April 12, 1932. C. W. BYRD 1,853,547

JERK LINE BREAK OUT PULLEY

Filed May 30, 1930

Fig. 1.

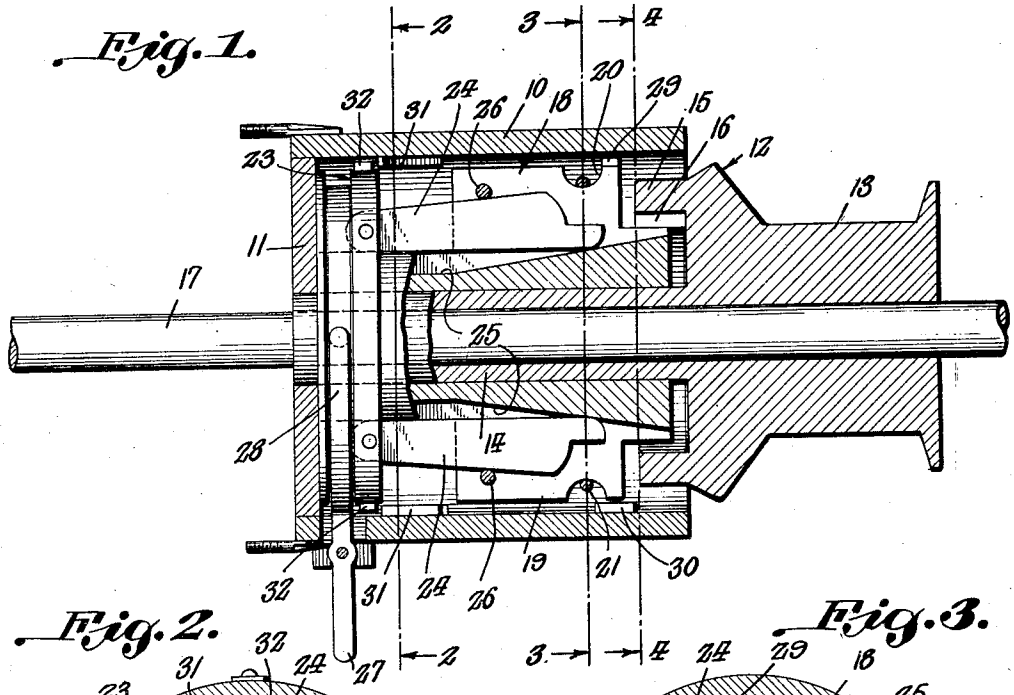


Fig. 2.

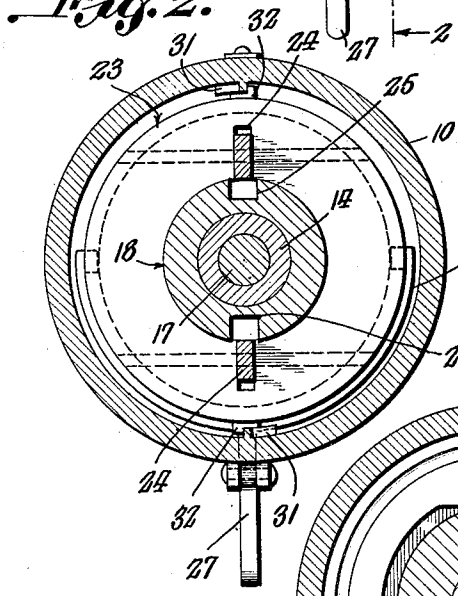


Fig. 3.

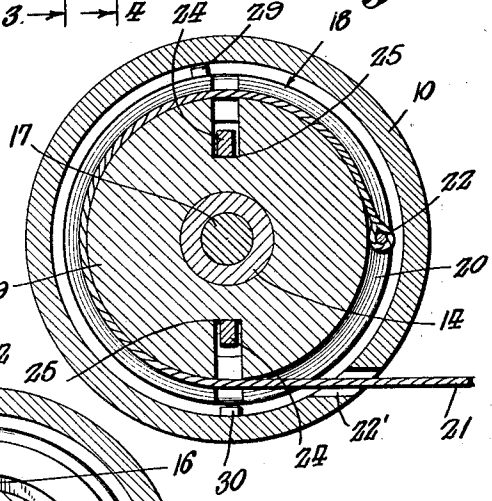
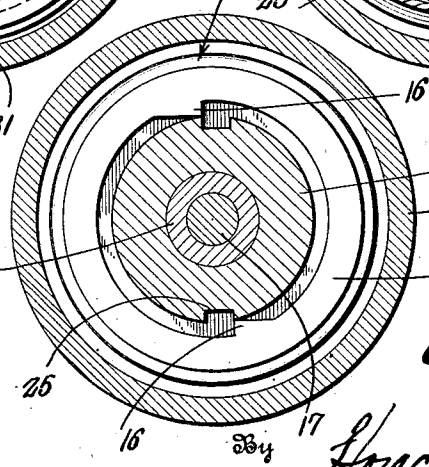


Fig. 4.



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UNITED STATES PATENT OFFICE

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JERK LINE BREAK OUT PULLEY

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This invention relates to new and useful improvements in well drilling devices, and particularly to devices for loosening and unscrewing the joints of drill rods, pipes, and the like, in connection with rotary drilling machinery.

The principal object of the invention is to provide a device which is known as a "cat head", by means of which the joint loosening wrench may be properly operated, in one direction, and wherein the device automatically releases itself at each operation of said wrench.

Another object is to provide a device of this character which is simple in construction, and wherein the operating elements of the clutch may be readily removed and replaced, without completely dismantling the entire device.

A further object is to provide a device of this character wherein the winding drum of the jerk line is prevented from spinning, at the completion of its wrench pulling action.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a vertical longitudinal sectional view of a jerk line device, made in accordance with the present invention.

