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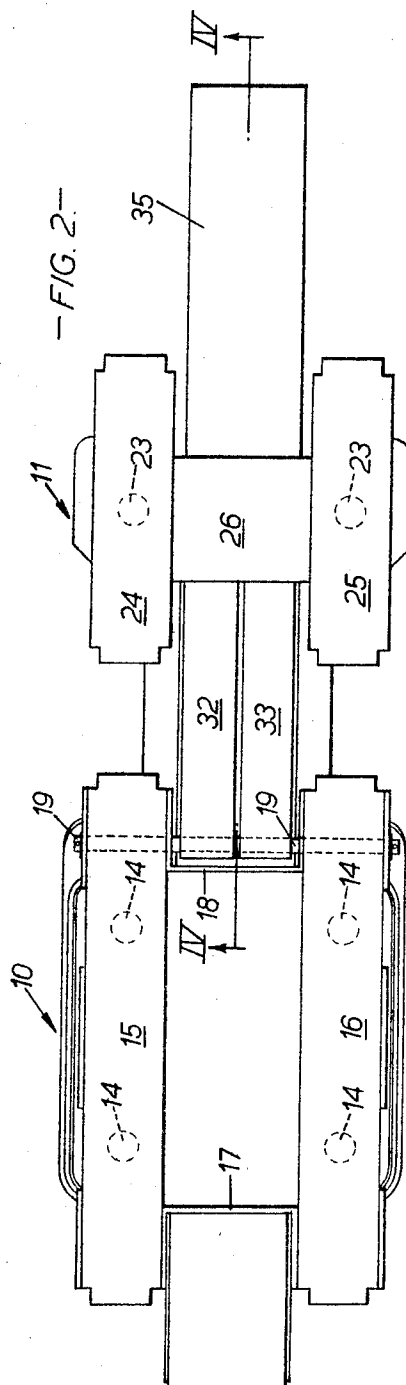
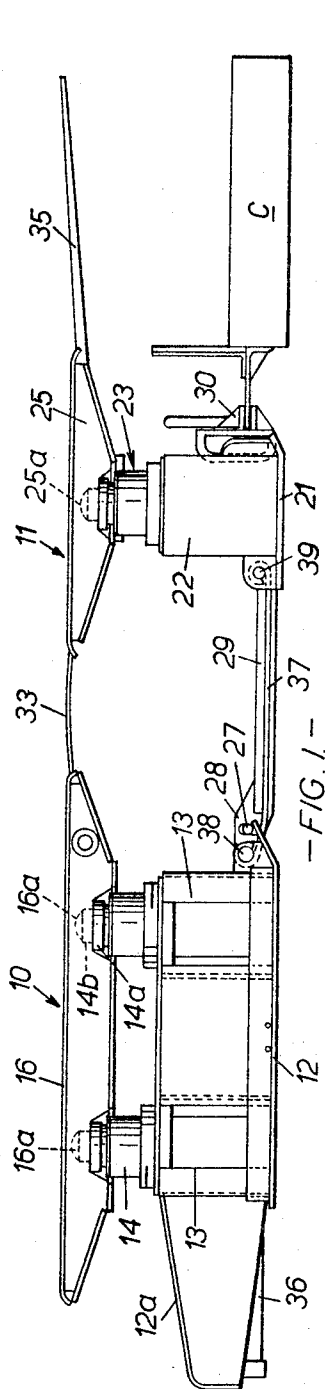
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3,270,510

