Jan. 29, 1924. 1,482,310

J. LODATO

ROCK DRILL

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Fig. 1

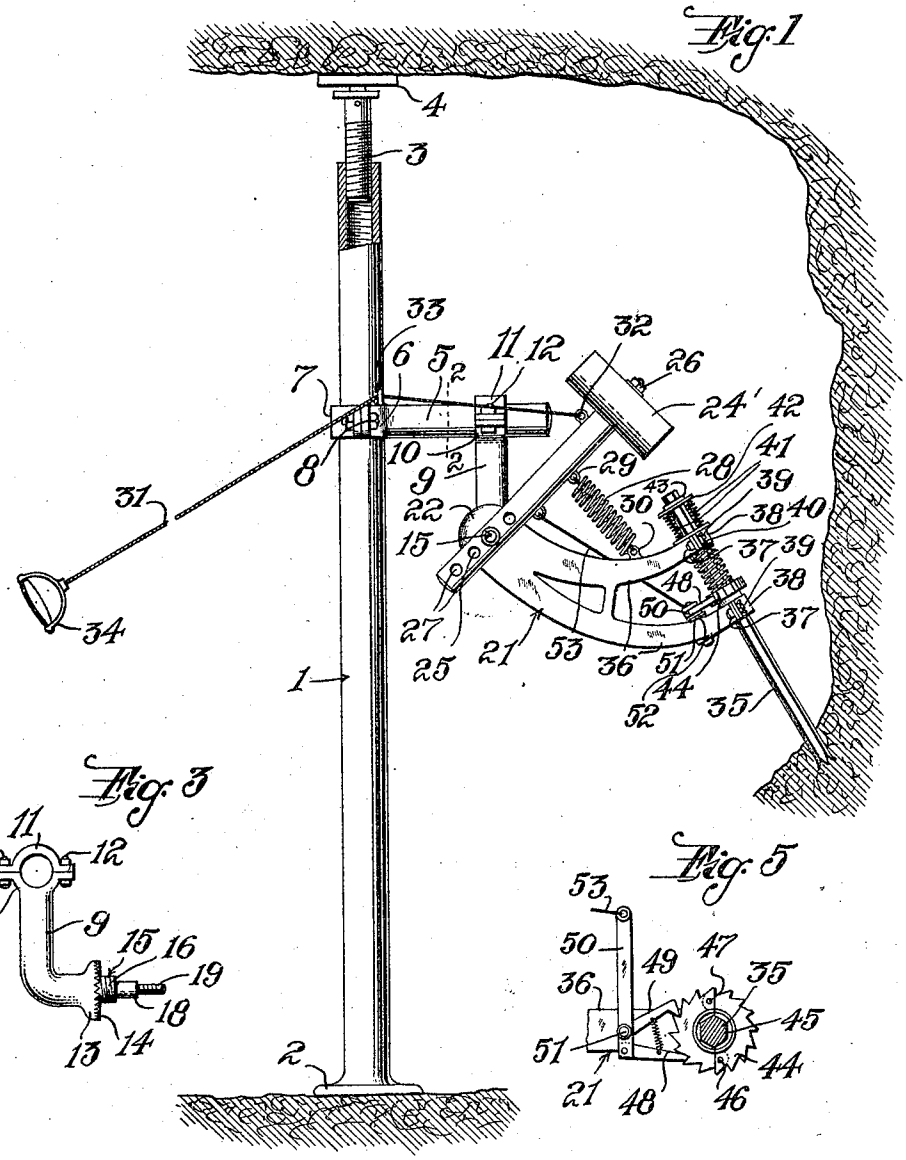



Fig. 3




Fig. 5




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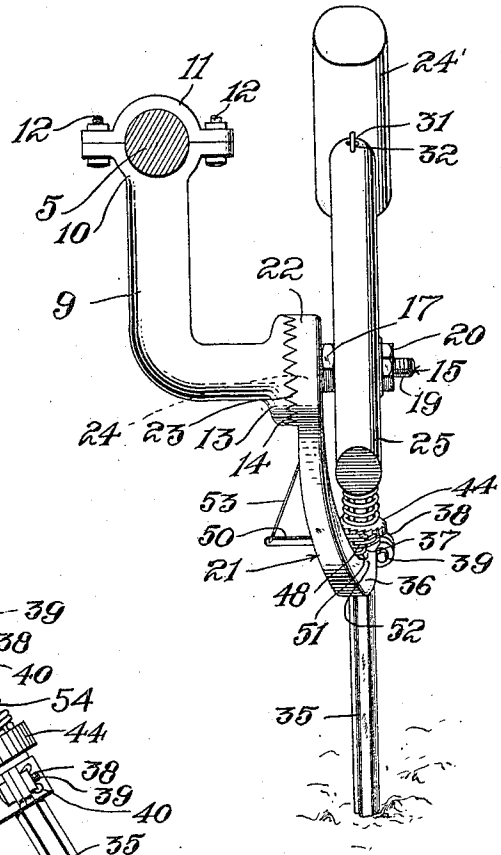
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Fig. 2



