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(54) Mine roof support

(57) A mine roof support comprises a canopy 1 having a top roof engaging plate 5 and a bottom plate 7, and an extension portion 2 slidably and pivotally mounted in the canopy. A first actuator is provided for slidably extending and/or retracting the extension portion relative to the canopy, and a second actuator 3 is provided for pivotally moving the extension portion relative to the canopy. Pivotal movement of the extension portion with respect to the canopy is transmitted from the actuator 3 via an eccentric cam arrangement 4, 16 pivotally attached to the canopy. The actuator 3 and eccentric cam arrangement 4, 16 are arranged in line with the extension portion and are located in a pocket in the canopy accessible from below.

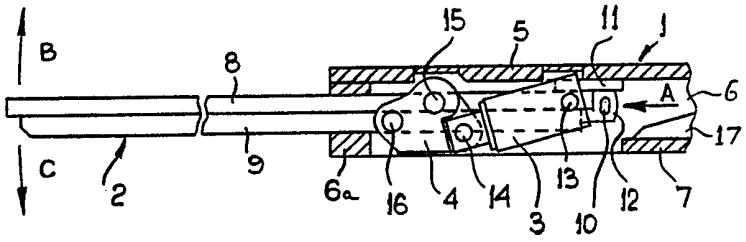

FIG.1

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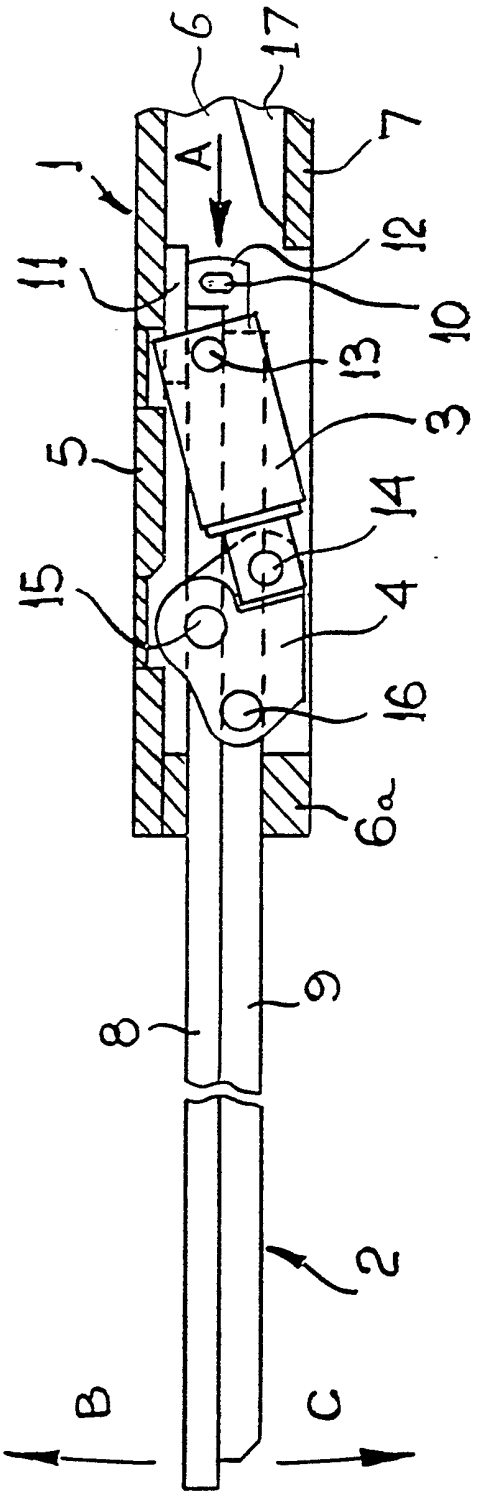

FIG.1

MINE ROOF SUPPORT

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This invention relates to a mine roof support and, in particular, to an extension means for use with a mine roof support.

With conventional roof supports which have an extendible and pivotal extension portion because of the requirement to maintain the integral strength of canopy in the region of the extension mechanism, the construction of the canopy tends to be bulky. In general this means the canopy of conventional roof supports tends to be relatively thick in comparison to conventional solid canopy constructions.

