

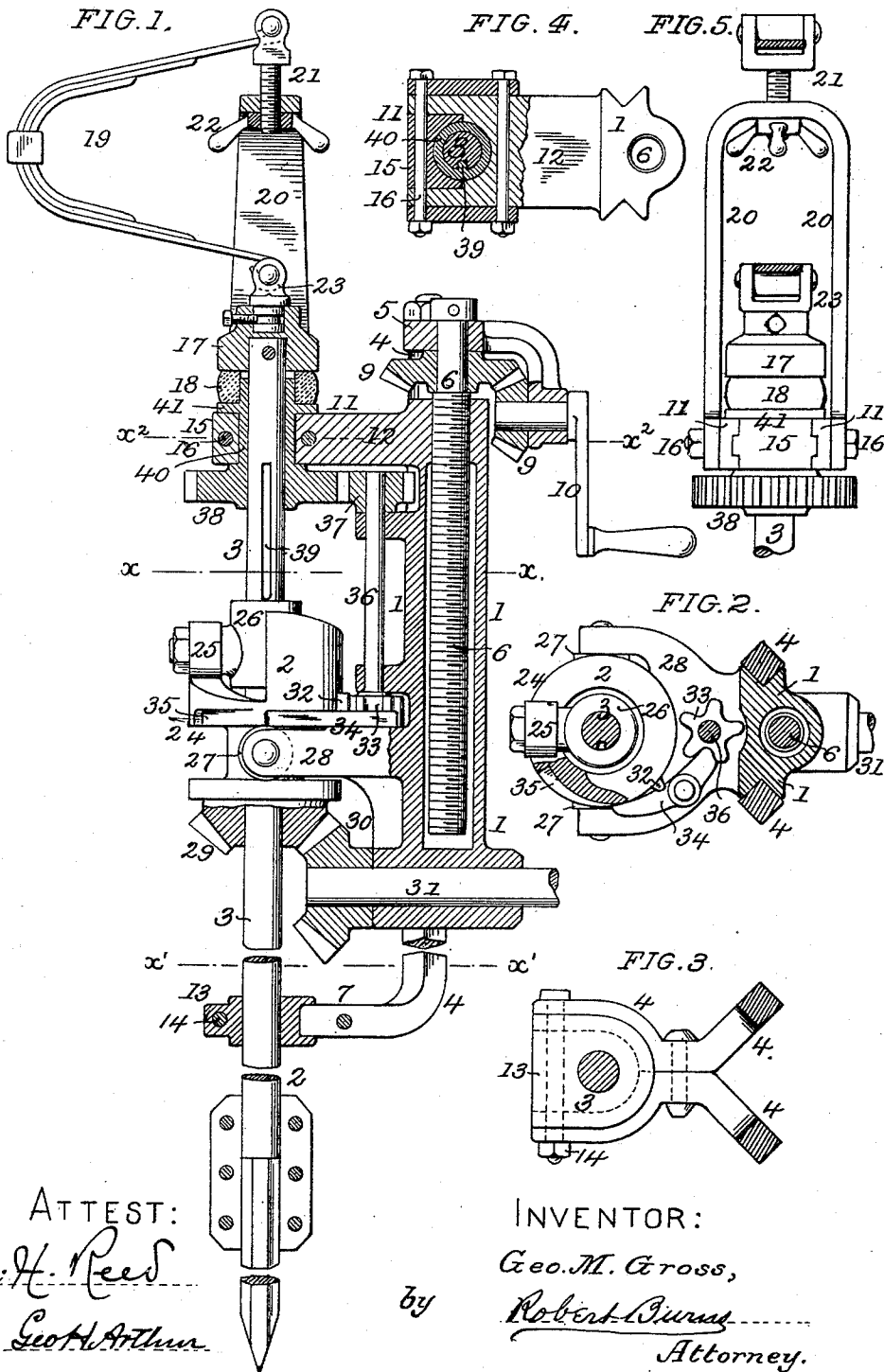
(No Model.)

G. M. GROSS.

OPERATING MECHANISM FOR MINING DRILLS AND STAMPS.

No. 483,842.

Patented Oct. 4, 1892.



UNITED STATES PATENT OFFICE.

GEORGE M. GROSS, OF CHICAGO, ILLINOIS.

OPERATING MECHANISM FOR MINING DRILLS AND STAMPS.

SPECIFICATION forming part of Letters Patent No. 483,842, dated October 4, 1892.

