

United States Patent

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[54] MOUNTING FRAME FOR ROCK BREAKERS AND ROCK IMPLEMENTS

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[51] Int. Cl.E21c 11/02

[58] Field of Search173/28, 23, 38, 43; 299/70

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[57] ABSTRACT

A mobile mounting frame for rock working tools having universally movable tool positioning and operatively supporting means.

9 Claims, 7 Drawing Figures

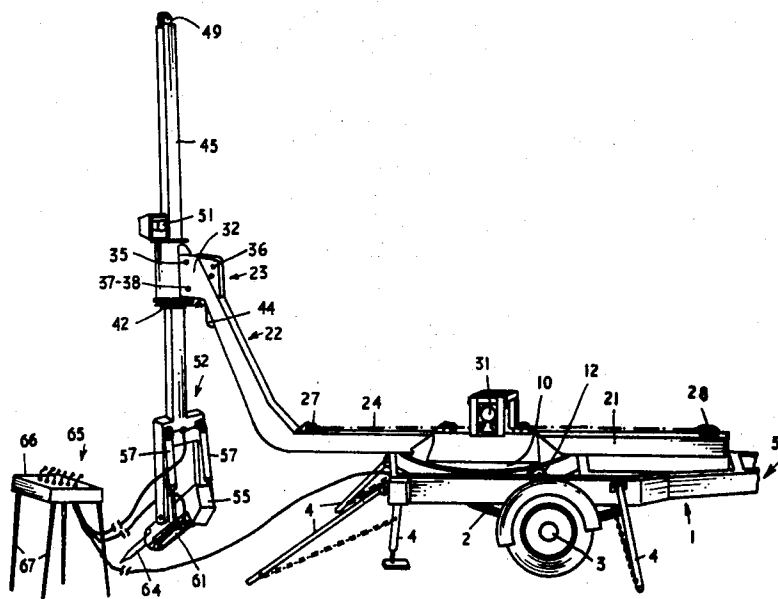


FIG. 1.

