

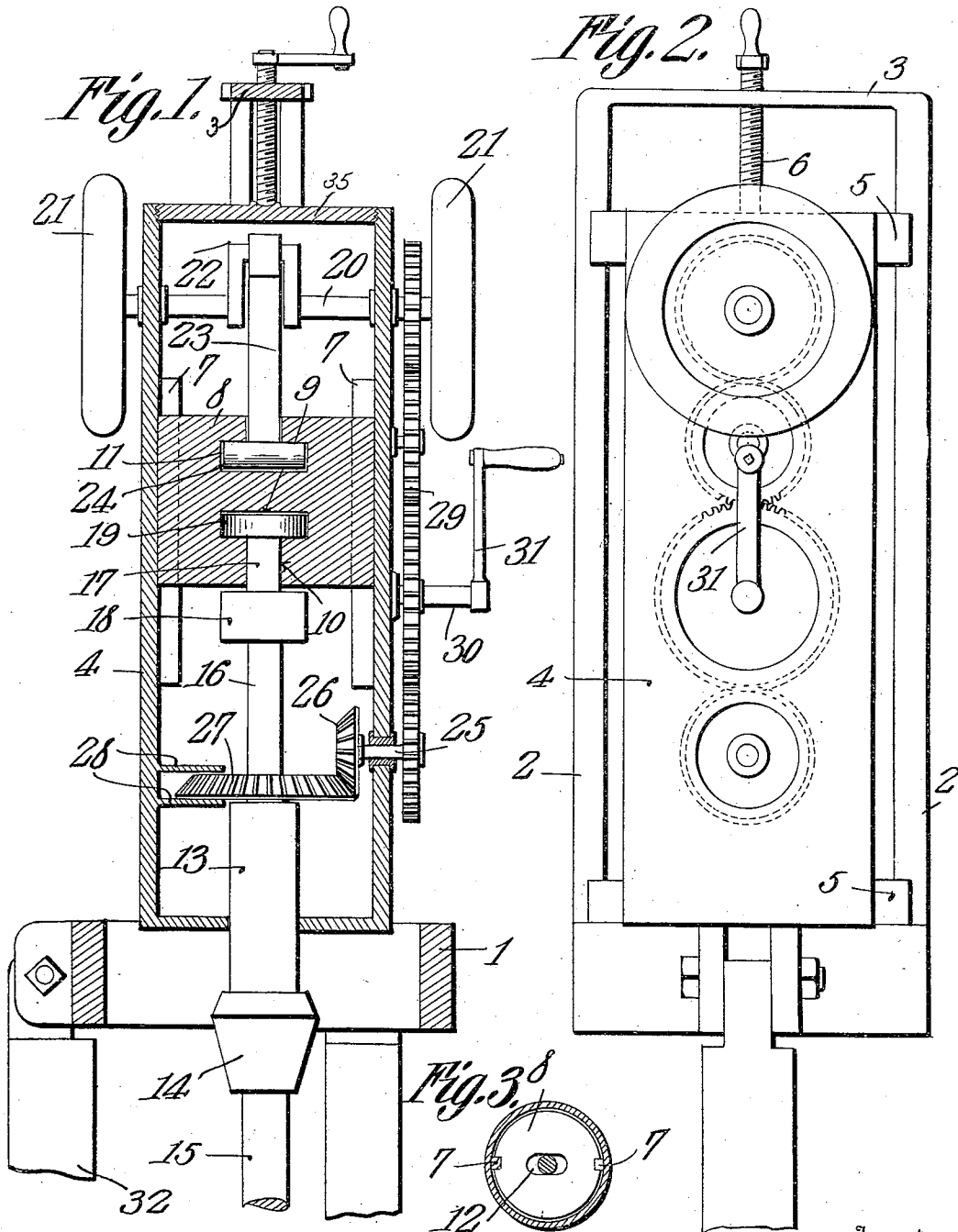
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ROCK DRILL.

APPLICATION FILED SEPT. 10, 1908.

954,826.

Patented Apr. 12, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH W. SELLECK AND FREDERICK C. SHARP, OF CUBA, WISCONSIN.

ROCK-DRILL.

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Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed September 10, 1908. Serial No. 452,384.