MINE ROOF AND LIKE SUPPORTS

Filed Nov. 12, 1963

4 Sheets-Sheet 1



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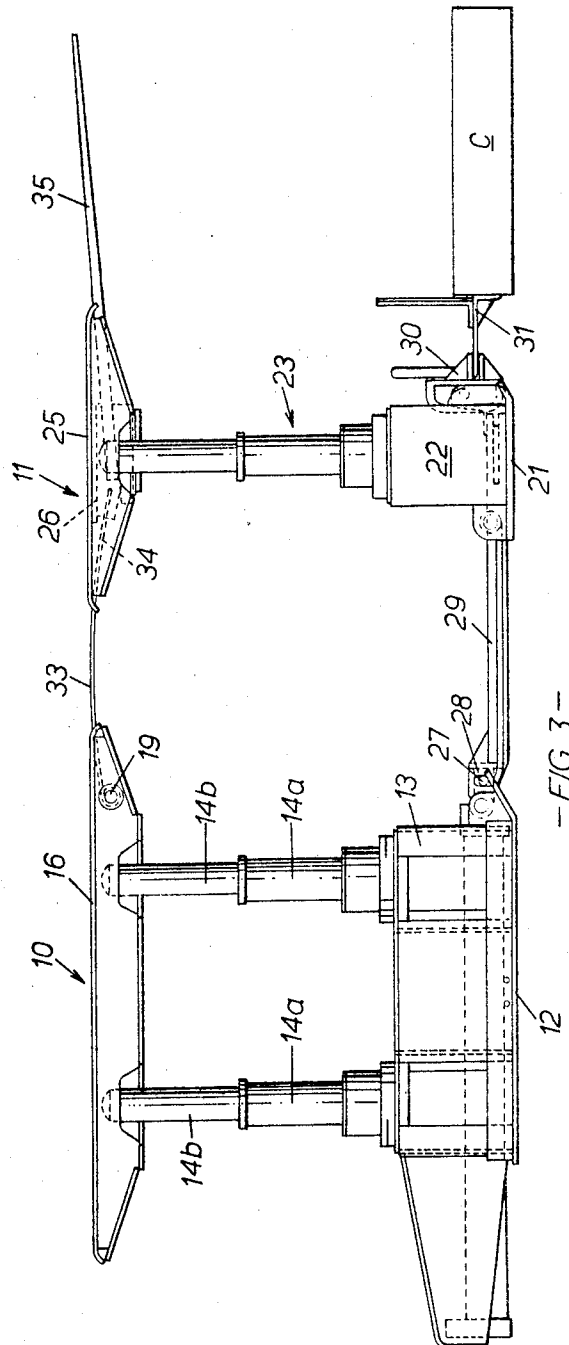
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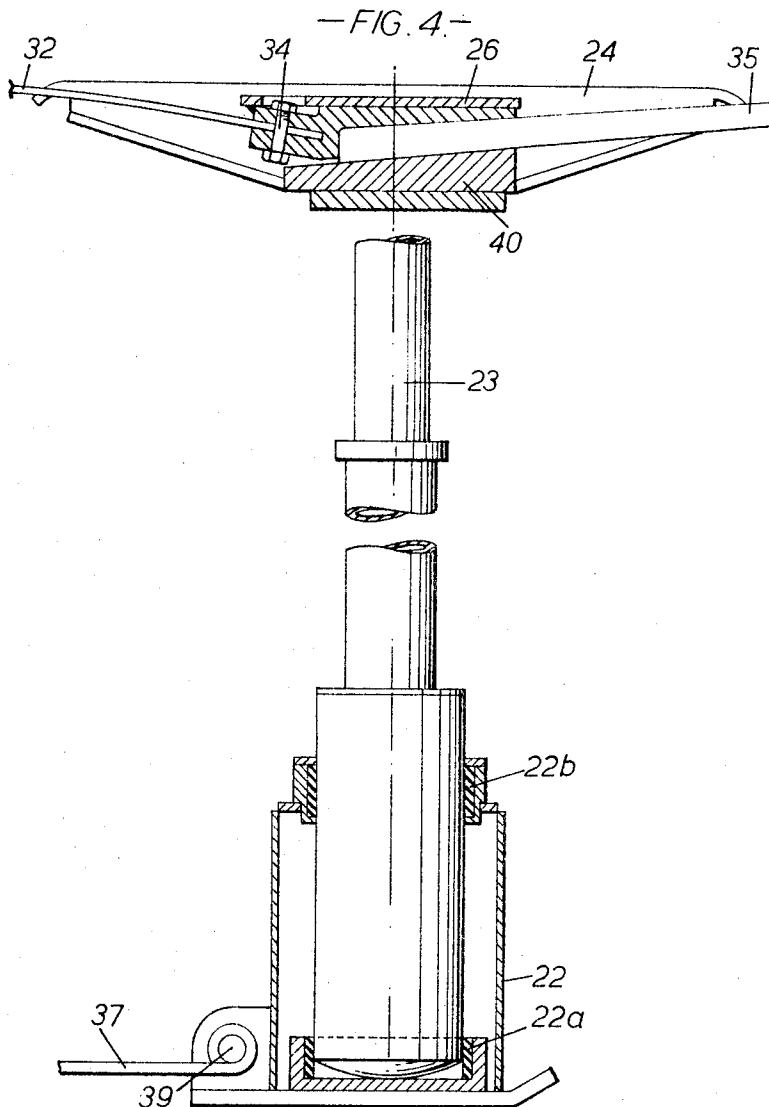
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MINE ROOF AND LIKE SUPPORTS

