

S. S. HENSLEY.

DRILL.

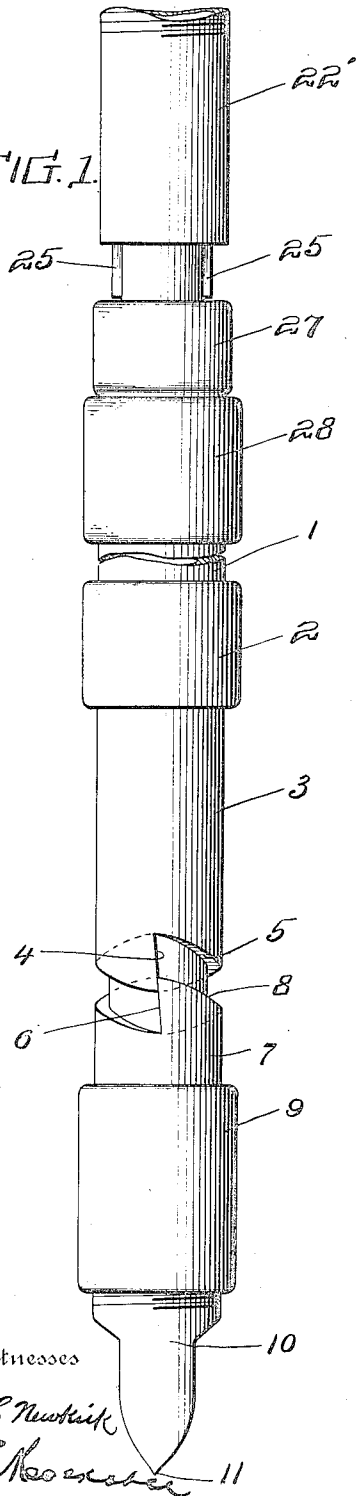
APPLICATION FILED OCT. 13, 1916.

Patented May 8, 1917.

2 SHEETS—SHEET 1.

1,225,629.

FIG. 1.

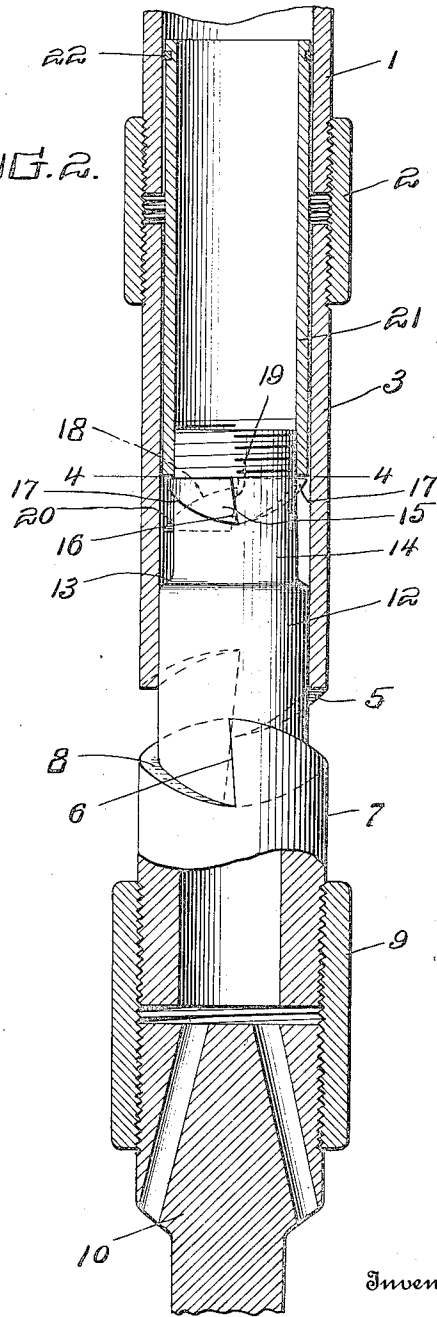


Witnesses

A. G. Newkirk

The Newkirk

FIG. 2.



Inventor

S. S. Hensley

By Victor J. Evans

Attorney

S. S. HENSLEY.

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2 SHEETS—SHEET 2.

FIG. 3.

