March 21, 1950 J. C. CURTIS ET AL 2,500,932

DRILLING APPARATUS

Filed Dec. 1, 1944 5 Sheets-Sheet 1

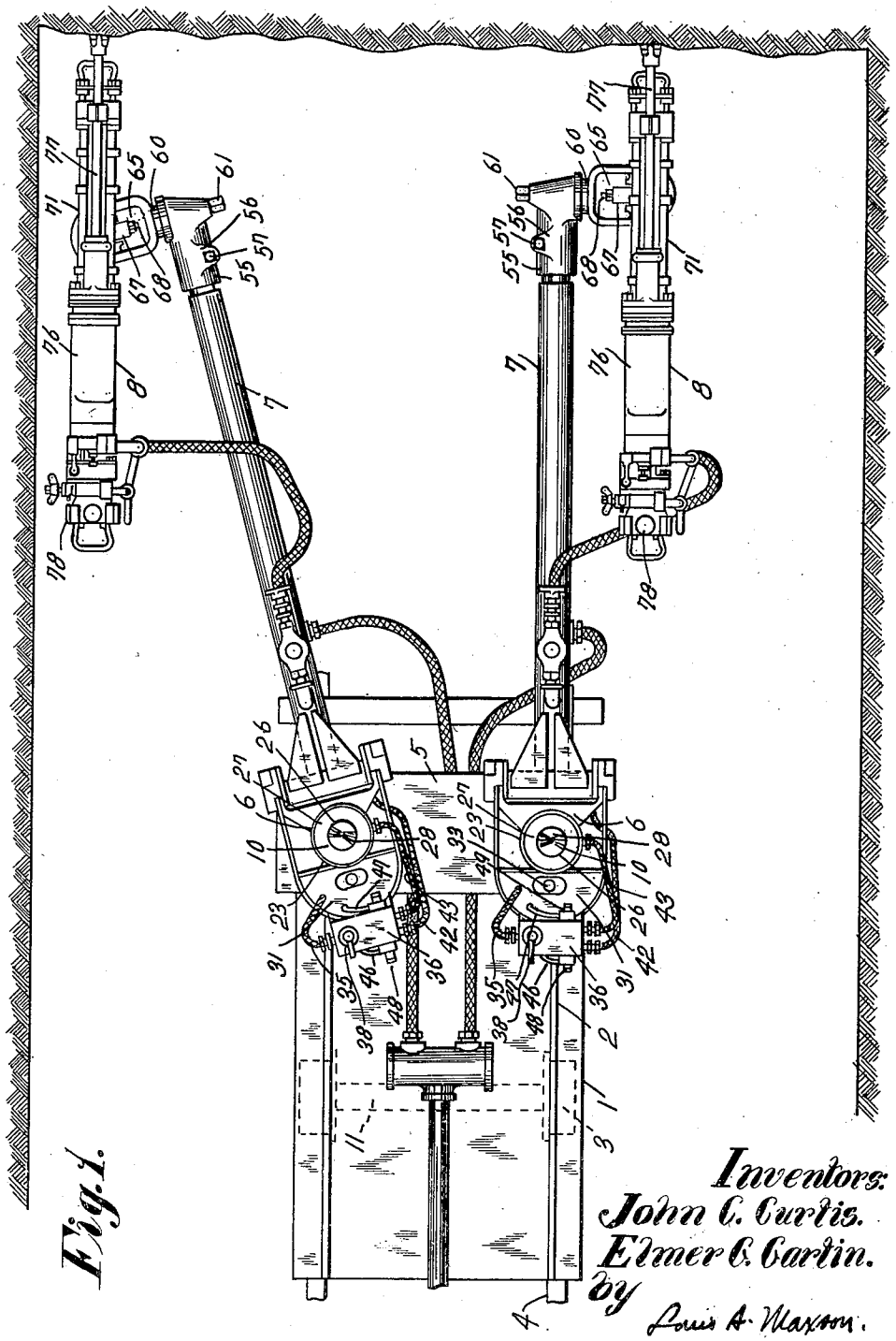

Fig. 1.

