

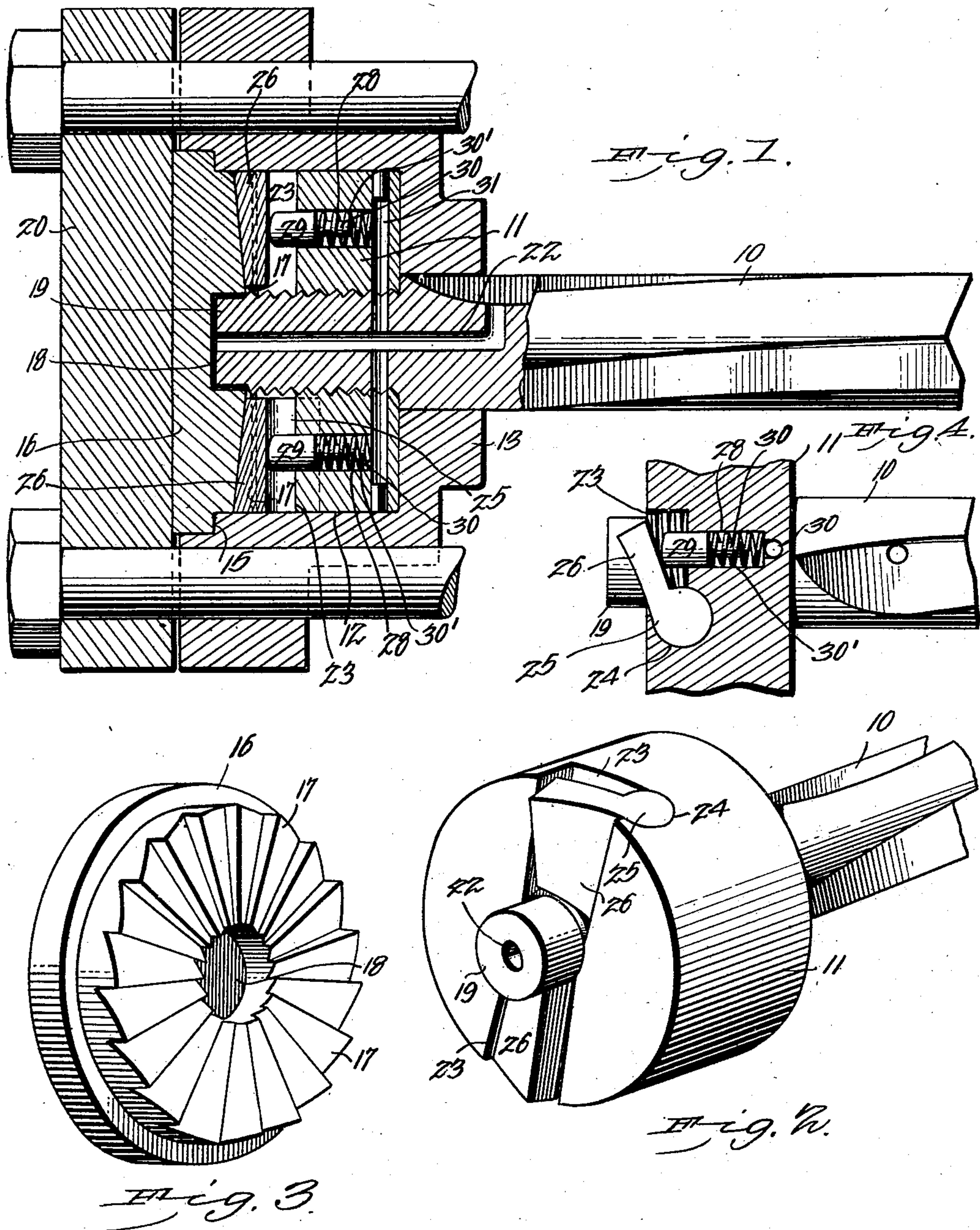
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PATENTED MAR. 17, 1903.

V. SCHNEIDER.
ROCK DRILL.

APPLICATION FILED JULY 2, 1902.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

VINCENT SCHNEIDER, OF TRIMOUNTAIN, MICHIGAN.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 722,914, dated March 17, 1903.

Application filed July 2, 1902. Serial No. 114,145. (No model.)