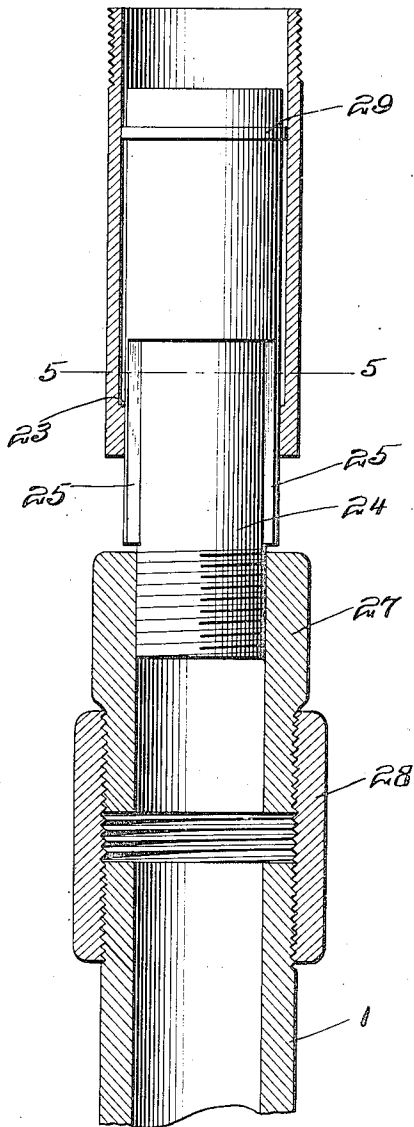


FIG. 4.

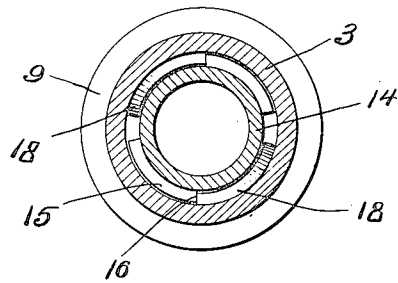


FIG. 5.

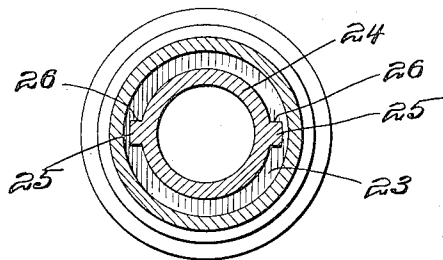
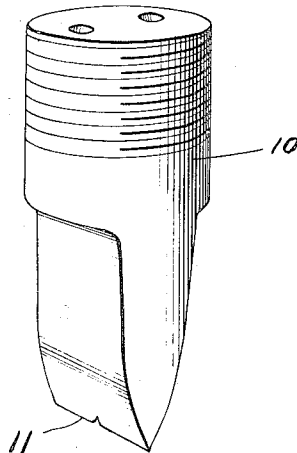


FIG. 6.



Inventor

S. S. Hensley

Witnesses

A. C. Newkirk
Th. M. Hensley

By Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

SEWELL S. HENSLEY, OF MEXIA, TEXAS.

DRILL.

1,225,629.

Specification of Letters Patent.

Patented May 8, 1917.

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To all whom it may concern:

Be it known that I, SEWELL S. HENSLEY, a citizen of the United States, residing at Mexia, in the county of Limestone and State of Texas, have invented new and useful Improvements in Drills, of which the following is a specification.

This invention relates to improvements in drills, and more particularly to that type of drills used in boring through rocks or other hard substances.

The object of the present invention is to provide a drill in which the stem or pipe is continuously rotated, said rotating means being arranged to give an intermittent rotating movement to the bit, during which period of rest the striking mechanism is active to force the bit into the rock.

Another object is to provide means for regulating the weight of the blow to be struck.

Other objects and advantages of the invention will appear in the following description and be pointed out in the appended claims.

In the drawings:

Figure 1 is an elevation of a drill constructed in accordance with the present invention;

Fig. 2 is an enlarged sectional view of the lower portion of the drill;

Fig. 3 is an enlarged vertical section through the vertically movable compensating means;

Fig. 4 is a transverse section on the line 4-4 of Fig. 2;

Fig. 5 is a transverse section on the line 5-5 of Fig. 3; and

Fig. 6 is a detail view of the drill bit.

Referring more particularly to the drawings the numeral 1 indicates the usual stem or pipe sections, being coupled together in the ordinary manner to provide the necessary lengths as the work progresses. One of the pipe sections 1 has coupled to it by means of a collar 2 a section 3 of approximately the same exterior and interior diameter as the above sections 1. The lower end of the section 3 is provided with preferably a pair of clutch teeth 4, said teeth being of approximately an angle of five degrees, more or less, while the surface 5 of the clutch is approximately an angle of twenty degrees.

Similar teeth 6 are formed upon a short section 7; the angle of the teeth 6 corresponding to that of the teeth 4, while the

angle of the surface 8 corresponds to that of the surface 5 previously mentioned. The lower end of the section 7 is threaded to receive a collar 9, said collar connecting the drill bit 10 with the section 7. This bit 10 is threaded at one end and at the opposite end is formed with a cutting face 11. The section 7 has secured thereto an extension 12, said extension extending upward within the section 3, and being swaged inwardly, as at 13, to provide a reduced portion 14. The portion 14 is formed upon its outer surface with lugs 15, the faces 16 corresponding with the faces 4 and 6 while the surfaces 17 are inclined in approximately the same manner as the surfaces 5 and 8. Formed upon the interior of the section 3 are lugs 18 having faces 19 corresponding to the faces 16 and surfaces 20 corresponding to the surfaces 17 on the lugs 15. The reduced portion 14 of the section 12 is threaded into a pipe section 21 which extends upward into the lowermost section 1 of the stem or pipe, and the section 21 is preferably provided with a hydraulic packing 22.

