Feb. 4, 1964 J. D. KIBBLE ET AL 3,120,105

SELF-ADVANCING MINE ROOF SUPPORTS

Filed Sept. 21, 1960 6 Sheets-Sheet 1

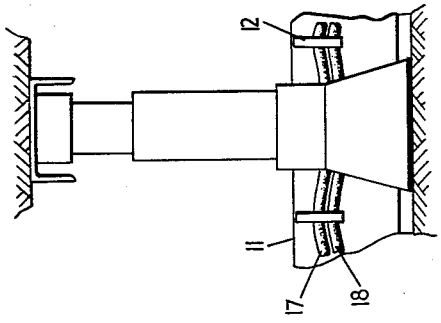


FIG.2.

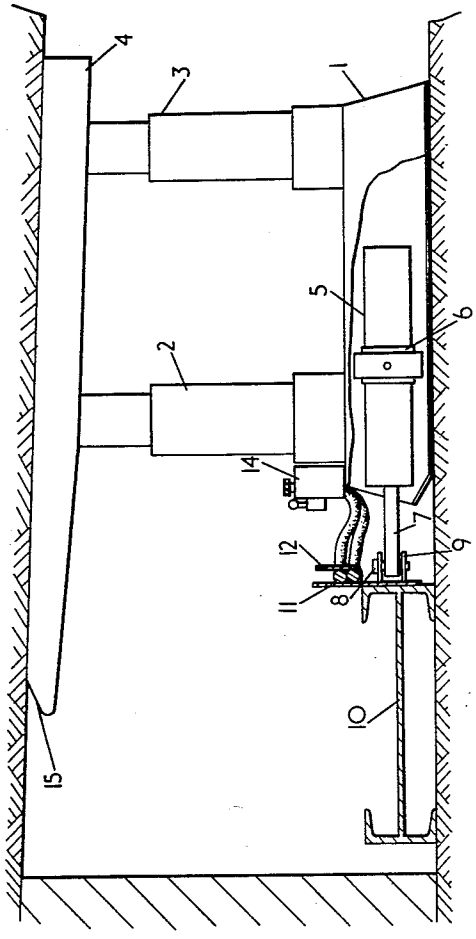


FIG.1.

SELF-ADVANCING MINE ROOF SUPPORTS

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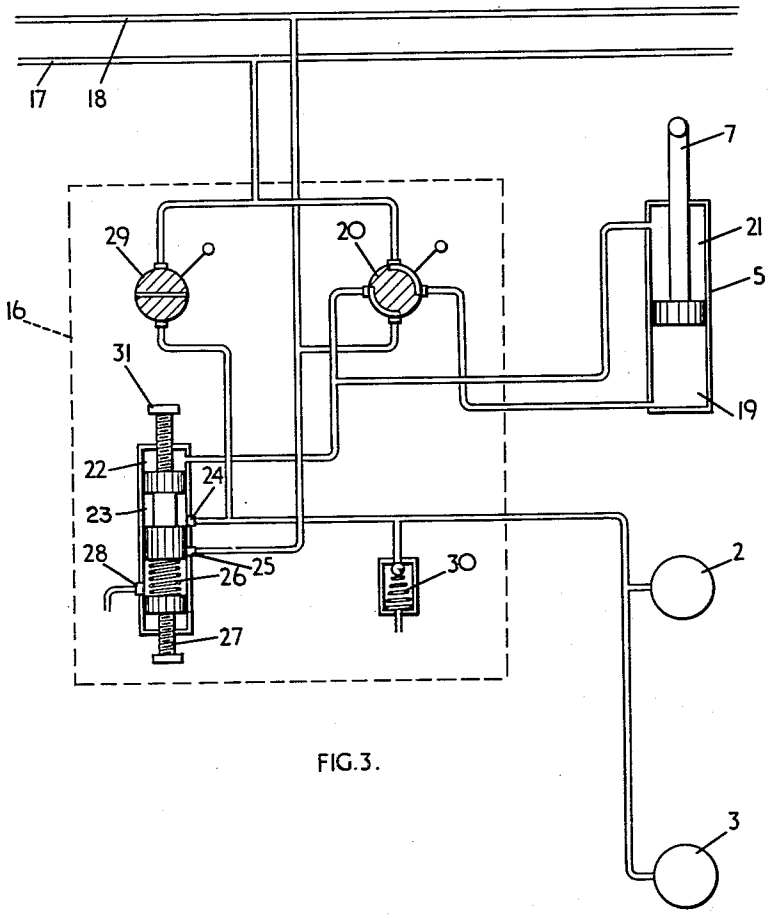


FIG.3.

