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Groetschel

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[54] **ROOF SUPPORT FOR USE IN MINE WORKINGS**

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[52] **U.S. Cl.** ..... **61/45 D**

[51] **Int. Cl.** **E21d 15/44**

[58] **Field of Search** ..... 61/45 D; 299/31, 33; 248/357; 91/170 MP

[56] **References Cited**

UNITED STATES PATENTS

3,490,243	1/1970	Groetschel	61/45 D
3,524,321	8/1970	Wilkenloh et al.	61/45 D
3,603,098	9/1971	Groetschel	61/45 D

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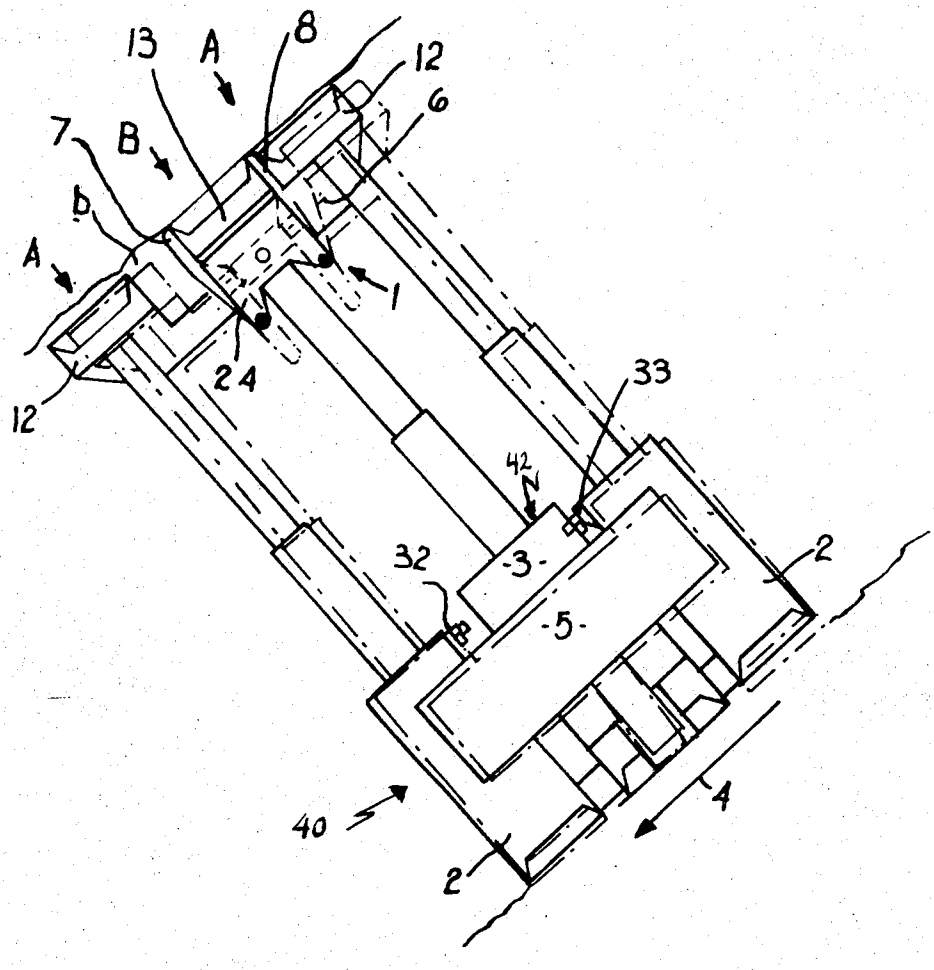
[57] **ABSTRACT**

A roof support for use in mine workings comprising an inner unit and an outer unit, each including a base element, a plurality of hydraulic props and superstructure with the inner unit disposed in a longitudinally extending slot in the base element of the outer unit, tilt controlling members projecting upwardly into clearance spaces between the superstructure of the inner unit and parts of the superstructure of the outer unit, said tilt controlling members being pivotally mounted about horizontal longitudinally extending axes beneath the superstructure of the inner unit or outer unit, and being operable by hydraulically energised piston and cylinder assemblies to maintain said clearance spaces in being when the support is operated in a laterally inclined working.