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4 Sheets-Sheet 3



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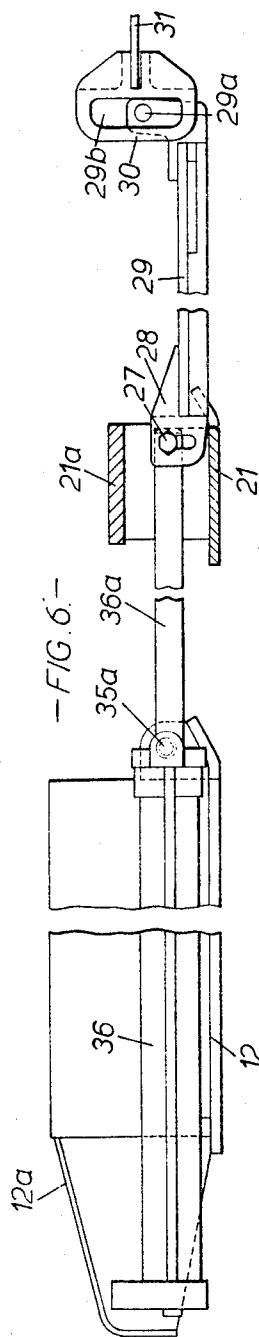
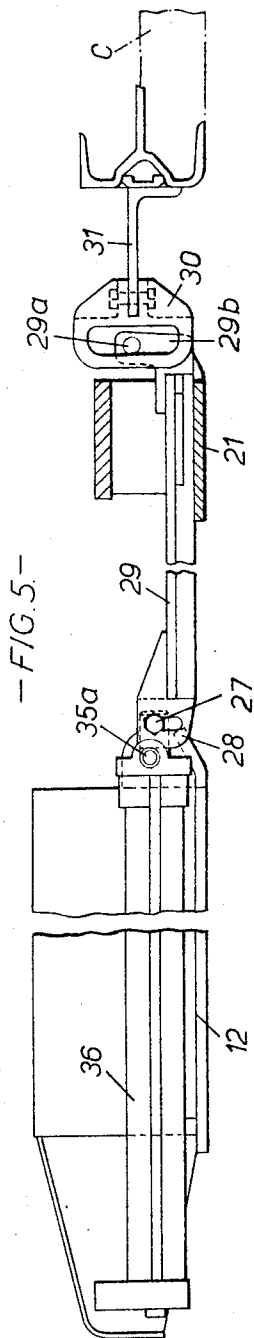
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MINE ROOF AND LIKE SUPPORTS

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4 Sheets-Sheet 4



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MINE ROOF AND LIKE SUPPORTS

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Claims priority, application Great Britain, Dec. 5, 1962, 46,026/62

5 Claims. (Cl. 61—45)

This invention is for improvements in or relating to mine roof and like supports.

The invention is more particularly concerned with mine roof supports of the self-advancing type. One such self-advancing support incorporates a hydraulic ram device which, with the support secured between floor and roof, is utilised to, for example, push over a coal conveyor towards the coal face. The support is then released and the ram, which is anchored to the conveyor, is operated so as to draw the support forwardly, i.e., towards the coal face, after which the support is re-secured between floor and roof.

One object of the present invention is to provide a self-advancing mine roof support with improved ability to adapt itself to any irregularities in the floor and/or roof. A further object of the invention is to provide a self-advancing mine roof support particularly suited for use in low seams.