To all whom it may concern:

Be it known that I, VINCENT SCHNEIDER, a citizen of the United States, residing at Trimountain, in the county of Houghton and State of Michigan, have invented a new and useful Rock-Drill, of which the following is a specification.

This invention relates to certain improvements in fluid-pressure-actuated rock-drills, and has for its principal object to provide an improved form of mechanism for effecting the rotation of the drill and the reciprocating piston carrying said drill.

A further object of the invention is to so arrange the pawl-and-ratchet rotating mechanism as to avoid the necessity of employing springs for the purpose of retaining the pawls in operative engagement with the ratchet-teeth, the springs employed being for the purpose of preventing excessive movement of the pawls and the latter being held in working position by the pressure of fluid in the cylinder.

A still further object of the invention is to so arrange and construct the pawl-and-ratchet mechanism as to permit of a yielding movement in the event of any strain which would tend to prevent rotative movement of the drill and piston, and thus avoid breaking or straining the drill or its actuating mechanism.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a longitudinal sectional elevation of the rear portion of a rock-drill, illustrating a drill-rotating mechanism constructed in accordance with my invention. Fig. 2 is a detail perspective view of a portion of the rifle-bar and its pawl-carrying head. Fig. 3 is a similar view of the loose ratchet-disk. Fig. 4 is a detail sectional view through a portion of the pawl-carrying head.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In rock-drills as ordinarily constructed pawl-and-ratchet mechanisms are employed for rotating the piston and drill during the inward movement of the piston, and springs

are usually employed to hold the pawls in engagement with the ratchet-teeth. As the movements of the drill are rapid and the parts subjected to violent shocks and strains, the springs are frequently broken and must be replaced at a considerable loss of time. Another difficulty experienced in the use of these drills is that on the return stroke the drill frequently sticks, usually as the result of a slight twist due to following a seam in the rock, and in such cases the pawl or pawls are broken or the teeth of the ratchet-disk are stripped or the drill otherwise damaged.

In carrying out my invention I employ an ordinary form of rifle-bar 10, to which is secured a cylindrical head 11, fitting within a chamber 12 in the rear head 13 of the cylinder. The rear end of the cylinder-head is grooved to form a seat 15 for the reception of a disk 16, having on its inner face a series of radially-arranged ratchet-teeth 17, which serve to engage the pawls carried by the cylindrical head 11. In the center of the disk 16 is a recess 18 for the reception of the rearwardly-extending end 19 of the rifle-bar, the end of the rifle-bar coming into contact with the bottom of the recess and preventing direct contact between the cylindrical pawl-carrying head 11 and the ratchet-teeth 17 under the pressure of air or steam within the cylinder.

The ratchet-disk 16 is held in place by an auxiliary head 20, which is bolted in position in the usual manner, the friction between the disk and auxiliary head serving to confine the disk in place during the ordinary operation of the drill. If on the rear stroke of the piston the drill should stick and prevent rotative movement on the rifle-bar, the disk will yield and rotate to an extent sufficient to compensate for the inward movement of the piston and drill, and thus avoid breaking any of the parts.

In the rifle-bar is formed a longitudinal passage 22, extending from the rear end thereof to a point in advance of the cylindrical head 11, said passage thence extending to the periphery of the rifle-bar and in free communication with the steam or air space of the cylinder, thus affording an open port for the passage of fluid under pressure to the inner face of the ratchet-disk and serving to more

securely hold said disk in frictional contact with the auxiliary head 20.

In the rear face of the cylindrical head 11 are two pawl-receiving recesses 23, having 5 circular portions 24 for the reception of the approximately-cylindrical heads 25 of pawls 26, the latter extending from the rifle-bar to the periphery of the cylindrical head and having radially-disposed engaging faces for 10 contact with the radial ratchet-teeth 17. At a point under each pawl is a circular opening 28 for the reception of a pin 29, which is forced outwardly to engage the rear surface of the pawl and hold the latter in contact 15 with the ratchet-teeth. The inner portion of the pin is reduced in diameter, forming a stem 30, around which is coiled a compression-spring 30', one end of which bears against the bottom of the opening and the opposite 20 end against the shoulder of the pin. The spring is intended only to prevent excessive inward movement of the pawl and is not relied upon to hold the pawl in active engagement with the ratchet-teeth. It may in some 25 cases be entirely dispensed with without interfering with the proper operation of the pins and pawls.