18 Claims, 6 Drawing Figures



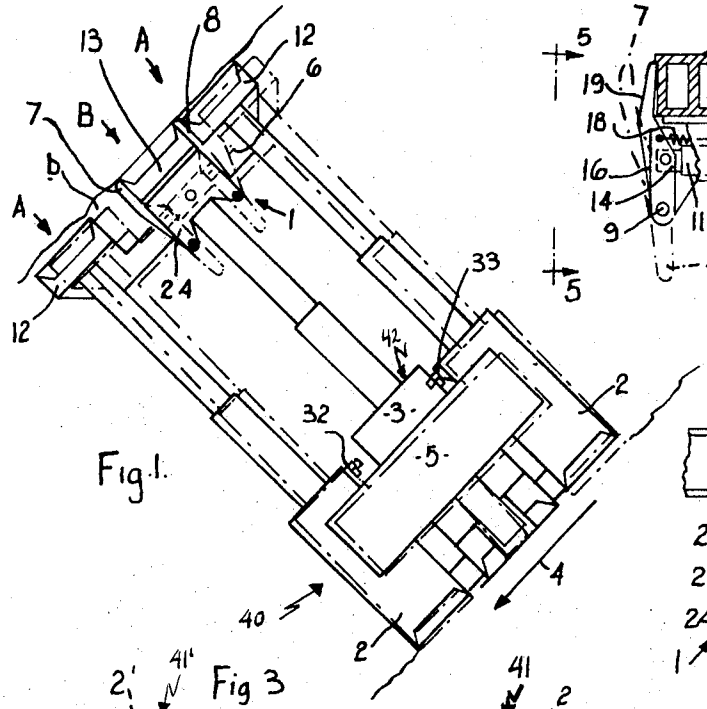


Fig.1.

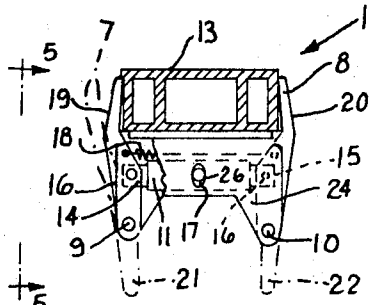


Fig2

Fig.5

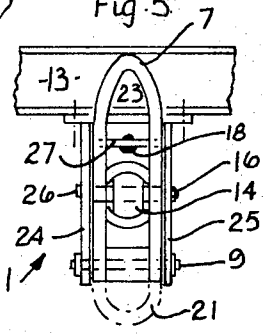


Fig 3

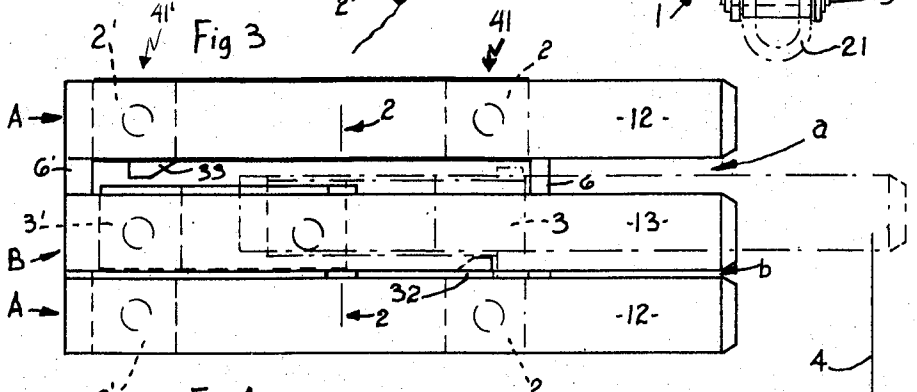
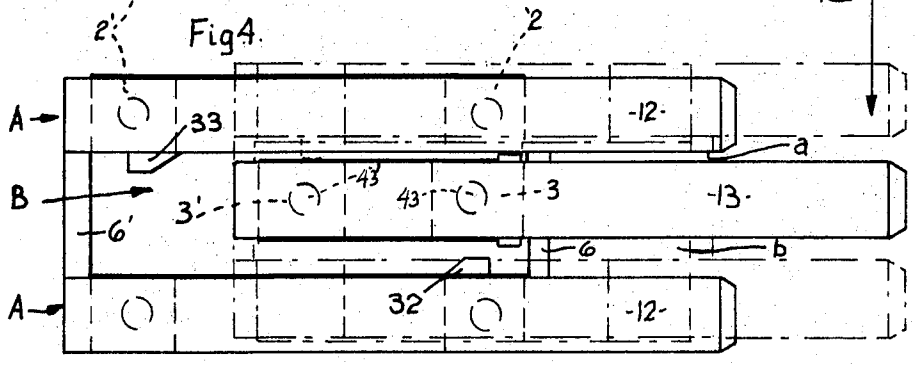


Fig4.