Figure 2 is a vertical transverse central sectional view through the device, on the line 2—2 of Figure 1.

Figure 3 is a vertical transverse sectional view on line 3—3 of Figure 1.

Figure 4 is a vertical transverse sectional view of the device, on the line 4—4 of Figure 1.

Referring particularly to the accompanying drawings, 10 represents a cylindrical casing which is provided with a removable closure disk 11, in one end. Disposed within the casing is a member, represented as a whole by the numeral 12, and comprising the terminal spool portion 13, arranged outwardly of the casing, and the stem portion 14, which is disposed longitudinally and centrally within the casing. The inner end of the spool portion is formed with a flange 15, on the inner face of which are formed the inclined lugs 16. Disposed longitudinally through the casing 10, and through the member 12 is a shaft 17. Mounted on the stem portion 14, of the member 12, is a cylindrical member 18, having the intermediate peripheral enlarged portion 19, in the outer face of which is formed the circumferential groove 20, in which is arranged to be wound the jerk line cable or wire 21. Across the groove is arranged the bar 22 to which one end of said cable or wire 21 is secured, the other end of said cable extending outwardly through a slot 22′ formed in the side of the casing 10. Mounted for longitudinal slidable movement on one end of the member 18, is a peripherally grooved ring 23, and pivotally supported on said ring are the clutch blades 24, which are arranged to slide in the longitudinal grooves 25, formed in the member 18. Stop members 26 are disposed across these grooves 25, to limit the movement of said blades, the bottoms of said grooves inclining longitudinally so that their deepest ends lie adjacent the ring 23, while their shallowest ends lie adjacent the other end of the member 18, as clearly seen in the sectional view, Figure 1. Pivotally mounted in one end of the casing is a lever 27, the inner end of which is formed with a fork 28, having the ends of its furcations engaged in the peripheral groove of the ring 23, by means of which said ring may be moved longitudinally on the member 18, to dispose the ends of the clutch blades 24 in and out of the path of the lugs 16, of the flange 15, of the spool portion 13. Projecting from the peripheral face of the grooved portion of the member 18 is a lug 29 which is adapted to engage, at times with a lug 30 projecting inwardly from the inner face of the casing 10. Also carried by the inner face of the casing adjacent the ring 23, are the diametrically opposite inclined cam lugs 31, with which the radiating lugs 32, carried by the ring 23, are adapted to be engaged, whereby to cause the movement of said ring longitudinally within the casing, as will be clearly understood from an inspection of the drawings.

The other end of the cable or wire 21 is

adapted to be connected with the wrench (not shown), which is used in unscrewing the drill rod, pipe, or the like sections.

In the operation of the device, the shaft 17 is in constant rotation, but if the clutch blades 24 are not in engagement with the lugs 16, the member 18, and the ring 23 will not rotate. Upon rocking the lever 27, to slide the ring 23, whereby to project the free ends of the blades 24 so that they will be engaged by the lugs 16, the member 18, and said ring will be rotated, with the result that the cable or wire 21 will be wound on the said member, within the groove 20, pulling on the wrench so that an unscrewing action is imparted to a section of the drill rod. The parts 18 and 23 are adapted to make one complete turn, in this pulling action on the wrench, when the lugs 32 will engage with the inclined lugs 31, with the result that the ring 23 will be moved longitudinally on the member 18, in a direction to withdraw the clutch blades 24 out of the path of the lugs 16, thus permitting the member 12 to continue to rotate, while the member 18 is brought to a stop by engagement of its lugs 29 with the lugs 30, of th casing. It is understood that the wrench is swung to get a new grip on the drill rod section by any suitable means, as springs, or by hand, but as this forms no part of the present invention, such is not illustated. Upon the return movement of the wrench, the cable or wire 21 is pulled, whereby to unwind the latter from the member 18, which causes a retrograde rotation of such member, such rotation continuing until the lug 29 again engages the lug 30, which brings this rotation to an end. Upon again swinging the lever 27, the wire 21 will be wound on the member 18, and the wrench given another movement to impart an unscrewing action on the drill rod section. This is continued until the drill rod sections have been completely separated, or unscrewed sufficiently to permit the operator to complete the operation by hand or machinery.

From the foregoing it will be seen that at the end of each operation of the wrench the clutch is automatically released, and that the rotating parts are stopped, after a further short rotary movement, without undue spinning.

What is claimed is:

1. A jerk line device comprising a shaft, a spool rotatable with the shaft and having an extension sleeve, a jerk line drum rotatable on the sleeve, a collar rotatable on the sleeve, blades movably carried by the collar and slidable through said drum into and out of clutching engagement with said spool, means for moving the collar in one direction to engage the blades with the spool, and means for automatically moving the collar in the opposite direction to disengage said blades.

2. A jerk line device comprising a shaft, a spool on the shaft and rotatable therewith and having an extension sleeve on the shaft, a jerk line drum rotatable on the sleeve, said drum having longitudinally inclined channels therein, a ring rotatable on the sleeve and movable toward and away from said drum, and blades pivotally carried by said ring slidable through said channels into and out of clutching engagement with said spool, and means for moving said ring.

3. A jerk line device comprising a casing, a shaft in the casing, a spool on the shaft and rotatable therewith, a sleeve on the spool extending into the casing, a flange on the spool overlying one end of said sleeve and having inwardly extending lugs, a ring rotatable on the other end of said sleeve, a jerk line drum rotatable on the sleeve between said flange and said ring, said drum having longitudinal inclined channels therein, blades pivotally carried by the ring for movement through said channels into and out of engagement with said lugs, means for manually moving the ring in one direction, and means on the casing and ring for cooperation to move said ring in the opposite direction.

In testimony whereof I affix my signature.

CHARLES W. BYRD.