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DRILLING APPARATUS

Filed Dec. 1, 1944

5 Sheets-Sheet 2

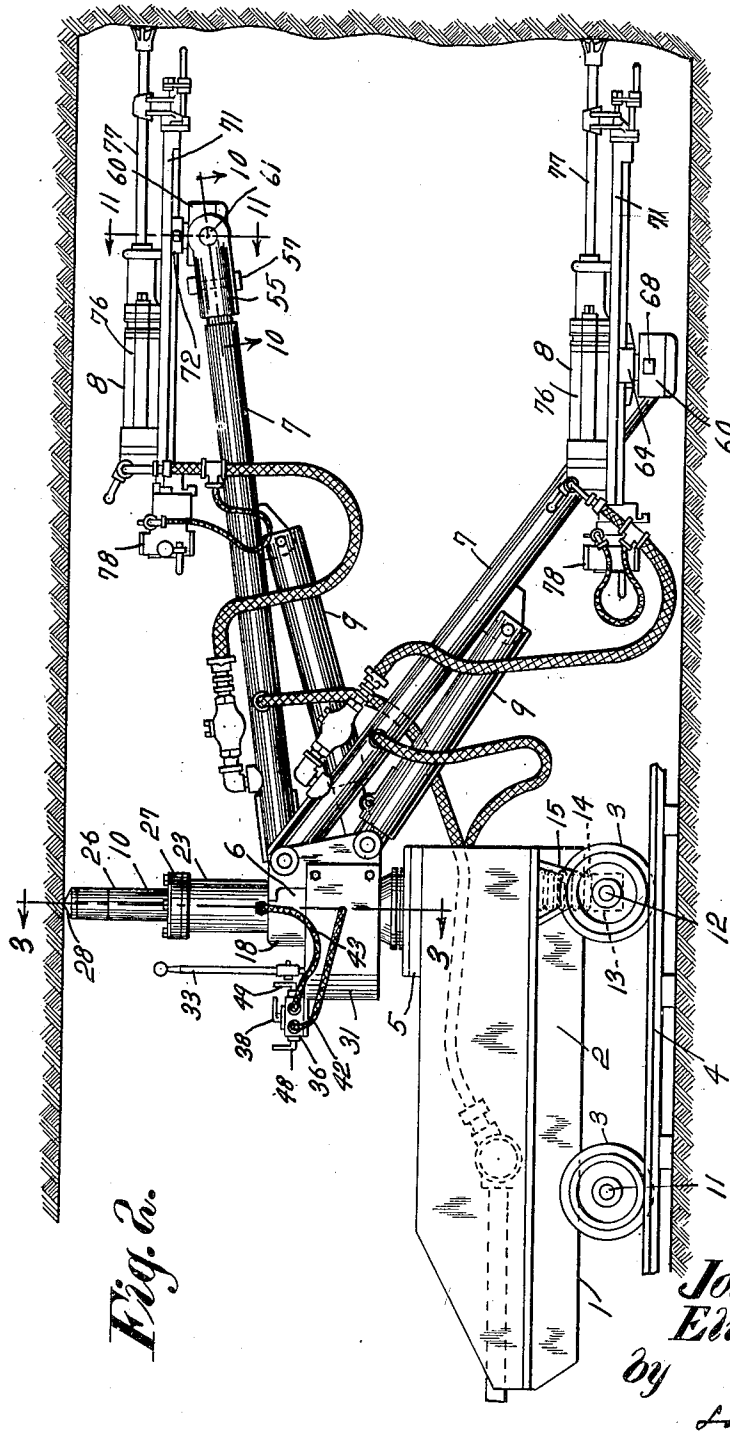

Fig. 2.

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DRILLING APPARATUS

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Fig. 3.

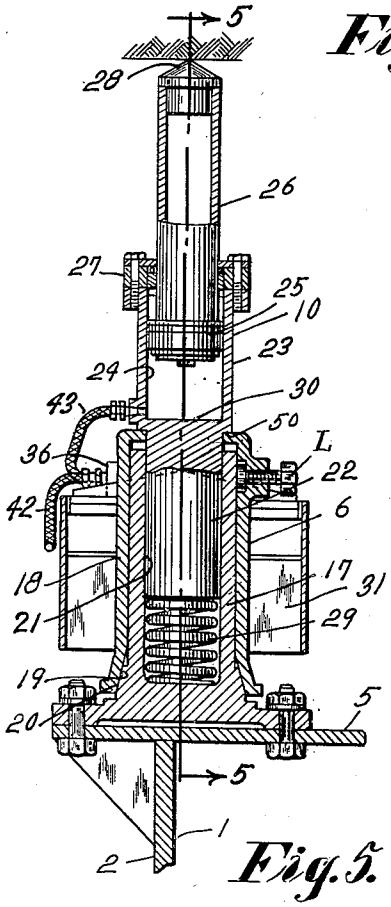


Fig. 4.

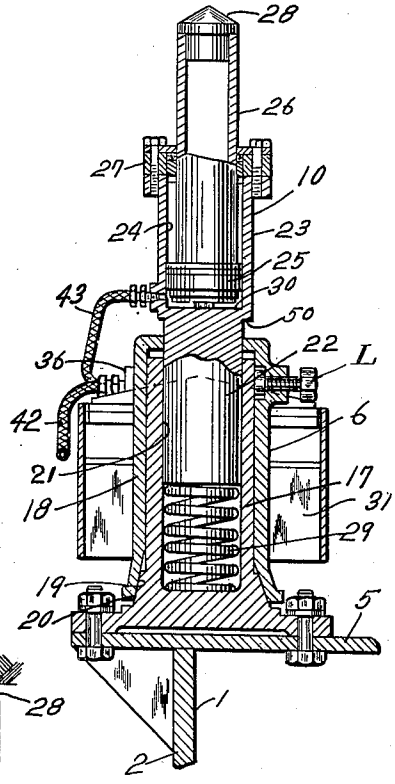
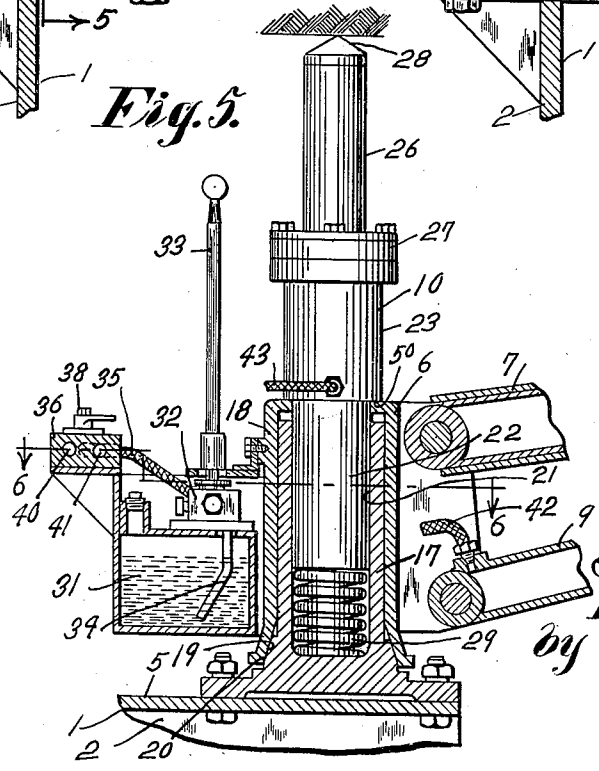


Fig. 5.



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DRILLING APPARATUS

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Fig. 6.

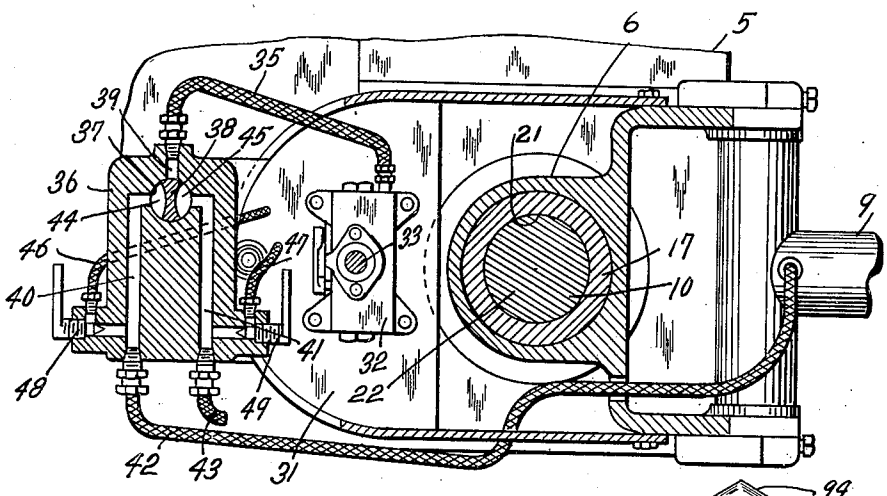


Fig. 8.

