

Sept. 2, 1958

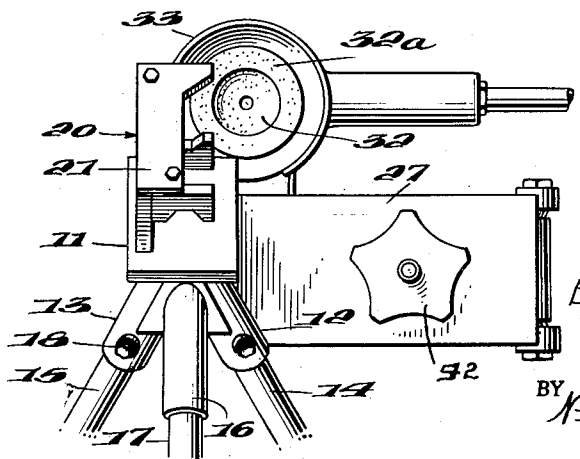
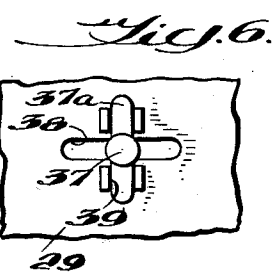
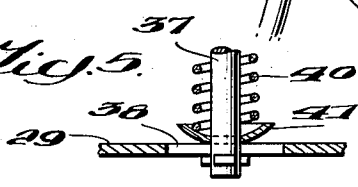
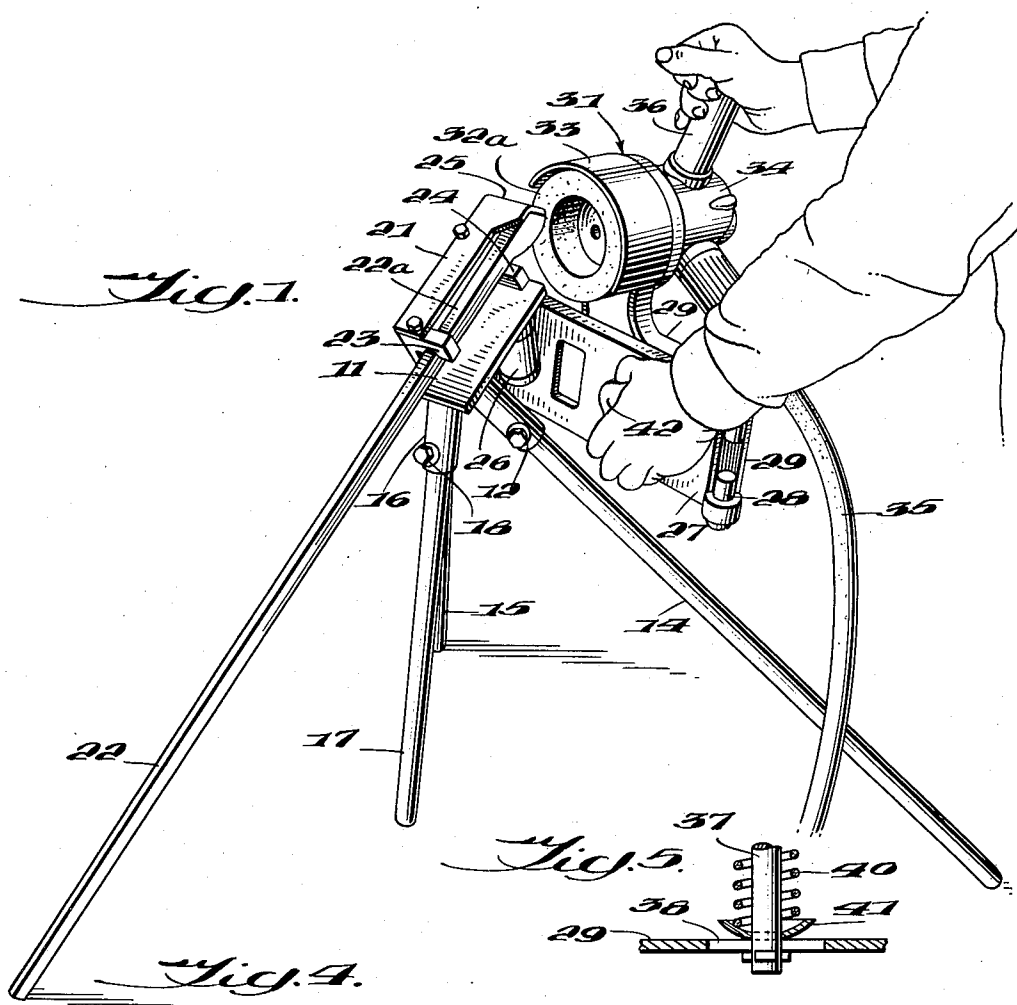
B. E. R. LÖFQVIST ET AL

