June 18, 1957 C. W. FITZGERALD 2,795,935

WALKING ROOF SUPPORT

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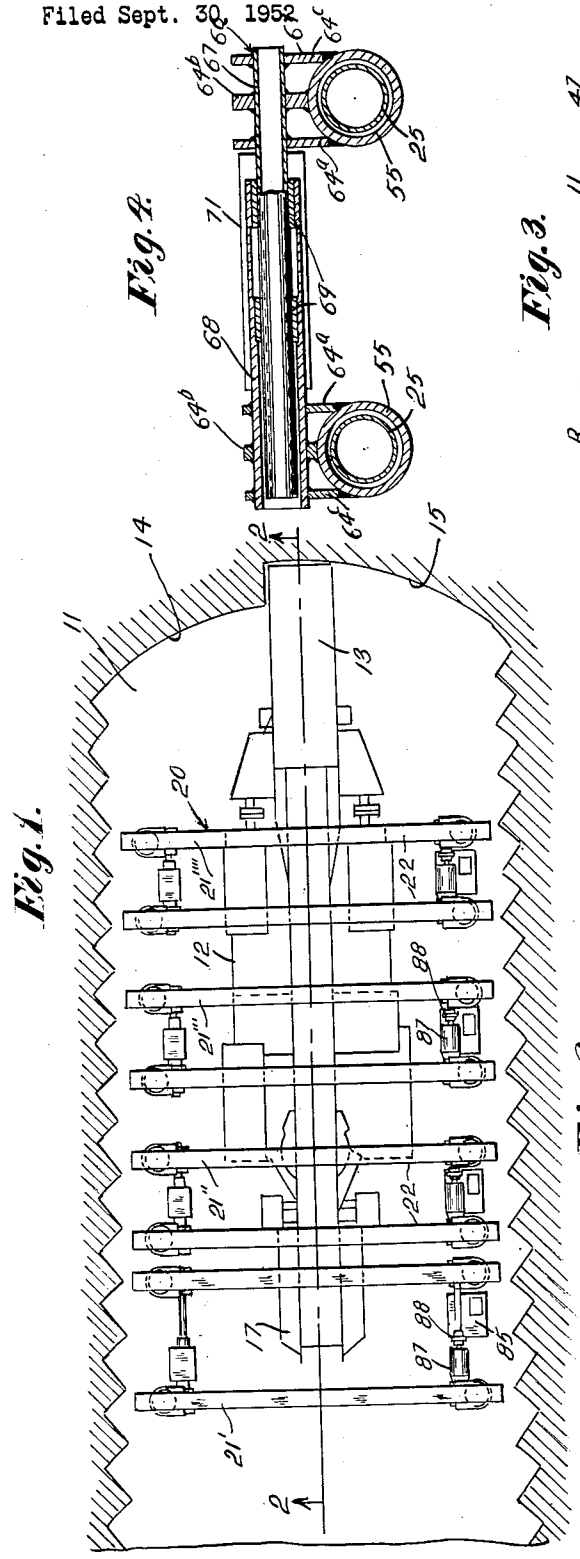


Fig. 1.

Fig. 4.

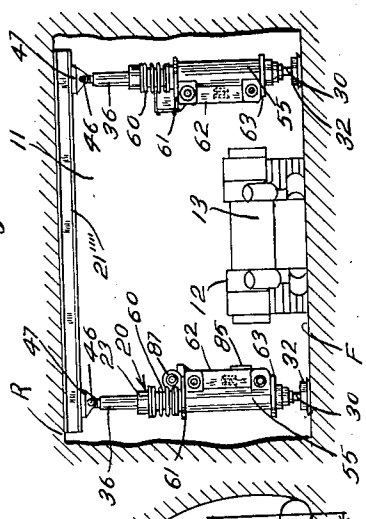


Fig. 3.

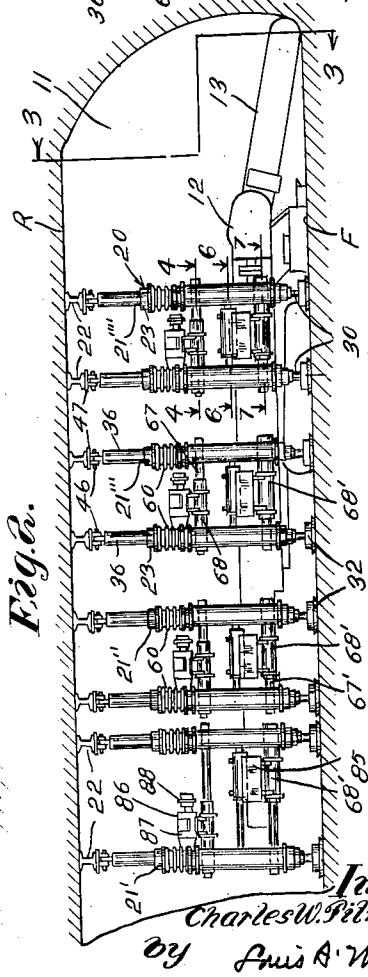


Fig. 2.