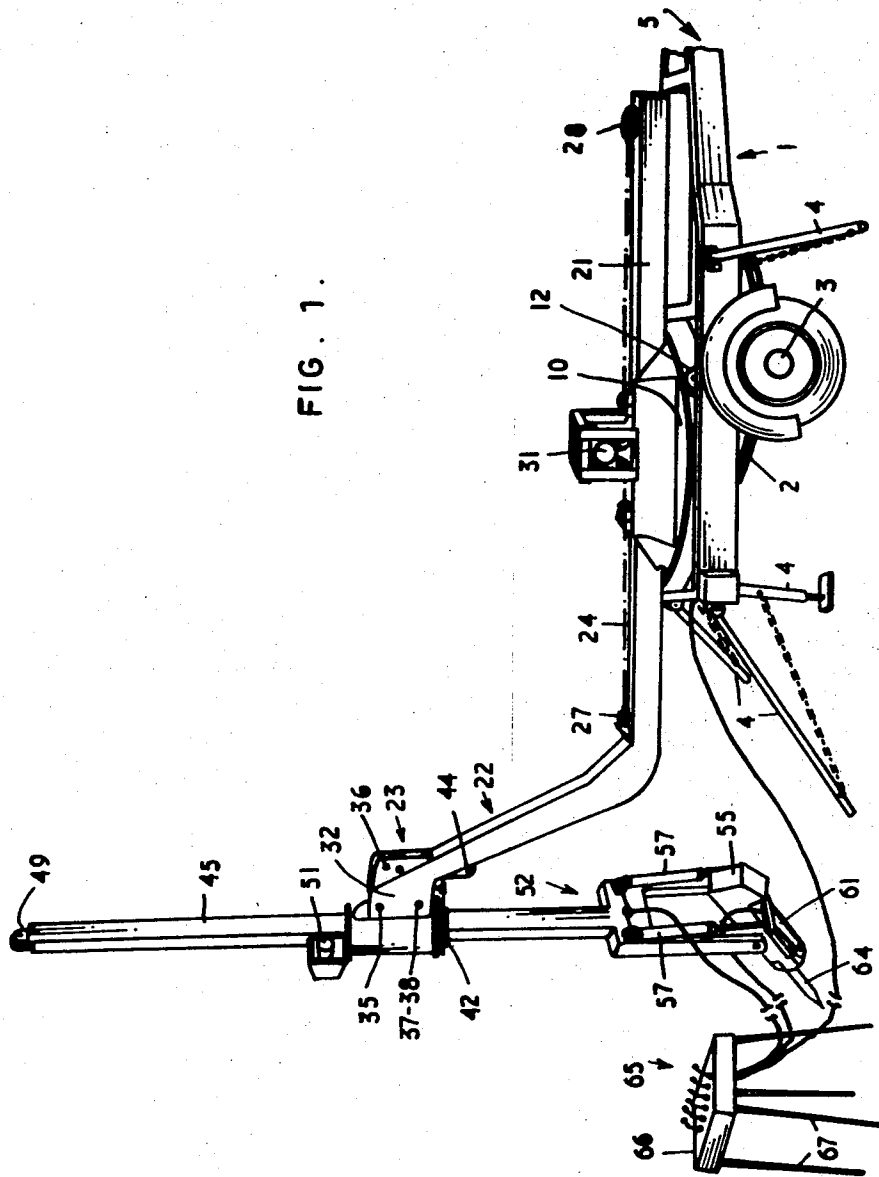
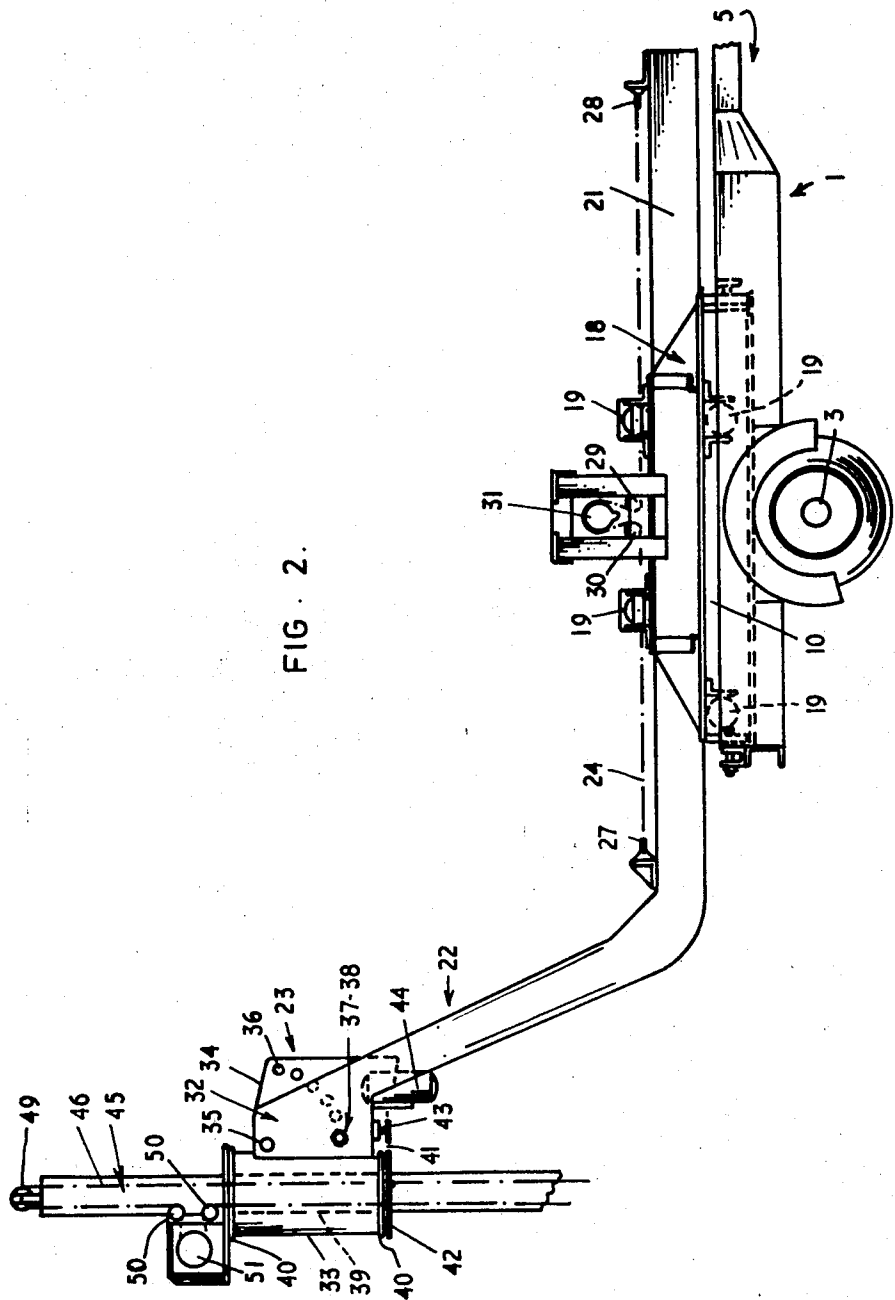


