S. PETERSEN.

HYDRAULIC SWIVEL.

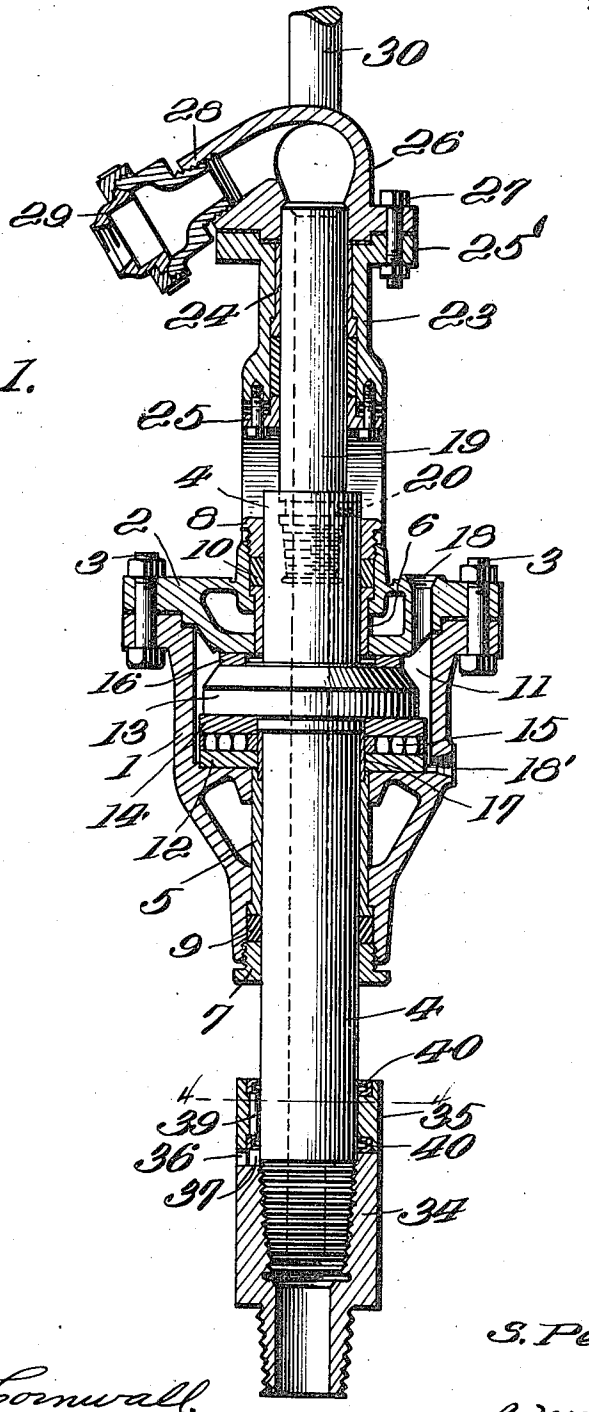
APPLICATION FILED JULY 5, 1918.

1,280,536.

Patented Oct. 1, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



Witness
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2 SHEETS—SHEET 2.

Fig. 3.

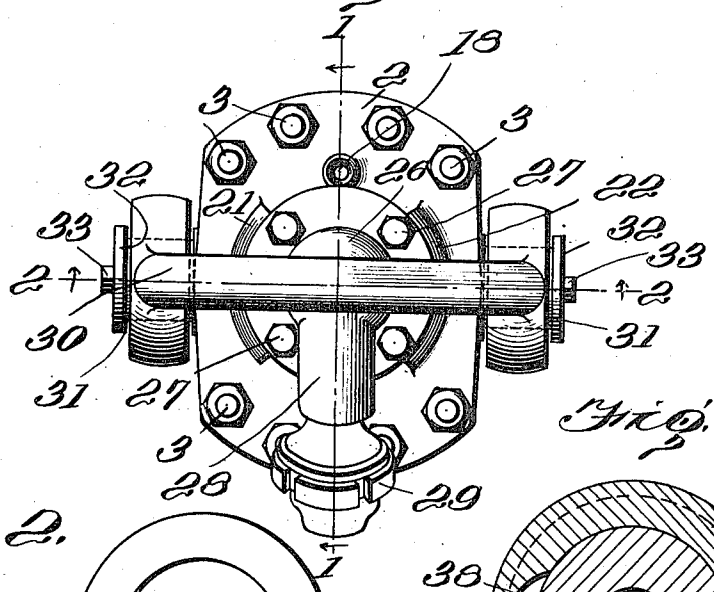


Fig. 4.