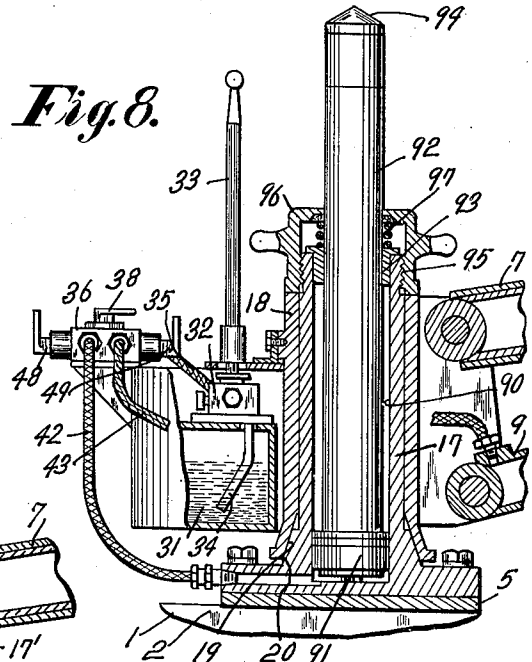
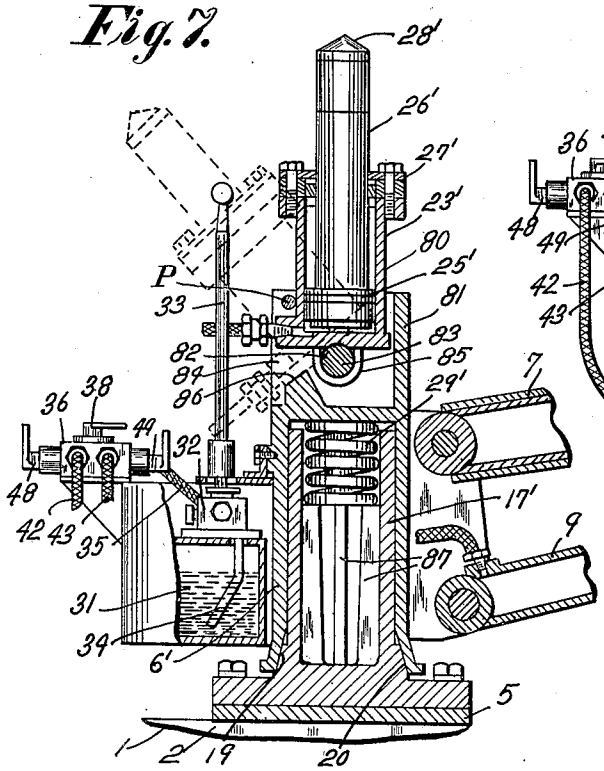


Fig. 7.



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DRILLING APPARATUS

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Fig. 9.

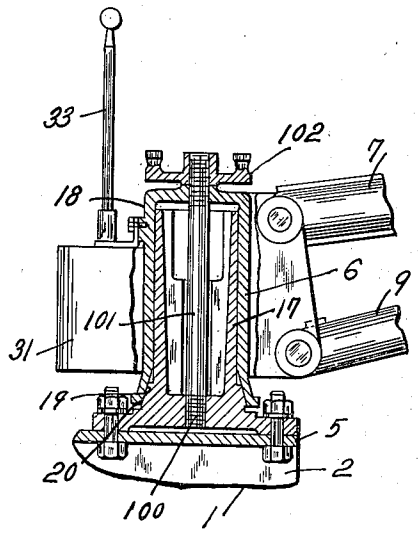


Fig. 10.

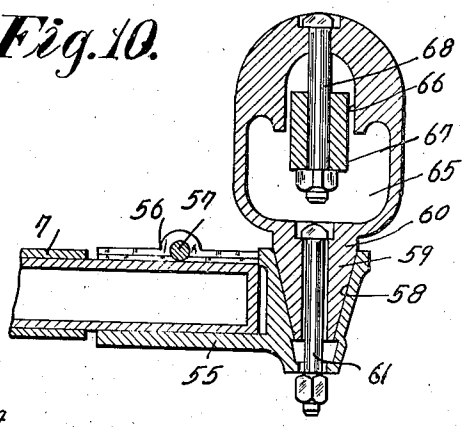
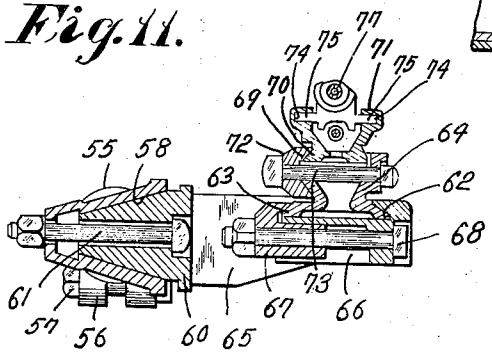


Fig. 11.



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Patented Mar. 21, 1950

2,500,932

UNITED STATES PATENT OFFICE

2,500,932

DRILLING APPARATUS

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Application December 1, 1944, Serial No. 566,056

22 Claims. (Cl. 255—51)

1

This invention relates to drilling apparatus and more particularly to improvements in a portable supporting apparatus of the character known as a rock drill "jumbo," especially designed for use in tunnel work.