FIG. 2.



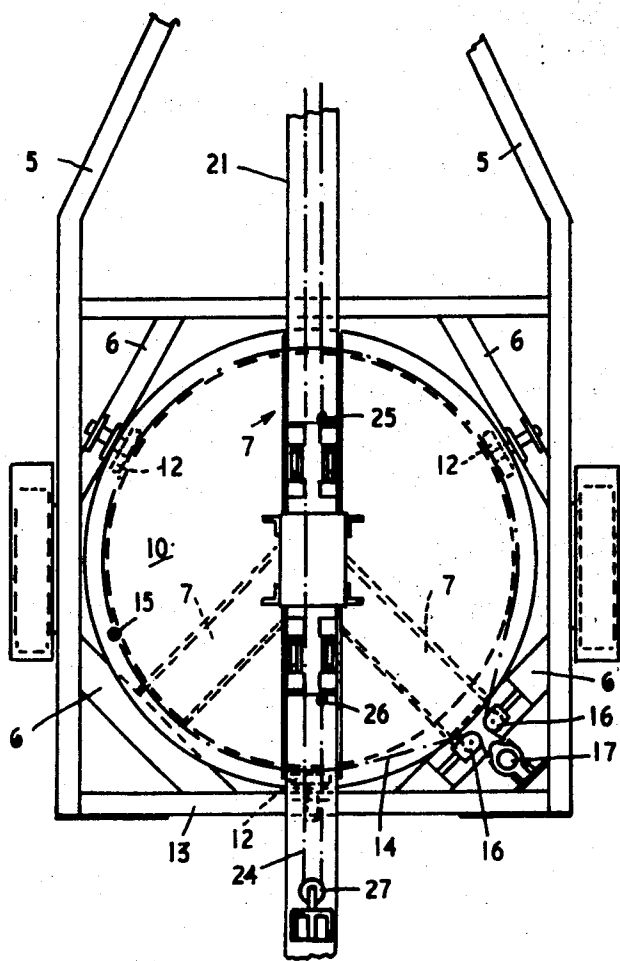


FIG. 3.

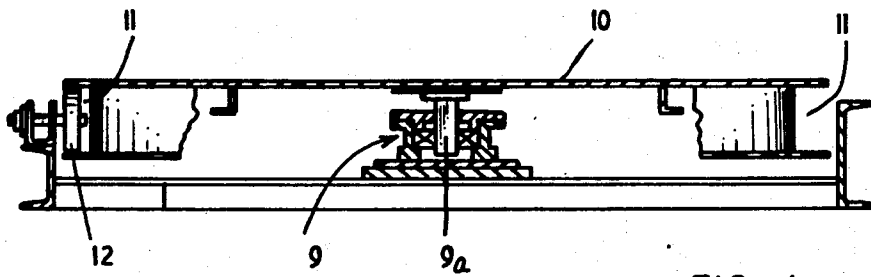


FIG. 4.