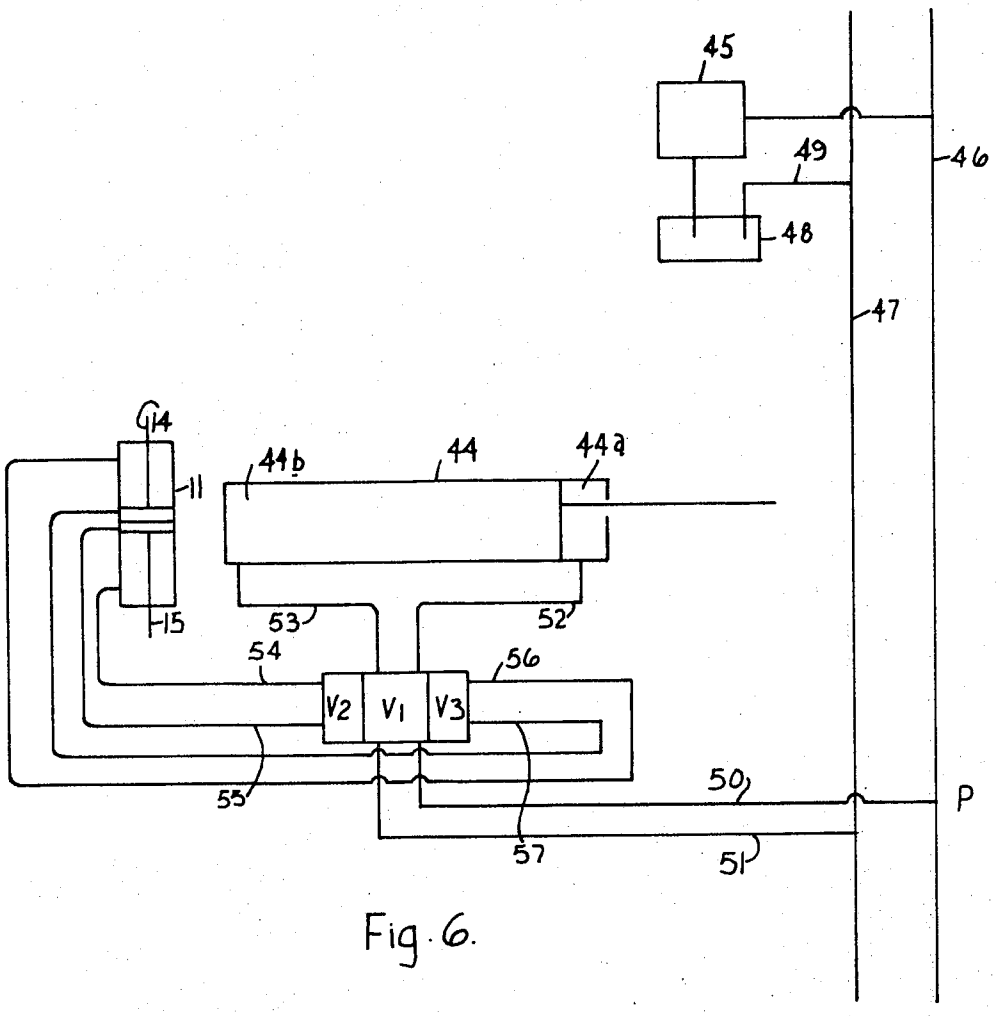


Fig. 6.

ROOF SUPPORT FOR USE IN MINE WORKINGS

FIELD OF THE INVENTION

This invention relates to roof supports, hereinafter referred to as being of the kind specified, comprising inner and outer units, each including a base element, extensible props carried thereby, and roof-engaging superstructure carried on the upper ends of the props, and advancing means for advancing each unit in succession when relieved from load bearing relation with the roof and when the other unit is in load bearing relation with the roof, the outer unit affording a longitudinally extending opening in which the inner unit is movable and with respect to the lateral boundaries of which clearance spaces exist between the inner and outer units at least at the level of the superstructure.

The invention has been developed primarily in relation to a roof support of the kind specified suitable for use in what is known as "mechanised long wall coal mining." In this method coal getting machinery is traversed horizontally along a coal face and the coal thus removed from the face is discharged or deflected onto a conveyor which extends along the coal face. The roof of the mine working extends over the top of the coal getting machinery and conveyor and in a direction away from the coal face and requires to be supported as the coal face advances with the removal of coal therefrom.

A particular form of support of the kind specified, and which is designed specifically for use in long wall coal mining, is one in which the longitudinally extending opening afforded by the outer unit is in the form of an upwardly open longitudinally extending slot in the base element of the outer unit, this latter carrying a group of said props spaced apart to lie on opposite sides of, and adjacent to opposite sides of, the slot, this group of props supporting a respective superstructure which projects forwardly of the outer base element so as to be capable of supporting the roof over the conveyor. The base element of the inner unit is preferably shorter than the length of the slot, for example of the order of half the length of the superstructure carried by the props of the inner unit when the base element thereof is in its rearmost position also of a length to project forwardly of the outer base element so as to support the roof above the conveyor.

DESCRIPTION OF THE PRIOR ART

A support of the form described in the foregoing paragraph is the subject of my prior United States Pat. No. 3,490,243. Therein I have described and claimed in a support for supporting the roof of a mine working comprising a bottom structure for resting on the floor, a top structure for engaging and supporting the roof, a plurality of power operated extensible props extending between said top and bottom structures, traction means for advancing said support, the improvement wherein both said bottom and said top structures each include longitudinally extending parts which are interleaved laterally with each other, said parts at least of said bottom structure are operatively connected with each other by said traction means for respective advancement thereby in successive steps, said parts of said top structure are spaced laterally from each other to define an interpart clearance space providing capability of limited movement of one of said parts of said top structure relative to the other of said parts thereof in a direction transversely of said support, deflector means are provided on said bottom structure upwardly of said floor for at least partially correcting lateral tilt of one of said parts of said support relative to the other of said parts over a terminal portion of one of said advancement steps, while maintaining said capability of said limited movement over the preceding portion of said step.