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Fig. 5.

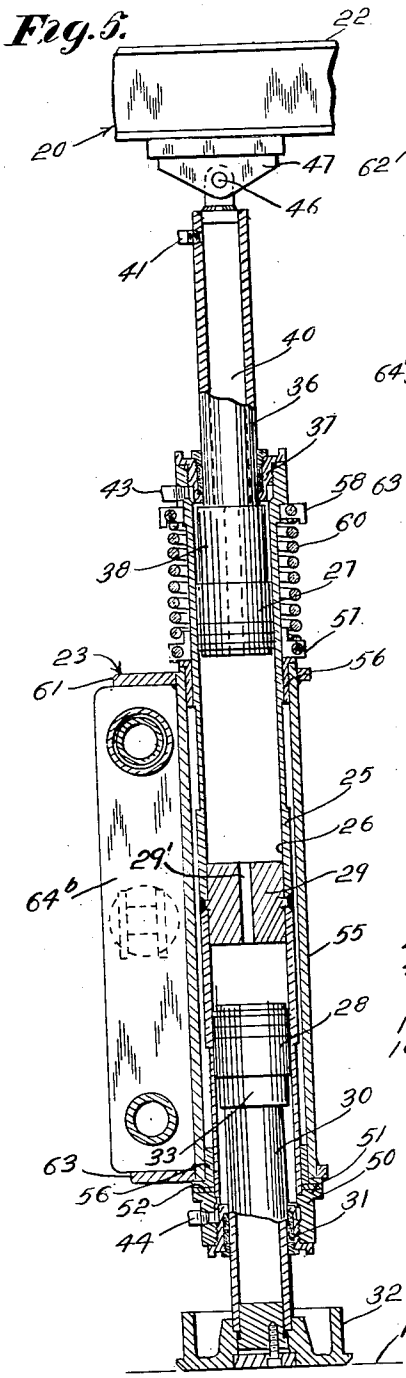


Fig. 6.

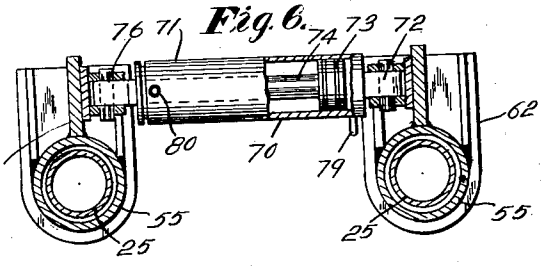


Fig. 7.

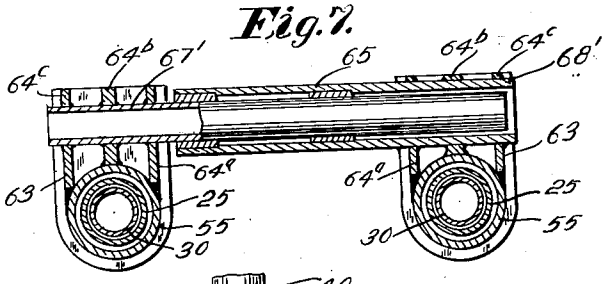


Fig. 8.

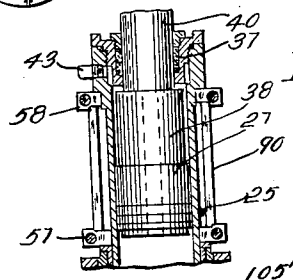
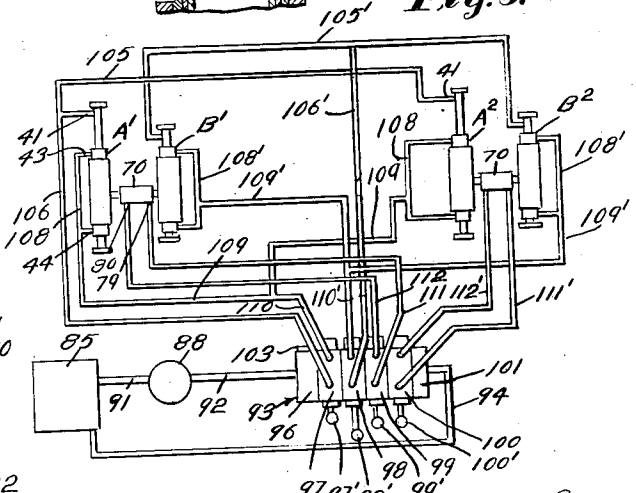


Fig. 9.