SELF-ADVANCING MINE ROOF SUPPORTS

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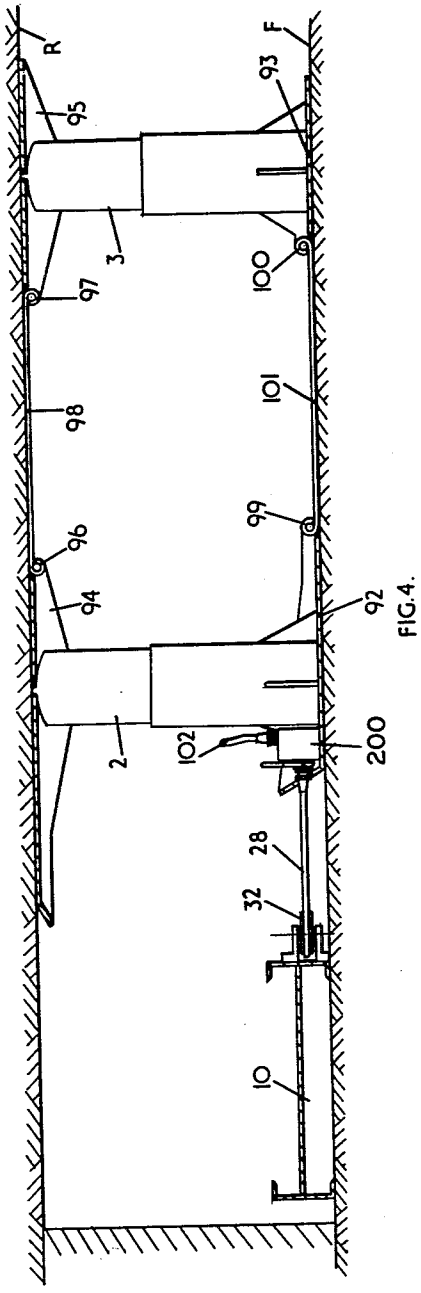


FIG.4.

SELF-ADVANCING MINE ROOF SUPPORTS

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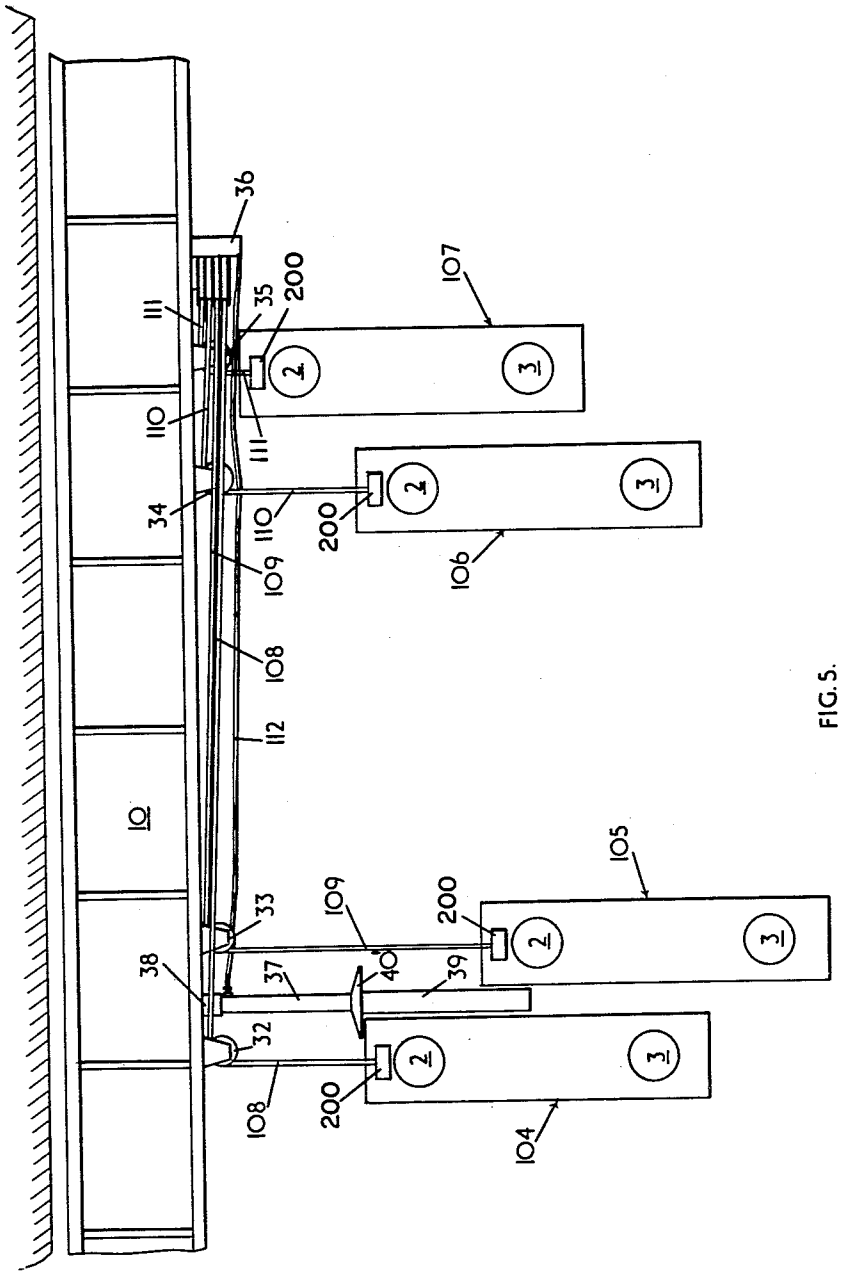


FIG. 5.

SELF-ADVANCING MINE ROOF SUPPORTS

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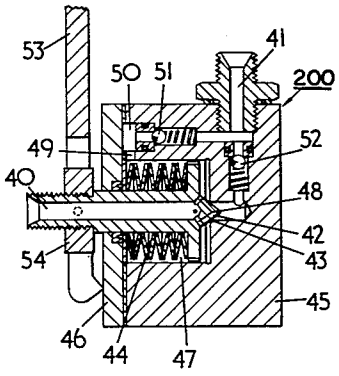


FIG. 6.