Application filed February 24, 1891. Serial No. 382,618. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. GROSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Operating Mechanism for Mining Drills and Stamps; and I do hereby 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.

This invention relates to that class of portable mining drills or stamps used more especially for prospecting purposes and adapted to be operated by hand or a light motor, the present improvement having for its object to provide a strong, durable, and efficient arrangement of parts for such uses embodying the features of a regular and uniform lifting action of the cam and an avoidance of side strains in the operation of lifting the reciprocating drill or stamp-rod, a perfect and automatic step-by-step rotation of the drill-rod in use, and a simple, ready, and convenient means for swinging the drill-rod and its attached parts sidewise out of the way when it is required to clean out the drill-hole, &c. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of my present improved mechanism; Fig. 2, a horizontal section at line $x x$; Fig. 3, a similar view at line $x' x'$; Fig. 4, a like view at line $x^2 x^2$; Fig. 5, a front elevation of the upper part of the mechanism, the spring being shown in section.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents the slidable carriage, on which are mounted the operating-cam 2, drill-rod 3, and other operating mechanisms of the apparatus, and 4 a frame or slideway formed of a pair of parallel square bars or rails of wrought metal, connected together at top by a cross-head 5, in which is journaled the operating-screw 6, by which the sliding or adjusting movement is imparted to the carriage 1 to feed the drill to and from its work, while the lower ends of said bars are brought together and properly secured by bolts or rivets to form a bracket

or shelf 7 for the reception of the lower guide of the drill or stamp rod 3, as hereinafter described. The parallel bars or rails of the slideway 4 have an angular arrangement in plan view, so as to form V-shaped guide-tracks for the carriage 1, the sides thereof being formed with corresponding V-shaped grooves to fit said tracks, as clearly indicated in Figs. 2 and 4.

For convenience in operation I prefer to operate the feed-screw 6 by bevel-gears 9 and a hand wheel or crank 10, as shown in Fig. 1.

The slideway or frame 2 will be provided with the usual supporting brackets and connections for attachment to a post or column, by which the apparatus is adjustably supported in the usual manner.

The reciprocating drill or stamp rod 3 is guided at top in a box formation 11 at the front of the upper bracket 12 of the carriage 1 and near its lower end by means of a box formation 13, that is adapted to slide endwise in the forked formation of the bracket-shelf 5 on the slideway 2, and is held in place by a cross-bolt 14, as shown in Figs. 1 and 3, the upper box formation 11 being made of a sectional formation, as shown in Fig. 4, the outer removable section 15 being held in place by a cross-bolt 16, as shown. With this improved arrangement of readily-removable box formation for the drill-rod I am enabled to readily and conveniently shift the drill sidewise away from the hole in cleaning out the same and, what is of greater consequence, insure the return of the drill to its exact former position.

The upper end of the drill-rod is provided with a fixed head 17, the under side of which is adapted to strike upon the interposed cushion 18, supported on the outer end of the upper bracket 12, when through a miss lick the drill-rod is dropped its full distance or stroke, such miss licks being of occasional occurrence, owing to seams or fissures met with in rock-drilling.

In my present construction the return movement of the drill or stamp rod is assisted by the elasticity of a spring 19, which is of a C form, the free ends being connected, respectively, with the top of the drill or stamp rod 3 and the vertically-arranged yoke-frame 20 of the carriage 1 in the following manner: to the

yoke-frame 20 by a pendent shackle formation 21, the cross-bolt of which passes through the turned eye at the upper end of the spring 19, while the screw-threaded shank passes down through the top of the yoke-frame, and is provided with a hand-nut 22, by which the tension of the spring can be regulated, and to the top of the drill or stamp rod by a similar eyebolt formation 23 the vertical shank of which is received and held by a vertical socket in the head 17 of the drill or stamp rod, the construction being especially adapted to admit of the step-by-step rotation that is imparted to the drill-rod in drilling rock, as hereinafter set forth.

The cam 2 in the present invention is of an annular formation upon the concentric rim or hub 24, the axis of which is occupied by the drill or stamp rod 3, to which movement is communicated from the cam through a friction-reducing roller 25, mounted on an arm of the sleeve 26, secured to the drill-rod, as clearly indicated in Figs. 1 and 3. The cam is supported in proper position by means of friction-reducing rollers 27 upon a bracket 28 of the carriage 1, engaging in an annular recess beneath the cam portion proper of the cam, as represented in Figs. 1 and 2, and motion may be communicated to said cam by any usual gearing, preferably by the bevel-gear formation 29 30 and counter-shaft 31, as illustrated in Fig. 1.