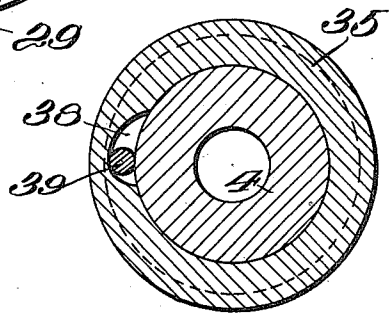


Fig. 2.

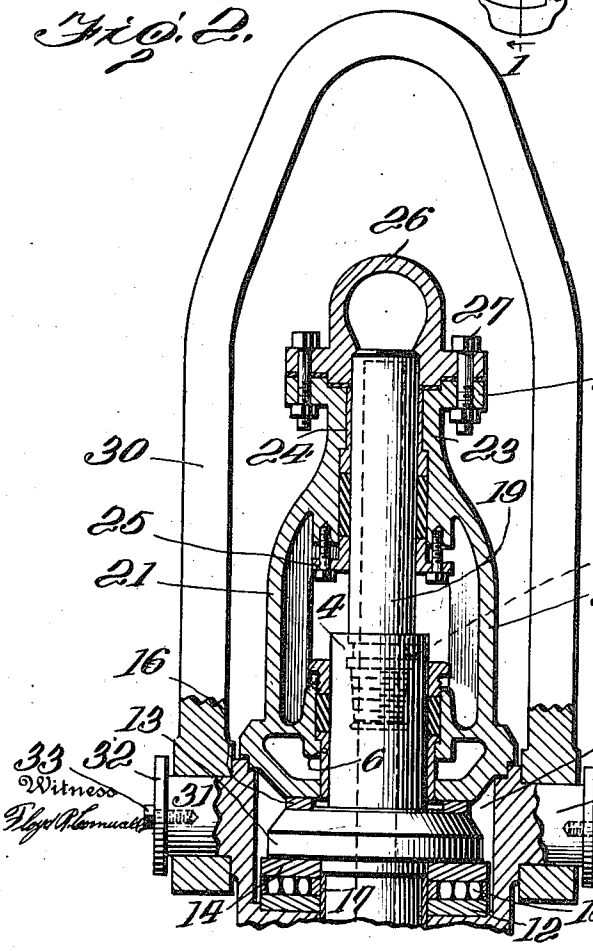
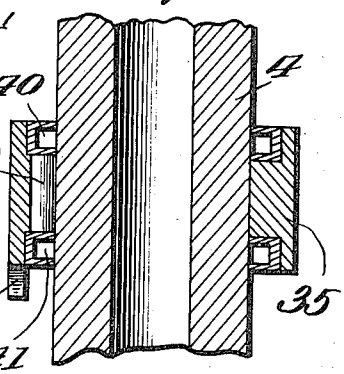


Fig. 5.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC SWIVEL.

1,280,536. Specification of Letters Patent. Patented Oct. 1, 1918.

Application filed July 5, 1918. Serial No. 243,354.

To all whom it may concern:

Be it known that I, SVERRE PETERSEN, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Hydraulic Swivels, of which the following is a specification.

This invention relates to well-drilling apparatus and has for its object to provide an improved connection between the rotating drill stem and the hoisting cable, so as to permit of the free rotation of the stem without twisting the connection between the latter and the cable.

Another object is to provide means whereby the apparatus may be used with a hollow drill stem through which water is conducted under heavy pressure from a pump to the point of the drill secured to the lower end of the rotating stem, and in which the supply hose may be supported in a given position and retained against movement in relation to the drill stem while supplying it with water.

A further object of this invention consists in having the bearing housed in a chamber and maintained in a constant supply of lubricant and by having the drill stem of one solid piece passing through and extending beyond both ends of the chamber, the water used, is prevented as far as possible from leaking into the bearing.

