No. 673,500. Patented May 7, 1901.

N. G. HALL.

WELL DRILLING APPARATUS.

(Application filed Feb. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

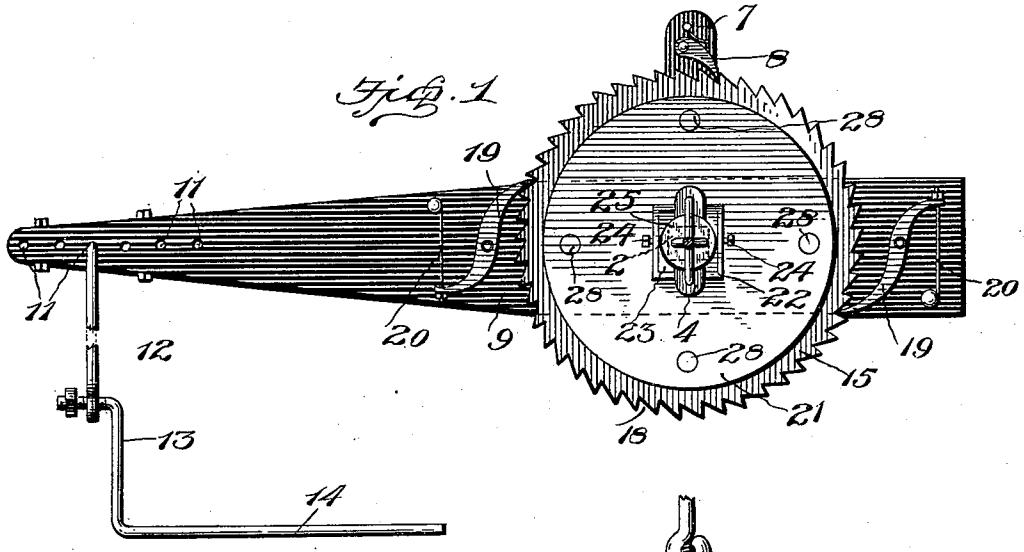
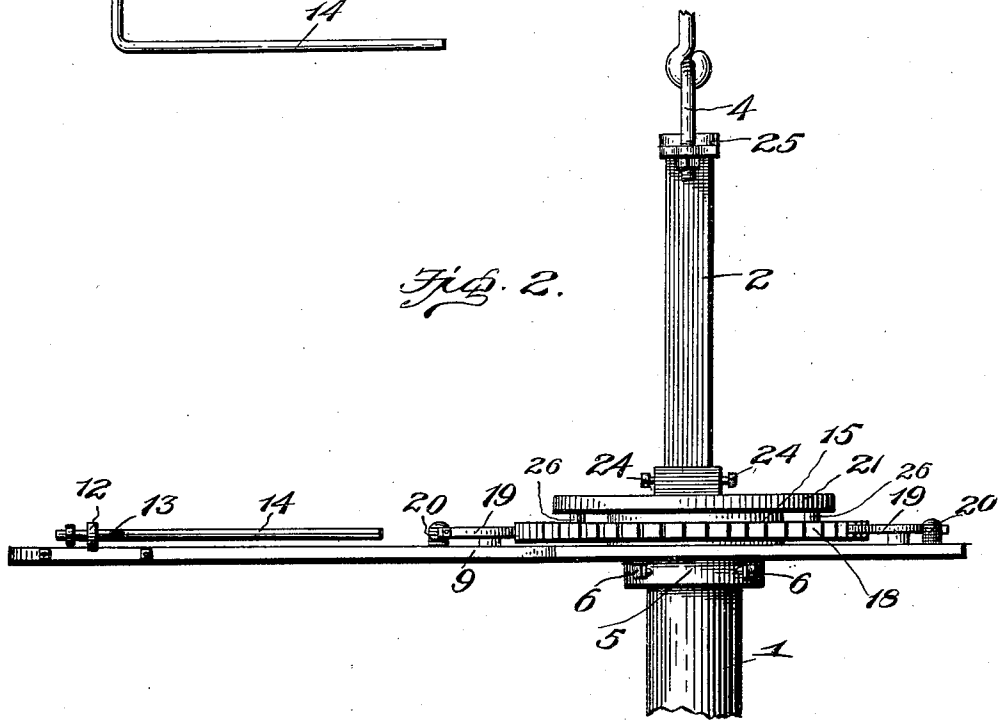


Fig. 2.