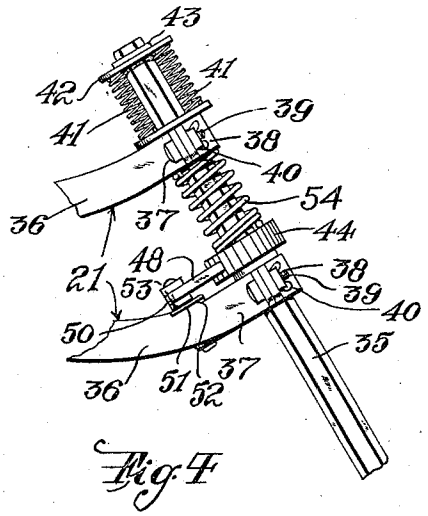




Fig. 4

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Fig. 6.

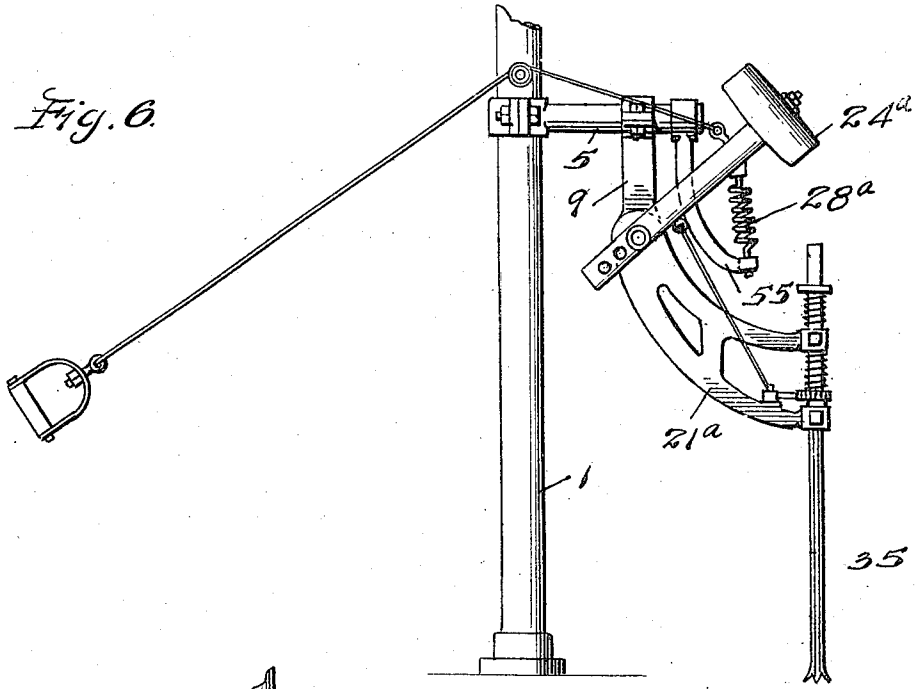
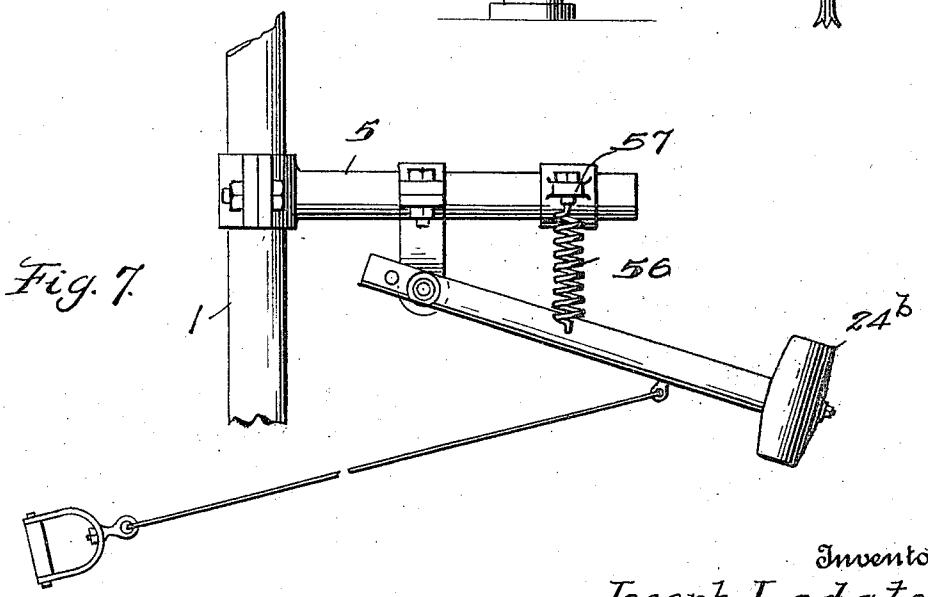



Fig. 7.