To all whom it may concern:

Be it known that we, JOSEPH W. SELLECK, and FREDERICK C. SHARP, citizens of the United States, residing at Cuba city, in the county of Grant and State of Wisconsin, have invented a new and useful Rock-Drill, of which the following is a specification.

The objects of the invention are, the provision in a novel and merchantable form, of a device of the above mentioned class, which shall be inexpensive to manufacture, facile in operation, and devoid of complicated parts, other objects and novel features of construction being disclosed as the description of the invention progresses.

The invention consists in the novel construction and arrangement of parts hereinafter described, delineated in the accompanying drawings, and particularly pointed out in that portion of this instrument wherein patentable novelty is claimed for certain distinctive and peculiar features of the device, it being understood that within the scope of what hereinafter thus is claimed, divers 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.

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

In the accompanying drawings:—Figure 1 shows the invention in vertical longitudinal section; Fig. 2 is a side elevation; Fig. 3 is a top plan upon a reduced scale, of the hammer, the housing and guides being shown in cross section, the closure for the top of the housing being removed.

The invention comprises a base-plate 1, which may be of any form. Preferably however, as shown, it is annular in structure, and from its sides rise standards 2, connected at their tops by a cross-piece 3.

The housing 4 may be of any form; as shown it is cylindrical in structure permanently closed at the bottom and provided at its top and bottom with the oppositely disposed arms 5, extending laterally from its side walls and engaging the standards 2, furnishing a means whereby the housing 4 is slidably mounted in the said standards. The upper end of the housing 4 is provided

with a removable closure 35, threaded to engage the housing, and constituting a means whereby access may be had to the interior of the housing. A threaded member 6 is passed through the cross-piece 3 into engagement with the top of the closure 35, furnishing a means whereby the housing 4 may be slidably adjusted in the standards 2. The interior of the housing 4 carries the longitudinally disposed guides 7, upon which is slidably mounted the hammer 8. The hammer 8 may be of any form, as shown in Fig. 3 it is circular in cross section and conforms to the interior of the housing 4. The lower face of the hammer 8 is provided with an opening 10, circular in cross section, and terminating within the body of the hammer, in an enlarged portion 9. The upper face of the hammer 8 is provided with a flaring opening 12, terminating, within the body of the hammer 8 in an enlarged portion 11.

Rotatably and slidably mounted in the bottom of the housing 4, is a drill-stock 13, carrying a chuck 14, adapted to engage and hold a drill 15. The drill stock 13 has a polygonal shank 16, cylindrical in its upper portion 17, the said portion 17 being rotatably mounted in the opening 10 which is axially disposed in the lower face of the hammer 8. The upper portion of the drill stock 13 is provided with a head 19 arranged to register rotatably, and against withdrawal, in the enlarged portion 9 of the opening in the lower face of the hammer. The drill stock is provided with a shoulder 18 arranged to contact with the lower face of the hammer upon the down stroke thereof. The shoulder 18 is so positioned as to contact with the lower face of the hammer 8 as hereinbefore pointed out, and this construction serves to distribute the shock incurred by the structure when the drill, in its downward movement, strikes the rock.

Transversely mounted in the upper part of the housing 4, is a crank-shaft 20, carrying upon its terminals balance wheels 21 and provided with the crank 22 located within the housing 4. A connecting rod 23 is provided, having its upper terminal operatively connected with the crank 22, its lower terminal being provided with a head 24, loosely mounted in the enlarged portion of the opening in the top of the hammer 11.

Mounted in the housing 4 below the crank shaft 20, is a shaft 25, operatively connected with the drill stock 13 by the beveled gears 26 and 27. The stock carried pinion 27, has
 5 a polygonal central opening through which passes the polygonal drill-shank 16. The stock carried pinion 27 is slidably mounted upon the shank 16 and is arranged to rotate therewith. In order that the reciprocating
 10 motion of the drill stock 13, may not break the union between the beveled gears 26 and 27, stops 28 inwardly projecting from the side walls of the housing, are provided, one disposed above and one disposed below the
 15 stock carried pinion 27. A gear train 29 connects the crank shaft 20 with the lower shaft 25. One of the shafts 30, on which a member of the gear train 29 is mounted, is prolonged and provided with a crank 31,
 20 or other suitable actuating means.