This particular form of deflector means comprised a pair of wedge elements on one of the bottom structures, such wedge elements having laterally presented faces oppositely inclined obliquely to the length of the gap or slot with respect to a central longitudinally extending reference axis, and said faces cooperating with the other bottom structure to bring same into a predetermined position in a direction laterally of the gap or slot when the other bottom structure had been brought during advancement into contact with the wedge elements.

Whilst under many conditions of lateral inclination this deflector means was effective to correct lateral tilt, there are conditions in which certain disadvantages arise.

When a support is in use, for example, in a mine working presenting a very steep inclination and also a seam thickness which is relatively high, the load imposed on the stabilising means to resist tilt is high.

During advancement of one unit relatively to another the wedge elements which bear the lateral tilt load constitute an additional load on the advancing means (in the form of a hydraulic ram) and consequently some obstruction or difficulty may be encountered to achieving full advancement, or even full correction of tilt.

SUMMARY OF THE INVENTION

The main object of the present invention is to provide an improved tilt correcting means whereby this disadvantage is overcome or reduced.

According to the invention a roof support of the kind specified is provided in at least one of the clearance spaces with a tilt controlling member pivotally mounted on one of the units about an axis extending longitudinally thereof and movable between an initial or inoperative position adjacent to the unit on which it is mounted so that lateral clearance still exists between the inner and outer units at the level of the superstructure, and an operative position in which, by engagement with said other unit, it serves to space this away from the unit upon which it is mounted so as to prevent or reduce lateral displacement of the superstructure of one of said units relatively to the superstructure of the other of said units under conditions wherein the support is operating in a laterally inclined attitude, the tilt controlling member being movable between its inoperative and operative positions by a pressure fluid energised actuating device on the unit on which the tilt controlling member is itself mounted.

Preferably a respective tilt controlling member is provided in each of the clearance spaces existing between the superstructure of the inner unit and laterally spaced parts of the superstructure of the outer unit on each side of the former, respective pressure fluid energised actuating devices being provided for the tilt controlling members operable independently of each other.

The piston and cylinder assemblies may be formed or constructed as a unit, the outer ends of which are pivotally connected to respective stay arms, said unit being floatingly connected intermediate its ends to the superstructure on which the stay arms are mounted in such a manner as to be free to undergo some upward or downward movement at the point of connection when it is energised to move one of the stay arms from its inoperative position to its operative position.

When two tilt controlling members are provided it would be within the scope of the invention for one of these to be mounted on the superstructure of the inner unit, and the other to be mounted on the superstructure of the outer unit so as to project into a clearance space existing between the inner and outer units at the superstructure, the side of the inner unit of which, when the support is in use in a laterally inclined attitude, is lowermost.

Preferably, however, both of the tilt controlling members are mounted on the inner unit at a position along the length thereof in the mid region of the superstructure.

The pivotal mounting of the tilt controlling members about an axis which is situated beneath the superstructure of the unit on which they are mounted intrinsically provides some protection against damage, for example by improper engagement between the superstructure carried by the outer unit when undergoing rising movement from a lower position and under severe conditions of inclination when tilt may be considerable.

Further, the pivotal mounting of the tilt controlling members, as such, ensures that loads applied to these members during advancement of one unit relatively to another and which arise through frictional engagement with the tilt controlling member concerned are borne by the pivotal mounting rather than by the pressure fluid actuating device by which the tilt controlling member is operated, thereby avoiding damage to such operating device.

Further, the mounting of the tilt controlling members in the mid region of the length of the superstructure of the inner unit does not provide any impediment to angular movement of this unit in a plane parallel to the floor (and roof) of the mine working which may be necessary for correcting or determining the direction of advancement. The tilt controlling members are approximately coincident with, or even define, the pivotal axis about which such angular movement can be effected (adjustable guide means being provided in this case to effect such movement).

It will be understood that the side faces of the superstructure of the unit on which the tilt controlling member is not mounted, and which engage the tilt controlling member when the latter is operated to correct tilt, present a continuous face in the direction of advancement so that there will be no obstruction to advancement when the tilt controlling member is maintained in its operative position throughout the advancement step. The presentation of such continuous face is intrinsic where superstructure is formed of a continuous roof bar. Where, however, the superstructure comprises roof bars which are pivotally connected to each other at adjacent ends about a horizontal axis transverse to the support, guide means may be provided to span or bridge the joints and in combination with the roof bars present an effectively continuous face for engagement with the tilt controlling member.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example, with reference to the accompanying drawings wherein:

FIG. **1** is a frontal view of one embodiment of an advancing support incorporating the invention, the outer unit of the support being shown in full drawn lines prior to, and in broken lines after, actuation of the restoring device;

FIG. **2** is a fragmentary view on an enlarged scale in cross-section on the line **2—2** of FIG. **3** and with certain parts broken away;

FIG. **3** is a plan view of the support shown in FIG. **1** with the outer unit of the support in loaded, and the inner unit of the support in load-relieved, condition showing in continuous lines the respective position prior to actuation of the restoring device, and in broken lines the advanced position of the inner unit under the influence of the restoring device;

FIG. **4** is a view corresponding to FIG. **3** with the inner unit advanced and loaded, the outer unit being load-relieved and shown in continuous lines as prior to actuation of the restoring device, and in broken lines in the position it occupies after advancement and subject to the influence of the restoring device;

