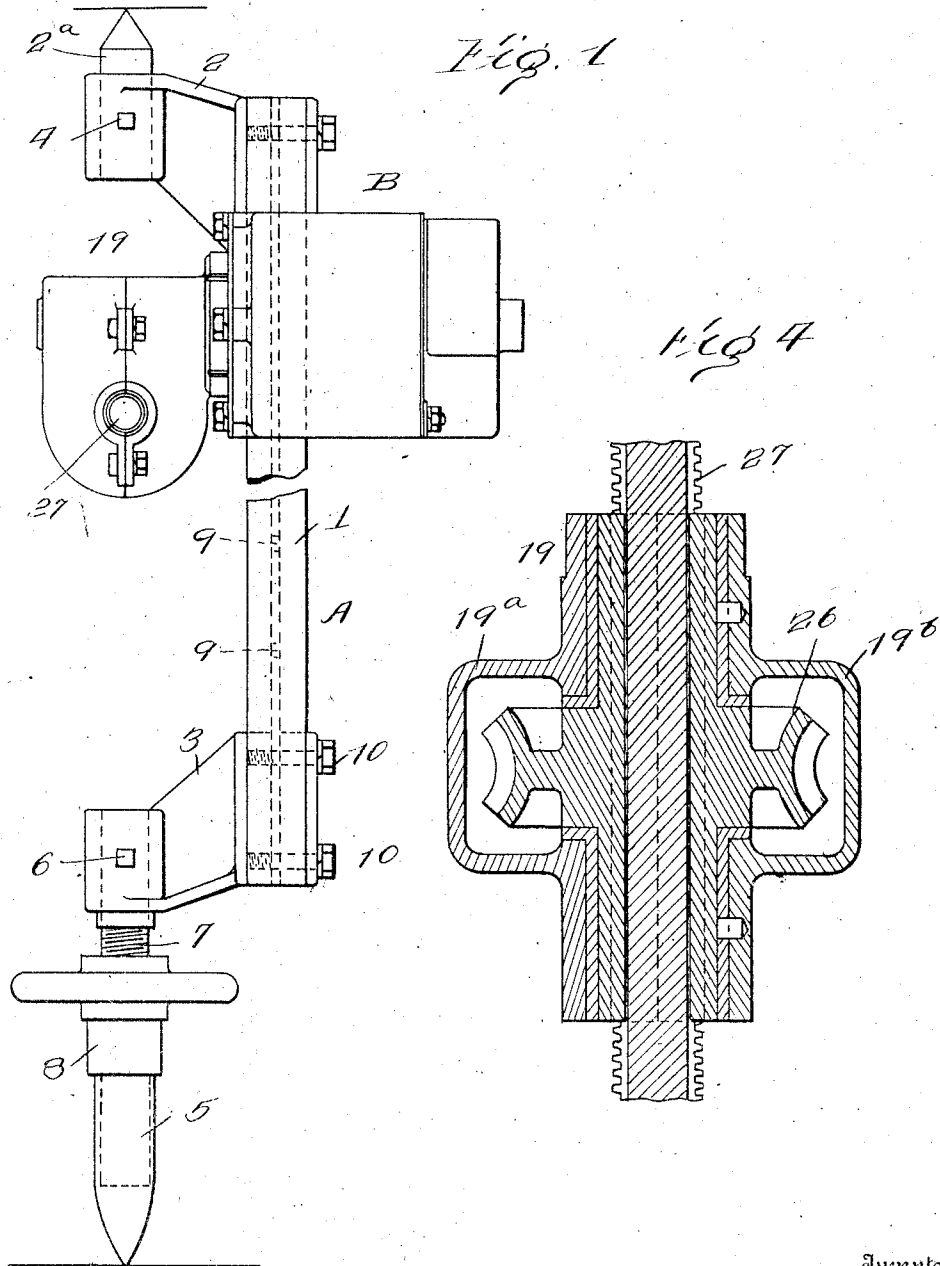


W. J. BAUROTH.
ELECTRIC DRILL.
APPLICATION FILED APR. 9, 1909.

1,044,338.

Patented Nov. 12, 1912.