As will be seen by an examination of Fig. 1, the heads 19 and 24 are adapted to reciprocate to a limited extent in the hammer. By this construction, the cutting action of
 25 the drill is divided into three distinct steps. First, the impact due to the weight of drill and drill stock; second, the impact due to the hammer impinging in its downward movement against the shoulder 18 and the
 30 head 19; third, the impact due to the head 24 impinging, in its downward movement, against the hammer, the impact due to the hammer striking the members 19 and 18 preceding the impact due to the member 24
 35 striking the hammer, so that they coöperate with the initial downward movement of the drill stock in giving to the drill a compound impact of great cutting efficiency, it being recalled that, from the initial to the final
 40 impact, the drill is being constantly rotated.

The invention is shown as mounted upon a tripod 32, but it is obvious that any other method of mounting may be employed. The
 45 invention may be so mounted as to be adjustable to any angle; or, it may be mounted upon a frame-work and used as a quarry-drill.

In practical operation the gear train 29 is set in motion by the crank 31 and motion
 50 is transmitted to the crank shaft 20. The crank shaft 20, rotating, causes the connecting rod 23 to move upward and downward, rocking in the flaring opening 12, and carrying with it, in reciprocating motion, the
 55 hammer 8. The hammer 8, rising, engages the head 19, and draws the drill stock 13 upward. When the down stroke is commenced, the hammer 8 impinges upon the annular shoulder 18, and forces the drill downward
 60 into the rock, the weight of the drill and the drill stock obviously accelerating the downward movement of the drill. When the crank shaft 20 completes its revolution, the hammer 8 and the drill stock 13 are carried
 65 upward in a position to begin again the

downward stroke. As the reciprocating motion, heretofore described, is being carried on, the shaft 25 is rotated. The beveled
 70 gears 26 and 27, transmit this rotatory motion to the drill stock 13, and, as the drill stock 13 is thus rotated, it is, at the same time, subjected to a reciprocating motion under the impulse of the hammer 8, as heretofore described. When the drill 15 has cut away
 75 all the material which lies beneath its foot, within the limit of its stroke, the threaded member 6 may be rotated, moving the housing 4 downward upon the standards 2, thus feeding forward the drill 15 into a position
 80 operative to remove any further material which may lie within its path.

As will appear upon an examination of the drawing, the hammer and most of the moving parts of the device are mounted
 85 within the housing and are protected thereby against injury from falling rocks and the like. The tubular form given to the housing results in a structure of great strength, well adapted to support the moving parts, which
 90 in a device of the class described, necessarily produce violent strains within the structure. When it is desired to examine the moving parts of the device, the closure 35 may easily be removed, the threaded element 6 having
 95 first been rotated to lift it from contact with the closure.

The threaded element 6, together with the crank which is assembled therewith, furnishes a means for advancing the housing,
 100 and with it, the drill, toward the rock as the same is worn away, and any suitable and common means for retaining the housing in the position to which it has been advanced by the rotation of the element 6, may be provided.

Having thus described the invention, what is claimed as new is:—

A device of the class described comprising a housing; a hammer mounted for reciproca-
 110 tion in the housing and provided in its upper and its lower faces with axial openings terminally enlarged within the body of the hammer; a transverse crank shaft journaled for rotation in the housing above the ham-
 115 mer; a connecting rod operatively assembled at one end with the crank shaft and at the other end provided with a head to rock in the enlarged portion of the opening in the upper face of the hammer, and to reciprocate therein to engage the hammer in lifting and
 120 in percussive relation; a drill stock slidably and rotatably mounted in the bottom of the housing, the stock being provided with a head to rotate in the enlarged portion of the opening in the lower face of the hammer and
 125 to reciprocate therein, the stock having a shoulder located below the hammer and arranged to receive, with the head of the stock, the impact of the hammer; a pinion arranged to rotate with the stock and through
 130

which the stock is arranged to reciprocate;
means carried by the housing for restraining
the pinion against reciprocation with the
stock; and means operatively assembling
5 the pinion with the crank shaft for simul-
taneously rotating the pinion and the crank
shaft.

In testimony that we claim the foregoing

as our own, we have hereto affixed our sig-
natures in the presence of two witnesses.

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Witnesses:

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