FIG. **5** is a fragmentary side view on an enlarged scale of the restoring device shown in FIG. **2** viewing in the direction of the arrow **5**; and

FIG. **6** is a hydraulic circuit diagram of a system for supply of hydraulic fluid to actuating devices of the support.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The advancing support illustrated in FIGS. **1, 3** and **4** comprises an outer unit A of trestle-like form comprising an outer base element **40** having laterally spaced front and rear pairs of sockets **2, 2'** fixed or rigid with respect to the remainder of the base element and carrying front and rear pairs of hydraulic props **41, 41'**. At each side the props **41, 41'** carry at their upper ends roof bars **12.** The sockets are connected by transverse bars such as are seen at **5,** and the roof bars **12** are connected by transverse bars **6, 6'.** The support further comprises an inner unit B including an inner base element **42** having forward and rearward prop sockets **3, 3'** fixed or rigid with the remainder of the inner base element and carrying respective hydraulic props **43, 43'.** These in turn carry a roof bar **13** at their upper ends.

Between the two units there are lateral gaps which provide freedom for relative angular movement of the units. In the drawings the gaps between the roof bars **12** and **13** are indicated at *a* and *b*.

The support further comprises a restoring device **1** which is secured to the underside of the roof bar **13** of the inner unit B. The restoring device includes tilt controlling members in the form of two stay arms **7** and **8.** Free ends of the stay arms extend laterally of the central roof bar **13** into the gaps *a* and *b*. The stay arms are pivotable about respective axes defined by pivot pins **9** and **10** which extend parallel with the longitudinal axis of the central roof bar **13** and are situated below said roof bar. These pivot pins **9, 10** are connected to the roof bar **13** through brackets **24, 25** secured to the underside of the roof bar. The arrangement and design of

the brackets in relation to the design of the stay arms is selected such that the stay arms, even in outwardly pivoted positions, will extend partly into the space between the brackets and thus be secured against lateral wedging or tilting.

Each stay arm is associated with an independently actuable hydraulic actuating means in the form of a piston-cylinder device. In the illustrated embodiment the piston-cylinder devices associated with the two stay arms **7** and **8** are in axial alignment with each other. The two cylinders are joined at their rear ends to form a single cylinder unit **11** and the two pistons **14, 15** which project outwardly from the cylinder chambers being pivotally connected by pins such as **16** to the stay arms above respective pivot pins **9** and **10.** The brackets **24, 25** serve also to support the piston-cylinder devices **11, 14, 15,** the cylinder unit **11** being mounted by means of bolts **26** engaging through vertically extending elongated holes such as **17** in the brackets. Since it is always only the upper roof bar, viewing in the direction of inclination, which, load-relieved at any given stage, tends to be displaced angularly in a vertical plane transverse to the length of the bar away from the loaded lower roof bar, only one of the stay arms **7** or **8** requires to be actuated at any given time. The other stay arm **8, 7** respectively can remain idle or at rest. The pin **16** of the actuated piston **14, 15** executes a circular movement about the associated pins **9** or **10** respectively. A pivotal movement is also performed by the piston-cylinder device **11, 14, 15** about the opposite pin **16** which at this stage remains in the initial position. The elongated holes **17** provided in the brackets **24, 25** are, therefore, of such dimensions as to permit of appropriate vertical movement of the supporting bolts **26** associated with the cylinder unit **11.**

The stay arms **7** and **8** are acted upon by tension springs **18** to urge them into contact with the sides of the central roof bar **13.** On actuation of one of the piston-cylinder devices the associated stay arm **7** or **8** is moved laterally outwardly against this pre-applied spring loading.

After the piston-cylinder device has been depressurised the spring will pull the stay arm back into its rest position along the side wall of the central roof bar **13.** The return of the stay arms may also be performed by using double-acting cylinder-piston devices as seen in FIG. **6** and providing a supply pipe system including valves operable to admit fluid under pressure to the cylinder space at the outer side of the piston concerned for this purpose.

The outer side faces **19, 20** of the stay arms **7** and **8** which constitute the working faces are of convex conformation in profile. On operation of a stay arm at the higher side of the roof bar **13,** such stay arm engages the inner face of the adjacent roof bar **12** at the higher side of roof bar **13.** Thus roof bar **12** will be load-relieved for forepoling, i.e., advancement, and will consequently be free to be moved laterally upwardly of the direction of inclination of the working by a distance corresponding to the magnitude of the displacement of the stay arm from its position of rest to its operative or extended position.

In order to reduce or obviate the risk of a higher roof bar (viewed in the direction of inclination) of a load-relieved, and hence lowered, unit of the support moving laterally beneath the roof bar of the adjacent lower unit, the stay arms preferably include portions **21, 22** extending below the associated pivot pins **9** and **10.**

As will be best observed from FIG. **5,** the stay arms **7** and **8** taper in the direction towards their upper ends. Such stay arm may, as shown, be constructed as a narrow frame presenting, at least at the upper end thereof, a passage opening or window **23** for any rock fragments which may fall between arm and roof bar side walls. As shown in FIG. **5** the springs **18** may advantageously be secured to a rod **27** spanning this window **23** between sides of the frame. The means may also connect the rods **23** of respective stay arms for limiting the outward pivotal movement of an actuated one of the stay arms.