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United States Patent Office 2,795,935 Patented June 18, 1957

2,795,935

WALKING ROOF SUPPORT

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Application September 30, 1952, Serial No. 312,184

10 Claims. (Cl. 61—45)

My invention relates to apparatus for the control of mine roofs and the protection of mining machinery—particularly, but not exclusively, continuous miners—and the operators thereof.

In the use of mining machinery such as continuous miners, it is important to have as it were a walking cover for the mineral vein-attacking and disintegrating apparatus, and for the machine operator or operators. Continuous miners of a well-known construction, in a series of operations performed from a relatively stationary position in an entry for example, in a matter of a very few minutes extend the entry, for its full width and height, forwardly a foot and a half, or thereabouts, and in like further periods exend it successively like further distances. As the entries may be on the order of twelve to fourteen feet wide, it will be evident that in many coal seams it is essential to provide roof support for substantially the full width of the entries, and to do this by means which leave the spaces between the walking timbers (elongated roof-engaging and supporting elements) comparatively short. For example, the average distances between the elongated roof-engaging and supporting elements may desirably be perhaps on the order of 36" from the center line to center line, and the advance in steps corresponding to the advance of the face between each shifting (advance) of the "miner" as a whole.

A desirable arrangement for entry work will consist of a number of units, each comprising two roof-engaging support elements in the form of I-beams or other suitable structural shapes, each of which support elements has beneath it an extensible upright jack device at or near one of its ends, and another extensible jack device similarly positioned at or near its other end, the spacing of said jack devices being such as to permit the presence of a continuous miner—or other apparatus to be protected—between the jack devices at or near the opposite ends of each support element, and a certain amount of relative maneuvering to be accomplished. The jack devices at one end of each unit will desirably be connected for relative movement by a walking motor (a cylinder and piston mechanism) which will provide for alternate advance (or retraction) of the extensible upright jack devices with which it is operatively connected. A like arrangement will be provided at the other end of the roof-engaging support elements. In addition to the walking motors, desirably a pair of telescoping guide devices will be arranged between each pair of associated extensible upright jack devices, one above and one below each walking motor, and a reservoir for hydraulic fluid and a motor-driven pump may be arranged on the different guide devices at one end of the roof-engaging support elements, and control devices mounted upon one or both of the guide devices at the other end of the roof-engaging support devices. The walking motors and the guide devices will desirably be pivotally connected to each of the extensible upright jack devices between which they extend, by pivotal connections afforded by cylindrical sleeve members to which they are each rigidly connected by support elements which extend outwardly from the cylindrical sleeve members so that the axial lines of the walking motors and guide devices at each end of a unit lie in a vertical plane parallel to the axes of the extensible upright jack devices. The cylindrical sleeve members surround the upright jack devices.

The extensible upright jack devices desirably comprise cylinder members providing coaxial upright bore portions in which pistons—two for each cylinder member—are reciprocable. The pistons have piston rods, that associated with the upper piston extending through an upper cylinder head, and the other projecting through a lower cylinder head. Fluid may be admitted between the pistons, and also above the upper piston and below the lower piston. The upper piston rods support, and are desirably connected, by horizontal pivots which extend transversely to the length of the roof-engaging support element which they support, with the roof-engaging support element which they underlie, and the lower piston rods are secured to mine floor-engaging pads or feet of substantial area, and which are preferably flat, to aid the apparatus to stand upright. Desirably the cylinder members have shoulder-forming means near their lower ends to limit their upward movement relative to the cylindrical sleeve members which surround them (and, conversely, the downward movements of the cylindrical sleeve members relative to the cylinder members). At their upper ends the cylindrical sleeve members desirably have annular abutments resting upon them and surrounding the upper portions of the cylinder members. The cylinder members at points well above such abutments carry annular abutments facing the annular abutments first mentioned, and desirably a strong spring is confined between the annular abutments and presses the cylinder member to its extreme possible upper position relative to the surrounding cylindrical sleeve member. If desired, the spring may be omitted and a plurality of rigid spacer rods or a spacer sleeve may be put in its place, in which event the relative longitudinal positions of the cylinder member and the cylindrical sleeve member will be relatively fixed. Relative rotation between the cylindrical sleeve members and the cylinder members upon their common axes will be possible.