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GRINDING STAND FOR ROCK DRILLS

Filed Feb. 7, 1957

2 Sheets-Sheet 1



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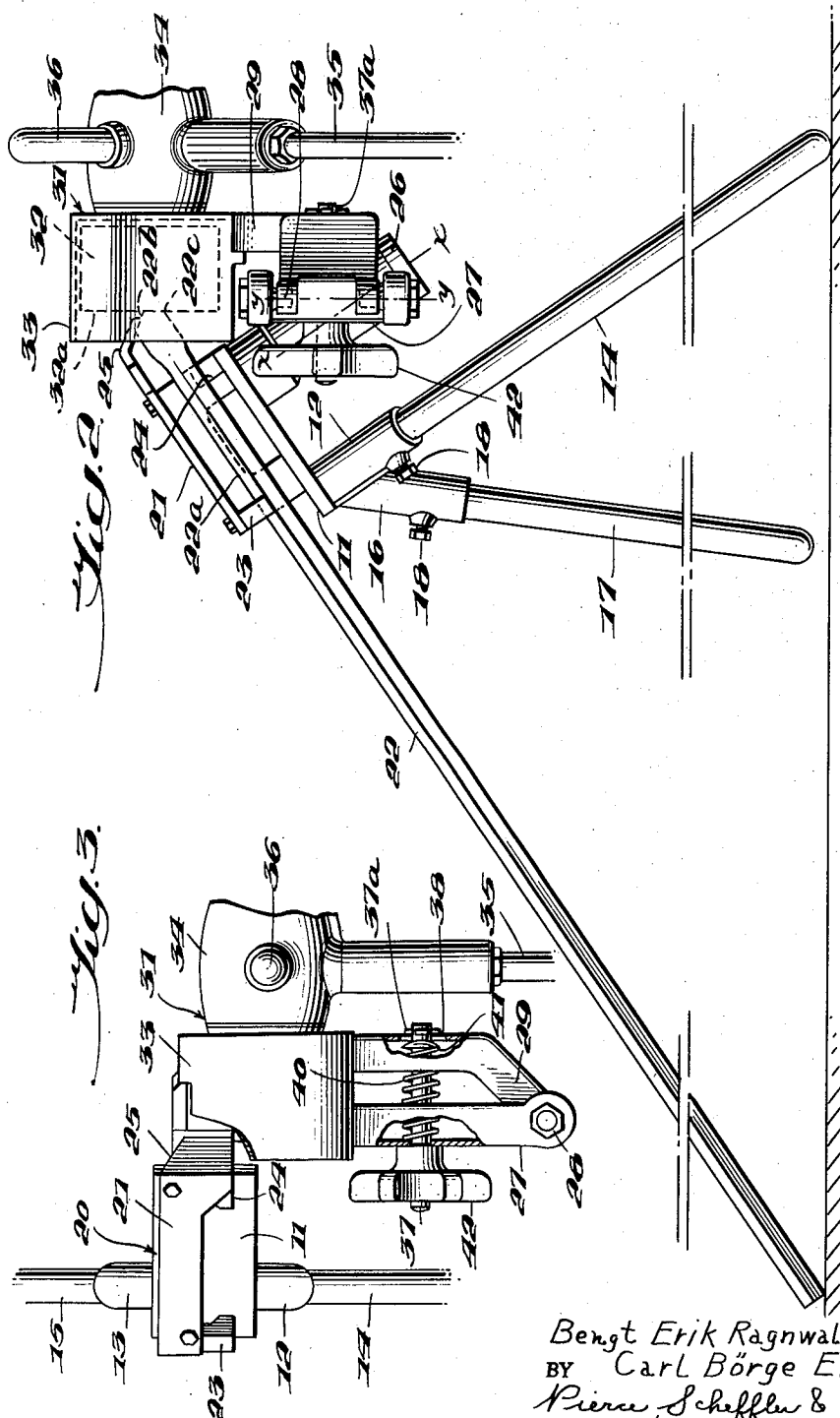
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GRINDING STAND FOR ROCK DRILLS

