cable and fastening the same in the socket with Babbitt metal in the usual
80 manner.

Preferably the lower end of the wall of the socket 8 is threaded to receive a ratchet pawl carrier 11, which carrier is provided with a threaded shank or stem 12 to engage therein. The carrier 11 thus in effect forms a part of
85 the swivel 6 and turns therewith. The carrier 11 is provided with a plurality of sockets to receive pawls 13. Preferably these pawls are three in number and are provided with an elongated perforation 14 through which re-
90 taining pins 15 pass, these pins being mounted in bores 16 in the carrier. Springs 17 are interposed between the end of the swivel 6 and the top of the pawls 14, these springs being carried within the carrier. By the
95 provision of the perforations or slots 14, the pawls 13 are permitted vertical movement, but are prevented from falling from the carrier.

18 represents the ratchet member. As
100 shown in Figs. 1 and 4, the shank or stem 19 of this member is cylindrical and provided with a thread adapted to screw into a threaded socket 20 in the end of the stem 4 of the
105 sub 2. In Figs. 6 and 7, the stem of the ratchet member 18, is shown squared and the socket of the stem 4 is shown as a squared hole. It is obvious that either form prevents the ratchet 18 from turning independent of the revolution of the sub. The upper
110

face of the ratchet 18 is provided with teeth 21, adapted to be engaged by the projections or teeth 22 of the pawl 13, which teeth are also held in position for engagement there-
 5 with as the pins 15 prevent the pawls 13 from turning in their chambers.

For the purpose of truly centering the swivel 6 so that it will turn in an even manner, the carrier 11 is provided at its bottom
 10 with a depending flange 23, cylindrical in cross section and fitting into the bearing 24, provided in the top of the ratchet blade or member 18. Any tendency of the swivel 6 to bind in the center chamber of the socket 5
 15 is thus prevented.

Preferably the carrier 11 and the ratchet member 18, are provided with central bores 25, 26, which register with one another and with a bore 27 in the sub 2, the vertical bore
 20 27 in turn opening into the lateral bore or perforation 28, as shown. The depending flange 23 on the carrier 11 is provided with one or more slots 29 leading into the bore or perforation 25. By this means ready egress
 25 is provided for any sand, dirt or grit which may at any time become present within the swivel socket.

The operation is as follows:—The string of well tools is connected with the socket 3 of
 30 the sub in the usual manner and the tools lowered into the well in the usual manner. The weight of the tools on the rope or cable 10 causes the rope to untwist or turn in the direction which would tend to lengthen the
 35 same. This causes the teeth 22 of the pawls 13 to engage with the teeth of the ratchet 18, thereby causing the swivel 6, socket 5 and sub 2, to be revolved together and carrying the string of tools around with the socket.
 40 When the drilling tools strike the surface to be drilled, at the instant of the impact the weight of the tools is removed from the rope or cable 10, and the rope immediately re-twists back to its normal condition, this is
 45 accomplished by the slight undercut of the teeth of the ratchet 18, and the resiliency with which they are held on the ratchet 18 by the spring 17. This operation is repeated at
 50 to revolve slightly in the well insuring the drilling of a straight round hole, thus securing the necessary turning of the string of tools by the torsion of the rope or cable without requiring the operator to manually revolve the
 55 tools from the top of the well.

By thus providing a ratchet which is fixed in the end of the sub against turning independent thereof and providing a cooperating ratchet member fixed in the swivel member,
 60 and providing spring pressure normally holding these two ratchet members together great efficiency and positiveness of action is secured, while at the same time great durability is also secured, the wear of the parts
 65 being exceedingly slight.

What I claim is:—

1. A ratchet swivel socket comprising a socket proper, a sub engaged thereby, a swivel member revoluble within said socket and carrying a depending ratchet member, a
 70 second ratchet member carried by said sub, and having a toothed upper face to be engaged by the depending ratchet member, and spring means resiliently holding one of said ratchet members in engagement with
 75 the other.

2. A ratchet swivel socket comprising a socket proper, a sub engaged thereby, a swivel member revoluble within said socket and carrying a depending ratchet member, a
 80 second ratchet member mounted in said sub to turn therewith, and having a toothed upper face to engage the depending ratchet member, and spring means resiliently holding one of said ratchet members in engage-
 85 ment with the other.