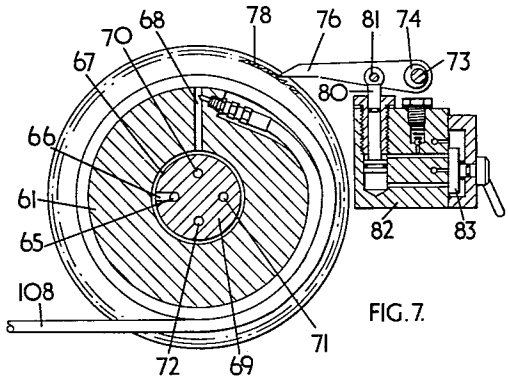


FIG. 7.

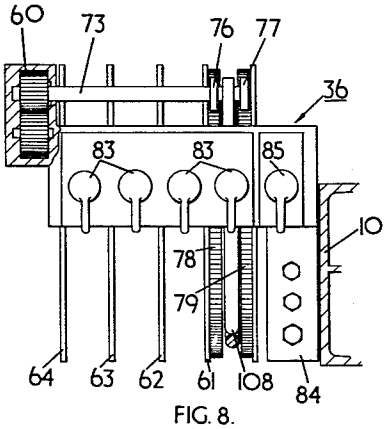


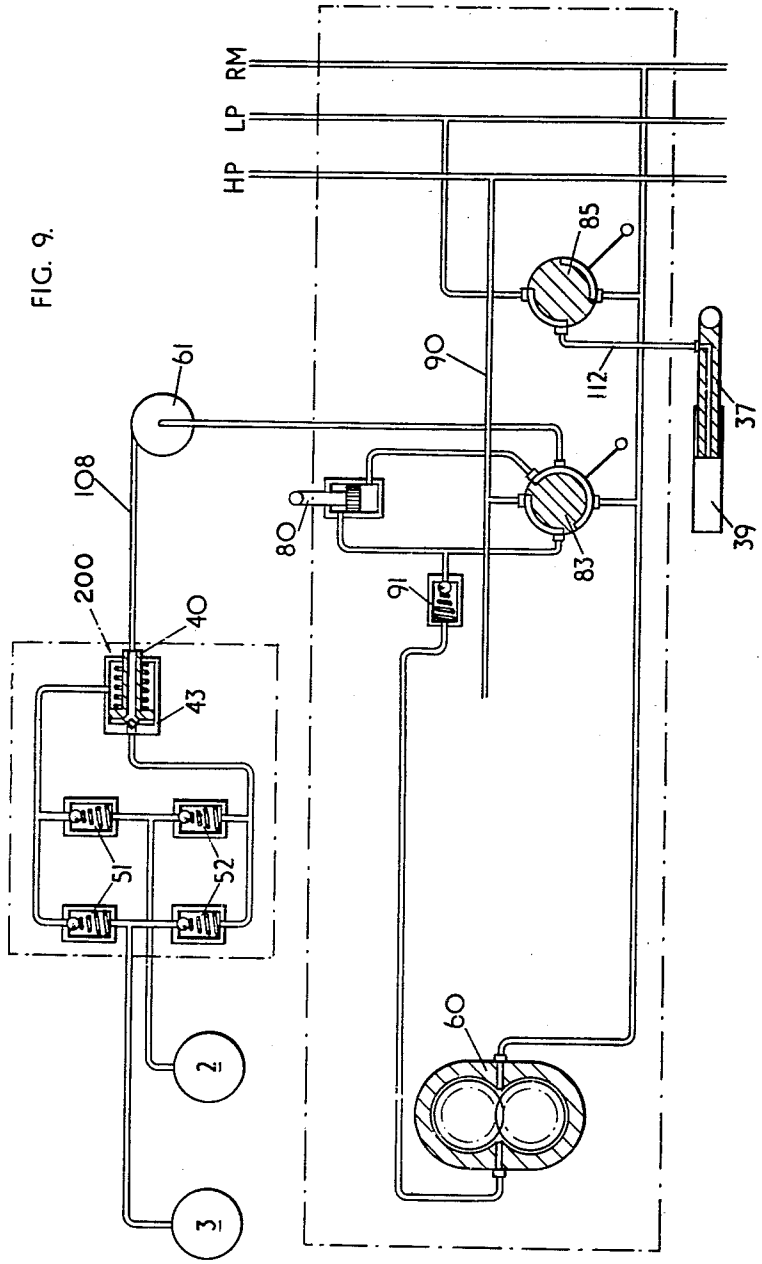
FIG. 8.

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SELF-ADVANCING MINE ROOF SUPPORTS

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FIG. 9.



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3,120,105

SELF-ADVANCING MINE ROOF SUPPORTS

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Filed Sept. 21, 1960, Ser. No. 57,462
Claims priority, application Great Britain Sept. 23, 1959
7 Claims. (Cl. 61—45)

This invention relates to mine roof supports and is particularly, although not exclusively, applicable to the supports in the system described and claimed in our co-pending application Serial Number 61,210.