In a drill supporting apparatus of the character known as a rock drill "jumbo" for use in tunnel work, it is desirable to provide adjustable supports for the rock drills whereby the latter may be adjusted into any desired drilling position with respect to the tunnel face. It is also desirable that the apparatus be readily portable and be firmly held in drill supporting position with respect to the tunnel roof and floor during the drilling operation. Further, the elements of the adjusting mechanism must be readily and expeditiously movable into their different adjusted positions and must be firmly locked in drill supporting position.

It is an object of the present invention to provide an improved drilling apparatus which embodies these several desirable features above outlined. It is a further object to provide an improved drill supporting apparatus of the character known as a rock drill "jumbo" which is readily portable and which may be firmly secured in drill supporting position. Yet another object is to provide an improved roof jack device for holding the apparatus firmly in drill supporting position between the tunnel roof and floor. Still another object is to provide an improved rock drill "jumbo" having a drill supporting boom swingable horizontally about an upright axis with respect to the portable base and having an improved roof jack device arranged in an improved manner with respect to the boom swivel. A still further object is to provide an improved roof jack device which may be so controlled as to permit swinging of the boom frame on its swivel mounting, while the apparatus remains firmly held by the jack device in drill supporting position. Another object is to provide an improved fluid operated jack device and improved fluid operated boom tilting means wherein a substantially greater pressure may be transmitted to the roof jack device than to the boom tilting means, and embodying means for partially venting the roof jack device, while still maintaining its jack function effective, to enable horizontal boom swing without affecting the operation of the boom tilting

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means. A still further object is to provide improved means for locking the boom against horizontal swinging movement about its swivel. A still further object is to provide an improved swivelled drill mounting at the outer extremity of the boom whereby a rock drill supported thereby may be adjusted into various positions with respect to the boom. These and other objects and advantages of the invention will, however, hereinafter more fully appear in the course of the following description and as more particularly pointed out in the appended claims.

The present application is directed to improvements over a copending Curtis application Ser. No. 563,579, filed November 15, 1944, owned by applicants' assignee.

In the accompanying drawings there are shown for purposes of illustration one form and several modifications which the invention may assume in practice.

In these drawings.

Fig. 1 is a plan view of a drilling apparatus constructed in accordance with an illustrative embodiment of the invention.

Fig. 2 is a side elevational view of the drilling apparatus shown in Fig. 1.

Fig. 3 is an enlarged vertical sectional view taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a sectional view similar to Fig. 3, showing parts in different positions.

Fig. 5 is a vertical sectional view taken substantially on line 5—5 of Fig. 3.

Fig. 6 is an enlarged horizontal sectional view taken substantially on line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 5 showing a modified form of construction.

Fig. 8 is similar to Fig. 7, showing another modification.

Fig. 9 is a vertical sectional view similar to Figs. 7 and 8, showing still another modification.

Fig. 10 is an enlarged detailed sectional view taken on line 10 of Fig. 2.

Fig. 11 is a detail sectional view taken on line 11 of Fig. 2.

In the illustrative constructions there is shown a drilling apparatus of a character known as the rock drill "jumbo," especially designed for use in tunnel work for supporting rock drills in various drilling positions with respect to the tunnel face. Evidently, various features of the in-

vention may be embodied in apparatus of other types.

The improved drilling apparatus or so-called rock drill "jumbo" includes a portable base 1 comprising a truck frame 2 mounted on wheels 3 adapted to travel along a trackway 4 laid on the tunnel floor. The "jumbo" disclosed herein is of a twin or dual drill type, although if desired but a single or more than two drills may be used. Carried by the truck frame above the front wheels is a horizontal plate 5 on the opposite sides of which are mounted a pair of swivel frames or turntables 6, which herein constitute drill support members and which are turnable about upright axes spaced equidistantly from the longitudinal vertical center of the base. Pivotally mounted on these swivel frames or turntables to swing in a vertical direction relative thereto are elongated supports or boom frames 7, 7 respectively, in turn having swivelly mounted thereon at their outer ends rock drills 8 of the conventional mounted drifter type. A fluid operated jack 9 extends between each swivel frame and boom frame and is pivotally connected to each of the same. By adjusting the boom frames horizontally and vertically about their pivots relative to the truck frame, and by adjusting the rock drills on their swivel mountings with respect to the boom frames, the rock drills may be located at any desired drilling position with respect to the tunnel face. Arranged coaxially with the upright swivels for the boom frames are improved jack devices 10, 10 engageable with the tunnel roof for jacking the apparatus in a stationary position on the trackway.

As described in a copending application to John C. Curtis, Ser. No. 563,579, filed Nov. 15, 1944, the truck frame has secured thereto a stationary rear axle 11 for the rear truck wheels and a front axle 12 for the front truck wheels, the front axle being mounted in upright guides 13 secured to the truck frame. Arranged between the truck frame and the front axle 12 are coil springs 14 to provide a yieldable front axle mounting for the truck. Secured to the truck frame are brake shoes 15 engageable with the treads of the front truck wheels. When the roof jack devices 10 are operated and a suitable downward pressure is applied to the truck frame, the latter is swung downwardly about the rear wheel axes, thereby compressing the springs 14 of the front axle mounting to bring the brake shoes 15 into braking contact with the treads of the front wheels and to force the latter into firm contact with the track rails to hold the truck in a stationary position on the trackway. Since this brake mechanism is fully described in the copending Curtis application above referred to, further disclosure thereof is herein unnecessary.

Now referring to the improved roof jack devices 10, as most clearly shown in Figs. 3 to 6 inclusive, it will be noted that the horizontal plate 5 has attached thereto a pair of hollow pedestals 17, and the swivel frames or drill support members 6 have cylindrical bearing portions 18 surrounding and journaled on these pedestals. The swivel frames also have limited movement longitudinally of the pedestals so that a conical surface 19 on each swivel frame may frictionally engage a tapered surface 20 on the base of each pedestal for locking the swivel frames against rotation. Slidably guided in the bore 21 of each pedestal is a cylindrical lower portion 22 of an upright jack cylinder 23. Reciprocable in the bore 24 of the jack cylinder

is a piston 25 having its piston rod 26 extending upwardly through the packed top head 27 of the cylinder. The piston rod at its upper end has a point 28 engageable with the tunnel roof or other extraneous abutment. These points will be made of different lengths and interchanged as different roof heights make it necessary. Interposed between the bottom wall of each pedestal bore and the lower surface of the portion 22 of the jack cylinder is a heavy coil spring 29 which, when compressed upon the admission of fluid under pressure to the cylinder 23, constantly urges the jack cylinder in an upward direction so that, when, after the cylinder 23 has been filled with liquid and the spring compressed, a little fluid is allowed to escape, the spring will yieldingly maintain the point 28 against the tunnel roof, though the cylinder again moves upward a short distance to release the clamping between the surfaces 19, 20. A manually controlled clamping screw L may be used to hold the booms against undesired swinging when the jacks are not in use.

