Sept. 8, 1936. J. P. HERKE 2,053,715

WELL DRILLING RIG

Filed Nov. 12, 1935

FIG. 1.

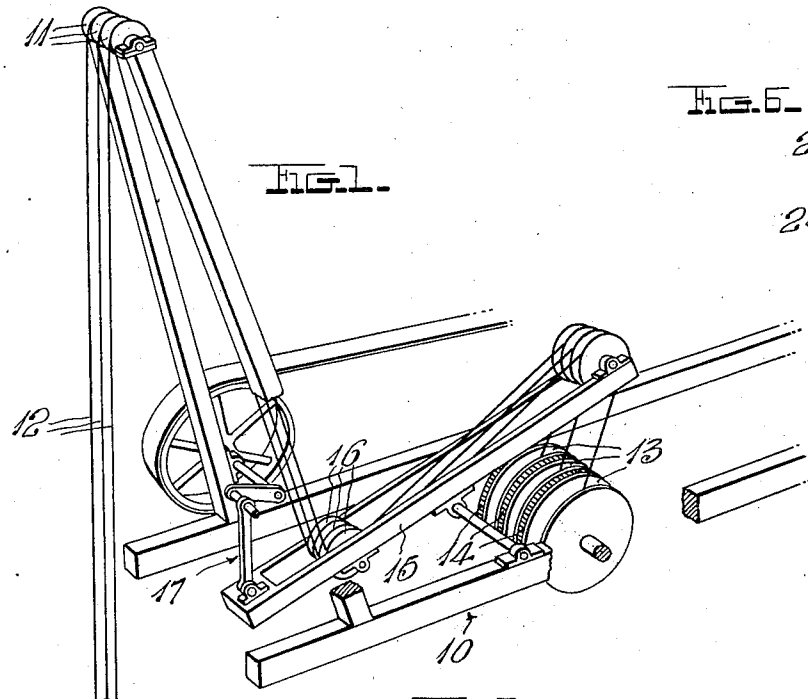


FIG. 6.

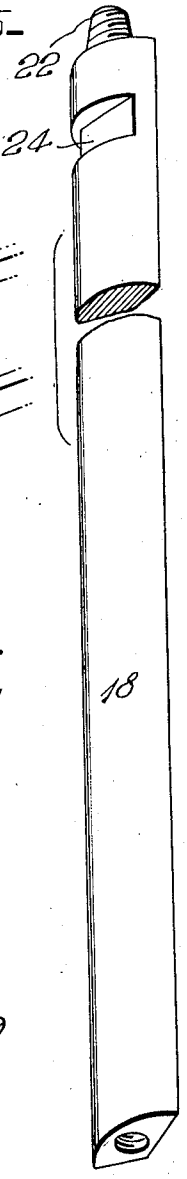


FIG. 4.

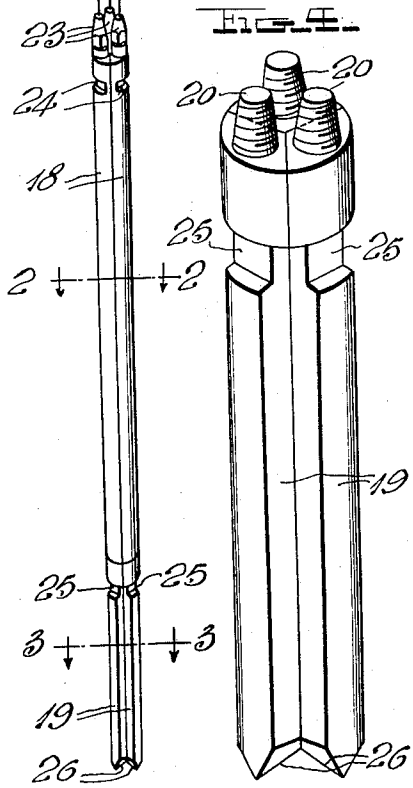


FIG. 5.

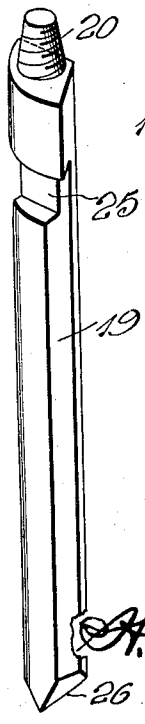


FIG. 2.

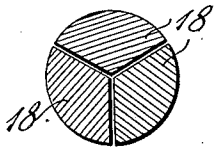
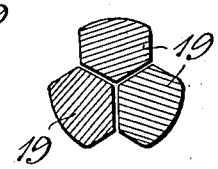


FIG. 3.



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WELL DRILLING RIG

Joseph P. Herke, Yakima, Wash.

Application November 12, 1935, Serial No. 49,409

6 Claims. (Cl. 255—2)

The invention aims primarily to provide a new and improved well drilling rig in which a group of drilling stems and a group of individual drilling bits carried by the stems, are simultaneously actuated to form the hole, the stems being carried by individual cables having separately operable drums, and all of said cables being simultaneously actuated by a walking beam or in other suitable way, to reciprocate the drilling stems and bits. Thus, should rock fall into the hole below the casing as often occurs, there is little likelihood that such rock will lock all of the stem sections and bits against withdrawal. Withdrawal of any section which may therefore be free, will loosen the other sections so that they also may be withdrawn, preventing such losses as those which occur when a single drilling stem is locked against withdrawal by rock falling under the casing.