According to the present invention a mine roof support is provided with means which is responsive to the force required to advance the support and which is arranged to control the lowering of the support in accordance with the magnitude of the force required. The means may be such that when the force required exceeds a predetermined value the support is lowered until the force required drops to said predetermined value or below it.

The support may be provided with fluid-operated extensible legs by which the support can be raised and lowered, and the means may comprise a fluid valve arranged to control the discharge of fluid from the legs. In this case, the valve may be resiliently biased into a closed position in which it prevents discharge of fluid from the legs and the arrangement may be such that the force required to advance the support is applied to the valve in opposition to the force resiliently biasing the valve to its closed position.

In one arrangement, the support is provided with a fluid-operated ram by which the support can be advanced and the means is responsive to fluid pressure applied to the ram for the purpose of advancing the support. In such an arrangement, the arrangement may be such that the fluid pressure applied to the ram is also applied to a valve in opposition to a force resiliently biasing the valve into its closed position in which the discharge of fluid from the legs is prevented. The valve may be a piston valve and, in this case, the arrangement may be such that the fluid pressure applied to the ram is also applied to one side of the piston of the valve and the force resiliently biasing the valve to its closed position is applied to the opposite side of the piston.

In an alternative arrangement, the support is provided with a cable (which may constitute a hose by which fluid can be supplied from a pressure main to the support) by which the support can be advanced and the means, in this case, may be such as to be responsive to the tension in the cable during advancing of the support. The tension applied to the cable for the purpose of advancing the support may be arranged to act in opposition to a force resiliently biasing the valve to its closed position in which discharge of fluid from the legs of the support is prevented. The cable may be connected to a winch, the operation of which applies tension to the cable for advancing the support and the winch may be such that tension can be applied to the cable of each of more than one such support, for example, the winch may be such that tension can be applied selectively to any one of the cables of the supports. In the arrangement in which a winch is such that tension can be applied to the hoses of more than one support, the winch may be provided with means by which the hoses can be selectively connected to a source of main fluid pressure.

Advantageously, manually operable means to lower the support are arranged in operation to override the means responsive to the force required to advance the support.

Two embodiments of the present invention will now

be described, in greater deteail, by way of example only, with reference to the accompanying drawings, of which:

FIGURE 1 is a partly sectional diagrammatic view in a direction parallel to the coal face of one embodiment of the invention.

FIGURE 2 is a partly sectional diagrammatic view at right angles to the coal face looking towards the unexcavated coal,

FIGURE 3 is a diagram of the hydraulic circuit,

FIGURE 4 is a partly sectional elevation of a roof support unit and a face conveyor of a second embodiment of the invention,

FIGURE 5 is a somewhat diagrammatic plan showing four roof support units and a conveyor,

FIGURE 6 is a diagrammatic cross-section of a valve,

FIGURE 7 is a cross-section of parts of a winch,

FIGURE 8 is a partly-sectional and diagrammatic elevation of the winch, and

FIGURE 9 is a diagram illustrating a hydraulic circuit.

The unit shown in FIGURES 1 to 3 inclusive of the accompanying drawings consists of a base 1 upon which are mounted resiliently two single acting hydraulic legs 2 and 3, upon which is resiliently mounted a roof bar 4. Within the base 1 a double-acting hydraulic ram 5, is mounted a gimbal bearing 6 which permits angular movement of the ram 5. The piston rod 7, of the ram 5, is connected by means of a pin 8 and a bracket 9, to an armoured flexible face conveyor 10. The conveyor carries a spill plate 11 upon which are mounted at intervals along its length brackets 12 which carry the flexible pipes 17 and 18 passing along the length of the face. These pipes 17 and 18 are connected to each support unit by branch flexible pipes. A hydraulic valve block 14, is mounted in a suitable position on the base. This is connected with the ram 5 and the legs 2 and 3, by pipes which are not shown. Similar support units are placed at short intervals throughout the length of the conveyor 10.

The roof bar 4 in FIGURE 1 (or, in any alternative construction, any bars or canopies which contact the roof) is constructed so that a smooth, flat and continuous surface is presented to the roof and at the front end, a short sloping portion 15 is provided as shown, to permit the bar to ride under any projection in the roof and to prevent it from catching.

The hydraulic circuit required is shown in FIGURE 3, and is a diagram of the fluid pressure operated equipment of one support unit. In FIGURE 3 the legs of the support unit are shown at 2 and 3 and its horizontal ram at 5. The necessary valves may be constructed in one block represented by the dotted line 16. The flexible pipe running along the face conveying hydraulic fluid from the pump is shown at 17 and that returning fluid to the tank at 18.

Pressure from the pipe 17 is applied to a port of a four-ported selector valve 20 controlling the supply of fluid to the ram 5. In the position in which the valve is shown, pump pressure is applied to the end 19 of the cylinder while the other end 21 is connected to the return pipe 18. In this position the ram 5 tends to thrust the conveyor forward.

When it is desired to advance the support unit, the valve 20 is moved to a position in which the connections are reversed, the side 21 of the ram 5 being pressurized and the side 19 exhausted. The ram 5 will then tend to contract thereby tending to advance the support.