Witnesses

E. Hunt.

E. Robinson

Inventor

N. G. Hall

By A. B. Williamson & Co

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 673,500. Patented May 7, 1901.

N. G. HALL.

WELL DRILLING APPARATUS.

(Application filed Feb. 14, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

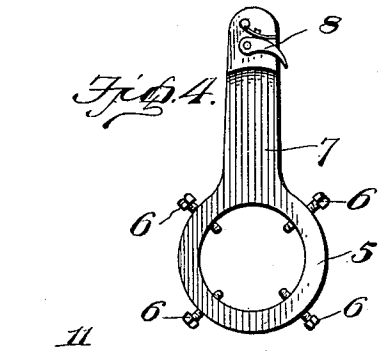


Fig. 3.

Fig. 5.

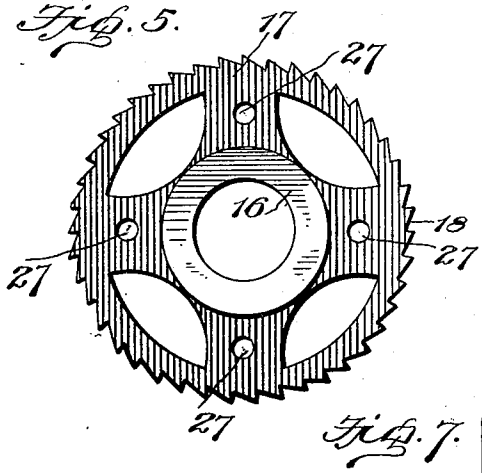


Fig. 6.

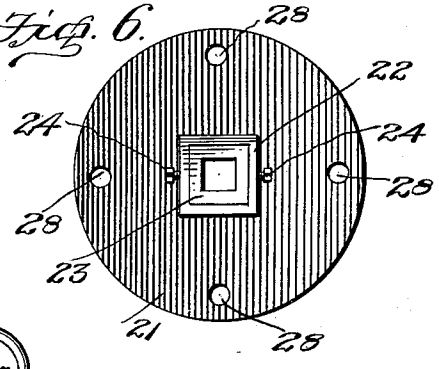
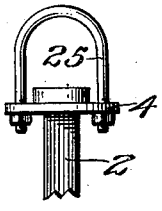


Fig. 7.



Inventor

N. G. Hall

Witnesses

C. E. Hunt,

J. Addison

By H. B. Wilson & Co

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NORMAN G. HALL, OF SPENCER, SOUTH DAKOTA.

WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 673,500, dated May 7, 1901.

Application filed February 14, 1901. Serial No. 47,258. (No model.)

To all whom it may concern:

Be it known that I, NORMAN G. HALL, a citizen of the United States, residing at Spencer, in the county of McCook and State of South Dakota, have invented certain new and useful Improvements in Well-Drilling Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in well-drilling apparatus, and has for its objects to provide simple and effective means for turning or twisting the drill-rod and to provide a construction of parts equally well adapted for either rock or dirt drilling.

With these and other minor ends in view, which will appear as the nature of the invention is better understood, the same consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a top plan view of a well-drilling apparatus embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a central vertical section. Figs. 4, 5, 6, and 7 are detail plan views of the different parts of the apparatus.

Like reference characters designate corresponding parts throughout the several views.