The openings 28 are placed in communication with the passage 22 by a diametral port 30 31, which is bored directly through the cylindrical head 11 and the portions between the periphery of the head and the openings 28 being afterward plugged. In this manner air or steam under pressure is admitted to the 35 rear faces of the pins 29, and as the latter are fitted snugly in the openings 28 the pressure serves to force the pins against the inner faces of the pawls, and the latter are at all times held tightly against the teeth of the 40 ratchet-disk. It will be observed that the ratchet-teeth are of considerable length, extending from the wall of the recess 18 to the periphery of the disk, and the pawls are of a similar length, the structure being much 45 stronger than would be possible with peripherally-disposed teeth on a ratchet-disk of the same diameter and weight.

The piston and other portions of the drill have been omitted from the drawings, the 50 construction of these parts of the device being well known and forming no part of the present invention. The operation of the rotating mechanism is similar to that of an ordinary drill, the outward movement of the 55 piston revolving the rifle-bar and the cylindrical head 11 turning to the extent of one or more teeth of the ratchet-disk 16. On the inward movement of the piston the ratchet-disk is held by frictional contact with the 60 auxiliary head 20, and as the rifle-bar is held from rotative movement the piston and drill are turned. If, however, the drill should stick from any cause and rotative movement prevented, the ratchet-disk will yield to the 65 excessive strain and turn to permit the inward movement of the piston without breaking any of the parts.

While the construction herein described, and illustrated in the accompanying drawings, is the preferred form of the device, it is 70 obvious that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention. 75

Having thus described the invention, what I claim is—

1. The combination in a rock-drill-rotating mechanism, of the rifle-bar, a cylindrical pawl-carrying head secured thereto and provided on its rear face with pawl-receiving recesses, pawls pivotally disposed in said recesses, pin-receiving openings formed in the head at points under said pawls and in communication with the air or steam space of 80 the cylinder of the drill, pins adapted to said openings and serving to hold the pawls in operative position, and a ratchet-disk for engagement with said pawls.

2. The combination in a rock-drill-rotating 90 mechanism, of the rifle-bar having a longitudinally-disposed port or passage in communication with the steam or air space of the rock-drill, a cylindrical head provided with pawl-receiving openings and with pin-receiving 95 openings, ports extending between the pin-receiving openings and the passage in the rifle-bar, pawls pivotally mounted in said recesses and provided with radial engaging faces, pins disposed within the pin-receiving 100 openings and held in contact with the pawls by the air or steam pressure, and auxiliary springs for preventing excessive inward movement of said pins, substantially as specified.

3. The combination in a rock-drill-rotating 105 mechanism, of the hollow cylinder-head in communication with the main cylinder of the rock-drill, a ratchet-disk disposed within the hollow cylinder-head and partly held in stationary position by the pressure of the actuating fluid, an auxiliary head, means for holding 110 the auxiliary head in frictional contact with the ratchet-disk, a rifle-bar, a cylindrical head secured to the rifle-bar, and pawls carried by the cylindrical head and engaging 115 the teeth of said ratchet-disk.

4. In a device of the class specified, the combination with the rifle-bar, the cylindrical head and pawls, of the rear cylinder-head having a ratchet-receiving recess, a ratchet-disk disposed therein and having a central recess for the reception of the rear end of the 120 rifle-bar, an auxiliary head, means for holding the same in frictional contact with the ratchet-disk, and a port or passage extending 125 through the rifle-bar to admit the fluid-pressure in the cylinder of the rock-drill to the inner face of the ratchet-disk, substantially as specified.

5. The combination in a rock-drill-rotating 130 mechanism, of the hollow cylinder-head in communication with the main cylinder of the rock-drill, an auxiliary head, an imperforate ratchet-disk disposed within the hollow cyl-

inder-head and held in close contact with the
auxiliary head by the pressure of the actu-
ating fluid, means for holding the auxiliary
head in frictional contact with the ratchet-
5 disk, a rifle-bar, a cylindrical head secured
to the rifle-bar, and pawls carried by the cyl-
indrical head and engaging the teeth of said
ratchet-disk.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in 10
the presence of two witnesses.

VINCENT SCHNEIDER.

Witnesses:

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