

N. D. LEVIN.
SUPPORT FOR COAL AND ROCK DRILLS.
APPLICATION FILED JULY 28, 1914.

1,185,809.

Patented June 6, 1916.

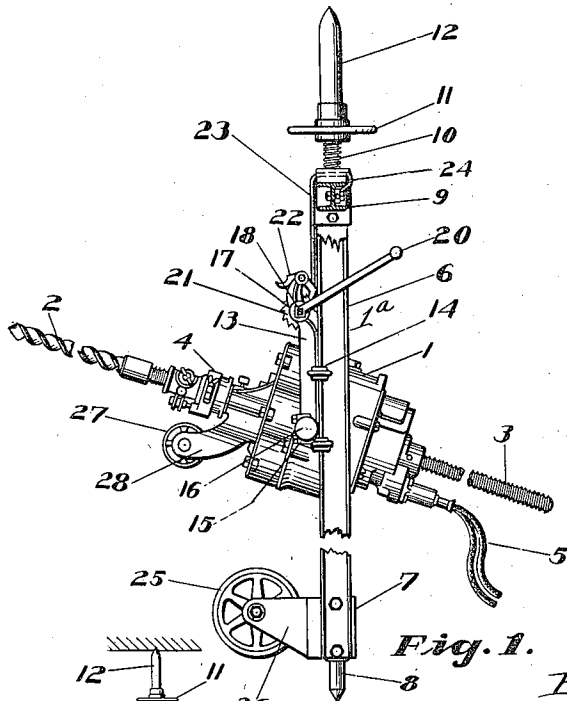


Fig. 1.

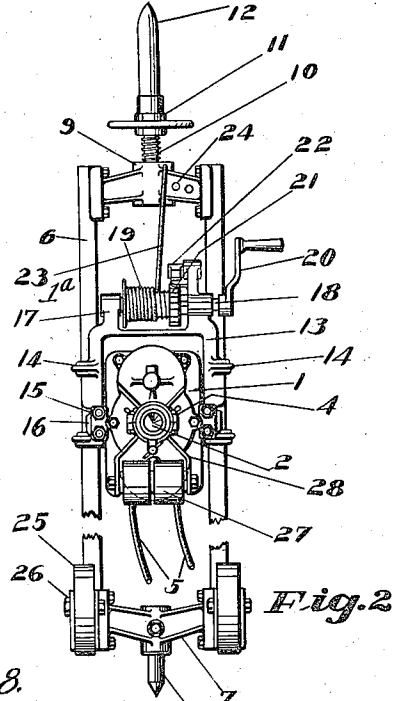


Fig. 2.

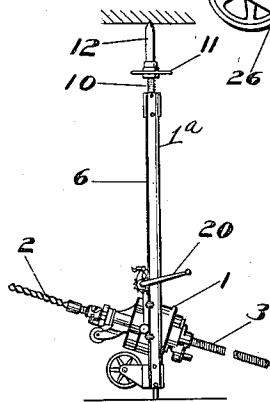


Fig. 3.

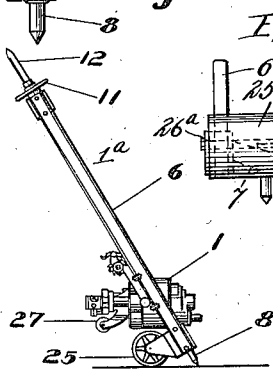


Fig. 4.

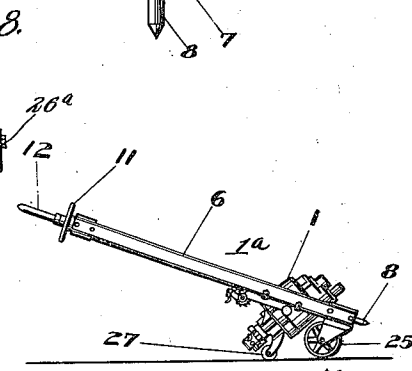


Fig. 5.

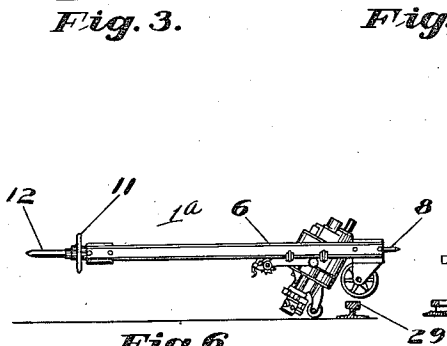


Fig. 6.