In order to provide that only a portion of the drill stem shall be raised and lowered a device is interposed between any of the pipe sections, the position being determined by the amount of weight or impact required upon the drill bit. This device is necessary inasmuch as the upper part of the drill stem is continuously rotated while the lower part which carries the bit is intermittently raised and lowered and rotated. The device just mentioned consists of a pipe 22' having an interiorly thickened lower end 23, the said lower end having an opening of sufficient diameter to receive a short section 24. This last mentioned section has formed thereon longitudinal keys 25 adapted to work in grooves 26 formed in the thickened portion 23 of the section 22'. A bushing 27 is connected to one of the pipe sections 1 by means of a collar 28. The portion of the drill stem comprising the member 22 and the parts thereabove must be held suspended above the coupling 27 a sufficient distance to allow the raising and falling of the stem.

In the operation of the drill the stem drops until the surfaces 5 and 8 contact and the lugs 18 and 15 disengage. The stem then stops and remains stationary while the surface 5 rides up upon the surface 8, raising the drill stem 1, to drop again at the

end of the incline 8. The surfaces 16 and 19 of the lugs 15 and 18 will disengage and rotate the bit until the stem 1 has dropped sufficiently for the lugs 15 and 18 to clear.

- 5 The stem 1 is raised and dropped twice in each complete rotation of the member 3 about the member 12, and the bit is rotated a short distance during each dropping movement. The drill stem 1 is rotated clockwise and as shown in Fig. 2 the lugs 15 and 18 will rotate the bit.

As before stated, the device just described may be placed between any of the sections 1, depending upon the amount of impact necessary for the work, the device practically forming a telescopic coupling between two of the pipe sections. A suitable packing 29 is provided in the upper portion of the section 24.

- 20 It will be seen from the foregoing description that I have provided a drill in which the stem is continuously rotated in the ordinary manner so that no change in this regard is necessary. I have also provided means whereby the bit is alternately rotated and acted upon by impact, which is desirable in this method of drilling. I have also provided means interposed at any point between the rotating mechanism and the drill bit to compensate for the raising and lowering of said bit.

Having thus described my invention, what I desire to claim and secure by Letters Patent, is;

- 35 1. A drill comprising continuously rotatable stem sections, an intermittently rotated bit, means for automatically raising and dropping a portion of the stem sections, and means interposed between said bit and the revolving mechanism of the stem sections for compensating for the raising and lowering of the stem sections.

2. A drill comprising stem sections, a bit-carrying shank rotatable within said stem sections, lugs located upon the shank and coacting with lugs upon the interior of the stem sections, ratchet teeth located between the said lugs and the bit and vertically movable compensating means located above the bit.

- 50 3. A drill comprising stem sections, an intermittently rotated bit adapted to be secured to said stem sections, means for alter-

nately raising and dropping the stem sections and means interposed in said stem sections to provide for said raising and dropping, said means comprising a vertically movable section, longitudinal keys formed on said section and grooves formed in an adjacent section.

4. A drill comprising stem sections, a bit operated by said stem sections, a removable shank connected to said bit, ratchet teeth formed on said shank and coacting with similar ratchet teeth formed on the stem sections, lugs secured to said shank and coacting with similar lugs carried by the lowermost stem section, a coupling section formed with a thickened lower portion and provided with longitudinal grooves, a reduced section slidable within this coupling and longitudinal keys formed on this reduced section.

5. A drill comprising a continuously rotatable drill stem, a removable bit operated by said stem, a shank for said bit, ratchet teeth located on said shank and coacting with similar ratchet teeth carried by the stem, cam lugs carried by said shank and coacting with similar lugs carried by the rotatable stem, a telescopic coupling located in said rotatable stem and a feather and spline between the members of said telescopic coupling.

6. A drill comprising a continuously rotatable stem, a removable bit operated by said stem, a telescopic coupling located in the continuously rotatable stem and means located between said telescopic coupling and the bit to provide for an intermittent rotary movement of said bit.

7. A drill comprising a continuously rotatable stem, a bit operated by said stem, a telescopic coupling located in the continuously rotatable stem and means located between said telescopic coupling and the bit for automatically raising and dropping a portion of the rotatable stem.

8. A drill comprising a continuously rotatable stem, a bit operated thereby, means providing an intermittent rotary motion for said bit and means for raising and dropping the drill stem.

In testimony whereof I affix my signature.

SEWELL S. HENSLEY.