According to the present invention there is provided a mine roof support comprising a rear unit and a forward unit each of which supports a roof-bar or upper structure wherein said roof-bar structures are connected together by a flexible elastic member or members and wherein the, or each flexible elastic member is hingedly connected to the roof-bar structure of one of the units and rigidly connected to the other. Conveniently the elastic member or members is or are of spring-steel.

In one preferred embodiment of the invention one end of a flexible elastic member is hingedly connected to the roof-bar structure of the rear unit and the other end is clamped in the roof-bar structure of the foremost unit.

The rear unit may with advantage comprise four hydraulic telescopic legs or props whilst the forward unit comprises two hydraulic telescopic props in side-by-side relationship.

Conveniently the roof-bar structure of the foremost unit carries, or is adapted to carry a roof-bar extension member. This roof-bar extension member is preferably of a material having a relatively high degree of flexibility and elasticity and is positioned so that it will be pre-stressed as it is applied to the roof. In one preferred arrangement the roof-bar extension is secured in the roof-bar structure of the foremost unit by a wedge arrangement so that it can be removed when required.

In some embodiments of the invention, particularly where a support is for use in low seams, the hydraulic ram for pushing-over the conveyor and subsequently advancing the support is housed entirely in the rear unit and is adapted for connection to the conveyor by an extension plate or thrust relay bar which is "flat" or of little height so that it does not obstruct passage between the two units. This extension plate passes freely between the two props or legs of the foremost unit.

One particular embodiment of the invention will now be described, by way of example, with reference to the accompanying drawing which shows a mine roof support particularly suitable for use in low seams. In the drawing:

FIGURE 1 is a side elevation of the support or chock with its telescopic hydraulic legs retracted,

FIGURE 2 is a plan view,

FIGURE 3 is a side elevation with the hydraulic legs

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or props extended so as to secure the chock or support between floor and roof,

FIGURE 4 is a cross-sectional view on the line IV—IV of FIGURE 2, and

FIGURES 5 and 6 are fragmentary detail views showing how the advancing ram is connected to the conveyor, the ram being in the retracted position in FIGURE 5 and in the extended position in FIGURE 6.

The support shown on the drawing comprises a rear unit 10 and a foremost unit 11.

The rear unit 10 has a base 12 on which four sockets 13 are mounted for the four hydraulically-extensible telescopic legs or props 14 which are of the double-lift type, i.e., comprise two extensible elements 14a and 14b.

Mounted on the four props 14 of the rear unit is a roof-bar structure comprising parallel roof-bars 15 and 16 connected together by U-shaped cross-members or brackets 17 and 18.

A shaft 19, for a purpose hereinafter to be described, extends across the roofing structure at its forward part and is secured thereto.

The foremost unit 11 comprises a base 21 carrying sockets 22 for a pair of side-by-side hydraulically-operated telescopic legs 23 which are also of the double-lift type.

The two legs 23 support a roof-bar structure comprising roof-bars 24 and 25 connected together by a cross-member 26.

Concave-convex seatings 16a and 25a may be provided where the roofing bar structures rest on the props so as to provide for a degree of adjustment to suit any irregularities in the roof.

Similarly, the legs or props may have convex base ends and rubber or other resilient bushes may be provided in the sockets for the hydraulic legs, in the usual way, so that they can adjust themselves to a limited extent out of the truly vertical. Such an arrangement for one of the legs of the forward unit is shown in FIGURE 4, the resilient bushes being indicated at 22a and 22b.

The hydraulic ram 36 for pushing-over the conveyor and advancing the support is located entirely in the base 12 of the rear unit, which has a tail-extension 12a over the rear part of the ram and is pivotally connected to said base as indicated at 35a. The thrust bar 36a of the ram 36 is provided at its forward end with a cross-pin 27 which engages in a vertically elongated hole or slot in a coupling member 28 at one end of a ram extension plate or thrust relay bar 29. The latter passes through an arch part 21a of the base 21 between the two legs 23 and is provided with a pin 29a which engages in a vertical slot 29b in a clevis or coupling element 30 to connect the bar 29 to a bracket or longitudinally extending angle iron 31 on the side of the conveyor C.