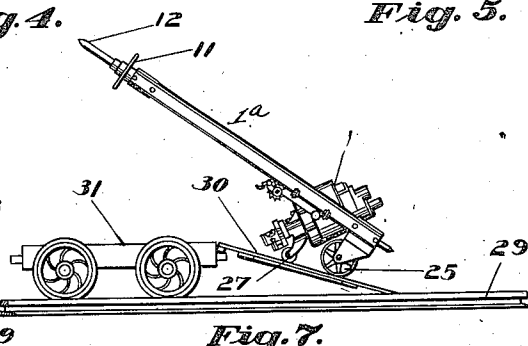


Fig. 7.

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UNITED STATES PATENT OFFICE.

NILS D. LEVIN, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

SUPPORT FOR COAL AND ROCK DRILLS.

1,185,809.

Specification of Letters Patent.

Patented June 6, 1916.

Application filed July 28, 1914. Serial No. 853,769.

To all whom it may concern:

Be it known that I, NILS D. LEVIN, 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 Supports for Coal and Rock Drills, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to improvements in the devices for supporting power drills that are used in forming the apertures in coal or rock for receiving blast charges, particularly in drilling mechanisms of the class wherein 15 each has a main frame adapted to be secured at the top and the bottom to external stationary abutments, such as roof rock and mine floor.

The supports for drills and kindred tools 20 which have been heretofore used have, generally, been in one or the other of two classes. The mechanisms of one class have each been provided with a four wheel supporting truck frame to which the main 25 frame of the drilling apparatus was pivotally connected; and an adjusting brace was employed and arranged to abut against the truck frame and against the main frame to hold the latter in any desired position.

30 The mechanisms of the second class have each had fastening devices at the top and bottom of the main frame arranged to react, vertically, one upon the other, there being no wheel frame or truck frame present.

35 The object of the present invention is to provide a drilling mechanism of the second class with means of support during transportation which will be entirely independent of the fastening devices of the main 40 frame. The mechanisms of this class have been excessively heavy, as entireties, as each has comprised not only the main frame with its fastening devices, but also the tool, its supporting and rotating feeding device, the 45 motor and the motor frame or tool frame. The practice has been to form each entire structure in several separable parts so that the weight can be divided.

50 When a drill of this sort and its accessories are brought into the room of a mine where holes are to be drilled, the supporting jack or main frame is lifted from the truck and carried to the desired position adjacent to the coal face and fastened, upright. Then 55 the drill supporting bearings are adjusted

at the desired elevation, and the drill is carried from the truck to the jack and lifted up to its position on the supporting bearing. This requires the work of two operatives.

The purpose of the present invention is 60 to avoid the necessity of separating the elements of the apparatus one from another, beyond the withdrawal of the tool, and enable a single operative to load and unload the combined mechanism, move them from 65 place to place and erect or take down the main frame, without separating the tool frame or motor frame therefrom.

Figure 1 is a side elevation, partly broken 70 away, of a drilling mechanism embodying my invention; Fig. 2 is a front elevation; Figs. 3, 4, 5, 6 and 7 are diagrammatic views illustrating the various positions into which 75 the mechanism can be put while erecting, taking down, transporting, loading or unloading. Fig. 8 is a fragmentary elevation showing a modified form of supporting wheel.

The main frame or jack frame indicated 80 as an entirety by 1* is composed of two parallel bars 6 having suitable cross connections at the bottom and at the top. The connection at the bottom is a yoke casting indicated by 7 having a fastening device in the 85 form of a pointed rod 8 secured thereto. At the upper end of the frame there is a cross casting or bar 9 carrying a threaded rod 10 to which is fitted the nut 11, with a hand wheel, and a loose pointed sleeve 12.

By means of the pointed parts 8 and 12 90 and the adjusting device 11, the upper and lower ends of the main frame can be firmly fastened in any desired position between two external abutment objects, such as the roof and floor of the mine. 95

Upon this frame is supported the drill or tool 2. It is carried by a frame or support 1 which also supports the motor, the gearing, the drill-rotating-and-feeding screw 3. The longitudinal feeding of the screw and, with 100 it, of the drill, is effected by the nut 4. The tool 2 is detachably fastened to the end of the screw rod so that it can be readily separated therefrom, and as the feed nut at 4 is made in separable sections, they can be 105 quickly opened and the screw rod also withdrawn freely, longitudinally.