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# UNITED STATES PATENT OFFICE.

JOSEPH LODATO, OF OGDEN, UTAH.

## ROCK DRILL.

Application filed August 26, 1921. Serial No. 495,641.

*To all whom it may concern:*

Be it known that I, JOSEPH LODATO, a citizen of the United States, residing at Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Rock Drills, of which the following is a specification.

The present invention relates to improvements in rock drills of the impact type employing a hand operated hammer, and designed more especially for use in drilling holes in mining operation.

By the construction of the device of my invention the drill may readily be assembled and placed in operative position, may be operated with facility and with a minimum exertion of hand power, and the device is capable of facile adjustment in order that drilling may be accomplished with the drill at various angles.

The invention consists in certain novel combinations and arrangements with the jack or column bar of a supporting arm and adjustable bracket thereon for supporting the operative parts of the drill mechanism, and further the invention consists in certain novel combinations of parts involving the drill holding and impact devices as will be hereinafter set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention, and a modification thereof, in which the parts are combined and arranged according to the best mode I have so far devised for the practical application of the principles of the invention.

Figure 1 is a view showing the device of my invention set up for use in a mine.

Figure 2 is a sectional view at line 2—2 in Figure 1.

Figure 3 is a detail view of the hanger arm for supporting the swinging hammer.

Figure 4 is a detail view of the drill bracket and its connections.

Figure 5 is a view showing the drill turning device actuated by the movement of the hammer. Figure 6 is a view showing a modified form of the invention, and Figure 7 is a further modification thereof.

In the preferred form of the invention as illustrated in the drawings, the customary supporting jack is utilized comprising the hollow column 1 with its base 2 and screw bar 3 having the usual head 4.

The column is cylindrical in form and equipped with a supporting arm 5 adjustable on the column and provided with a bearing head 6 and cap 7 through which bolts 8 are passed to clamp the arm in adjusted position on the column. Thus it will be apparent the laterally extending arm may be adjusted vertically on the column, or may with equal facility be swung around on the column to desired position and fixed on the column.

The arm 5 is designed to support a hanger or bracket 9 which depends from the arm and is adjustable axially of the arm through the instrumentality of the clamp head 10, cap 11 and bolts 12 on the bracket. By means of its clamp head the bracket is adjustable on the arm in manner similar to the adjustment of the arm on the column, and these two adjustable elements are thus capable of a wide range of position for use.

The free end of the bracket or hanger is turned at right angles to its axis and formed with a head 13 having a radially toothed face 14 and a fixed pin 15 projecting therefrom perpendicular to the bracket. The pin is threaded at 16 for a clamping nut 17 and its reduced end 18 is threaded at 19 for a nut 20.

In connection with the hanger or bracket 9, a bracket arm 21 is employed, having a head 22 and radial teeth 23 complementary to and adapted to engage with the teeth 14 of the hanger 9 and formed with an open center 24 to afford a bearing on the pin 15 of the bracket 9. The employment of the teeth on the respective heads 13 and 22 permits of an adjustment of the bracket arm about the pin 15 as a center, and when the desired angle of the bracket arm has been attained, the nut 17 may be tightened to clamp the ratchet heads 13 and 22 together.

On the smooth reduced bearing extension 18 of the pin 15, an oscillatable hammer is pivoted. This hammer is composed of the steel head 24 of suitable weight, and its metal handle 25, which may be sheathed with wood, is tapered and fitted into the head in usual manner and secured as by a nut 26 on the threaded end of the handle. Near the flattened end of the handle are provided a number of openings 27 each adapted to fit over and form a bearing on the pin 15 at 18, and the nut 20 on the threaded end 19 of the pin secures the ham-

mer in place. By utilizing different openings 27 in the handle the leverage of the hammer may be varied as it swings on its pivot 18, with an over-hand stroke as indicated in Figure 1.