2 SHEETS-SHEET 1.



Witnesses
B. S. Ham
S. Jay Teller

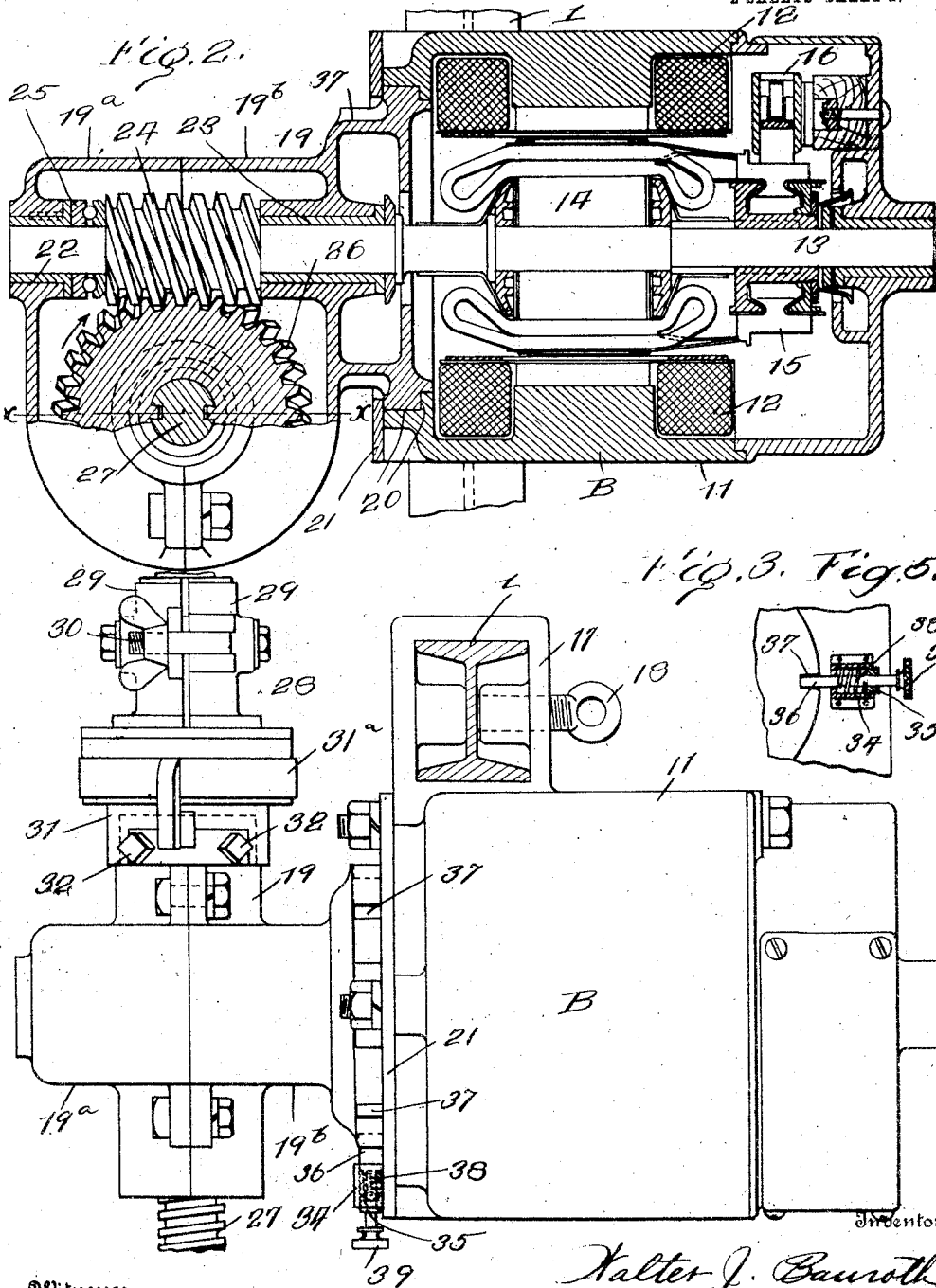
Inventor
Walter J. Bauroth
By A. A. Bliss
Attorney

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A. A. Bliss
Attorney

UNITED STATES PATENT OFFICE.

WALTER J. BAUROTH, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, A CORPORATION OF OHIO.

ELECTRIC DRILL.

1,044,338.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed April 9, 1909. Serial No. 488,915.

To all whom it may concern:

Be it known that I, WALTER J. BAUROTH, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Electric Drills, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in electric rotary coal or rock drills and its object is to provide a drill of this class which shall be light and simple in construction, and readily adjustable for drilling at various elevations and angles.