Carried by each swivelled boom supporting frame 6 is a liquid reservoir 31 and a hand pump 32 operated by a hand lever 33. The pump intake is connected by a pipe 34 to the reservoir, and the pump discharge is connected by a pipe 35 to a valve box 36 supported by the casing of the reservoir. This valve box, as clearly shown in Fig. 6, has a vertical bore 37 containing a rotary control valve 38 provided with a suitable operating handle, and a passage 39 connects the pipe 35 with the valve-receiving bore 37. Passages 40 and 41 in the valve box connect the valve-receiving bore 37 with flexible pipes 42 and 43, respectively, leading to the rear end of the boom tilt jack 9 and to the lower end of the jack cylinder 23. The valve 38 is cut away at 44 and 45 at its opposite sides, and, when the valve is turned in one direction or the other, liquid under pressure may be supplied from the pump either to the boom tilt jack 9 or the roof jack cylinder 23. The passages 40 and 41 are respectively connected by pipes 46 and 47, under the control of hand valves 48 and 49, back to the reservoir so that liquid may be discharged at a controlled rate from the jack devices 9 and 10. The valves 48 and 49 may be closed and then the valve 38 may be positioned to trap the liquid in the jack devices 9 and 10 to lock the same in adjusted position. When the valves 38 are turned to connect the passages 41 with the pump discharge pipes 35, liquid under pressure may be pumped into the roof jack cylinders 23 to bring the piston rod points 28 into engagement with the tunnel roof, and upon continued flow of liquid to the roof jack cylinders, the latter move downwardly relative to the pedestals until shoulders 50 thereon engage the tops of the swivel boom frames, forcing the latter downwardly with respect to the pedestals to bring the surfaces 19 and 20 into locking engagement, and to swing the truck frame 2 downwardly to apply the brakes and to clamp the front wheels into tight engagement with the trackway. The valves 38 may then be turned to cut off the passages 41 from the passages 39 to trap the liquid in the roof jack cylinders beneath the pistons. The valve 38 for each boom may then be turned into a position to connect the discharge pipe 35 with the passage 40 so that liquid under pressure can be supplied through pipe 42 to the boom tilt jack 9 to lift the boom, and thereafter the valve 38 may be turned into closed position to trap the

liquid in the boom lift jack to lock the boom in in adjusted position.

When it is desired to swing each boom frame horizontally with respect to its pedestal, the hand valve 49 may be adjusted to discharge a small quantity of liquid from the roof jack cylinder 23 back to the reservoir 31, and, as the liquid is vented back to the reservoir, the coil spring 29 lifts the cylinder 23 and operates through the liquid remaining in the latter to hold the rod point 28 in firm engagement with the tunnel roof. The pressure on the swivel boom frame is, however, relieved sufficiently to loosen the friction lock at 19, 20 to permit turning of the swivel boom frame relative to the pedestal without releasing the front wheel brakes. After horizontal adjustment of the boom frames has been made, the valve 49 or valves 49 may be reclosed and by shifting the valve 38 the cylinders 23 may be forced downward again and lock the parts firmly in position. By manipulating the hand valves 48, liquid may be discharged from the boom lift jacks 9 back to the reservoir to effect lowering of the booms. Under the control of the valve 38 a substantially higher pressure may be transmitted to the roof jacks than to the boom tilt jacks, in an obvious manner.

As shown in Figs. 10 and 11, the improved swivel mountings for the rock drills at the outer ends of the boom frames each comprise a rotatable support 55 mounted on the outer end of the boom frame to turn about the longitudinal axis of the boom frame, and this support is held in adjusted position by a split clamp 56 having an adjusting bolt 57. Formed in the rotatable support 55 in advance of the boom frame is a transverse conical socket 58 receiving the tapered portion 59 of a lateral arm 60 extending at right angles to the boom frame. An adjusting device in the form of a bolt 61 is provided for securing the tapered portion 59 tightly within the socket, and, when the bolt is released, the lateral arm 60 may be turned relative to the support 55 about an axis at right angles to the longitudinal axis of the boom frame. Formed in the arm 60 is a socket 62 (Fig. 11) for receiving a circular swivel plate 63 on a support 64. The arm 60 has an opening 65, and the arm beneath the socket has a guideway 66, and held against rotation therein is a clamp 67 for engaging the swivel plate 63. When this clamp is tightened by its adjusting bolt 68, the swivel plate is secured in its adjusted position with respect to the arm 60. When released, the swivel plate may be turned relative to the arm 60 about an axis generally at right angles to both the arm axis and the longitudinal axis of the boom frame. The support 64 has guideways 69 for slidingly receiving lateral guide flanges 70 of a guide shell 71. The guide shell may be slid longitudinally in the guideways of the support 64, and a clamp 72 adjusted by a bolt 73 may be tightened to clamp the guide shell in adjusted position. The guide shell has longitudinal guideways 74 for slidingly receiving guides 75 on the rock drill. Each rock drill has a usual hammer motor 76 for percussively actuating a usual drill steel 77 and each rock drill has a feed motor 78 for operating the feeding means for feeding the rock drill relative to the guide shell. The rock drills are of a well-known design and other types of rock drills and other drilling tools may be supported by the boom frames if desired. The rock drills and the fluid supply connections for the hammer motors and the feeding motors are fully described in the co-

pending Curtis application above referred to and do not per se enter into the present invention.