As will be observed in particular from the superstructure plan views shown in FIGS. **3** and **4,** the stay arms **8** and **7** which extend into the gaps *a* and *b* between adjacent roof bars **12** and **13** are situated as viewed in plan approximately in the centre of the length of, and hence centre of, gravity region of the inner support unit B.

Conveniently, the piston-cylinder device mechanically connected with the stay arm **7** is also operatively connected by pipe means with that pressure chamber in an advancement ram **44** for the support, actuation of which causes the inner unit B to advance, and the pressure chamber associated with the stay arm **8** is connected by pipe means and communicates operatively with that pressure chamber of the forepoling ram **44** which produces advancement of the outer unit A in the support.

Referring to FIG. **6,** this illustrates the circuit diagram of a hydraulic supply system for energising the advancement ram **44** and the cylinders incorporated in the cylinder unit **11.**

As illustrated, both the ram **44** and each cylinder of the unit **11** are double-acting.

Hydraulic supply is derived from any suitable pressure source, such as a pump **45** feeding a pressure supply pipe **46** extending along a row of supports similar to that now described. A return or drain pipe **47** communicates with a drain tank **48** by way of a branch pipe **49** and completes the circuit to the pump.

For effecting advancement of the inner and outer units respectively, chambers **44***a* and **44***b* of the ram **44** require to be pressurised selectively, the other chamber in each case being connected to the drain pipe **47.**

For this purpose a valve V_1, is provided having pressure exhaust inlets connected to the pipes **46** and **47** by pipes **50** and **51** respectively, and having outlets connected by pipes **52** and **53** to the chambers **44***a* and **44***b*. According to the setting of the valve V_1 which can be accomplished either manually or automatically, either pipe **52** or pipe **53** can be placed in communication with the pressure inlet, the other pipe in each case being connected to exhaust inlet.

Associated operatively with the valve V_1, for example incorporated in the same valve block, are two further valves V_2 and V_3. A control member settable manually and provided on each of these valves may be movable from an inoperative to an operative position.

In the inoperative position the outlets of these valves connected to pipes **54** and **56** would be connected through valve V_1 to the pressure inlet at pipe **50,** and pipes **55** and **57** would be connected through valve V_1 to the exhaust inlet connected to pipe **51,** thereby

maintaining the pistons **14** and **15** in their retracted or inner positions as shown in FIG. **6.**

When either valve V_1 or V_2 is set to the operative condition, the connections would be reversed, that is to say pipe **55** or pipe **57** as the case may be would be pressurised while pipes **54** and **56** would be connected to exhaust through valve V_1, subject, however, to valve V_1 being moved from an off or neutral position to pressurise either pipe **53** or pipe **52** according to which unit is required to be advanced.

Thus, either chamber and associated piston **14** and **15** of the unit **11** can be selected for energisation concurrently with advancement of either the inner unit or outer unit.

On completion of the advancement step the valve selected for operation V_2 or V_3 can be returned automatically to the inoperative condition, for example by means of a cam or operating member on the advancing unit cooperating mechanically with the setting member of the valve V_2 or V_3 as appropriate. In this case the supplementary tilt controlling members would maintain the unit concerned in the proper lateral position independently of the hydraulically operated tilt controlling members **7** or **8** as the case may be.

With such an arrangement the unit which is lowered at any given time will be correctly restored directly on commencement of the advancement step by means of its associated stay arm. The control valves V_2 and V_3 may be arranged if desired to maintain the pressure in the inner chambers of the piston-cylinder devices **14, 15,** maintaining the stay arms in operative positions after termination of the forepoling step. This arrangement ensures that at the end of the advancement step the unit continues to occupy its correct lateral position. Alternatively, or in addition, supplementary tilt controlling members in the form of projections **32, 33** may be provided acting between the forward or rearward prop sockets respectively to ensure that the recently forepoled unit remains in upright position during the final phase of its advancement step independently of continued pressurisation of the piston-cylinder device of the operated stay arm.

As shown in FIGS. **1, 3** and **4** projections **32** and **33** are formed or secured to the upper regions on mutually opposite or facing sides of the prop sockets **2,** and **2'** respectively. Similar projections could be provided alternatively or additionally on the upper regions of prop sockets **3, 3'.** In all cases such projections have contact faces preferably oblique to the direction of advancement. In the illustrated example the inner unit B is positively positioned in a lateral direction in the final phase of its forepoling step by the projection **32** provided on the forward lower socket **2** forming part of the outer unit in the support. The projection **32** bridges the gap *b* and engages by its contact face with the upper region of the leading socket **3** of the inner unit B which, in advanced position, is opposite thereto. If the stay arm **7** is load-relieved during the final phase of the forepoling step of the inner unit the said inner unit will be supported solely by the projection **32** and maintained in upright position preparatory to its props being repressurised to raise its roof bar into load bearing relation with the roof.