Referring now more particularly to the drawings, the numeral 1 represents the well-casing, which extends in practice a sufficient distance above the surface, and 2 the drill-rod, which may be either hollow or solid, but is preferably made hollow and of rectangular form except at the ends, where it is made circular and screw-threaded to receive the upper drill-tube 3 and draft-cable-connecting swivel 4. By this construction the rod may be adapted for either rock or dirt work by the application of the proper form of swivel to the upper end of said rod, dirtwork requiring the use of an open-work swivel, which will permit water to flow down through said rod, as will be readily understood by those versed in the art.

The drill-turning mechanism comprises in its construction a collar 5, having set-screws 6 for securing it to the well-casing 1, and a radial arm 7, carrying at its outer end a spring-actuated stop-pawl 8. Above this collar is located an oscillating bar 9, having adjacent to one end an opening 10 to admit said casing 1 and at the opposite end a series of apertures 11 to adjustably receive one end of a pitman-rod 12, the opposite end of which is connected with a crank 13 on the drive-shaft 14 of the drill-operating mechanism. The operation of the shaft causes the pitman to reciprocate and to in turn oscillate the said bar 9, which turns loosely about the well-casing. By adjusting the pitman-rod to engage the desired aperture 11 in the oscillating bar the stroke of the latter may be varied in an obvious manner. About the well-casing above the oscillating bar is also mounted a ratchet-wheel 15, formed with a hub 16 to loosely embrace and turn on said casing a series of radial arms 17, and a toothed rim 18, which is engaged at one point by the stop-pawl 8 to hold the ratchet-wheel against retrograde movement. Engaging the toothed rim at diametrically opposite sides are also feed-pawls 19 on the oscillating bar, which in one direction of movement of the bar engage the teeth of the rim and revolve the ratchet-disk a portion of a revolution, and in the reverse direction of revolution of the bar ride loosely over said teeth while the pawl 8 operates to prevent the wheel from moving backwardly. Each pawl 19 is held in working position by a spring 20, secured at one end thereto and at its opposite end to the bar. As shown in Fig. 3, the upper surface of the ratchet-wheel lies practically flush with the upper end of the well-casing 1.

Above the well-casing and ratchet-wheel is arranged a turning disk 21, having at the center a rectangular slot 22 for the reception of a similarly-shaped bearing-ring 23, detachably secured thereto by set-screws 24. Through this ring the drill-rod 2 passes, and said ring acts in the nature of a wear-plate to protect the disk from injury from the rapid reciprocatory motion of the drill-rod and at the same time to rigidly connect said rod to turn with the disk. When the ring in use becomes worn and unfit for further use, it may be

readily detached and a new one substituted therefor. The disk is held from dropping off the drill-rod when the rod is removed by a washer 25, secured to said rod beneath the disk. The ratchet-wheel and disk are connected to move in unison by plugs 26, fitting in registering sockets 27 and 28, formed in said parts. These plugs are preferably made of wood or some suitable material which will readily fracture when the resistance to the turning of the drill becomes greater than normal, so as to avoid injury to the disk and wheel. The plugs may be readily knocked out when it is desired to detach the disk from the ratchet-wheel.

In operation it will be readily understood from the foregoing description, taken in connection with the drawings, that at each revolution of the drive-shaft and on each stroke of the drill the oscillatory bar will be operated to move the ratchet-wheel a part of a revolution, whereby motion will be communicated to the disk 21, which will turn the drill-rod 2.

Changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

In a well-drilling apparatus, the combination, with a well-casing and a drill-rod, of a collar detachably mounted upon said casing and provided with a radial arm carrying a stop-pawl, an oscillating operating-bar mounted upon the well-casing above said collar and supported thereon, a ratchet-wheel rotatably mounted on the casing above the operating-bar and engaged by said stop-pawl, pawls on the operating-bar to engage and turn the ratchet-wheel, a disk engaging the drill-rod, and plugs removably fitted in corresponding openings in the ratchet-wheel and disk and detachably connecting said parts together, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

NORMAN G. HALL.

Witnesses:
WM. HOESE,
V. H. MASTERS.