In Figs. 7, 8 and 9, several modifications for the swivel mountings at the rear ends of the boom frames are disclosed. Fig. 7 shows a roof jack device 80 which is generally similar to the roof jack devices 10. In Fig. 7, a swivelled boom supporting frame 6' is supported on a pedestal 17' to turn about an upright axis and the boom frame 7 is pivotally mounted in the swivelled frame 6' to swing in a vertical direction with respect thereto in the manner of the embodiment above described. The swiveled boom frame, in this instance, has an upstanding hollow portion 81 on which a jack cylinder 23' is pivotally mounted at 82 on a transverse pivot member 83 secured within the walls of the hollow portion 81. One side of the hollow portion 81 is cut away at 84 so that when a positioning pin P is removed, the jack device may be swung downwardly against a stop 86 into the dotted line position shown in Fig. 7 to reduce the overall height of the apparatus. Reciprocable in the cylinder 23' is a piston 25' having its piston rod 26' extending upwardly through the top packed cylinder head 27', and the upper end of the piston rod terminates in a point 28' engageable with the tunnel roof or other extraneous abutment. A heavy coil spring 29' is arranged within the hollow pedestal and engages the top of the swiveled boom frame for urging the latter in an upward direction. The lower end of the spring rests on ribs 87 reinforcing the pedestal, in the manner shown. When liquid under pressure is supplied to the lower end of the jack cylinder, the piston is moved upwardly to bring the piston rod point into contact with the tunnel roof, and, upon continued flow of liquid under pressure to the jack cylinder, the swivel frame is moved downwardly to bring the locking surfaces 19, 20 into locking engagement to hold the swivel frame against turning. Liquid may be discharged from the jack cylinder to release the locking engagement of the surfaces 19 and 20, while the piston rod point is maintained in engagement with the tunnel roof by the coiled spring 29', and the swiveled boom frame may then be turned on its pedestal. Thus without releasing the roof jacks the boom frames may be swung horizontally, and thereafter liquid under pressure may be supplied to the jack cylinders to again lock the swivel boom frames in adjusted position. In Fig. 8, the swivel boom frame and pedestal structure are substantially the same as those shown in Fig. 5, but, in this instance, the coil spring for urging the piston rod point into engagement with the tunnel roof is omitted. Formed in each pedestal is a cylinder bore 90 containing a piston 91 having its piston rod 92 extending upwardly through the top cylinder head 93. The upper end of the piston rod terminates in a point 94 engageable with the tunnel roof or other extraneous abutment. Threaded at 95 at the upper end of the pedestal and surrounding the piston rod is a hand nut 96 engaging the top surface of the swiveled boom frame, and interposed between this nut and the top cylinder head is a coil spring 97 for holding the cylinder head in position. When the hand nut is turned in the proper direction, the swiveled boom frame may be forced downwardly to bring the locking surface 19, 20 into locking engagement to hold the boom frame in adjusted position, and, when the hand nut is loosened, the lock 19, 20 is released to permit horizontal swinging of the boom frame. Otherwise, this embodiment is similar to those above described. In Fig. 9, the

swiveled boom frame and pedestal structure are similar to those shown in Fig. 8, with the exception that the roof jack is omitted. In this construction threadedly secured at 100 to the lower portion of the pedestal and arranged centrally within the pedestal is a screw shaft 101 on the upper end of which is threaded a hand nut 102. This hand nut engages the top surface of the swivel boom frame, and, when the nut is turned in the proper direction, the boom frame is moved downwardly on the pedestal to force the locking surfaces 19, 20 into frictional locking engagement to lock the boom frame against rotation.

The general mode of operation of the improved drilling apparatus is as follows. The apparatus may be moved along the trackway in any suitable manner. When located at the tunnel face, the operator may then oscillate the hand lever 33 of the pump 32 for each boom frame to force liquid under pressure from the reservoir through pipe 35 past the valve 38 and through passage 41 and pipe 43 to the lower end of the cylinder 23 of the jack device 10 to move the piston 25 upwardly, thereby raising the point 28 into contact with the tunnel roof. As the piston rod points are forced into contact with the roof, the cylinders 22 are moved downwardly to bring the shoulders 50 against the tops of the swivel boom frames 6, thereby moving the latter downwardly to bring the surfaces 19 and 20 into locking engagement to lock the boom frames against horizontal swinging movement, and, at the same time, swinging the truck frame downwardly to compress the front axle springs to bring the brake shoes 15 into engagement with the front wheel treads to brake the wheels and to hold rigidly the wheels in engagement with the trackway. The strength of the springs 29 and 29' will be made great enough so that they are abundantly capable of exerting enough pressure, after compression by the action of the liquid admitted to the jack cylinders, to maintain entirely adequate jacking even when liquid is bled off to free the boom for horizontal swinging. The liquid may be trapped in the jack cylinders 23 to hold the jack devices in this position. Liquid under pressure may then be pumped through pipe 42 to the lower end of each boom tilt jack 9 to effect raising of the boom frames. The boom frames may be lowered by discharging liquid under the control of the hand valves 48 from the boom tilt jacks 9 back to the reservoir. By discharging a portion of the liquid from the jack cylinders beneath the pistons, the locks 19, 20 for the swiveled boom frames may be released, while the piston rod points 28 are maintained in engagement with the tunnel roof by the coil springs 29 acting through the remaining liquid, thereby enabling horizontal swinging of the boom frames without releasing the jack devices and the wheel brakes. By adjusting the several clamps, the drill guide shells 71 may be adjusted into the desired position at the outer ends of the boom frames, and, by tightening these clamps, the guide shells may be rigidly held in position. By loosening the clamps 56, 57 for the rotatable supports 55, the rock drills may be adjusted relative to the boom frames about the longitudinal axes of the booms, and, by loosening the clamps 67, 68, the drills may be swung about axes at right angles to the longitudinal axes of the booms. By releasing the clamp bolts 61, the drill supporting arms 60 may be turned in their sockets with respect to the supports 55 about axes at right angles to the longitudinal axes of the boom frames. When the jacks are not in use, the locks or clamps L can be used to prevent undesired lateral boom swinging. In the modification shown in Fig. 7, when liquid under pressure is supplied to the lower end of the jack cylinder, the piston rod point 28' may be forced into contact with the tunnel roof, and, upon continued liquid flow, the swiveled boom frame 6' may be forced downwardly to bring the surfaces 19, 20 into locking engagement, and, when liquid is discharged from the lower end of the jack cylinder, the boom frame lock 19, 20 is released while the jack is held in engagement with the tunnel roof by the coil spring 29'. By withdrawing the pin P, the jack device may be swung downwardly into the dotted line position shown in Fig. 7 to reduce the overall height of the apparatus. In the modification shown in Fig. 8, when liquid under pressure is supplied to the lower end of the cylinder bore 90, the piston 91 is moved upwardly to bring the piston rod point 94 into engagement with the tunnel roof and the truck frame is moved downwardly to apply the brakes to the front wheels and to clamp the latter rigidly in contact with the track rails. The swiveled boom frame may be locked against rotation by tightening the hand nut 96 to bring the surfaces 19, 20 into frictional locking engagement, and these locking surfaces may be readily released by the hand nut. In the modification shown in Fig. 9, the locks 19 and 20 for the swiveled boom frames are operated by the hand nut 102 threaded on the screw shaft 101 arranged centrally within the pedestal. The jack devices coaxial with the pedestals are, as above mentioned, omitted in this form.