Initially, when the legs 2 and 3 are still forcing the roof bar 4 against the roof, the support will be prevented from moving and the pressure in the space 21 will rise considerably. This pressure in the space 21 is also applied to a volume 22 on one side of the piston of a piston valve 23. Valve 23 constitutes a stop cock so constructed that in its normal position the port 24 communicating

with the legs 2 and 3 of the support unit, is sealed off from the port 25 which leads to the return main 18; the piston of the valve 23 being resiliently urged into this position by a spring 26 the compression of which is adjustable by a screw 27. The end of the valve 23, having therein the spring 26, is provided with a leak exit 28 to atmosphere so that pressure is not built up in this end of the valve 23.

The screw 27 is so adjusted that the initial rise of pressure in the space 21 and the space 22 causes the valve 23 to operate, so that the ports 25 and 24 are connected. This permits release of the hydraulic pressure within the legs 2 and 3 so that they lower under their own weight. Forward motion of the whole unit will then occur, pressure in the spaces 21 and 22 falling to a lower value determined by the sliding friction of the support unit over the face floor. Adjustment of the valve 23 by adjustment of the degree of compression of spring 26 by screw 27 is such that this lower pressure is insufficient to keep the valve 23 in the open position. Thus further lowering of the legs 2 and 3 is prevented. Adjustment of the valve 23 can, in fact, be such that the unit advances with the roof bar 4 in comparatively gentle contact with the roof.

The most likely causes of the unit encountering increased resistance to forward motion are rises in the floor, accumulations of loose material on the floor, and downward projections from the roof. In each case the roof bar 4 is caused to be forced against the roof again and greater force (i.e. pressure in space 21) will be required to advance the support unit. Any such rise in pressure in the space 21 will, for as long as it persists, cause the valve 23 to operate again, so that the legs 2 and 3 descend further until, once again, there is sufficient clearance for the unit to slide over obstacles on the floor or under those on the roof and the required pressure in space 21 to advance the support unit drops to the lower value.

When the forward motion of the unit is complete, the valve 20 is placed in an intermediate position in which pressure is applied to neither side of the ram 5. The valve 22 will then be closed (by spring 26) and the legs 2 and 3 may be re-set against the roof by opening a stop cock 29 which allows the supply of fluid to them from the pump through the pipe 17. The cock 29 is then closed and the valve 20 may be restored to its original position so that the conveyor is thrust forward.

A relief valve 30 is provided to allow the escape of fluid from the legs 2 and 3 if strata convergence occurs when the valves 23 and 29 are both shut, thus preventing the generation in the legs of an excessively high pressure.

Alternative operation of the valve 23 is possible by means of the hand-operated screw 31, when it is desired to lower the legs without pressurising the space 21.

Automatic lowering of the legs 2 and 3 may be prevented if desired by altering the setting of the screw 27 so that even the full pump pressure if applied to the pilot cylinder 22 does not cause the valve 23 to open.

Whilst the above described embodiment refers to a support unit having two legs 2 and 3, it will be understood that the invention is applicable to support units with only one leg or to those with more than two.

If it is desired to divide the legs of the unit into two or more hydraulically independent groups, this may be done by providing for each group a further set of valves equivalent to valves 23, 29, and 30 in FIGURE 3. Alternatively, only one of any or each of these valves may be used with non-return valves in the pipes connecting each group of legs to the valve. These non-return valves should be arranged so that the above described operation may occur but so that reverse flow is prevented; thus, if pressure should be lost in one group of legs, the other groups are not affected.

Further, the valves are represented in the diagram as rotary and slide valves only for clarity, and each may in fact be of either type or be a poppet valve. In certain constructions it may be convenient to combine valves 23 and 29 into one valve, or to control the two ends of ram 5 from two separate valves replacing valve 20, the hydraulic operation remaining as described. It is alternatively possible, if valves 23 and 29 are combined, to arrange for the legs to rise automatically towards the roof again if necessary so as to remain in close contact with it during forward movement of the support unit. However, if such an action were to occur, particularly if it were to occur repeatedly, a friable roof might be broken up by the motion of the roof bar. It is therefore preferred to control automatically the lowering of the legs only.

In another alternative arrangement the fluid supply to the valves 20 and 29 is derived from two separate sources.

The means by which a pulling action on the part of the advancing ram is caused to release the support unit leg pressure may be purely mechanical, rather than hydraulic as has been described. In such a case the mounting 6 (FIGURE 1) of the ram 5 is omitted, and the longitudinal force is taken by a link connected to the piston of the valve 23, the cylinder of the valve being fixed to the support unit base. It is then arranged that the pull of the ram 5 is taken by a spring equivalent to the spring 26, the valve 23 opening when the force reaches a value set by adjustment. Such a system may be used in conjunction with a circuit in which the fluid supplies to the cylinder and the legs are separate, that the legs being from a hand operated pump mounted on the support unit itself.

The invention is particularly suitable for systems in which the operating valves of the support unit are themselves controlled remotely or automatically. The valves 20 and 29 (FIGURE 3) may thus be operated, not manually as shown, but by electric means or by pilot cylinders pressurised by a special fluid pressure circuit, for example, as disclosed in our co-pending application Serial Number 61,210.

A further embodiment of the present invention will now be described in greater detail, by way of example only, with reference to FIGURES 4 to 9 inclusive of the accompanying drawings.