The impact blow of the hammer is secured from a strong coiled spring 28 connected at 29 to an eye on the bracket arm and at 30 to an eye on the hammer handle, and the retracting stroke or return stroke of the hammer is accomplished by a pull on the cable or rope 31. The pull rope is attached to an eye 32 on the hammer handle and passed through a guide loop 33 on the arm 5 and may be provided with a handle 34 to be grasped by the operator. Now a pull on the rope will raise or lift the hammer on its pivot, against the tension of the retractible spring 28, and when the power is released on the rope, the uplifted hammer is quickly pulled down by spring 28 to swing on its pivot 18 and impart a blow to the drill 35. The continued pull on and release of the rope 31 alternately lifts the hammer and permits the spring 28 to impart a blow to the drill, and the hammer is thus continuously oscillated on its pivot for performing its required functions.

Preferably the drill 35 is of the four tooth type and hexagonal in cross section, and as seen in Figure 1 the drill is supported in the bent forked ends 36 of the bracket arm 21. These forked ends of the arms are fashioned with openable alined guide bearings for the drill, and each head comprises a curved or rounded yoke 37 and hinged cap 38 secured together by a pivoted bolt 39 and clamp nut 40. Thus the drill bar may with facility be placed within its guide bearing-heads, or with equal facility be withdrawn therefrom by manipulating the hinged caps 38 and their locking bolts 39 and nuts 40.

The reciprocable drill bar is resiliently held in uplifted position by a plurality of springs 41 disposed in a plane parallel with the drill bar, and interposed between the upper guide bearing of the bracket arm and a steel plate or spider 42 resting upon a fixed collar 43 at the upper end of the drill bar, and it will be apparent that after the blow of the hammer has forced down the drill bar on its working stroke, the spring 41 will return the drill bar or tool to uplifted position, thus causing a continuous reciprocation of the tool in the performance of its functions.

After each blow of the hammer, the drilling tool 35 is turned axially in its guide bearing heads through the use of a ratchet mechanism including a ratchet wheel 44 formed with a central hexagonal opening 45 conforming to the cross section of the tool, and preferably the ratchet wheel is made up with a hinged joint 46 and securing pin 47, diametrically opposite thereto, in order that the ratchet wheel may be fitted about the tool and conveniently attached or detached when required.

By means of the two pivoted pawls 48 and 49 which form an escapement in connection with the ratchet wheel 44, and actuated by the lever 50, fulcrumed at 51 on the bracket 52, the tool or drill is turned with each stroke of the hammer through the wire or cable connection 53. The ratchet wheel is held against the forward guide bearing of the arm 21 by means of a coiled spring 54 surrounding the tool 35 and interposed between the rear bearing head and the ratchet wheel.

Drilling at any desired angle, within limits may be accomplished with the above described mechanism, and the parts of the device may be adjusted with facility and convenience by manipulating the supporting arm, the hanger, and other adjustable elements of the mechanism.

It will be apparent that one or more of these mechanisms may be supported from the jack or column 1 and operated by a pull on the actuating cables or cords 31 for drilling purposes.

The mechanism may be dismantled with facility, for transportation, and quickly set up for new work, and when being transported, or stored, the parts may be compactly arranged to occupy small space.

In Figure 6 the hammer $24^a$ is actuated on its working or down stroke by means of the spring $28^a$ which is interposed between the hammer handle, which is pivoted on the bracket $21^a$, and the spring supporting arm 55 that is affixed to the side arm 5 on the post 1. In some instances the apparatus is preferably constructed in this manner. In Figure 7 the hammer $24^b$ is actuated to function on an upward stroke by means of the spring 56 that is interposed between the pivoted handle of the hammer and the spring bracket 57 on the side arm 5, the drilling tool of course being inverted from its position in Figure 6 for receiving blows from the hammer.

Claims:

1. The combination with a bracket and its support, of a ratchet head on the bracket and a pivotal member projected therefrom, a hanger having a ratchet head complementary to the first head and secured on said pivotal member, a hammer pivoted on said member and an impact spring between said hammer and hanger, a reciprocable tool supported in the hanger and means for retracting said tool, means for retracting the hammer and means connected to and actuated from the movement of the hammer for turning said tool.

2. The combination with a member suitably supported and provided with a ratchet

head and pivot member, of a hanger on the pivot member having a ratchet head engaging the first head, a hammer pivoted on said member, a spring between the hammer and hanger, said hanger having forked ends and a tool having a projecting end and reciprocably supported in said ends, resilient means between said projecting end and the hanger for retracting the tool, retracting means on said tool operatively connected to said hammer and for the hammer and means actuated by said hammer for turning said tool.

JOSEPH LODATO.