The travel of the pistons in their respective cylinder portions will desirably be such that the stroke of the lower pistons will be materially less than that of the upper one and overtravel of the pistons may be prevented by a ported septum in the cylinder bore or by engagement of abutment surfaces surrounding the rods with the cylinder heads or portions fixed relative to the latter.

An object of the invention is to provide an improved walking roof support. Another object is to provide an improved walking roof support particularly adapted to the protection of a continuous miner as the latter is operating. A further object is to provide improved roof supporting apparatus for protecting the relatively extended length of such a piece of equipment as a continuous miner. Still another object is to provide an improved roof-supporting jack. A further object is to provide an improved walking jack couple. Still a further object is to provide an improved arrangement including a pair of roof supporting beams and improved supporting and walking means thereof. A still further object is to provide an improved apparatus of the character described embodying an improved safety arrangement precluding injury to relatively rigidly connected parts when a hole in a mine floor is encountered. Yet another object is to provide an improved connecting, guiding, and pushing and pulling arrangement for the control of relative movement between a pair of extensible jack devices which act as a couple in the walking

operations of a multi-beam walking jack unit. Additional objects are to provide a walking jack system providing better stability, requiring no brakes to be employed in non-rectilinear advance, involving no dragging contact with a mine bottom during adjustment, and taking care of variations in height between floor and roof and unevennesses in either by the use of separate pistons controlling floor-engaging and roof-engaging elements. Other objects and advantages of the invention will hereinafter appear in the course of the ensuing specification and the appended claims.

In the accompanying drawings, in which one illustrative embodiment and a modification of the invention from its various aspects are disclosed:

Fig. 1 is a top view of a continuous miner, with a walking jack system constructed in accordance with the invention associated with it, the view being what would be seen if the roof were lifted off an entry.

Fig. 2 is a central longitudinal vertical section on a plane corresponding to the line 2—2 of Fig. 1, through a mine entry, with the apparatus therein shown in side elevation.

Fig. 3 is a transverse vertical section on the plane of the line 3—3 of Fig. 2.

Fig. 4 is a detail horizontal section on the plane of the line 4—4 of Fig. 2, showing a telescopic guide device.

Fig. 5 is a central longitudinal vertical section through an extensible and contractible upright roof supporting jack device.

Fig. 6 is a horizontal section on the plane of the line 6—6 of Fig. 2, showing a walking motor.

Fig. 7 is a horizontal section on the plane of the line 7—7 of Fig. 2, showing another telescopic guide device.

Fig. 8 is a fragmentary view, on the same section as Fig. 5, showing a modification.

Fig. 9 is a hydraulic diagram.

Referring to the drawings, and first to Fig. 1, there will be observed an entry 11 in which a continuous miner 12 is working. The vein-attacking and disintegrating mechanism 13 of the continuous miner is operating at the middle of the entry and is in the process of removing coal from the face 14 and in the production of a new face 15. The continuous miner is of considerable length, and its material-delivery end is shown at 17.

For the purpose of protecting the machine and the operator or other miners who may be with the machine while it is in operation, an improved roof supporting arrangement, generally designated 20 is provided. As illustrated, this consists of four different units, 21', 21'', 21''' and 21''''. Each of these units includes a pair of roof-engaging support elements 22 in the form as shown, of I-beams (see Fig. 2). The roof-engaging support elements 22 are comparatively long—considerably longer than the overall width of the continuous miner 12, so that there is substantial room at each side of the "miner" between the "miner" and the extensible upright jack devices 23 which support the roof-engaging support elements 22 near their opposite ends. Each roof-engaging support element 22 is supported near each of its opposite ends by an extensible upright jack device and there are connections between the extensible upright jack devices 23 at each end of each unit, so that the forward and rearward roof-engaging support elements 23 may be caused to undergo movements of separation and approach, whereby the unit may be walked forwardly as the miner advances, and may be retracted and, as will later appear, also caused to move straight ahead or backwards, or in non-rectiliner paths. Unit 21' shows the forward and rearward roof-engaging support elements 22 separated by a substantial distance. The other three units have their roof-engaging support elements relatively close to each other, that it, at substantially their minimum distance apart. There will be walking of the individual units ordinarily while the others remain in roof-supporting position, whereby a maximum support for the roof may be provided.

Fig. 2 shows the structure of Fig. 1 from the side, and Fig. 3 is a front end view, looking backwards in the entry away from the face, showing the amount of space provided around the continuous miner 12 when the latter has its disintegrating apparatus lowered.