This is a particular problem where the roof support is provided with a number of extension portions in one particular area, for example the tip or rear of the canopy.

In view of the space requirements, in particular in certain thin seam mining operations, this use of space in the mine face area can lead to certain operational difficulties.

The present invention is concerned with providing

a roof support in which these space/strength problems are reduced.

In accordance with the present invention a mine roof support comprises:

- a canopy having a top roof engaging plate and a bottom plate;

- an extension portion pivotally mounted with respect to the canopy;

and - an actuator to effect pivotal movement of the extension portion;

wherein the pivotal movement of the extension portion with respect to the canopy is transmitted from the actuator via an eccentric cam arrangement pivotal attached to the canopy.

A roof support made in accordance with the present invention may be provided with any number of actuators and eccentric cam arrangements, including only one. The actual number present will be dictated by the particular design/operational criteria placed on the support.

In a preferred embodiment of the invention the mine roof support is provided with two actuators and two eccentric cam means, one on either side of the extension portion and in line with the blade.

Preferably, where the roof support is provided with a number of extension portions in a particular area, the actuators and eccentric cam arrangements are placed in line with the extension portions.

Preferably, the or each actuator is mounted in a pocket in the canopy.

With the arrangement of the present invention and, in particular, where the mounting of the actuators and eccentric cam means is in line with the blade, the roof support is provided with a canopy having the required strength, without the requirement to extend the bottom plate so as to fully enclose the canopy. Therefore, the overall dimensions of the canopy, in the area of the extension portions, are reduced, hence relieving the demand for space in the area of the mine face, without compromising the integral strength of the canopy.

The saving in space achieved with the present

invention means that, particularly where a number of extension portions are provided in one area, the dimensions of the canopy, depth and width remain relatively compact, in comparison to those achieved with conventional supports. In practice this means the width of canopy can be kept within certain operational restrictions, so enhancing the operational characteristics of the roof support.

Further, the removal of the bottom plate opens up the space in the vicinity of the extension portion, and maintenance and checking of the equipment related to the extension portion is thereby enhanced.

Preferably, the extension portion is mounted in/on the canopy so that it may be extended and/or retracted. Preferably, the extension portion is extended and/or retracted by means of an actuator which acts against one end thereof.

Preferably, the extension portion is pivotal mounted with respect to the canopy and is slidably mounted in the canopy.

Further, in order to facilitate the above, preferably, the transmission of pivotal movement

from the actuator to the extension portion is effected by means of a pin on the eccentric cam means slidably engaging with a surface/means provided on the extension portion.

In this manner, the roof support is supplied with a simple but relatively strong arrangement which enables the pivotal setting as well as extension/retraction of the extension portion, with a reduced space requirement and minimum strengthening requirement.

Preferably, the actuator to extend/retract the extension portion and/or the actuator to effect pivoted movement of the extension portion, are double acting hydraulic rams.

Roof supports made in accordance with the present invention may be provided with extension portions which extend from the canopy in the region of the tip or rear of the support.

The invention also includes an extension portion arrangement, as previously described, for use with a roof support.

The invention will now be illustrated by way of

description of an example with reference to the accompanying drawings; in which:

Figure 1 shows a cross-sectional view of a section of a canopy of a roof support made in accordance with the present invention.

Now referring to Figure 1 of the drawings, a mine roof support made in accordance with the present invention includes:

- a canopy 1;
- an extension portion 2;
- two actuators 3;

and - two eccentric cam means 4.

The canopy 1 comprises:

- a top roof engaging plate 5 extending to the forward end of the canopy, when the extension portion 2 is retracted;
- two side walls 6 (only one of which is

shown);

- a front wall 6a through which the extension portion extends;

- a bottom plate 7, which is shorter in length than the top roof engaging plate 5, leaving the actuator 3 and the eccentric cam means 4 accessible from below;

- a spacer plate 11 welded thereto;

and - two ramp plates 17 mounted on the bottom plate 7.

The canopy is also provided with two guide mechanisms (not shown); one in each side wall.

The extension portion 2 comprises a top plate 8 and a support means 9, and is provided with a bar 10 at an end 12 thereof, against which an hydraulic ram (not shown) can act to move the extension portion 2 in the direction of arrow A.