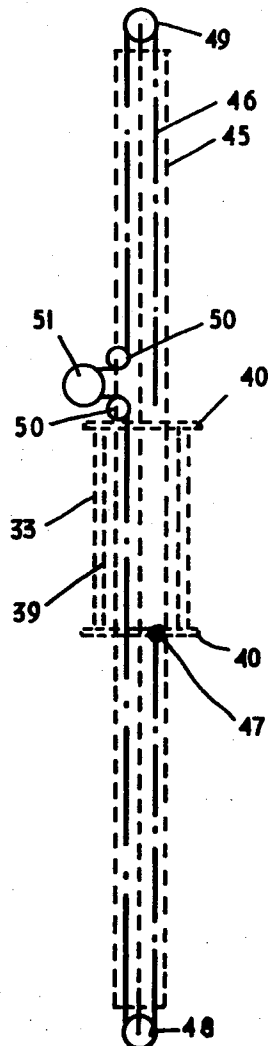


FIG. 7.

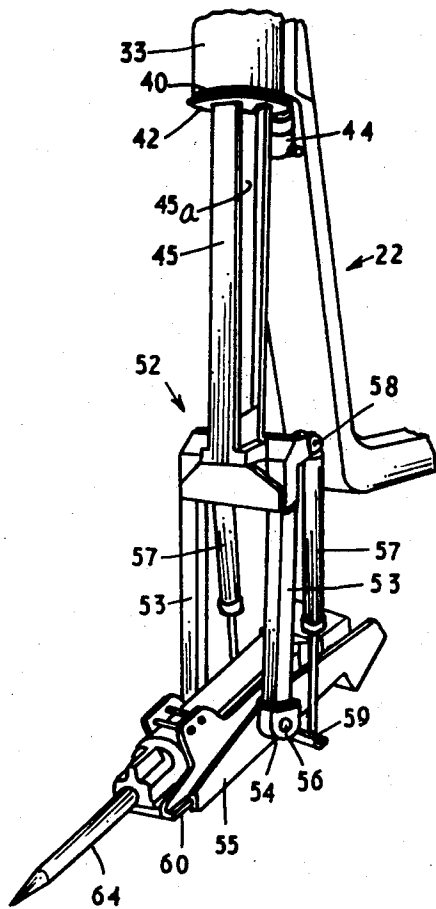


FIG. 5.

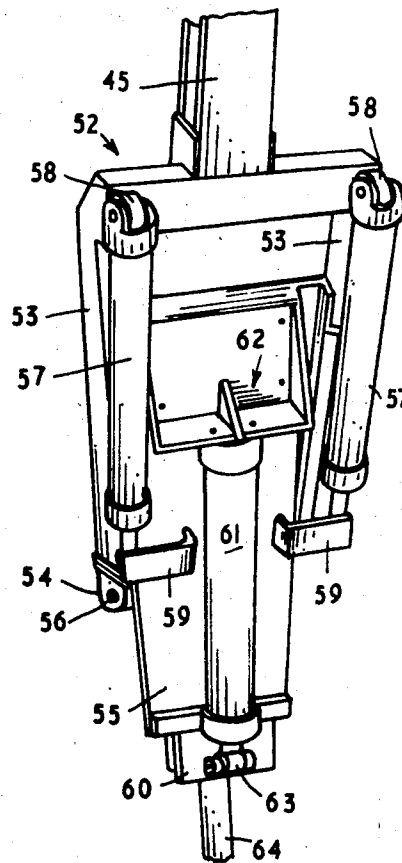


FIG. 6.

MOUNTING FRAME FOR ROCK BREAKERS AND ROCK IMPLEMENTS

This invention has been devised to provide a mounting frame for rock working tools. The mounting frame can be easily transported to a work area and an implement mounted thereon can be moved radially and/or vertically and/or angularly and accurately located and operatively secured in a selected work position.

The mounting frame for rock working tools according to the invention comprises a base, a turntable part-rotatably mounted on the base and means whereby the turntable can be turned to and held in a selected position, a primary arm slidably mounted on the turntable and means whereby said primary arm can be moved and held on the turntable in a selected position, a secondary arm slidably and rotatably mounted in a head on one end of the primary arm and means whereby said secondary arm can be moved and held in the head in a selected position, a yoke mounted on one end of the secondary arm, a carrier for an implement cradle swingably mounted in the yoke and means to swing the carrier and hold it in a selected position and actuating and control mechanism for the several means.