As a result of this invention, an improved drilling apparatus of the character known as a rock drill "jumbo," especially designed for use in tunnel work is provided wherein the apparatus may be rigidly held in position between the tunnel roof and floor during the drilling operation, and the same may be readily moved from place to place when desired. By the provision of the improved roof jack device coaxial with the vertical swivel axes for the boom frames, the holding of the apparatus in drill supporting position is substantially improved. The improved roof jack devices may be readily partially vented to permit swinging of the boom frames about their vertical swivel axes while engagement of the jack devices with the tunnel roof, braking of the wheels and clamping of the wheels against the track rails are maintained. The novel locks for the boom frames enable firm holding of the booms in their adjusted positions and the locks may be quickly released when desired. By the provision of the horizontally and vertically swingable boom frames and the improved swivel mountings at the outer extremities of the boom frames, the rock drills may be adjusted into any desired position with respect to the face of the tunnel. These and other uses and advantages of the improved drilling apparatus will be clearly apparent to those skilled in the art.

While there are in this application specifically described one embodiment and several modifications which the invention may assume in practice, it will be understood that this embodiment and these modifications of the same are shown for purposes of illustration, and that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What we claim as new and desire to secure by Letters Patent is:

1. In a drilling apparatus, a base, a drill sup-

port swiveled on said base to turn about an upright axis, a wedge lock for said support frictionally to hold the latter against turning movement with a wedging action, said lock comprising cooperating frusto-conical wedging surfaces on said base and said support respectively and having relative movement, and a roof jack device coaxial with the swivel of said support for effecting relative movement of said wedging surfaces to bring the latter into frictional locking engagement thereby to apply said wedge lock.

2. In a drilling apparatus, a support swivelled to turn about an upright axis, a boom frame pivotally mounted on said support to swing in a vertical direction with respect thereto and adapted to carry a drill at its outer extremity, a power operated jack device coaxial with the swivel of said support and engageable with an extraneous abutment for holding said support and boom frame in operative drill supporting position, means for supplying operating medium to said jack device to effect engagement thereof with an extraneous abutment, and means associated with said jack device for maintaining the same firmly against the extraneous abutment when the supply of operating medium to said device is at least partially interrupted or discontinued.

3. In a drilling apparatus, a portable base, a drill support swiveled thereon to swing relative thereto about an upright axis, a lock for said support for holding the latter against turning movement relative to said base, a roof jack device for operating said lock, and means associated with said jack device for maintaining engagement thereof with the roof even when said device is operated at least partially to release said lock.

4. In a drilling apparatus, a portable base, a drill support swiveled thereon to swing relative thereto about an upright axis, a lock for said support for holding the latter against swinging movement, a roof jack device for operating said lock, and means associated with said jack device for maintaining engagement thereof with the roof even when said device is operated at least partially to release said lock, said last mentioned means including a coiled spring constantly acting to urge the roof engaging element of said jack device into engagement with the roof.

5. In a drilling apparatus, a base, a drill support swiveled on said base to turn about a vertical axis, a wedge lock for said support for frictionally locking the latter against turning movement on its swivel relative to said base, and including cooperating relatively movable frusto-conical wedging surfaces on said base and said support respectively and movable into engagement to effect locking of said support with a wedging action, and a roof jack device relative to which said support is turnable for effecting relative movement of said wedging surfaces to bring the latter into frictional locking engagement thereby to apply said lock.

6. In a drilling apparatus, a base, a drill support swiveled thereon to turn about a vertical axis, said support having limited movement in a vertical direction, a lock for said support operated by vertical movement of the latter, a roof jack device for moving said support to effect operation of said lock, and means for operating said roof jack device to release said lock while engagement of said jack device with the roof is maintained.

7. In a drilling apparatus, a base, a pedestal thereon, a drill support swiveled on said pedestal to turn in a horizontal direction and having limited movement longitudinally of said pedestal, said pedestal having a bore providing a fluid cylinder and a roof jack piston reciprocable in said pedestal bore, and a lock for holding said support against turning movement relative to said pedestal and operated by such longitudinal movement of said support.

8. In a drilling apparatus, a base, a pedestal thereon, a drill support swiveled on said pedestal for horizontal turning movement, a lock for said drill support, a roof jack device coaxial with said pedestal, and means coaxial with said jack device and movable axially relative thereto for operating said lock.

9. In a drilling apparatus, a base, a drill support swiveled thereon to turn about a vertical axis, a lock for said support, a roof jack device coaxial with the swivel of said support for effecting operation of said lock, and a spring for urging said jack device upwardly so that when said jack device is operated to release said lock its engagement with the roof is yieldingly maintained.

10. In a drilling apparatus, a support having a pedestal thereon, a boom frame swivelly mounted on said pedestal and having limited movement longitudinally of said pedestal, and means for locking said frame to said pedestal including cooperating locking surfaces on said frame and said pedestal, and adjusting means engaging said frame and said pedestal for moving said frame longitudinally of said pedestal to bring said surfaces into locking contact, said adjusting means including a screw shaft arranged centrally on said pedestal and a hand nut threaded on said shaft and engaging said frame.