By my improved swivel I obtain most advantageous results with a simple construction and have so designed and located the wearing parts that the same may be easily removed or replaced without requiring the disassemblage of the main parts of the swivel.

With these and other objects in view, which will appear as the nature of my invention is better understood, the invention consists in the novel features hereinafter described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings;

Figure 1 is a vertical cross section of swivel.

Fig. 2 is a vertical cross section of the upper part of the swivel, taken at right angles to Fig. 1.

Fig. 3 is a plan of the swivel.

Fig. 4 is a horizontal section on line 4—4 of Fig. 1.

Fig. 5 is a vertical cross section of the locking collar.

As embodied in the accompanying drawing, the swivel consists of a body 1 to which is secured at its upper end, the top 2, by means of the bolts 3. The lower end of the body 1 and the top 3 are apertured to receive the hollow drill stem 4 which is journaled in the bushing 5 located in the body 1 and in the bushing 6 within the top 2. Glands 7 and 8 are fitted in the body and top respectively with suitable packings 9 and 10 interposed between the bushing 5 and the gland 7 and the bushing 6 and the gland 8 respectively, thus making the chamber 11 formed by the body and top suitable for maintaining a supply of oil within the same, for the lubrication of the bearing hereinafter described.

Located within the chamber 11 and the surrounding stem 4 is the ring 12 which is held rigid to the body 1 by a seat formed in the same. Surrounding the stem 4 on the portion within the chamber 11 is a collar 13. Directly beneath the collar 13 is another ring 14 which is fastened to the stem and revolves with the stem during operation. Located between the rings 14 and 12 are the antifriction elements 15. It will be seen that the weight of the revolving drill stem is supported on the body 1 and with the antifriction elements thus placed between the same, a considerable amount of the friction is eliminated.

Secured to the upper side of the solid collar 13, is a wearing ring 16, the upper side of which comes in contact with the lower side of the top 2. The object of this ring 16 being to take up the wear on the upper surface of the collar 13, thus eliminating any upward play of the stem, and keeping the antifriction elements in close contact.

I provide a sleeve 17 which surrounds the stem at that portion within the antifriction elements for the purpose of avoiding any undue leakage of the lubricant and for main-

taining its level above the said antifriction elements.

I provide an opening 18 to introduce and replenish the supply of lubricant to the bearing within and an opening 18′ for the purpose of removing lubricant from said bearing.

Connected to the upper end of the drill stem 4 is a washdown pipe 19 with a bore of equal diameter to that of the stem and which is held in alinement with the stem by being screwed into the upper end of the stem and held in locked position by means of set screw 20.

Extending from and connected to the top 2 are the brackets 21 and 22 which terminate in a cylindrical portion 23 which surrounds the upper end of the wash down pipe 19. Located within the cylinder 23 and surrounding the pipe 19 is a bushing 24 which forms a suitable bearing for the revolving pipe 19. A gland 25 is fitted in the underside of the cylinder 23 and suitable packing interposed between the same and the bushing 24. A flange 25′ is formed around the upper end of the cylinder 23 to which is fastened the bonnet 26 by means of bolts 27. Leading from the bonnet 26 is a pipe connecting element 28 to which is connected a socket 29 for connection to a flexible water supply pipe (not shown).

Connection between the swivel and the cable (not shown) is provided for in the usual way by means of a bail link 30 which straddles the upper part of the swivel and engages the trunnions 31, forming a part of the body 1, and is held in place by means of the plates 32 which are secured to the trunnions by means of the screws 33. Connected to the lower end of the stem 4, is a bushing or joint 34 which is threaded externally for connection to the drill stem (not shown).