5 indicates the electric cable, the plug of which can be readily withdrawn from the motor socket, or inserted. 110

The parts which have been just referred to can be of any of the well known forms now in use.

The frame which carries the tool, the motor and the other parts specified is mounted in a yoke frame 13 having lugs 14 which are fitted to the side bars 6 of the main frame.

15, 15 are bearings formed on the yoke frame 13 and in these are journaled the trunnions 16 extending laterally from the tool frame.

17, 17 are also bearings formed on the yoke frame 13 and in these are mounted a shaft 18 carrying a windlass or cable winding drum 19, together with a ratchet wheel 21.

22 is a pawl cooperating with the ratchet.

The cable 23 is at one end connected to the drum 19 and at the other end is connected to the upper part of the main frame, as at 24.

The position of the tool frame, together with the motor and other parts mounted thereon, can be readily adjusted along the main frame by these devices and held as desired in adjusted position.

25, 25 are wheels or rollers supported in carriers 26 connected to the lower end of the main frame. Preferably, these wheels are held in fixed positions relatively to the frame bars, in which case the carriers 26 are, as shown, rigidly connected to the frame. When the main frame is in vertical position the wheels 25 are elevated from the ground to a considerable distance, the supporting of the frame in any of its operative positions being entirely independent of the wheels and their carrier. A single wheel or roller suitably mounted and of sufficiently wide face can be employed. The carriers 26 can be cast as wings or plates integral with the lower cross bar or brace 7.

The trunnions 16 which support the drill frame and the parts carried thereby are so placed in relation to the center of gravity of said frame and parts that the drill can be directed horizontally or at any angle above or below the horizontal that is desired, without requiring lifting or labor on the part of the operator, their tendency, however, being to take an approximately horizontal position, as shown in Fig. 4. If the main frame be inclined as in that figure, the truck wheels 25, 25 are brought down to the ground and the whole apparatus is supported upon said wheels and upon the rod or fastening device 8, the center of gravity at such time being on a vertical line between the wheel and the rod.

The parts above specified can be used for supporting and transporting the mechanism, for even though the main frame be brought down to lines near the horizontal, the weight will be close to the wheels 25. But to furnish supplemental support I provide another wheel or wheels as at 27. These I

prefer to attach to the tool frame by means of arms or plates 28. When the main frame is inclined as in Fig. 5, that is lies in lines near the horizontal, the wheel or wheels 27 contact with the ground, the fixed supporting points 8 now being elevated. The center of gravity is now thrown forward to a line between the wheels 25 and 27; and the operator is practically relieved of all weight and is free to pull or push the apparatus around as if it were upon a truck. Because of the presence of car tracks and of cavities and projections in the floor of the mine, however, transportation for any distance, as from one room to another, is effected by means of a small truck 31, to and from which the drill apparatus can be quickly taken upon its own wheels over a board or incline 30. In case obstructions are met with, while the mechanism is on the ground, either the wheels 25 or those at 27 can be used as a fulcrum for lifting the others, as shown in Fig. 6.

In the drawings the working position of the main frame is shown as a vertical one, but it will be understood that it can be fastened rigidly in place for working in either of several planes or lines varying from the vertical; when it is at work the supporting wheels are relieved of carrying weight or of down pressure. When the main frame is released from its fastenings at the upper and lower ends it and the tool frame can be supported on the wheels in either of several positions other than their working positions; but when the ends of the main frame are secured to their external abutments they are held independently of the wheels, the upper and lower fastening devices reacting upon each other. It will also be observed that the wheels operate as fulcrums around which the frames can swing vertically. When the upper end of the main frame is freed from its fastening and is brought down to planes near the horizontal it becomes a lever for manually operating and moving the structure.

When the apparatus is made in the way shown the tool swings in a vertical plane which is transverse to the vertical plane of the axis of the wheels 25, the plane in which it swings including the vertical axis around which the main frame swings horizontally, and as the wheels are freed of weight and pressure they are adapted to swing also horizontally with the other parts.

In Fig. 8 I show a modification of the construction shown in the other figures, a single elongated ground wheel 25^a supported in suitable carriers 26^a being employed in lieu of the two wheels 25 shown in the other form of construction illustrated.