Each extensible upright jack device 23 comprises a cylinder member 25 which has within it a bore 26 for the reception of pistons 27 and 28. The bore 26 is partially separated into two portions by a perforated septum 29 having a hole 29' through it which connects the two portions of the bore. The pistons 27 and 28 are suitably packed, and each has a piston rod extending from it. The piston rod 30 of the lower piston 28 extends through a suitable gland structure 31 at the lower end of the cylinder member 25 and the piston rod 30 is connected rigidly to a pad or foot 32 which is adapted to engage and rest upon the mine floor F. The piston rod 30 is comparatively large compared with the piston 28 and it has a still larger portion 33 which is adapted to cooperate with the lower cylinder head and to serve as a stop to outward piston rod movement. As a result of the construction, the area of the piston 28 upon which fluid can act to effect upward movement is much smaller than the top area of the piston 28, this being desirable and possible because the fluid acting upwardly on the piston 28 needs only to raise the pad or foot 32 from the mine floor, to facilitate movement of the upright jack device in a manner later to be described. The upper piston 27 has a piston rod 36 which extends through a suitable gland 37 at the top of the cylinder. The upper piston rod 36 has a somewhat larger portion 38 next to the piston 27, and the portion 38 provides a stop for limiting upward movement of the piston 27. The piston 27 and the piston rod 36 are traversed by a passage to which a common number 40 is given. This is for the purpose of permitting the supply of fluid from a conduit 41 opening into the passage 40 just below the upper end of the piston rod 36, into the space between the pistons 27 and 28. Fluid supply and venting connections 43 and 44 are provided respectively at the upper and lower ends of the cylinder member 25 for the control of fluid flow to the extreme upper end and to the extreme lower end of the cylinder member 25. It will be observed that supply of fluid to the conduit 41 will cause a forcing apart of the pistons 27 and 28 and the pressing of the pad 32 against the mine floor F, and of the roof-engaging support element 22 against the mine roof R. The piston rod 36 is connected by a pivot element 46 to a mounting 47 secured to the lower side of the roof-engaging support element 22. The pivot 46 extends transverse to the longitudinal direction of the element 22.

The cylinder member 25 has at its lower end and provided upon its lower head 50, a shoulder-forming means 51 which provides an annular abutment 52 which forms a lower support for a cylindrical sleeve member 55 which is journaled by means of appropriate bushings 56 on the periphery of the cylinder member 25. A split collar 57 surrounds the cylinder member 25 near its upper end, and rests on and is held against downward movement by the top of the cylindrical sleeve member 55. The cylinder member 25 is slidable within the collar 57. Another collar 58 surrounds the upper end of the cylinder member 25 and a heavy spring 60 surrounds the top portion of the cylinder member 25 and acts between the collars 57 and 58. It will be evident that this construction permits relative longitudinal movement between the cylinder member 25 and the cylindrical sleeve member 55, and that if a sufficiently heavy downward force be exerted on the cylinder member 25 and there is no obstruction to downward movement of the latter, it may move down relative to the then stationary cylindrical sleeve member 55.

The two cylindrical sleeve members 55 at each end of each unit are connected together by means for maintaining them against relative up and down movement, but permitting them to be moved towards or from each

other. In order to have adequate room for certain parts which it is desired to support upon these connecting means, the connections are not made by devices arranged with their axes in the vertical planes which include the axes of the cylindrical sleeve members **55**.

Each cylindrical sleeve member **55** has secured to it as by welding structures which provide suitable supports at three vertically spaced points **61**, **62** and **63**. For rigidity of mounting, three mounting plate portions **64a**, **64b** and **64c** are provided at the top and bottom of the cylindrical sleeve, and the intermediate plate portion **64b** extends continuously from top to bottom. The mountings **61** at the points highest on the sleeve members support a telescoping guide device **66** comprising a rod **67** secured rigidly to the forward sleeve member **55** and a hollow guide element **68** having bushings **69** fitting the rod **67**. The element **68** is secured to the mounting fastened to the rearward cylindrical member **55** of the unit. The bottom pair of mountings—those at points **63**—support a corresponding but reversed arrangement, and the hollow rod **67'** is secured in fixed relation to the rearwardly disposed sleeve member **55**, while the hollow guide member **65** is secured rigidly to the forward cylindrical sleeve member **55**. Between the central pair of support elements **62** a walking jack structure (a hydraulic cylinder and piston mechanism) **70** extends. It includes a cylinder **71** pivotally supported at **72** on the support **62** secured to the forward cylindrical sleeve member **55** and a piston **73**, whose piston rod **74** is pivotally secured at **76** to the support element **62** carried on the rearward cylindrical sleeve member **55**. Fluid may be supplied through a conduit **79** to extend the distance between the cylindrical sleeve members **55**, and through a conduit **80** to reduce that distance.