As shown in FIGURES 4 to 9 inclusive of the accompanying drawings, this roof support unit comprises two legs 2 and 3 each mounted on a separate base 92 and 93 respectively, the bases 92 and 93 resting on the floor F and being of sufficient size to prevent the legs 2 and 3 from falling over. Each leg 2 and 3 may be mounted rigidly on its base 92 or 93, or it may be located in a resilient bush on the base. Each leg 2 and 3 also has a roof bar 94 and 95 respectively, which can engage the roof R and is pivotally mounted on the piston portion of the respective leg. The front leg 2 has a roof bar 94 extending in cantilever fashion towards or over a face conveyor 10. The two roof bars 94 and 95 are interconnected (being attached by means of hinged joints 96 and 97) to a spring steel strap 98 spanning the roof between them. The two bases 92 and 93 are similarly interconnected by means of hinged joints 99 and 100 and a steel strap 101. A valve 200 which controls the release of the hydraulic fluid in the two legs 2 and 3 is rigidly mounted on the base 92 of the front leg 2 and is connected to both legs 2 and 3 by means of flexible hoses 102 of which the first few inches only are shown in FIGURE 4.

FIGURE 5 shows diagrammatically a plan of a small part of a coal face equipped with such roof support units, four roof support units 104, 105, 106 and 107 being indicated. One of four hoses 108, 109, 110 and 111 only runs to each roof support unit, and this hose is used to supply fluid to the respective unit and also to pull the unit forward for the advancing operation. Each hose 108, 109, 110 and 111 runs from a valve 200 on its respective unit round a pulley 32, 33, 34 or 35 attached to the face conveyor 10 and thence to a winch 36.

As shown in FIGURE 5, the roof support units are arranged in groups, each group comprising two pairs and the hoses from all four units are connected to the winch 36. Each group of four roof support units is also equipped with one hydraulic single-acting ram which advances the face conveyor 10. The ram comprises a piston 37 attached to a bracket 38 on the conveyor 10, and a cylinder portion 39 which lies loosely on the ground between the two adjacent front bases 92 of the units of one pair of units. The cylinder portion 39 has a cross-piece 40' attached to it at right angles in such a way that it bears against whichever of the two front bases 92 is in front at any time. The piston portion 37 is hollow and is connected to a hose 112.

FIGURE 6 is a diagrammatic cross-section of the valve 200 of one roof support unit. The supply hose (not shown in FIGURE 6) is attached to a union 40 and there are two outlets for supplying the front and rear props respectively, of which only one, outlet 41, is shown in FIGURE 6. The main portion of the valve 200 is a combined release and yield valve comprising a cone 42 urged towards a seating 43 by a stack of disc springs 44 in a housing 45 with a plate 46. In order to set the props against the roof fluid under pressure is supplied through the respective hose and union 40 and enters the spring chamber 47 in the housing 45 by means of drillings 48 in the cone 42. From chamber 47 it passes through a channel 49 between the housing 45 and the cover plate 46 into a recess 50 in which is mounted a non-return valve 51 through which the fluid is able to pass in one direction to the outlet 41 to the props. A similar channel and non-return valve permits fluid to pass from the chamber 47 to the outlet communicating with the other prop. If the feed hose is disconnected from the supply of pressure fluid the non-return valve 51 prevents the fluid in the prop from leaking away. In addition to the passage of fluid through the outlet 41 to the props, fluid also passes through another non-return valve 52 which, similar to valve 51 permits passage of fluid in one direction only, to the main valve cone 42. The function of the valve 52 (two of which are provided, one for each prop) is described below with reference to FIGURE 9. If roof convergence occurs and when the pressure reaches a high enough value, the fluid compresses the disc springs 44 and escapes past the main valve cone 42 back into the hose.

When the hose is pulled so as to advance the roof support unit the force is sufficient to compress the disc springs 44 and lift the release valve cone 42 from its seating 43. The valve cone 42 may also be lifted from its seating 43 by means of a manual operating handle 53 which acts upon a collar 54 screwed on to the union 40 which is integral with the release valve cone 42. It will thus be seen that the main cone valve 42 serves both as a yield valve in the event of roof convergence occurring and as a release valve for operation either by increased tension in the hose, or by the handle 53.

The winch 36 which advances all the roof support units of a group is shown in more detail in cross-section in FIGURE 7 and in a partially-sectioned elevation in FIGURE 8. It is a quadruple winch, powered in this example by a hydraulic gear motor 60. In FIGURE 7 it may be seen how the hose 108 terminates in the drum 61 which is one of four drums 61, 62, 63 and 64, and how channels 65, 66, 67 and 68 are provided for the fluid to reach the centre spindle 69 of the winch, rotary fluid seals (not shown) being provided on either side of each winch drum so that the fluid can pass into only one of the four axial holes 65, 70, 71, 72 in the spindle 69 to which a drilling such as the channel 66 is provided on the centre-line of each one particular drum. The hydraulic gear motor 60 drives a shaft 73 parallel to the drum spindle 69, on which shaft 73 are mounted eight eccentrics of which only one is shown at 74 in FIGURE 7. On each eccentric there is a pawl which