What is claimed is:

1. In apparatus of the character set forth, the combination of an elongated supporting

frame having means at its lower and upper ends adapted to engage the floor and roof of a mine and hold the frame in operative position, a tool mechanism on the frame comprising a motor, a tool holder driven by the motor and a tool in the said holder, the said tool mechanism being bodily adjustable through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, and means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on the supporting frame near the lower end thereof, whereby when the tool mechanism is adjusted to the lower end of the supporting frame and the upper end of the latter is swung downward the center of gravity of the tool mechanism is brought relatively near the axis of the said wheel so that the weight of said mechanism can be directly borne by said wheel.

2. In apparatus of the character set forth, the combination of an elongated supporting frame having means at its lower and upper ends adapted to engage the floor and roof of a mine and hold the frame in operative position, a tool mechanism on the frame comprising a motor, a tool holder driven by the motor and a tool in the said holder, the said tool mechanism being bodily adjustable through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, and means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on a fixed axis on the supporting frame near the lower end thereof so as to clear the ground when the supporting frame is secured in its upright operative position and to be brought into engagement with the ground when the upper end of said frame is swung downward from its operative position, whereby when the tool mechanism is adjusted to the lower end of the supporting frame and the latter is swung downward from its operative position as aforesaid the center of gravity of the tool mechanism is brought relatively near the axis of the said ground wheel so that its weight can be directly borne by said wheel.

3. In apparatus of the character set forth, the combination of an elongated supporting frame having means at its lower and upper ends adapted to engage the floor and roof of a mine and hold the frame in operative position, a tool mechanism on the frame comprising a motor, a tool holder driven by the motor and a tool in the said holder, the said tool mechanism being bodily adjustable through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on the supporting frame near the lower ends there-

of, whereby when the tool mechanism is adjusted to the lower end of the supporting frame and the upper end of the latter swung downward the center of gravity of the tool mechanism is brought relatively near the axis of the said wheel so that the weight of said mechanism can be directly borne by said wheel, and a second ground wheel mounted on a part of the apparatus nearer the upper end of the supporting frame than the first mentioned wheel.

4. In apparatus of the character set forth, the combination of an elongated supporting frame having means at its lower and upper ends adapted to engage the floor and roof of a mine and hold the frame in operative position, a tool mechanism on the frame comprising a motor, a tool holder driven by the motor and a tool in the said holder, the said tool mechanism being bodily adjustable through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on the supporting frame near the lower ends thereof, whereby when the tool mechanism is adjusted to the lower end of the supporting frame and the upper end of the latter swung downward the center of gravity of the tool mechanism is brought relatively near the axis of the said wheel so that the weight of said mechanism can be directly borne by said wheel, and a second ground wheel on the frame of the said motor and adapted when the tool mechanism is lowered and the supporting frame swung downward to operatively engage the ground.

5. In apparatus of the character set forth, the combination of an elongated supporting frame having means at its lower and upper ends adapted to engage the floor and roof of a mine and hold the frame in operative position, a tool mechanism on the frame comprising a motor, a tool holder driven by the motor and a tool in the said holder, the said tool mechanism being bodily adjustable through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, mechanism for effecting the adjustment of the tool mechanism longitudinally of the supporting frame, and means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on the supporting frame near the lower ends thereof, whereby when the tool mechanism is adjusted to the lower end of the supporting frame and the upper end of the latter swung downward the center of gravity of the tool mechanism is brought relatively near the axis of the said wheel so that the weight of said mechanism can be directly borne by said wheel.

6. In apparatus of the character set forth, the combination of an elongated supporting

frame having two longitudinally extending parallel bars spaced from each other and centrally arranged alining pointed rods at its lower and upper ends adapted to engage the floor and roof of a mine to hold the frame in operative position, a tool mechanism on the supporting frame comprising a frame slidably engaging the parallel bars of the supporting frame, a motor disposed between the parallel bars of the supporting frame and pivotally mounted on the sliding frame to swing in a vertical plane, an end-wise moving tool carrier and tool connected to be driven by the motor and disposed in a vertical plane through the axis of the pointed rods of the supporting frame, the said tool mechanism being bodily adjustable

through a wide range longitudinally of the supporting frame to and from a position near the lower end thereof, and means for facilitating bodily movement of the apparatus comprising a ground wheel mounted on the supporting frame near the lower end thereof, whereby when the tool mechanism is adjusted to the lower end of the frame its center of gravity is brought relatively near the axis of the said wheel so that its weight can be directly borne by said wheel.

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

NILS D. LEVIN.

Witnesses:

P. J. HENRY,
DUDLEY T. FISHER.