Of the drawings—Figure 1 is an end elevation. Fig. 2 is a cross sectional elevation through the center line of the motor. Fig. 3 is a plan view, a section being taken through the vertical portion of the standard. Fig. 4 is a cross section through the center of the drill stem and along the line $x-x$ of Fig. 2. Fig. 5 is an enlarged detail view of the locking device.

Referring to the drawings, A represents the frame or standard as a whole.

1 is the main upright and preferably comprises a single I-beam. This has bolted to its upper and lower ends the two brackets 2 and 3. The bracket 2 at the upper end carries the supporting point or center 2^a, which is held in place by the set screw 4. The bracket 3 at the lower end carries the jack 5, which is held in place by the set screw 6. The jack may be of any usual or preferred type. That which I have shown in the drawings has the inner thread standard 7 and the pointed sleeve and hand wheel 8 adapted to feed support standard 7. Threads on the hand wheel engage with the threads on the standard, thus providing means of adjustment. At the lower end of the upright 1, I provide a series of holes 9, 9 spaced the same distance apart, as the holes for the bolts 10, 10 of the bracket 3. By means of these holes the bracket 3 may be bolted to the upright 1 at a number of different points, thus changing the over-all distance between the two supporting points. In this way I am able to provide a considerable range of adjustment to adapt the drill to rooms of varying heights. If a still wider range of adjustment than can be obtained by this means is desired, several uprights of different lengths can be provided. The

point 2^a and the jack 5 are interchangeable, and the elevation of the upright 1 may be changed by transposing them.

B represents as a whole an electric motor which may be of any usual or preferred type. That which I have shown comprises the main frame 11, the field windings 12, the main shaft 13, the armature 14, the commutator 15 and the brushes 16. The frame 11 has a bracket 17, preferably cast integral with the frame. This bracket is formed to engage the upright 1 so as to support the motor in horizontal position. The eye-bolt 18 is provided to clamp the bracket in position upon the upright and may be tightened by thrusting a bar into the eye. By means of this bracket and eye-bolt the motor may be securely clamped to the upright at any desired elevation.

19 is a supporting frame rotatably mounted at one end of the motor frame. The motor frame has bearing surfaces 20, and the supporting frame is formed to engage with and rotate in these bearing surfaces. The clip 21 is provided to secure the supporting frame in position. The frame has two journal bearings 22 and 23 for the main motor shaft. Between these bearings is located the worm 24, keyed or otherwise securely fastened to the motor shaft. The ball thrust bearing 25 is located between the worm and the journal bearing 22. In the supporting frame and at right angles to the motor shaft the worm wheel 26 is mounted in suitable bearings so that it will mesh with the worm 24. The supporting frame 19 is divided into two parts 19^a and 19^b in order to permit proper assembling of the parts. The threaded drill stem 27 is mounted within the worm wheel having spline and groove engagement therewith.

28 represents as a whole the feeding device located at one end of the supporting frame 19. This feeding device may be of any preferred type, but for purposes of illustration I have shown one similar to that shown in an application for patent by W. F. Trotter, Ser. No. 333,697, filed Sept. 7 1906. This has an inner split feed nut, which is held together and in engagement with the drill stem by means of the two clamping members 29, 29 and the clamping screw 30. These clamping members 29, 29 are rotatably mounted upon the member 31, and a frictional band brake 31^a is provided to

regulate their rotation with respect thereto. The member 31 is attached to the supporting frame 19 by means of the set screws 32, 32. This frictional mounting of the parts 29, 29 serves as a safety device to prevent the drill from being forced into the coal or rock with too great force. Whenever the force tending to feed the drill forward becomes too great, the feed nut will turn, thus stopping the forward movement of the drill. The point at which the feed nut will begin to turn may be adjusted by properly regulating the frictional connection between the parts 29, 29 and 31.

33 is a locking device to secure the supporting frame in position with relation to the motor frame. The motor clip 21 is provided with a boss 34 having a hole into which a plug 35 is secured.

36 is a pin passing through the boss 34 and the plug 35 and is adapted to engage at its inner end with notches 37 in the supporting frame. The pin 36 is made small at its outer end, and the coiled spring 38 within the plug 35 acts to force the pin inward to engage with the supporting frame.

39 is a knob, by means of which the pin may be pulled out to permit the movement of the supporting frame.