The functioning of the restoring device as applied to the advancing support illustrated in FIG. **1** is hereinafter more specifically explained with reference to FIGS. **1, 3** and **4.**

Considering in the first place the initial or basic position of the support system, wherein the rearward prop sockets **2', 3'** of the two support units A and B are placed in transverse alignment with each other as shown in FIG. **3,** then, for forepoling the support, the inner unit B is pressure-relieved and lowered. The roof bar **13** of the load-relieved inner unit as shown in FIG. **3** will then tilt laterally under gravity to lie closely adjacent to the roof bar **12** at the lower side of **13,** the stay arm **7** remaining in its position of rest. In order to avoid the inner unit remaining in this laterally tilted position after advancement, and thereby rendering the proper advancement of the outer unit difficult or impossible, the tilted unit B is pushed in a direction upwardly of the inclination by the operation of the stay arm **7.** This moves the roof bar **13** away from the stationary lower roof bar **12** of the outer unit A and restores the roof bar **13** to its correct medial position between the roof bars **12.**

FIG. **3** shows in continuous lines the inner unit B in its initial load-relieved position and tilted away in the direction downwardly of the inclination, the stay arms **7** and **8** which are part of the restoring device being shown in inoperative or rest position closely adjacent to the side walls of the associated central roof bar **13.** The broken lines on the other hand show the position of the central roof bar **13** approximately at the end of the forepoling step of the inner unit B after restoring has been effected by operation of the lower stay arm **7,** and maintained independently thereof by projection **32** on the lower one of the prop sockets **2.** Deviation from the proper lateral positions of the roof bars by lateral tilting of the unit in which they are incorporated, due to inclination, is thus compensated by actuation of the stay arm **7** which is supported from that roof bar which, for the time being, is held stationary, i.e., the roof bar **12** at the lower side of roof bar **13.**

FIGS. **1** and **4** of the drawings depict the position of the outer unit A prior to commencement, and at the end of, the advancement step following the advancement step of the inner unit B. The position of the outer unit A prior to this step is shown in continuous lines in both figures. The higher roof bar **12** has, after load-relieving, become engaged with the higher side of the central roof bar **13.** In order to restore the outer unit from this displaced lateral position, the stay arm **8** which is shown in continuous lines in the drawing to indicate its rest position, is moved into the operative position indicated in broken lines in FIG. **1.** As a result of this, the higher roof bar **12** of the outer unit is pushed away from the stationary central roof bar **13** and restored to correct position. This restoring movement is transmitted from the higher roof bar **12** to the lower roof bar **12** of the unit A by one or more transverse beams **6, 6'.** The restoring forces acting on the higher roof bar **12** thus restore the whole of the outer support unit A in the system to its correct lateral position.

After advancement of the outer unit into the position shown in broken lines in FIG. **4,** the supplementary tilt controlling member, namely the form of the projection **33** provided in the upper terminal region of the higher rearward prop socket **2',** comes into action engagement over its oblique contact face with prop socket **3'** of the inner unit to maintain the outer unit in its proper lateral position independently of the stay arm **8.**

It will be appreciated that stay arms working in the same or in a similar way may also be fitted, in a manner

different from that illustrated in the present examples, on the outer roof bars 12 of the outer elements.

I claim:

1. In an advancing roof support comprising inner and outer units; advancing means for advancing each unit in succession when relieved from load bearing relation with the roof and when the other unit is in load bearing relation with the roof; each of said units including a base element, extensible props carried thereby, and roof-engaging superstructure carried by said props at their upper ends; the outer unit affording a longitudinally extending opening in which said inner unit is movable and with respect to the lateral boundaries of which clearance spaces exist between said inner and outer units at least at the level of the superstructure; the improvement comprising

a. at least one tilt controlling member projecting into one of said spaces,

b. means for pivotally mounting said tilt controlling member on one of said units about an axis extending longitudinally of this unit for movement between inoperative position in which said tilt controlling member in said space is adjacent to the side of the superstructure of the unit upon which said tilt controlling member is mounted, and an operative position in which said tilt controlling member is spaced laterally from said side of said superstructure,

c. pressure fluid energised actuating means for moving said tilt controlling member between said inoperative and operative positions, whereby, when the support is in use in a laterally inclined attitude, proper relative lateral positions between superstructures of said inner and outer units can be established.

2. A roof support according to claim 1 wherein:

a. a respective tilt controlling member is provided in each of said clearance spaces defined between said superstructure of said inner unit and laterally spaced parts of said superstructure of said outer unit,

b. said pressure fluid energised actuating means comprises respective piston and cylinder assemblies each mounted on the unit on which the associated tilt controlling member is mounted, relatively movable parts of each such assembly being connected respectively to said unit and to said associated tilt controlling member.

3. A support according to claim 2 wherein:

a. each of said tilt controlling members comprises a stay arm,

b. said means for pivotally mounting said stay arm is at the underside of the superstructure of the unit on which said stay arm is mounted,

c. said piston and cylinder assembly for operating said stay arm is connected at one of its ends to said stay arm and at the other of its ends to said superstructure.