The hollow guide element **68'** provides a mounting for a reservoir **85** for hydraulic fluid. The hollow guide element **68** provides a mounting for a motor pump unit **86** which includes a suitable motor **87** driving a pump **88** fixed to the motor casing and adapted to draw fluid from the reservoir **85** and supply it, under suitable control, to the hydraulically actuated devices previously mentioned. A control mechanism for the distribution of fluid is provided and, if desired, the control box may be mounted on the sleeve **68** associated with the jacks which do not support the motor-driven pump and the reservoir.

It should be noted at this point that instead of employing a spring **60**, if it were not desired to provide for relative longitudinal movement between the cylinder members **25** and the sleeves **55**, a rigid abutment **90** might, as shown in Fig. 8, be placed between the collars **57** and **58**.

Fig. 9 shows diagrammatically a suitable control system for one unit of the roof-supporting apparatus. The reservoir **85** is connected by a conduit **91** with a pump **88** and fluid is discharged by the pump to a conduit **92** which leads to a valve box structure generally designated **93**. The other end of the valve box structure is connected by a return line **94** back to the reservoir **85**. The valve box structure **93** is made up of a number of conventional units. These are numbered respectively **96**, **97**, **98**, **99**, **100** and **101**. **101** is a discharge box and when the valve elements in the four units **97**, **98**, **99** and **100** are all in mid-position, fluid may flow from the conduit **92** through the box **96** and straight through to the discharge box **101** and back to the tank. The valve box **96** to which the conduit **92** leads is provided with a relief valve **103** set at a desired working pressure and when the relief valve **103** opens fluid may pass through the several valve boxes **97**, **98**, **99** and **100** to the discharge box **101** and back to the reservoir **85**. Each of the valve boxes **97**, **98**, **99** and **100** is adapted to supply fluid to either of a pair of conduits and simultaneously to connect the conduit which is not then receiving fluid back to the tank. In the mid-position of the valves (not shown) which are contained in these valve boxes, both of the conduits are shut off from communication both with supply and exhaust. Operating handles **97'**, **98'**, **99'** and **100'** are provided for the valves in the valve boxes **97**, **98**, **99** and **100**.

In Fig. 9 the extensible upright jack devices will be designated as A^1, A^2, B^1 and B^2 for convenience in reference. The jack devices A^1 and A^2 are those associated with the relatively rearward roof-engaging support element **22** of the unit and those marked B^1 and B^2 are the ones associated with the relatively forwardly disposed roof-engaging support element **22** of the unit. The conduits **41** of the jack devices A^1 and A^2 are connected together by a conduit **105** and the conduit **105** connects with a conduit **106** which leads to the lower end of the valve box **97** in Fig. 9. The conduits **43** and **44** are connected together on each of the jack devices A^1 and A^2 by conduits **108**, and conduits **108** are connected by conduits **109** to a conduit **110** leading to the top (in Fig. 9) of the valve box **97**. Similar connections, suitably primed, are provided, in the case of the jack devices B^1 and B^2, with the valve box **98**. The valve box **99** has conduits **111** and **112** leading from it and connecting respectively with the conduits **79** and **80** of the walking jack device **70**, associated with the cylindrical sleeve members **55** which surround the jack devices A^1 and B^1. Corresponding conduits **111'** and **112'** are connected with the opposite ends of the valve box **100** for controlling the operation of the walking jack device **70** associated with the upright jacks A^2 and B^2. While it is immaterial what arrangement is employed, it may be understood that push on a valve handle admits fluid to the conduit nearer it and vents the farther conduit, while pull on the handle supplies fluid to the furthest conduit and connects the nearer one to vent.