By providing a sufficient number of holes in the supporting frame it may be locked at practically any desired position. The drill stem is so mounted in relation to the standard that it will at all times lie in a vertical plane, passing through the upper and lower supporting points. This gives a direct line of thrust through the drill stem without any tendency for bending.

The worm and wheel transmission between the motor and the drill stem permits the use of a high speed, and consequently a small and light electric motor, without a complicated speed producing mechanism. The rotatable mounting of the drill stem supporting frame with respect to the motor frame permits the drill stem to be swung to any angle without moving the motor from its normal horizontal position. Heretofore it has been common in rotary electric drills to use a hollow armature shaft, the drill stem passing through it. With this form of construction, it was necessary to move the whole motor when it was desired to point the drill at an angle, either upward or downward. This movement of the motor interfered materially with its proper lubrication, and also made great changes in the load on the thrust bearings. In a drill embodying my invention the drill stem may be pointed in any direction from horizontal to vertically upward or vertically downward without in any way changing the position of the motor. The load on the thrust bearing 25 remains constant at all times. If it is desirable to provide for driving the drill at

different speeds, this may be accomplished by the use of worms and worm wheels of different pitches. The division of the supporting frame 19 along a vertical line permits the part 19^a to be readily removed for changing the worm and worm wheel.

If it is desired at any time to obtain access to the armature commutator, this may be done by moving the clip 21, which leaves the supporting frame free so that it can be removed, carrying with it the motor shaft, the armature and the commutator.

The use of a single upright 1 instead of two, as has been common heretofore, permits the more ready adjustment of the bracket 3 and permits the whole machine to be placed much closer to the wall of a room. When the machine is not close to the wall of the room there is an unobstructed space for the operator to adjust the feeding device.

If it is desirable to drill at a point higher than may be reached with the parts of the machine in normal position, greater elevation of the machine may be obtained by reversing the position of the drill stem, i. e., by swinging the supporting frame through 180°, so that the worm wheel will be located above instead of below the worm. It will be readily understood that the various adjustments which I have described will make it possible to drill holes in a wide range of positions in rooms of varying heights.

What I claim is—

1. In an electric rotary drill the combination of a standard provided at its ends with pointed parts in substantially vertical alignment for pivotal engagement with the floor and roof of a mine and with a single offset portion intermediate its ends, an electric motor mounted upon the offset portion of the standard and having the axis of its shaft horizontal, and parallel to but separated from the plane of the standard, a rotary drill stem, a drill stem support mounted solely on the motor frame and adapted to oscillate concentrically with the axis of the motor shaft and gearing between the motor shaft and the drill stem, substantially as described.

2. The combination, in an electric drill of a standard having pointed end parts adapted for pivotal engagement with the floor and roof of a mine, an electric motor mounted upon the said standard, a drill stem, a drill stem support mounted solely on the motor frame and adapted to swing concentrically about the axis of the motor shaft and gearing between the motor shaft and the said drill stem, substantially as described.

3. The combination in a rotary drill of an electric motor, a device for supporting the motor, a drill stem, a drill stem support mounted on the motor frame to oscillate concentrically about the axis of the motor shaft, the axis of the drill stem and the axis

of the motor shaft being at right angles to each other in separated parallel planes, and gearing between the motor shaft and the drill stem, substantially as described.

5 4. The combination in a rotary drill of an electric motor, means for supporting the motor, a drill stem, a drill stem support
10 mounted solely upon the motor frame to swing concentrically about the axis of the motor shaft, the axis of the drill stem and the motor shaft being at right angles to each
15 other in separated parallel planes, a worm on the motor shaft, and a worm wheel connected with the drill stem and engaging the said worm, substantially as described.

20 5. The combination in a rotary drill of a standard having pointed end parts in substantially vertical alinement for pivotal engagement with the floor and roof of a mine, the said standard also having an offset portion between the said points, an electric mo-

tor mounted upon the offset portion of the standard and having its axis horizontal in a plane parallel to but separated from the plane of the standard, a drill stem and a drill
25 stem support rotatably mounted on the motor frame to swing concentrically about the axis of the motor shaft, the said support being adapted when in one position to maintain the said drill stem in a vertical plane
30 separated from the plane of the motor shaft and on the opposite side of the said plane from the plane of the said standard, and gearing between the motor shaft and the said drill stem, substantially as described. 35

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

WALTER J. BAUROTH.

Witnesses:

F. L. SESSIONS,
E. P. SNIVELY.