A positive step-by-step rotation is imparted to the drill-rod, so as to continually change its stroke-point in a circular path, by the following mechanism: 32 is a single wiper or tooth on the rim of the cam 2, that on each revolution of the cam moves the spur-wheel 33 the distance of one tooth, said spur-wheel 33 being locked against rotation at all other times than when receiving motion from the wiper 32 by a pivoted dog or latch 34, the point of which engages between the teeth of the spur-wheel, as shown in Fig. 2, to lock the same against rotation, said dog being held to its engagement by its tail portion riding against the rim portion of the cam until at such times as it drops into a recess 35 in said rim portion to release the spur-wheel 33, the recess and wiper being so positioned that as the wiper reaches a position to operate the spur-gear the recess will allow the dog to release itself from engagement with the spur-gear during the action of the wiper on the spur-gear and then re-establish the engagement after the wiper has imparted the desired movement to the spur-gear. The spur-gear 33 is arranged at the lower end of a vertical shaft 36, journaled to the carriage 1, the upper end of the shaft carrying a pinion 37, that meshes with and drives a gear-wheel 38, surrounding the drill or stamp rod 3 and connected thereto in a slidable but non-rotary manner by a spline or key and keyway 39, as indicated in Figs. 1 and 4. In the construction shown the gear 38 has a sleeve portion 40, by which it is journaled in the upper box formation 11

of the carriage 1, and it is preferable that such sleeve have a rim 41 to form a shelf for the drill-rod cushion 18, as well as to constitute a confining-rim for holding the gear 38 in place.

While in the drawings I illustrate my invention by a construction specially intended for portable rock-drills, yet it is capable of ready use as a portable stamp or ore-crusher by the mere substitution of a stamp-head for the drill-point used in drilling, and in making up an outfit for prospecting purposes both can be made interchangeable to enable both drilling and stamping to be done at will with one and the same apparatus.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the reciprocating drill-rod 3, the cam 2 of an annular form concentric on its hub that surrounds the rod 3 and is provided with annular supporting-recess, the carriage 1, having laterally-overhanging bracket-arm 12, forming a guide for the drill-rod, a laterally-overhanging bracket-arm 28, engaging in the annular recess in the cam-hub to form a support for the same, and a lower bracket 7, such bracket being of an open-sided formation to admit of the lateral removal of the drill-rod and its parts, essentially as set forth.

2. The combination of the reciprocating drill-rod 3, the cam 2 of an annular form concentric on its hub 24, that surrounds the rod 3, the adjustable carriage 1, having laterally-overhanging bracket-arms 12 28, that form, respectively, a guide for the upper end of the rod 3 and a support for the hub 24 of the cam, the lower guide-box 13, having upper and lower flanges and adapted to engage the forked formation of the shelf or bracket 7, and a cross-bolt 14 for securing it in place, substantially as set forth.

3. The combination of the reciprocating drill-rod 3, the cam 2 of an annular form concentric on its hub 24, that surrounds the rod 3, the adjustable carriage 1, having laterally-overhanging bracket-arms 12 28, that form, respectively, a guide-box having an outer removable section 15 for the upper end of the rod 3 and a support for the hub 24 of the cam, the lower guide-box 13, having upper and lower flanges and adapted to engage the forked formation of the shelf or bracket 7, and a cross-bolt 14 for securing it in place, substantially as set forth.

4. The combination of a reciprocating drill or stamp rod 3 and the lifting-cam 2 therefor, having an annular form, concentric with the axis of the rod 3, with the carriage 1, having bracket formation 28, provided with friction-reducing rollers 27, engaging in an annular recess in the hub of the cam to support the same in proper position, substantially as set forth.

5. The combination of the reciprocating drill or stamp rod 3 and the lifting-cam 2 there-

for, having an annular form, concentric with the axis of the rod 3 and provided with a wiper or tooth 32, and recess 35, with the spur-gear 33, locking-dog 34, shaft 36, pinion 37, and
5 gear-wheel 38, connected by a key and key-way to the rod 3, substantially as set forth.

6. A frame or slideway for portable rock-drill, consisting of parallel square bars having an angular arrangement to form V-shaped
10 guides for the carriage with their lower ends

bent inwardly and forwardly so as to meet and form a bracket for the lower guide-box of the drill-rod, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. M. GROSS.

Witnesses:

ROBERT BURNS,
GEO. H. ARTHUR.