The top plate 8 of the extension portion 2 extends beyond the support means 9 of the extension portion 2 and forms two ledge like means, one on

either side of the extension portion 2.

The extension portion 2 is mounted in the canopy so that it extends through the front wall 6a, and slidably engages therewith.

When the extension portion 2 is in an extended position the weight distribution of the extension portion is such that the end 12 thereof is urged into contact with the spacer plate 11. However, when the extension portion is in a retracted position, i.e. position in which the weight distribution is not urging the end 12 thereof into contact with the spacer plate 11, the end 12, in particular the ledges in the vicinity thereof, engage with the ramp plates 17. The actual operational characteristics of this type of system are well known in the industry, hence no further explanation is necessary here.

The spacer plate 11 is provided so as to space the end 12 of the extension portion 2 from the roof engaging plate 5 of the canopy. In operation, the extension portion 2, in particular end 12 thereof, pivots about the spacer plate 11.

Each of the actuators 3 comprises an hydraulic

ram, and is pivotally mounted with respect to the canopy 1 by a pivot pin 13 and to the respective eccentric cam means 4 by a pivot pin 14.

Each of the eccentric cam means 4 is pivotally attached to a respective actuator 3 by pivot pin 14 and to the canopy 1 by pivot pin 15. Further, the extension portion 2 by means of a pin 16 which engages with a respective ledge thereof is in slidable engagement with the eccentric cam means 4; one on either side of the extension portion 2.

In operation, the actuator is operated causing the eccentric cam means 4 to pivot about pivot pin 15 with respect to the canopy 1 and transmit the pivotal movement via pin 16 to the extension portion 2 causing the extension portion 2 to pivot with respect to the canopy.

With the arrangement shown extension of the actuators 3 will cause the extension portion to tilt in the direction of arrow B, and retraction will cause the extension portion to tilt in the direction of arrow B.

CLAIMS

1. A mine roof support comprises:

- a canopy having a top roof engaging plate and a bottom plate;

- an extension portion pivotally mounted with respect to the canopy;

and - an actuator to effect pivotal movement of the extension portion;

wherein the pivotal movement of the extension portion with respect to the canopy is transmitted from the actuator via an eccentric cam arrangement pivotal attached to the canopy.

Amendments to the claims have been filed as follows

1. A mine roof support comprising a canopy having a top roof engaging plate and a bottom plate, an extension portion mounted for slidable and pivotal movement relative to the canopy, a first actuator for slidably extending and/or retracting the extension portion relative to the canopy, a second actuator for pivotally moving the extension portion relative to the canopy, and an eccentric cam means pivotally attached to the canopy for transmitting movement of the second actuator to the extension portion.

2. A mine roof support as claimed in Claim 1, wherein two second actuators and two eccentric cam means are provided, one on either side of the extension portion.

3. A mine roof support as claimed in Claim 1 or Claim 2, wherein the or each second actuator and the or each eccentric cam means are operable in planes parallel to the direction of movement of the extension portion by the second actuator or actuators.

4. A mine roof support as claimed in any one of Claims 1 to 3, wherein the extension portion is slidably and pivotally mounted in the canopy.

5. A mine roof support as claimed in Claim 4, wherein the or each second actuator is mounted in a pocket in the canopy.

6. A mine roof support as claimed in the Claim 4 or Claim 5 , wherein the bottom plate of the canopy is

shorter than the top plate of the canopy and the arrangement of top and bottom plates is such as to define an opening in the bottom of the canopy in the vicinity of the eccentric cam means and the second actuator.

7. A mine roof support as claimed in any one of the preceding claims, wherein the eccentric cam means includes a pin slidably engaging with a surface/means provided on the extension portion to transmit pivotal movement to the extension portion from the second actuator.

8. A mine roof support as claimed in any one of the preceding claims, wherein the first and second actuators are double acting hydraulic rams.

9. A mine roof support as claimed in any one of the preceding claims, wherein the roof support is provided with a plurality of extension portions in a particular area.

10. A mine roof support substantially as hereinbefore described with reference to the accompanying drawing.

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