The mode of operation will now be readily understood. If it is desired to effect movement of the parts to the position shown in connection with the unit **21'** from a position corresponding to the position of the parts shown with respect to unit **21''**, the control handle **98'** will be moved outwardly to effect the supply of fluid to the conduit **110'** to effect collapse of the upright jacks B^1 and B^2, thus withdrawing the pads **32** from contact with the mine floor F and lowering the roof-engaging support **22** which the jacks B^1 and B^2 support, from contact with the roof. The jack devices A^1 and A^2 will be maintained extended, as by trapping fluid in them or by holding the handle **97'** inward, in a position to maintain communication between the conduit **106** and the supply line **92**. With these positions of the handles **97'** and **98'** it will be evident that the jacks A^1 and A^2 will hold the roof-engaging support element **22** which overlies them firmly against the roof, while the jack devices B^1 and B^2 will be collapsed and their element **22** and pads **32** will be supported out of engagement with the mine roof and mine floor, and these jacks will be free to be advanced by the supply of fluid to the horizontal jack devices **70** through the supply of pressure to the line **111** and **111'** under the control of the operating handles **99'** and **100'** (which will be pushed inward) and venting of fluid from the lines **112** and **112'** also under the control of the handles **99'** and **100'**. When the jack devices B^1 and B^2 reach the position shown with respect to the unit **21'** in Fig. 2, the jack devices B^1 and B^2 will be extended again into firm engagement with the mine floor and mine roof under the control of the control handle **98'**, and the walking jacks **70** will be cut off from communication with both the supply and return lines by positioning the handles **99'** and **100'** in mid-position until it is desired to advance the rearward jack devices A^1 and A^2. Then these jacks will be collapsed by the supply of fluid to the conduit **110** under control of the control handle **97'** and venting of fluid from the conduit **106**, and then fluid will be supplied to the conduit **112** to effect collapse of the walking jack **70**. When the jacks A^1 and A^2 have been moved up into such relative position with respect to jacks B^1

and B^2 as exists in connection with each of the units **21'**, **21''**, **21'''** and **21''''** the jacks A^1 and A^2 may be again expanded by the supply of fluid to the conduit **106** under control of the valve element **97'**, and the supply of fluid to the conduit **112** will be cut off by the operating handle **99'**.

The several units will be successively caused to take the same advance and retracting steps, that is, the unit **21'** will be advanced, then the unit **21''**, then the unit **21'''** and finally the unit **21''''**. If at any time in the advance of a jack device its associated pad **32** comes over a low place in the mine floor so that the absence of contact with the floor by the pad **32** permits the piston **28** to exert a heavy downward pressure on its associated cylinder member **25**, the latter will slide downwardly against the pressure of the spring **60**, and thus prevent heavy strains being imposed on the structure which is at the moment supporting the cylinder member **25** on the associated jack structure.

Because the cylindrical sleeve members are rotatably supported on the cylinder members **25**, it will be evident that when any pair of jack devices is collapsed they and their connected roof-engaging support elements may be moved angularly or obliquely relative to the extended associated jack devices, in the latter case while the roof-engaging support elements **22** remain parallel with one another, and in the former while the one undergoing adjustment is angled by having one end of it moved further than the other end thereof relative to the stationary roof-engaging support member.

In the application of Warren A. Blower and Richard L. Ziegler, Serial No. 312,182, which is being filed of even date herewith, a method of moving roof-engaging jacks around a corner is described and while the present invention does not include means for locking the cylindrical sleeve members relative to the extended upright jack devices, manual adjustment of the contracted upright jack devices and the roof-engaging support elements **22** which they carry, is obviously possible.

In an application of William J. Jenkins, Serial No. 312,183, which is being filed of even date herewith, a hydraulic diagram for jack control is shown in which accumulators are shown between control valve boxes and the roof jacks which they control. Evidently accumulators can be arranged in the conduits **106**, **106'** herein, if desired, to insure against material reduction in roof-supporting pressure in the event of packing leakage.

It will be evident that a simple, rugged, stable, readily controllable, easily adjustable and safe roof-supporting walking jack device is disclosed in this application, and further description of its structural features or mode of operation in its illustrative embodiment is unnecessary.

While there are in this application specifically described one form which the invention may assume in practice, together with a modification, it will be understood that these 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 I claim is:

1. In a mine roof-supporting jack mechanism, in combination, a pair of cross beams, extensible power operated jack devices one at each end of each cross beam, the jack devices supporting one of said beams being spaced apart at least approximately the same distance as the jack devices supporting the other of said beams, a plurality of extensible connections connected between the pair of jack devices at each end of said beams, one of said extensible connections at each end of the beams being power operated for moving one jack device of each pair relative to the other, and power supply and control means for said power devices and said extensible power connections including elements carried by said other extensible connections.

2. A combination as set forth in claim 1 wherein one of said elements is arranged at one end of said cross beams while said other element is carried at the other end of said cross beams.