A further object of the invention is to provide a construction in which the drilling bits crowd outwardly under the impact of drilling, insuring ample clearance between the wall of the hole and drill and insuring formation of a straight hole.

A still further object is to provide the drilling stem sections and the bit sections of such form that they will lie non-rotatably against each other during operation, to rise and fall as a single unit.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawing.

Fig. 1 is a perspective view showing portions of a portable drilling rig embodying the invention.

Fig. 2 is a horizontal sectional view through the drilling stems, on line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view through the drilling bits, on line 3—3 of Fig. 1.

Fig. 4 is a perspective view of the group of bits.

Fig. 5 is a perspective view of one of the bits.

Fig. 6 is a perspective view of one of the drilling stems.

A frame 10 is shown having three pulleys 11 for three drilling cables 12, for which cable three individual drums 13 are provided, said drums having separate driving mechanisms, portions of which are shown in the form of gears 14. The cables 12 are actuated by any preferred means such as the walking beam 15 having cable-engaging pulleys 16, and the operating means 17 for said walking beam.

Three separate or individual drilling stems 18 are carried by the three cables 12 respectively, and the lower ends of said stems 18 are provided with separate or individual drilling bits 19. Both the stems 18 and the bits 19 are of truly or substantially segmental form to lie non-rotatably against each other during simultaneous reciprocation of said stems and bits during the drilling operation. The upper ends of the bit sections 19 are provided with integral threaded studs 20 and the lower ends of the stem sections 18 are formed with threaded sockets 21 to receive said studs. The upper ends of the stem sections 18 are provided also with threaded studs 22, one of which is seen in Fig. 6, and these studs are threaded into the usual or any preferred cable connectors 23 which are secured to the cables 12. At suitable locations, the stem sections 18 and bit sections 19 are provided with appropriate formations 24 and 25 to be engaged by a wrench when connecting the bit sections with the stem sections, the formations 24 being also used when connecting the connectors 23 with said stem sections.

The lower ends of the bit sections 19 are suitably sharpened and their lower edges 26 preferably incline upwardly from their outer to their inner ends, causing the bit sections and stems to crowd outwardly under the impact of drilling. This insures that the drilling means shall be properly guided by the wall of the hole at the end of each drilling blow to form a straight hole but upon ascent, the sections of said drilling means may readily clear the wall of the hole instead of binding with excessive friction thereon.

In operation, all of the cables 12 are simultaneously, uniformly and unidirectionally reciprocated to raise and permit descent of the stem sections 18 and bit sections 19 as a single unit. In case any rock should fall below the well casing, there is little likelihood that it will lock all of the sections against withdrawal. The chances are that there will be a possibility of withdrawing at least one of the stem sections 18 and its bit section 19 by operating the proper drum 13, and the chances are that such withdrawal of the one section will so loosen the other sections as to permit them also to be readily pulled from the well. There is thus little danger of the entire drill becoming stuck in the well so that it cannot be salvaged, as often occurs with drills of conventional types.

The general construction shown and described

for the stem sections 18 and the bit sections 19, may be followed if desired. While operating cables equal in number to the stem sections would always be employed, together with independent means for winding any one of said cables independently of the others, it is to be understood that the actuating means for moving the cables to reciprocate the drill, may be of any conventional or desired form, the present showing being illustrative rather than limiting.

I claim:—

1. In a well drilling rig, a group of separate drilling stem sections to jointly drill a single hole, said stem sections having individual drilling bit sections; individual cables connected with said stem sections, and means for simultaneously actuating said cables to actuate said stem and bit sections; whereby if rock should fall under the well casing upon the stem sections, there would be little likelihood of said rock locking all of said stem sections, and withdrawal of a free stem section of the group would loosen the remainder of said group.

2. In a well drilling rig, a group of separate drilling stem sections to jointly drill a single hole, said stem sections having individual drilling bit sections; individual cables connected with said stem sections, individual winding drums for said cables, and means for simultaneously actuating said cables to actuate said stem and bit sections; whereby if rock should fall under the well casing upon the stem sections, there would be little likelihood of said rock locking all of said stem sections, and withdrawal of a free stem section of the group would loosen the remainder of said group.

3. In a well drill, a group of stem sections to abut each other during operation, the upper ends of said sections being provided with individual cable-attaching means, the lower ends of said sections being provided with individual drilling bit sections.

4. In a well drill, a group of stem sections of segmental form to non-rotatably abut each other during operation, the lower ends of said stem sections being provided with individual drilling bit sections, the upper ends of said stem sections being provided with individual cable-attaching means.

5. In a well drill, a group of drilling stem sections of segmental form to abut each other during operation, the upper ends of said stem sections being provided with cable-attaching means, the lower ends of said stem sections being provided with bit-attaching means.

6. In a well drill, a stem section of segmental cross-section having cable-attaching means at its upper end and bit-attaching means at its lower end.

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