4. A support according to claim 3 wherein:

a. said piston and cylinder assemblies are formed or constructed as a unit;

b. the outer ends of said unit are each pivotally connected to respective ones of said stay arms,

c. said said unit is floatingly connected intermediate its ends to the superstructure on which said stay arms are mounted with freedom for movement in the upward and downward direction at the point of connection to said superstructure.

5. A support according to claim 2 wherein:

a. both of said tilt controlling members are mounted on said inner unit,

b. said mounting means and said stay arms are situated on the superstructure of said unit at a position along the length of said superstructure in the mid region thereof.

6. A support according to claim 1 wherein:

a. said advancing means comprises a pressure fluid energised ram,

b. supply means are provided for simultaneously supplying fluid under pressure to said ram and to said pressure fluid energised actuating means for said tilt controlling member to establish concurrent advancement of a unit of said support and movement of said tilt controlling member from its inoperative to its operative position.

7. A support according to claim 1 wherein:

a. at least one of said units is provided with a supplementary tilt controlling member,

b. said other unit includes a part cooperative with said supplementary tilt controlling member during a terminal portion of an advancement step of one unit relatively to the other to establish superstructure carried respectively by the props of said inner and outer units in proper relative lateral positions independently of maintainence of said tilt controlling member in its operative position.

8. A support according to claim 7 wherein:

a. said base elements incorporate upstanding sockets in which said props are mounted,

b. said outer base element includes two laterally spaced ones of said sockets at each end of said outer base unit,

c. said inner base element includes two longitudinally spaced sockets,

d. the rearmost one of said sockets of said inner base unit is in at least approximate transverse alignment with said rear sockets of said outer base element preparatory to advancement of said inner base element,

e. the foremost one of said sockets of said inner base element is in at least approximately transverse alignment with the forward sockets of said outer base element after advancement of the inner base element,

f. said supplementary tilt controlling members are provided on at least one of said sockets in each group which can be established in transverse alignment as aforesaid and is situated adjacent to the upper end of said socket and has a contact face for engagement with a part of another one of said sockets in transverse alignment therewith, said contact face being oblique to the direction of advancement.

9. A support according to claim 1 wherein spring means are provided for urging said tilt controlling member towards its inoperative position, said pressure fluid energised actuating means urging, when energised, said tilt controlling member towards its operative position.

10. A support according to claim 2 wherein each of said tilt controlling members comprises a stay arm including

a. a limb projecting upwardly from said axis about which said tilt controlling member is pivotally mounted into one of said clearance spaces between said superstructure of said inner and outer units respectively,

b. a limb projecting downwardly from said axis,

c. a working face presented by the outer sides of said limb for contacting an opposed face of said superstructure of said unit other than that on which said tilt controlling member is mounted.

11. A support according to claim **10** wherein said working face is of convex form in profile as viewed endwise of said support.

12. A support according to claim **1** wherein said tilt controlling member comprises a frame element defining a window or aperture presented laterally of the clearance space in which said tilt controlling member is situated.

13. A support according to claim **1** including stop means for limiting movement of said tilt controlling member from its inoperative position towards its operative position and thereby defining the latter.

14. A support according to claim **1** wherein:

a. said mounting means for said tilt controlling member comprises a bracket secured to said superstructure of said unit on which said tilt controlling member is mounted at the underside of said superstructure,

b. said bracket has pivot means engaged with said tilt controlling member at a position adjacent to the outer lateral end of said bracket,

c. said pressure fluid energised actuating means comprises a piston and cylinder assembly pivotally connected between said bracket and said tilt controlling member, in the latter case at a position upwardly from said pivot means.

15. A support according to claim **14** wherein:

a. tilt controlling members are provided at both lateral ends of said bracket and are connected thereto by respective pivot means,

b. said piston and cylinder assemblies are constructed as a single unit, the outer ends of which are pivotally connected to said tilt controlling members at positions spaced upwardly from their respective pivot means,

c. said unit is connected to said brackets intermediate at its ends through means providing freedom for movement in an upward and downward direction.

16. A support according to claim **1** wherein respective portions of said superstructure overlap longitudinally, and said clearance spaces extend along the entire length of the overlapping portions of the superstructure, whereby, when the tilt controlling member is in its operative position and engages at a contact position with the superstructure of the unit other than that unit on which the tilt controlling member is mounted, the inner unit as a whole is angularly movable relative to the outer unit about an axis which extends in a direction from the base element to the superstructure of one of the units and which passes through said contact position.

17. A support according to claim **1** wherein the unit other than that unit on which the tilt controlling member is mounted includes means for engaging with the tilt controlling member when the latter is in its operative position, at all relative, positions of said units within the range of relative longitudinal movement which occurs during use.

18. A support according to claim **1** wherein:

a. a respective tilt controlling member is provided in each of said clearance spaces defined between said superstructure of said inner unit and said superstructure of said outer unit,

b. said pressure fluid actuating means is connected in a pressure fluid supply circuit to provide positioning of both of said tilt controlling members in their inoperative positions or positioning of at least one of said tilt controlling members in its operative position.

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