It will be noted that the extension plate 29 is of little height so that it does not, to any material extent, obstruct the passageway between the rear and foremost units 10 and 11.

The base 12 is coupled to the base 21 by a rigid link arrangement 37 having its ends hingedly connected to link pins 38 and 39.

The roof-bar structure of the rear unit is connected to the roof-bar structure of the forward unit by two parallel, slightly bowed, flexible elastic members 32 and 33, the rearmost ends of which are carried around the shaft 19, so as to be hingedly connected thereto, and the foremost ends of which are rigidly bolted to the roof-bar structure 24, 25, 26 as indicated at 34 in FIGURE 4. The manner in which the members 32 and 33 are clamped in and bolted to the roof-bar structure 24, 25, 26, as shown, permits them to be disconnected therefrom if required. Preferably the members 32 and 33 are of spring-steel.

The roof-bar structure of the foremost unit 11 carries

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a roof-bar extension 35, which is preferably of a material having a relatively high degree of flexibility and elasticity. This roof-bar extension is secured in the roof-bar structure 24, 25, 26 in a readily removable manner by means of a wedge arrangement 40 which permits the extension bar to be removed without releasing or disturbing either of the roof supporting units 10 or 11. It will be noted that initially the extension bar 35 has an upward inclination so that its forward part is above the roof-bar structure 24, 25, 26. As a result, as said roof-bar structure is applied to the roof the extension bar 35 is pre-stressed to an advantageous extent.

It will be appreciated that with the above-described arrangement the rear and foremost roof-bar structures can readily adjust themselves relatively to one another so far as may be necessary to allow for roof irregularities whilst at the same time they are caused, when the support is released from between floor and roof by the elastic members 32 and 33, to return to their correct relative positions.

I claim:

1. A mine roof support comprising a rear unit and a forward unit, each of said units comprising a base, hydraulically extensible prop means on said base and a roof-engaging member mounted on the upper part of said prop means, the roof-engaging member of the forward unit having a forwardly extending extension member and a pivotal seating on its prop means whereby it can adjust itself to roof irregularities, at least one flexible elastic member positioned between opposed ends of the roof-engaging members of the rear and forward units, means at one end of said flexible elastic member hingedly connecting it to one of said roof-engaging members so that it can pivot towards and away from the roof and means at the other end of said flexible elastic member rigidly connecting it to the other of said roof-engaging members whereby said self-adjustment of the roof-engaging member of the forward unit is elastically controlled.

2. A mine roof support as claimed in claim 1 wherein the flexible elastic member is an upwardly bowed leaf-spring.

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3. A mine roof support as claimed in claim 1 wherein the forwardly extending extension member of the roof-engaging member of the forward unit is of a material having a relatively high degree of flexibility and elasticity, said extension member having an upwardly and forwardly directed inclination such that it is pre-stressed as the roof-engaging member of the forward unit is applied to the roof.

4. A mine roof support as claimed in claim 1 wherein the base of the rear unit is connected to the base of the forward unit by at least one link hingedly attached at its ends to both the base of the rear unit and the base of the forward unit.

5. A mine roof support as claimed in claim 1 wherein the roof-engaging member of the rear support unit comprises two spaced apart parallel roof-engaging bars and the roof-engaging member of the forward unit comprises two spaced apart parallel roof-engaging bars and wherein a shaft extends across and is secured in the forward part of the roof-engaging member of the rear support unit and forms a hinge pin for the flexible elastic member which comprises two parallel leaf-springs positioned between the bars forming the roof-engaging members of the rear and forward support units.

References Cited by the Examiner

UNITED STATES PATENTS

2,910,282	10/1959	Barrett	61—45.2
3,097,829	7/1963	Seddon	61—45.2 X
3,120,105	2/1964	Kibble et al.	61—45.2

FOREIGN PATENTS

1,337,706	8/1963	France.
Das. 1,112,480	8/1961	Germany.
Das. 1,119,803	12/1961	Germany.
845,302	8/1960	Great Britain.
876,797	9/1961	Great Britain.
885,645	12/1961	Great Britain.

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