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Application February 7, 1957, Serial No. 638,797

7 Claims. (Cl. 51—55)

The present invention relates to grinding stands and in particular to stands adapted for the grinding of rock drill bits of the percussion type. The stand in accordance with the invention is easily movable and effective for most accurate grinding of the drill bit.

An object of the invention is to provide a grinding stand comprising a support body and two legs extending downwardly therefrom in a divergent manner, the body including a clamping or claw device for holding the bit end of the drill which is to be ground and the shank portion of the drill when so held also extending downwardly at an angle away from the two legs to thus form the third "leg" of a tripod type of support. A grinding machine in the form of a motor driven grinding wheel is mounted on the support body in such manner that the face of the grinding wheel can be moved in a rocking manner back and forth across the face of the drill bit in a path at the proper grinding angle, and the invention also provides means whereby the operator is able to increase the pressure of the grinding wheel against the face of the drill bit, the constructional arrangement being such that the operator is able to pass the grinding wheel back and forth across the face of the bit with one hand and change the grinding pressure, between successive grinding passes, with the other hand.

A further object is to provide a drill grinding stand having three legs arranged in the manner of a tripod so as to support the same when not in use, and wherein one of the legs of the tripod is automatically raised off the floor upon insertion of a rock drill bit for grinding, the drill bit itself then becoming the third leg of the tripod support, and the stand including a simple claw device for gripping the end of the drill bit in such manner that the gripping action is established in a simple manner by the reaction forces attributable to the tripod type of support for the masses involved and which exert an upward force on the drill bit in its claw thus holding the bit firmly in the grinding position without the need for any positive clamping device.

The foregoing as well as other objects and advantages of the invention will become more apparent from the following detailed description of a typical embodiment thereof and the accompanying drawings wherein:

Fig. 1 is a view in perspective showing the grinding stand with a drill bit inserted therein and being ground;

Fig. 2 is a view in side elevation of the grinding stand;

Fig. 3 is a top plan view of the stand with certain parts broken away to show detailed structure;

Fig. 4 is a view of the stand in end elevation; and

Figs. 5 and 6 are fragmentary views down to an enlarged scale to show certain details of construction.

With reference now to the drawings, the grinding stand is seen to be comprised of a body member in the form of a metallic elongated plate 11 of suitable thickness to provide the necessary strength and to the lower face of which is secured at one end of the plate, such as by welding, a pair of pipe sockets 12, 13 which extend

2

downwardly therefrom in a divergent manner and in a plane substantially perpendicular to the plate 11. The sockets 12, 13 are adapted to receive legs 14, 15 respectively, which may be formed from drill rods cut into suitable lengths, or the legs may be made from any other suitable rod material having the necessary strength. A third socket 16 extends downwardly from plate 11 in a plane forming an angle with the plane containing the sockets 12, 13 and is adapted to receive a third leg 17 which is shorter than legs 14, 15. The legs 14, 15 and 17 are secured within their respective sockets by any suitable means such as by set screws 18, and such legs by virtue of their mutually divergent relationship establish a tripod type of support for the drill stand when not in use.

Secured to the upper side of plate 11 is a simple claw type of clamping device by which a drill bit is held firmly in grinding position without the need for any special screw actuated or other positive clamping means. The clamping device 20 comprises an essentially inverted L-shaped member 21 secured as by welding to plate 11, and of suitable length to receive an appreciable portion of the bit end 22a of a drill rod 22. The member 21 is provided at one end with an upper claw 23 adapted to bear against the upper surface of the bit end 22a and with a lower claw 24 at the other end adapted to bear against the lower surface of the bit end 22a. As is clear from the drawings, the drill rod 22 when inserted in the clamping device 20 will be in the plane of the third leg 17 of the tripod support. However, since the leg 17 is shorter than the two other legs 14, 15 and the drill rod 22 is equal to or longer than legs 14, 15, it will be evident that leg 17 will be raised from the floor and that the drill rod 22 now constitutes the third leg of the tripod support. Moreover, due to this arrangement, the support forces reacting from the weight, which the tripod carries, upon the drill rod 22 is such as to produce an upward force on the latter which causes it to bear most firmly against the upper and lower claws 23, 24 and thereby prevents the drill bit end 22a from becoming loosened in the clamping device as it is ground. In addition to the claws 23, 24, the member 21 is provided at its front end with an inclined stop flange 25 disposed at such an angle as to engage the face 22b of the drill bit opposite from face 22c which is being ground so as to hold the bit at the proper angular position for grinding relative to the grinding wheel.