One embodiment is described with reference to the drawings wherein

FIG. 1 is a perspective view of the frame with a tool mounted thereon and illustrating a mobile table housing the controls for the various movements of the frame components.

FIG. 2 is a side elevation with part of the secondary arm omitted.

FIGS. 3 is a fragmentary plan showing the turntable and part of the primary arm.

FIG. 4 is sectional end elevation showing the turntable king pin.

FIG. 5 is a fragmentary perspective side view of a tool mounted in a carrier in the yoke.

FIG. 6 is fragmentary perspective view of the back of the yoke and the tool carrier and

FIG. 7 is a schematic illustration of secondary arm moving mechanism

Referring to the drawing the base 1 is made from steel channels formed into a substantially square sub-frame to which is fixed springs 2 and an axle and wheel assembly 3. Frame stabilizing jacks and stays 4 and towing arms 5 extend from the sub-frame. The sub-frame has corner braces 6 and three radial braces 7 on which is mounted a center bearing assembly 9 to receive the king pin 9a of a circular turntable 10. The turntable 10 has a peripheral channel 11 which receives three load supporting rollers 12 mounted on two of the corner braces 6 and on the back member 13 of the sub-frame.

The turntable 10 rotated by a chain 14 in the channel 11 fixed as at 15 to the turntable, the chain passes around jockey pulleys 16 and through an air motor-chain drive unit 17.

A channel housing 18 is fixed to the top of the turntable 10 over its axis of rotation and upper and lower primary arm support rollers 19 are mounted on the housing 18 and on the turntable 10 respectively.

The primary arm 21 is of generally box section and is set upwardly outwardly and acutely at one end as at 22. At the upper end of the part 22 is a head 23.

The arm 21 is movable longitudinally by means of a chain 24 anchored at its ends to the channel housing 18 as at 25 and 26, and passing around chain pulleys 27 and 28 on the arm 21, around jockey pulleys 29-30 and an air motor-chain drive unit 31 mounted on the turntable.

The head 23 comprises a pair of mounting plates 32. A cylindrical case 33 has side plates 34 pivotally connected as at 35 to the mounting plates 32. There is a plurality of positioning holes 36 on a common radius from the pivot connection 35 through the side plates 34. The holes 36 are selectively alignable with a hole 37 through the mounting plates 32. A bolt 38 is used to position the case 33 relative to the arm part 22.

A rotatable mounting sleeve (see FIGS. 2 and 5) is held in position in the case 33 by end plates 40. The sleeve is rotated by a chain 41 passing around a sprocket 42 fixed to the lower end plate 40, around jockey pulleys 43 mounted on the side plates 34 and around an air motor-chain drive unit 44 mounted between the side plates 34.

The secondary arm 45 is an "H" section beam having a web 45a and is slidably mounted in correspondingly shaped openings through the end plates 40.

The arm 45 is raised and lowered and held in a selected position by a chain 46. The chain 46 is anchored as at 47 to the lower end plate 40, passes around chain pulleys 48, 49 at the lower and upper ends of arm 45 around jockey pulleys 50 and an air motor-chain drive unit 51 mounted on the top plate 40.

A yoke 52 is fixed to the lower end of the arm 45. The yoke 52 has two arms 53 having bearings 54 in the lower ends and working tool carrier 55 is mounted by trunnion journals 56 in the bearings 54. The carrier is held in operative position aligned with the legs 53 or set at a selected angle thereto by two pneumatic cylinder-plunger units 57. The units 57 are pivotally mounted at their respective ends to brackets 58 on the yoke 52 and offset brackets 59 on the carrier 55. An implement cradle 60 is slidably mounted on the carrier 55 and its sliding movement is controlled a pneumatic cylinder and plunger unit 61 connected at its respective ends to the carrier 55 as at 62 and to the cradle 60 as at 63. A tool, in this case a pneumatic rock pick 64 and its actuating unit, is mounted in the cradle by conventional means.