To obviate the danger of the bushing 34 working loose or unscrewing when the drill stem is being disconnected, I provide a collar 35 which is free to travel in one direction and becomes locked to the stem when turned in the opposite direction. The collar 35 is free to move longitudinally on the stem 4 and is provided with a lug 36 which engages in a slot 37 in the upper face of the bushing 34. On the inner face of the collar 35, I provide a recess or recesses 38 which have located therein rollers 39 held in position at top and bottom by the washers 40 and 41. It will be seen that if the collar is turned so that the roller 39 is forced by the cam face of the recess toward the smaller end, the roller will press against the stem and thus stop further movement of the collar in relation to the stem. If the collar is turned in the opposite direction there will be a free movement of the collar owing to the space between the face of the recess and the stem being larger than the roller. Thus if the collar 35 is connected to the bushing 34 by means of the lug 36 engaging in the slot 37, the collar can be arranged so that the locking effect will be obtained when the bushing tends to unscrew.

From the foregoing description it will be noted that I have extended the main drill stem 4 upward beyond the body 1 of the swivel so that a steady running bearing can be obtained and by having the wash down pipe connected to the upper end of the stem with the joint clear of the lubricated bearing, I am enabled to renew the washdown pipe when necessary or desirable.

What I claim and desire to secure by Letters Patent is;

1. In a hydraulic swivel, the combination with a trunnion block and a bail supporting the same, of a hollow stem extending through said block, a collar carried by said stem and supported within said block to carry the weight of said stem, another hollow stem connected to the upper end of the first stem and housed in a separate bearing carried from the trunnion block, means connected to the upper end of the second stem to introduce a supply of fluid through the hollow stem.

2. In a hydraulic swivel, the combination with a trunnion block and a bail supporting the same, of a hollow stem extending through said block and provided at its lower end with means for connecting the same to the drill rod, a chamber provided in said block, a collar carried by said stem and rotatably mounted within said chamber, means for introducing a lubricant into said chamber, an aperture for draining lubricant from the chamber, a cap for said chamber secured to the trunnion block and through which the upper end of the stem extends, brackets carried by said cap and terminating at their upper ends in a cylindrical portion having a hollow cap for admitting fluid to the swivel, a washdown pipe screwed into the upper end of the stem and having its upper end seated in the cap of the cylindrical portion, and renewable bushings provided in said trunnion block, cap and cylindrical portion to provide bearings for said stem and washdown pipe.

3. In a hydraulic swivel, the combination with a trunnion block and a bail supporting the same, of a hollow stem extending through said block and provided at its lower end with means for connecting the same to the drill rod, a chamber provided in said block, a collar carried by said stem and rotatably mounted within said chamber, a cap for said chamber secured to the trunnion block through which the upper end of the stem extends, brackets carried by said cap and terminating at their upper ends in a cylindrical portion having a hollow cap for admitting fluid to the swivel, a washdown

pipe screwed into the upper end of the stem and having its upper end seated in the cap of the cylindrical portion, and renewable bushings provided in said trunnion block, cap and cylindrical portion to provide bearings for said stem and washdown pipe.

4. In a hydraulic swivel, the combination with a trunnion block and a bail supporting the same, of a hollow stem extending through said block and provided at its lower end with means for connecting the same to the drill rod, a chamber provided in said block, a collar carried by said stem and rotatably mounted within said chamber, a cap for said chamber secured to the trunnion block, brackets carried by said cap and terminating at their upper ends in a cylindrical portion having a hollow cap for admitting fluid to the swivel, a washdown pipe screwed into the upper end of the stem and having its upper end seated in the cap of the cylindrical portion, and renewable bushings provided in said trunnion block, cap and cylindrical portion to provide bearings for said stem and washdown pipe.

5. In a hydraulic swivel, the combination with a trunnion block and a bail supporting the same, of a hollow stem extending through said block and provided at its lower end with means for connecting the same to the drill rod, a chamber provided in said block, a collar carried by said stem and rotatably mounted within said chamber, means for introducing a lubricant into said chamber, an aperture for draining lubricant from the chamber, a cap for said chamber secured to the trunnion block, brackets carried by said cap and terminating at their upper ends in a cylindrical portion having a hollow cap for admitting fluid to the swivel, a washdown pipe screwed into the upper end of the stem and having its upper end seated in the cap of the cylindrical portion, and renewable bushings provided in said trunnion block, cap and cylindrical portion to provide bearings for said stem and washdown pipe.

In testimony whereof I have set my hand and affixed my signature.

SVERRE PETERSEN.