Depending from the lower face of plate 11 at the opposite end thereof and normal thereto and in the plane of the socket 16 is a pivot assembly comprising a cylindrical member 26 mounted for rotation about its longitudinal axis $x-x$ seen in Fig. 2. A plate member 27 is secured at one end as by welding, to the cylindrical member 26, and has secured to its opposite end by a hinge assembly 28 a second plate member 29 which is located generally parallel with and in spaced relation from the plate member 27, the hinge axis $y-y$ being located parallel with the grinding face of the grinding wheel and the function of the hinge assembly being such as to permit the position of the grinding member to be moved closer, by increments, to the face of the bit being ground. The plates 27 and 29 lie in planes parallel with axis $y-y$.

As seen in Fig. 2, the axes $x-x$ and $y-y$ are arranged at an angle to each other in order to form a correct angle for grinding the surfaces 22b, 22c of the drill bit in relation to the longitudinal axis of the latter, the grinding angle being, for example, 55° .

The plate member 29 has secured to it a grinding machine 31 having a motor driven grinding wheel 32 and which is covered in part by an arcuate protection shield 33. The motor 34 in the illustrated embodiment

is of the pneumatic type and includes a flexible conduit 35 for bringing air to the motor. Other types of motors such as hydraulic or electric may be used and it is also possible to have only the rotatable grinding wheel mounted on the stand and the power for driving it being carried up to its shaft by some suitable type of flexible drive-shafting. The grinding wheel 32 may have any desired form such as, for example, the hollow cylindrical form shown in the drawing or it can have a disc formation, etc. As will later be more clearly understood, the invention makes it possible to move the grinding wheel back and forth across the face of the drill bit by imparting a similar movement to the grinding machine 31 and for this purpose it will be seen that the latter is provided with a handle 36 adapted to be grasped by the right hand of the operator, as indicated in Fig. 1.

As explained above, the improved grinding stand includes an arrangement for manually increasing, by adjustable increments, the pressure exerted by the end face of the grinding wheel 32 against the surface of the drill bit being ground. To this end it will be seen from Fig. 3 that a threaded bolt 37 has a T-shaped head 37a which passes through an elongated slot 38 in the plate member 29 and is then turned 90° and brought to rest in a locking recess 39 provided at the outer face of plate 29 and which extends normal to the long axis of slot 38 and thus prevents the bolt 37 from turning about its axis.

Surrounding the bolt 37 is a helical spring 40. One end of spring 40 adjacent the plate 29 is received in and bears against a cup 41 surrounding bolt 37 and bearing against the inner face of plate 29, and the opposite end of spring 40 bears against the inner face of plate 27. The opposite end of bolt 37 passes through an aperture in plate 27 and threads through a hand wheel 42 which bears against the outer face of plate 27. The spring 40 is held in compression between its cup 41 and the inner face of plate 27 and thus urges the hingedly connected plates 27 and 29 apart. As the hand wheel 42 is turned i. e. threaded downwardly upon the shank of bolt 37, the plates 27 and 29 will thus be drawn closer together, thus relocating the end face 32a of the grinding wheel closer against the face 22c of the drill bit.

If desired, the support member 11 may be provided with a suitable type of indexing means, not shown, for indicating the position of the drill bit.