3. In a mine roof-supporting jack mechanism, in combination, a pair of cross beams, extensible power operated jack devices one at each end of each beam, the jack devices supporting one of said beams being spaced apart at least approximately the same distance as the jack devices supporting the other of said beams, extensible connections between the jack devices at each end of said beams, one of said extensible connections being power operated for moving the jack devices at each end of the beams relative to one another, and members rotatable about the axes of said extensible jack devices and supported on the latter with which said extensible connections are connected at their opposite ends.

4. A combination as set forth in claim 3 wherein said members supported on said jack devices are freely rotatable about the axes of said jack devices.

5. In a mine roof-supporting jack mechanism, in combination, a pair of roof-engaging beams, extensible hydraulic jack devices one under each end of each beam, the distance between the jack devices beneath one beam being equal to the distance between the jack devices beneath the other beam, telescopic connections between the jack devices at one end of said beams, telescopic connections between the jack devices at the other end of said beams, one of said telescopic connections at each end of the beams being a walking motor for moving the jack devices at each end of the beams relative to one another, others of said telescoping connections at each end of the beams providing means for supporting a reservoir for hydraulic fluid and for supporting a motor-driven pump to furnish fluid under pressure to said walking motors, and members rotatable about the axes of said extensible jack devices and supported on the latter with which said telescopic connections are connected at their opposite ends.

6. In a mine roof-supporting jack mechanism, in combination, a pair of roof-engaging beams, extensible hydraulic jack devices one under each end of each beam, the distance between the jack devices between one beam being equal to the distance between the jack devices beneath the other beam, telescopic connections between the jack devices at one end of said beams, telescopic connections between the jack devices at the other end of said beams, one of said telescopic connections at each end of the beams being a walking motor for moving the jack devices at each end of the beams relative to one another, the axes of said telescopic connections at each end of said beams lying in a plane parallel to a plane through the axes of the jack devices at one end of said beams, and members rotatable about the axes of said extensible jack devices and supported on the latter with which said telescopic connections are connected at their opposite ends.

7. In a mine roof-supporting jack mechanism, in combination, a pair of roof-engaging beams, extensible hydraulic jack devices each including a cylinder member and a pair of pistons reciprocable relative to said cylinder member, one under each end of each beam, the distance between the jack devices beneath one beam being equal to the distance between the jack devices beneath the other beam, sleeves rotatably surrounding said cylinder members and slidably mounted thereon, means connected between the sleeves of the jack devices at one end of said beams for maintaining said sleeves against axial movement relative to one another and for moving them toward and away from one another, means connected between the sleeves of the jack devices at the other end of said beams for maintaining the latter sleeves against axial movement relative to one another and for moving them toward and away from one another, and means yieldable to permit movement of said cylinder members relative to said sleeves in one direction from a predetermined relative

position, but normally maintaining them in such relative position.

8. In a mine roof-supporting jack mechanism, in combination, a pair of roof-engaging beams, an extensible hydraulic jack device under each end of each beam, the distance between the jack devices beneath one beam and the distance between the jack devices beneath the other beam being equal, three telescopic connections between the jack devices at one end of said beams, three telescopic connections between the jack devices at the other end of said beams, the middle telescopic connection of each trio being a walking motor, the uppermost and lowermost telescopic connections associated with the jacks at one end of said beams respectively carrying a motor-driven pump and a tank for hydraulic fluid, and a device for controlling the supply of fluid from the motor-driven pump to both walking motors arranged on a telescopic connection at the other end of said beams.

9. In a mine roof-supporting jack mechanism, in combination, a pair of roof-engaging beams, extensible hydraulic jack devices one under each end of each beam, the distance between the jack devices beneath one beam being equal to the distance between the jack devices beneath the other beam, telescopic connections between the jack devices at one end of said beams, telescopic connections between the jack devices at the other end of said beams, one of said telescopic connections at each end of the beams being a walking motor for moving the jack devices at each end of the beams relative to one another, and members rotatable about the axes of said extensible jack devices and supported on the latter with which said telescopic connections are connected at their opposite ends.

10. In a mine roof-supporting jack mechanism, in combination, a pair of elongated roof-engaging beams, extensible hydraulic jack devices one under each end of each beam, each of said jack devices connected to the beam which overlies it by a pivotal connection of which the axis is perpendicular to the axis of the jack device and to the elongated beam, the distance between the jack devices beneath one beam being equal to the distance of the jack devices beneath the other beam, telescopic connections between the jack devices at one end of said beams, telescopic connections between the jack devices at the other end of said beams, one of said telescopic connections at each end of the beams being a walking motor for moving the jack devices at each end of the beams relative to one another, and members freely rotatable about the axes of said extensible jack devices and supported on the latter with which said telescopic connections are connected at their opposite ends.

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