engages with a toothed disc attached to one of the winch drums. Only one drum 61 and its pawls 76 and 77 and toothed discs 78 and 79 are shown in full in FIGURE 8. There are two toothed discs attached to each winch drum, each operated by means of a pawl, and each pair or pawls is either forced out of engagement with the toothed discs or held in engagement with them by means of a small hydraulic ram acting upon a universally-jointed cross-member between the pawls; FIGURE 7 shows one ram 80 and a cross-member 81. The eccentrics driving the pawls are arranged to be 180° out of phase so that as the motor shaft 73 revolves the two pawls of one winch drum can alternately cause the winch drum to rotate. The shaft 73 will require several bearings to support it, but these are not shown for clarity. The bearings and the motor 60 itself are mounted on a manifold block 82 which also carries one rotary face valve 83 controlling the supply of fluid to each winch drum and its operating cylinder and certain other hydraulic connections. The winch drum spindle 69 and the manifold block 82 are mounted on a further block 84 by which the whole winch is attached to the conveyor 10. This block 84 also acts as a hydraulic manifold, in that the face hydraulic mains enter it at one side and emerge at the other, the necessary connections to the winch itself being taken off by cross-drillings.

Part of the hydraulic circuit of the whole system is shown in FIGURE 9. The high pressure face main "HP" is connected by a duct 90 to each of the four rotary face valves 83 controlling one roof support unit and its associated winch drum. Only one such circuit is shown in FIGURE 9. With the valve 83 in the position in which it is shown the high pressure fluid is allowed to pass to the upper side of the ram 80 controlling the pawls (not shown in FIGURE 9) forcing them into engagement with the toothed discs on the winch drum and also, through a non-return valve 91 fluid passes to the hydraulic motor, thus causing it to operate. At the same time the hose 108 itself through the drillings in the winch drum 61 and the valve 83 is connected to the return main "RM." Thus the hose 108 is hauled in, advancing the roof support unit, and the fluid in the legs 2 and 3 is allowed to escape through the hose 108 to the return main RM so long as the force required to advance the unit is sufficient to lift the release valve cone 42 from its seating 43 in the valve 200.

In order to reset a support unit the rotary face valve such as the valve 83 controlling it is moved to a position 90° clockwise from that shown in FIGURE 9. Then the passage leading to the hydraulic motor 60 and to the top side of the ram 80 is connected to the return main RM while the passage connected to the lower side of the ram 80 is pressurised, forcing the pawls out of engagement with their toothed discs. The hose 108 leading to the roof support unit is also pressurised. Therefore the winch no longer pulls on the hose 108 and the legs 2 and 3 are reset against the roof.

With the valve 83 in an intermediate position all outputs from it are connected to the return main RM except that leading to the lower side of the ram 80 which remains connected to high pressure, ensuring that the pawls are out of contact with their toothed discs. The purpose of the non-return valve 91 in the passage leading to the hydraulic motor 60 is to ensure that when the hydraulic motor 60 is driven through one of the other valves fluid cannot pass back to the ram 80 in order to engage the pawls of a drum whose valve has not been operated.

The function of the four non-return valves 51 and 52 in the valve 200 on each support unit is to ensure that should pressure be lost in one of the legs 2 and 3 while the unit is not connected to the pressure main HP, as might be caused by the roof above that leg breaking up, pressure is not then lost in the other leg also.

The ram 37, 39 which advances the conveyor 10 is controlled by a fifth rotary face valve 85 and its hydraulic

connections are shown in FIGURE 9. With the valve 85 in the position shown, the low pressure face main LP is connected through the hose 112 to a drilling in the centre of the piston rod 37 thus causing the ram 37, 39 to push. When the valve 85 is rotated 90° clockwise the ram 37, 39 is connected to the return main RM, thus stopping the pushing action as will be required before advancing either of the support units associated with that ram.

One great advantage of this invention is that the travelling way along the face is almost completely unobstructed by the bases of roof support units or by rams in contrast to conventional roof supports. The thin spring steel roof bars 94 and 95 occupy very little space; the principal remaining obstruction to travelling is the conveyor advancing ram 37, 39, but this being single-acting, can be of small diameter, and also only one ram is required for every four roof support units. It will also be noticed that all the roof support units of a group together with the conveyor-advancing ram may all be controlled from the winch. Thus the operator has to do less travelling to do his work. These two points are of particular advantage in thin seams.

A further advantage is that the amount by which the roof support units may be advanced at each operation is no longer limited by the maximum convenient length of hydraulic rams. Advantage may be taken of this to allow the roof support units to be released and reset much less frequently than is necessary with existing designs. In FIGURE 5, for example, the roof support unit 107 at the extreme right is supposed just to have been advanced from a rear position such as that in which the roof support unit 105 second from the left is shown, the latter being adjacent to the waste edge and ready to be advanced. The left-hand roof support unit 104 or 106 of each pair will not be advanced at this operation, but only after a further web of coal has been removed. The frequency with which they have to be released and reset is one of the principal disadvantages of present designs of powered roof support units, and in certain conditions it has a very adverse effect upon the roof.

It will also be noted that fewer loops of loose hose than is usual are required by the present system. There is, in fact, only one hose to each roof support unit, and that hose is under the control of the winch 36.