The operation of the grinding device is deemed to be obvious from the foregoing description but can be summarized as follows:

Before using, the drill stand rests upon its three legs 14, 15 and 17. A rock drill 22 with a bit end 22a which needs regrinding is then inserted longitudinally into the claw type clamping device 20 between the claws 23, 24 until the upper face 22b at the cutting edge of the bit comes to rest against the stop flange 25. The drill 22 being longer than leg 17, the latter thus no longer will reach the floor, and the drill 22 takes over the function of the third leg of the tripod support. The grinding wheel 32 is now adjusted by means of the hand wheel 42 until the grinding end face 32a bears against the bit face 22c to be ground. The grinding machine 31 is now started and the operator, with his hand on and using handle 36, rocks the grinding machine 31 and its supporting components comprising plates 27, 29 and cylindrical pivot member 26 about the axis x—x thus causing the rotating face 32a of the grinding wheel to execute a corresponding back and forth movement across the bit face 22c. After a few passes of the grinding face 32a across the bit face 22c, the hand wheel 42 is turned down on the bolt 37 to move the grinding face 32a closer to the bit face 22c and a few more passes are made with the grinding wheel across the bit face 22c. When the bit face 22c has received the necessary amount of grinding, the grinding machine 31 can then be stopped, the drill bit turned in its clamp through 180° and the grinding procedure then repeated with respect to the opposite bit face 22b.

In conclusion it is to be understood that the improved grinding stand in accordance with the invention is not only usable for grinding single cutter rock drills as shown but also other types of rock drills and other types of drills or similar tools which include a working edge at the end of a shaft. Moreover, it will be understood that various minor changes in the construction and arrangement of parts can be made without, however, departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. In a grinding stand for drill rods such as rock drills and the like, the combination comprising a support body, a pair of supporting legs extending downwardly from said body, means carried by said body for holding the bit end of the drill rod in such position relative to said pair of supporting legs that said drill rod cooperates therewith as the third leg of a tripod type of support, first and second elongated plate-like supporting members arranged in generally side-by-side spaced relation and being interconnected at one end thereof by a first pivot means, second pivot means at the opposite end of said first supporting member pivotally interconnecting the same with said support body, and a grinding machine carried by said second supporting member, said first and second supporting members being rotatable as a unitary assembly about the axis of said second pivot means thereby to move the grinding component of said grinding machine across the face of the drill bit to be ground.

2. A grinding machine as defined in claim 1 wherein the respective axes of said first and second pivot means form an angle with each other.

3. A grinding machine as defined in claim 1 and which further includes means for moving said second supporting member about said first pivot means closer to said first supporting member and thereby correspondingly moving the grinding component of said grinding machine closer to the face of said drill bit.

4. A grinding machine as defined in claim 3 wherein said means for moving said second supporting member closer to said first supporting member comprises a threaded bolt having the head end thereof attached to one of said supporting members and passing through an aperture in the other supporting member, and a hand wheel threaded onto the end of said bolt and bearing against the face of said other supporting member.

5. A grinding machine as defined in claim 4 and which further includes a helical spring surrounding said bolt, the opposite ends of said spring bearing against the confronting faces of said first and second supporting members.

6. A grinding machine as defined in claim 1 and which further includes a handle member on said grinding machine for facilitating movement thereof and of said first and second supporting members as a unitary assembly about the axis of said second pivot means.

7. In a grinding stand for drill rods such as rock drills and the like, the combination comprising a support body, a pair of supporting legs extending downwardly from said body, claw means carried by said body for holding the bit end of the drill rod in such position relative to said pair of supporting legs that said drill rod cooperates therewith as a third leg of a tripod type of support, the bit end of said drill rod being kept in place in said claw means solely by the weight acting downwardly on said legs, a third leg extending downwardly from said body and which cooperates with said pair of legs to also establish a tripod type of support in the absence of the drill rod, first and second elongated plate-like supporting members arranged in generally side-by-side spaced relation and being interconnected at one end thereof by a first pivot means, second pivot means at the opposite end of said first supporting member pivotally interconnecting the same with said support body, the respective axes of said first and second pivot means forming an

5

angle with each other, and a grinding machine carried by said second supporting member, said first and second supporting members being rotatable as a unitary assembly about the axis of said second pivot means thereby to move the grinding component of said grinding machine across the face of the drill bit to be ground, and means engaging said first and second supporting members for drawing said second supporting member and hence also

6

the grinding component of the grinding machine carried by the latter towards said first supporting member thereby to effect a corresponding movement of said grinding component closer to the face of said drill bit.

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