3. A ratchet swivel socket comprising a socket proper, a sub to which said socket is detachably secured, a swivel member revoluble within said socket and carrying a de-
 90 pending ratchet member, a second ratchet member removably mounted in a socket in said sub to turn therewith, and having its upper face provided with teeth for engagement with said depending ratchet member,
 95 and resilient means holding said ratchet members in engagement.

4. A ratchet swivel socket comprising a socket proper provided with a central chamber, the lower end of the socket provided
 100 with an internal thread adapted to screw upon the stem of a sub, the upper portion of the socket provided with a central bore of smaller diameter than the diameter of said chamber and communicating thereto through
 105 the upper end of the socket, a swivel member revolubly mounted in said chamber and having a hollow stem extending through said central bore, a ratchet provided between the end of said sub and said swiveled member,
 110 one portion of said ratchet downwardly acting and fixed against revolution independent of said sub, and mounted in a recess in the sub and having a toothed upper face for en-
 115 gagement with said downwardly acting ratchet portion or part, and the other portion of said ratchet being fixed in said swivel member, a sub and resilient means holding said ratchet members in engagement.

5. A ratchet swivel socket comprising a
 120 socket proper, a sub to which said socket is detachably secured, a swivel member revoluble within said socket and carrying a carrier provided with pawl retaining chambers, downwardly acting pawls mounted in said
 125 chambers, springs normally pressing said pawls downward, and a ratchet plate mounted in the end of said sub and fixed against rotation independent thereof and having a toothed upper face to engage with said pawls.
 130

6. A ratchet swivel socket comprising a socket proper, a sub to which said socket is detachably secured, a swivel member revoluble within said socket and carrying a carrier provided with pawl chambers, downwardly acting pawls within said chambers, said pawls provided with slots, retaining pins passing through said chambers and the slots of said pawls, springs interposed above said pawls and normally holding said pawls in their outward position, a ratchet member removably mounted in the end of said sub and fixed from rotation independent thereof and having a toothed upper face to engage with said pawls.

7. A ratchet swivel socket comprising a socket proper, a sub engaged thereby, a swivel member revoluble within said socket and carrying a ratchet member, a second ratchet member carried by said sub, spring means resiliently holding one of said ratchet members in engagement with the other, said sub provided with a bore and said ratchet members having bores registering therewith whereby egress is provided for grit or dirt.

8. A ratchet swivel socket comprising a socket proper, a sub to which said socket is detachably secured, a swivel member revoluble within said socket and carrying a carrier provided with pawl chambers, pawls within said chambers, said pawls provided with slots, retaining pins passing through said chambers and the slots of said pawls, springs interposed above said pawls and normally holding said pawls in their outward position, a ratchet member removably mounted in the end of said sub and fixed from rotation independent thereof, said carrier, ratchet member and sub provided with registering bores providing egress for sand or grit from the working portions of the socket.

9. A ratchet swivel socket comprising a socket proper, a sub engaged thereby and having a socket in its end, a ratchet member mounted therein to turn with said sub, a swivel member revoluble in said socket proper and adapted to hold a cable, a

ratchet member carried by said swivel, means holding said ratchet members in resilient engagement, said first ratchet member having a bearing in its upper face and said second ratchet member having a centering flange extending within said bearing, said sub provided with a bore and said ratchet members provided with bores registering therewith whereby egress is provided for grit or dirt to escape from the bearings.

10. A ratchet swivel socket comprising a socket proper provided with a central chamber, the lower end of the socket provided with an internal thread adapted to screw upon the stem of a sub, the upper portion of the socket provided with a central bore of smaller diameter than the diameter of such chamber and communicating thereto through the upper end of the socket, a swivel member revolubly mounted in said chamber and having a hollow stem extending through said central bore to receive the drilling cable, a ratchet member carried by the swivel, said ratchet member having downwardly acting pawls, a sub, and a second ratchet member carried by said sub and having ratchet teeth on its upper face to be engaged by said pawls.

11. A ratchet swivel socket comprising a socket proper and a sub engaged thereby, a swivel member revoluble within said socket, a carrier rotating with said swivel member, said carrier provided with downwardly acting pawls mounted in sockets in said carrier, means for limiting the movement of said pawls in said sockets, means for pressing said pawls downwardly, and a second ratchet member carried by the sub and having a toothed upper face to be engaged by said pawls.

In testimony whereof I have hereunto set my hand at Los Angeles, California, this 5th day of May, 1906.

CHARLES DANIEL.

In presence of—

ARTHUR P. KNIGHT,
BELL HALL.