In an alternative embodiment of the invention the roof support units are hauled forward not by the hose but by a length of chain, wire rope or other form of cable connecting the release valve 200 to the multiple winch 36. The hose is then run separately and takes no tensile force. It may in fact be connected directly to a hydraulic manifold without passing through the winch, thus avoiding the rotary seal required otherwise. In a further variation the roof support units are also hauled forward by means of a chain or a rope but no fixed hose at all is provided to each unit. Yielding or release of the props is allowed with discharge of fluid on to the floor on the "open circuit" principle. Resetting of the roof support units is accomplished by one length of hose which may be attached to any selected roof support unit of a group by means of a quick-release hydraulic coupling.

It is to be further understood that the hydraulic motor shown is only one of the possible ways of powering the winch required to advance the support units. Other possibilities would be a compressed air or an electric motor drive, or a mechanical drive taking power from the armoured conveyor itself or from a special moving chain placed alongside it.

We claim:

1. An advancing mine roof support comprising: at least one vertical extensible and retractable support member of the type incorporating a cylinder and piston assembly to the vertical cylinder of which fluid under pressure can be admitted for the purpose of extending the said support member into a roof-engaging position, said vertical cylinder having connected thereto an outlet conduit capable of serving as a passage for the exhausting of fluid from said vertical cylinder for the purpose of retracting said support member; a control valve associated with said outlet conduit, said control valve comprising a valve housing defining valve inlet and valve outlet passages, a valve closure member movably located within a chamber defined by the housing, and spring means associated with the said valve closure member and adapted to exert a resilient force in a direction such that the said valve closure member is normally maintained in a closed position in which fluid flow between the said valve inlet passage and the said valve outlet passage is prevented, said valve inlet passage having hydraulic connection with the said outlet conduit; advancing means connected to said support member and to an abutment spaced from the said support member, said advancing means being further adapted to exert an advancing force whereby said support member is urged towards the said abutment; valve actuating means interconnecting said advancing means and said control valve and adapted to transmit to the said valve closure member a valve actuating force proportionate to the said advancing force in opposition to the said resilient force whereby, when the said advancing force attains a predetermined value, the valve actuating force overcomes said resilient force to move said valve closure member into an open position in which fluid flow is established between the said valve inlet and outlet passages to exhaust said vertical cylinder.

2. An advancing mine roof support as claimed in claim 1, wherein said advancing means comprises an extensible and contractable horizontal piston and cylinder assembly to the horizontal cylinder of which fluid under pressure can be supplied through an inlet conduit leading into said horizontal cylinder for the purpose of contracting the said horizontal piston and cylinder assembly whereby the said support member can be moved towards said abutment, and the valve actuating means is in the form of a pressure-transmitting conduit interconnecting said inlet conduit and said chamber defined by said valve housing, whereby the pressure of the fluid supplied to the horizontal cylinder is also supplied to the said chamber to act on the said valve closure member so as to urge the latter against said resilient force.

3. An advancing mine roof support as claimed in claim 2, wherein the said valve closure member is in the form of a valve piston presenting a first face acted upon by the pressure of fluid supplied to said chamber, and a second face acted upon by said resilient force in opposition to the said pressure of fluid.

4. An advancing mine roof support comprising: at least one vertical extensible and retractable support member of the type incorporating a vertical cylinder and piston assembly to the vertical cylinder of which fluid under pressure can be admitted for the purpose of extending the said support member into a roof-engaging position, said vertical cylinder having connected thereto an outlet conduit capable of serving as a passage for the exhausting of fluid from said vertical cylinder for the purpose of retracting said support member; a control valve associated with said outlet conduit, said control valve comprising a valve housing defining valve inlet and valve outlet passages, a valve closure member located within a chamber defined by said valve housing, spring means associated with said valve closure member and adapted to exert a resilient force in a direction such that the said valve closure member is normally maintained in a closed position in which fluid flow between said valve inlet passage and said valve outlet passage is prevented, said valve inlet passage having hydraulic connection with said outlet conduit; advancing means in the form of a cable adapted to interconnect said support member to an abutment spaced horizontally from said support member; tensioning means for applying a tension to the said cable in a direction such that the said support member is urged towards said abutment; the

valve closure member being connected to an end of the cable whereby the said tension acts on the said valve closure member in opposition to said resilient force, the latter having a value such that, when said tension attains a predetermined value, the said tension overcomes said resilient force to move the said valve closure member into an open position in which fluid flow is established between said valve inlet and outlet passages to exhaust said vertical cylinder.

5. An advancing mine roof support as claimed in claim 4, wherein the said cable is constituted by a hose by which fluid under pressure can be admitted to the said vertical cylinder for the purpose of extending said support member into a roof-engaging position.

6. An advancing mine roof support as claimed in claim 4, wherein the tensioning means for applying tension to said cable, comprises a winch adapted to be attached to said abutment, said winch comprising a rotatably mounted drum upon which said cable can be wound, at least one peripherally toothed disc arranged co-axial with and secured to said drum, reciprocally-mounted pawl means adapted to engage said toothed disc, and pawl-operating means adapted to reciprocate said pawl means and thereby rotate said drum.

7. An advancing mine roof support as claimed in claim 6, wherein said winch comprises a plurality of rotatably mounted drums arranged co-axial, and a plurality of associated pawl means, each pawl means having retracting means capable of retracting its associated pawl means out of engagement with the respective toothed disc, whereby tension can be applied selectively to the cable of more than one such support unit.

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