11. In a drilling apparatus, a base, a support swiveled on said base to turn about an upright axis, an elongated boom frame pivotally mounted on said support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, a wedge lock for frictionally holding said support against turning movement on its swivel including cooperatively relatively movable frusto-conical wedging surfaces on said base and said support respectively for locking said support with a wedging action, and a jack device coaxial with the swivel of said support for holding said base in a stationary position during the drilling operation and for effecting relative movement of said wedging surfaces to bring the latter into frictional locking engagement thereby to apply said lock.

12. In a drilling apparatus, a base, a support swivelled on said base to turn about an upright axis, a boom frame pivotally mounted on said swivelled support to swing in a vertical direction relative thereto and adapted to carry a drill at its outer extremity, fluid operated means for swinging said boom frame about its pivot, a fluid reservoir on said swivelled support at the side of its swivel opposite from said boom frame, and a fluid pump carried by said swivelled support and having communication with said reservoir for supplying fluid under pressure to said fluid operated means.

13. In a drilling apparatus, a base, a support swivelled on said base to turn about an upright axis, a boom frame pivotally mounted on said swivelled support to swing in a vertical direction relative thereto and adapted to carry a drill at its outer extremity, a fluid operated jack for securing the base in a stationary position, fluid operated means for swinging said boom frame about its pivot, a fluid reservoir on said swivelled

support, and a fluid pump carried by said swivelled support and having communication with said reservoir for supplying liquid under pressure to said jack and said fluid operated means.

14. In a drilling apparatus, a base, a support swivelled on said base to turn relative thereto about an upright axis, a boom frame pivotally mounted on said swivelled support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, means for swinging said boom frame about its pivot, a fluid operated jack on said base and engageable with an abutment extraneous to the apparatus for holding said base steady during the drilling operation, a fluid reservoir on said swivelled support, and a fluid pump carried by said swivelled support and having communication with said reservoir and said jack for supplying fluid under pressure to said jack.

15. In a drilling apparatus, a base, a support swivelled on said base to turn about an upright axis and adapted to carry a drill, a lock for securing said support against turning movement relative to said base, a power operated jack device engageable with an extraneous abutment for holding said base in a stationary position during the drilling operation and for applying said lock, means for supplying operating medium to said jack device to effect engagement thereof with an extraneous abutment and to effect application of said lock and for discharging operating medium from said jack device to release said lock, and means associated with said jack device for maintaining the same firmly against the extraneous abutment when the operating medium is dicharged as aforesaid and said lock is released.

16. In a drilling apparatus, a base, a support swivelled on said base to turn relative thereto about an upright axis, a boom frame pivotally mounted on said swivelled support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, a fluid operated jack on said base and engageable with an abutment extraneous to the apparatus for holding said base steady during the drilling operation, a source of pressure fluid carried by said swivelled support, passage means for conducting pressure fluid from said source to said jack, and control valve means for controlling fluid flow through said passage means to said jack and positionable to interrupt such fluid flow and to trap fluid in said jack.

17. In a drilling apparatus, a base, a drill support swivelled thereon to swing relative thereto about an upright axis, a lock for securing said support against turning movement relative to said base, a roof jack device for holding said base in a stationary position and for operating said lock, and means associated with said jack for maintaining engagement thereof with the roof even when said device is operated at least partially to release said lock, said last mentioned means including resilient means constantly acting to maintain said jack device in engagement with the roof when said jack device is partially released as aforesaid.

18. In a drilling apparatus, a base having a bearing support, a boom frame swivelly mounted on said bearing support and having limited movement longitudinally of said bearing support and means for locking said frame to said bearing support including cooperating locking elements on said frame and said base, and adjusting means engaging said frame and said bearing support for moving said frame longitudinally of said bearing support to bring said locking elements into locking engagement, said adjusting means including a screw and nut device arranged centrally of said bearing support.

19. In a drilling apparatus, a base, a support swiveled on said base to turn about an upright axis, a boom frame pivotally mounted on said swivelled support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, fluid operated locking means for said swiveled support for locking the latter against turning movement about its swivel axis relative to said base, fluid operated means for swinging said boom frame about its pivot, a source of fluid under pressure, passage means for conducting pressure fluid from said source to both of said fluid operated means, and valve means for controlling the supply of fluid under pressure through said passage means to said fluid operated locking means and said fluid operated swinging means to effect locking of said swiveled frame and swinging of said boom frame.

20. In a drilling apparatus, a base, a support swiveled on said base to turn about an upright axis, a boom frame pivotally mounted on said swiveled support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, fluid operated locking means for said swiveled support for locking the latter against turning movement about its swivel axis, fluid operated means for swinging said boom frame about its pivot, a fluid reservoir on said swiveled support, a fluid pump carried by said swiveled support and having communication with said reservoir and both of said fluid operated means, for providing a source of fluid under pressure, and valve means on said support for controlling the supply of fluid under pressure from said pump to said locking means and said swinging means to effect locking of said support and swinging of said boom frame.

21. In a drilling apparatus, a base, a support swiveled on said base to turn relative thereto about an upright axis, a boom frame pivotally mounted on said swiveled support to swing in a vertical direction relative thereto and having at its outer extremity a support for a drill, means for locking said swiveled support in any desired position relative to said base to hold said boom frame against lateral movement, fluid operated means for swinging said boom frame about its pivot, a source of fluid under pressure on said swiveled support, passage means for conducting pressure fluid from said source to said fluid operated means, and valve means on said support for controlling the supply of fluid under pressure through said passage means to said swinging means to effect swinging of said boom frame while said support is locked against turning.

22. In a drilling apparatus, a base, a support swiveled on said base to turn relative thereto about an upright axis, a boom frame pivotally mounted on said swiveled support to swing in a vertical direction relative thereto and adapted to carry a drill at its outer extremity, a fluid operated lock for holding said support against turning movement about its swivel axis, fluid operated means for swinging said boom frame about its pivot, a fluid operated roof jack for holding the apparatus stationary during the drilling operation, pumping means for providing fluid under pressure, and valve means for supplying fluid under pressure from said pumping means to said

locking means, said swinging means and said roof jack.

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