The various power units are operatively connected to an external source of compressed air and/or hydraulic power through a portable battery of control valves 65 on, in this embodiment, a separate control board 66 having legs 67.

Once the frame is positioned and supported by the jacks and stays 4 in juxtaposition to a work site the control panel is positioned so that the operator can see and control the tool at the workface. The primary arm can be moved longitudinally and the turntable can be rotated by operation of the units 31 and 17 respectively. The secondary arm can be rotated, raised and lowered by operation of the units 44 and 51 respectively and the carrier 55 can be set at a required angle for the tool 64 to be positioned against a work face by operation of the units 57. The tool is operated in conventional manner through the control panel and the unit 61 will hold the tool against the workface. When using a rock pick as illustrated side loads can be applied by units 57.

The claims defining the invention are as follows:

1. A mounting frame for rock working tools, said mounting frame comprising a base, a turntable rotatably mounted on the base, means whereby the turntable can be turned to and held in a selected position, a primary arm slidably mounted on the turntable, said base including means for supporting said turntable, said means comprising a plurality of rollers forming a ring track on which said turntable is mounted, a channel track extending across said turntable over the axis of its rotation, a plurality of upper and lower rollers located to support the primary arm slidably in said channel track, means whereby said primary arm can be moved and held on the turntable in a selected position, a head at one end of said primary arm, a secondary arm slidably and rotatably mounted in said head, means whereby said secondary arm can be moved and held in the head in a selected position, a yoke mounted on one end of said secondary arm, a carrier swingably mounted in the yoke, an implement cradle slidably mounted on said cradle means to swing the carrier and hold it in a selected position, and actuating and control mechanisms for each of said aforementioned means.

2. A mounting frame as claimed in claim 1 wherein the base includes a trailer chassis mounted on wheels, jacks supporting the chassis when in operative position and stays to stabilize the chassis.

3. A mounting frame as claimed in claim 1 including means for rotating the turntable and holding it in a selected position, said means comprising an endless chain mounted around the turntable and anchored thereto, a motor mounted on said base, said chain drivingly connected to said motor.

4. A mounting frame as claimed in claim 1 including means for moving the primary arm and securing it in a selected position, said means comprising a chain, a channel housing on the turntable, chain pulleys on said arm, a motor mounted on the turntable, said chain anchored at its ends to said channel, passing around said chain pulleys and drivingly connected to said motor.

5. A mounting frame as claimed in claim 1 wherein the end part of the primary arm to which the head is fixed is set upwardly outwardly and acutely relative to said arm, said head comprising a pair of mounting plates, a case including side plates pivotally connected to said mounting plates, said side plates having a plurality of positioning holes on a common radius from said pivot connection, said head mounting plates having at least one registering hole therethrough, a mounting sleeve for said secondary arm rotatably mounted in the case, upper and lower end plates holding said sleeve in said case, a sprocket on one of said end plates, a motor mounted between said side plates, and a chain connecting said sprocket to said motor.

6. A mounting frame as claimed in claim 5 wherein said secondary arm is slidable in said end plates, means for raising and lowering said arm and holding it in a selected position, said means comprising a chain, a pulley on the bottom of said secondary arm, a motor mounted on the upper sleeve end plate, a pulley at the top of said secondary arm, said chain anchored at one end to the lower sleeve end plate, passing around said bottom pulley upwardly to said motor and then over said top pulley.

7. A mounting frame as claimed in claim 1 wherein said yoke comprises two arms including bearings in their lower ends and said carrier includes trunion journals mounted in said bearings, two pneumatic cylinder-plunger units pivotally connected to said yoke and to brackets on the working tool carrier respectively to thereby hold said carrier in a selected operative position.

8. A mounting frame as claimed in claim 1 wherein said implement cradle is slidably mounted on the carrier, means controlling said sliding movement, said control means comprising a pneumatic cylinder and plunger unit connecting said cradle to said carrier.

9. A mounting frame as claimed in claim 1 wherein said actuating and control mechanisms are mounted on a mobile control member.

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