

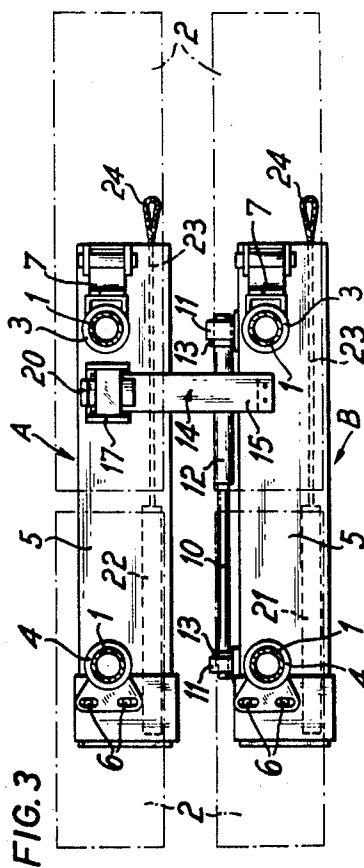
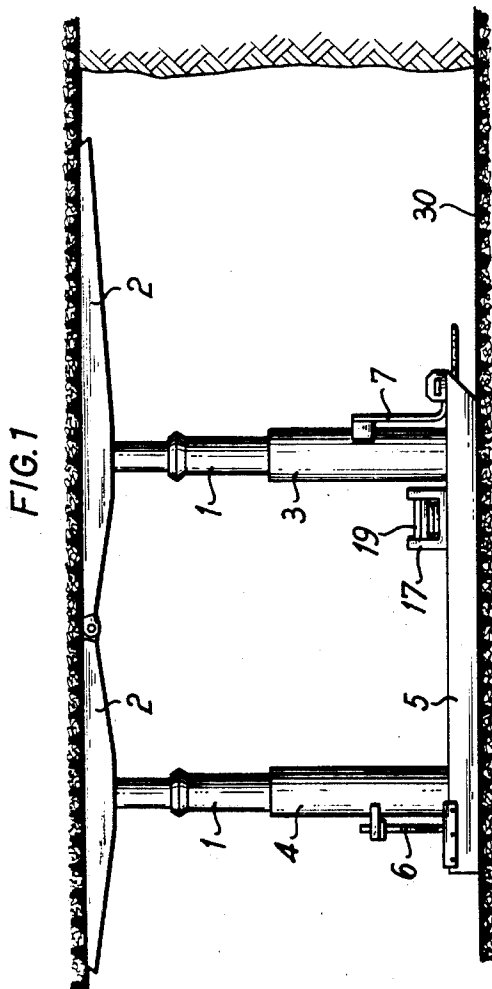
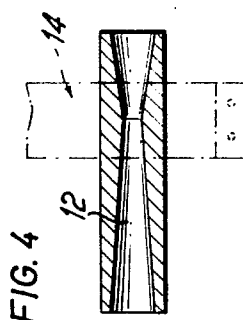
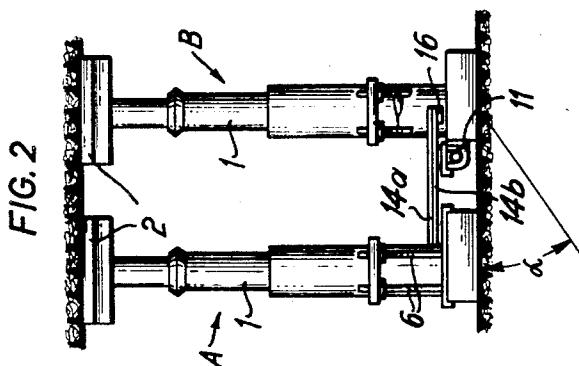
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MINE ROOF SUPPORT UNITS

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MINE ROOF SUPPORT UNITS

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9 Claims

ABSTRACT OF THE DISCLOSURE

The specification describes a mine roof support unit comprising two advancing support frames. In order to limit relative movement between the frames they are connected by means of a transverse strap sliding along a rod fixed on top of the frames. The strap has a heel part to limit rotation about the axis of the rod and its end remote from the frame with the rod is wedged in a pocket structure on the other of the frames.

The present invention relates to mine roof support units and more particularly to such units of the type comprising hydraulic or other pit-props and at least two frames which are provided for means for guiding them in relation to each other as they are advanced by their advance drive means.

The guide means should be so constructed that it prevents a tilting of the frames about axes parallel to the direction of advance. Such tilting is likely to occur when the mine floor slopes, for instance if the coal seam dips, or is irregular.

One object of the present invention is to provide a mine roof support unit with a guide means which is of resilient construction and allows a certain amount of relative displacement of the two frames of the unit.

In a mine roof support unit comprising first and second frames with extending roof support props, drive means, elongated foot-parts of the frames extending in the direction of advance, and guide means connecting bottom parts of the frames for preventing movement of the frames away from each other in a direction perpendicular to the direction of advance, the present invention provides the improvement that the unit further comprises a bar parallel to, and adjacent to the foot-part of the first frame, a slide able to move along the bar, a resilient strap which extends approximately horizontally from the bar, is attached to the slide, and is connected with the foot-part of the second frame, the strap having a heel part extending away from the rod in a direction away from the second frame and arranged to make sliding contact with the foot-part of the first frame to limit relative tilting of the two frames.

Such a strap connection can be resiliently deformed to a certain extent by relative tilting or other movement between the frames and will tend to urge the two frames back into their correct relative positions.

In order to allow the frames further freedom of movement the slide can be able to swivel to a limited extent about the rod in three mutually perpendicular planes. For this purpose the slide can be in the form of a bush surrounding the rod and having a bore converging from both its ends.

Conveniently the strap can be of spring steel.

The unit can further comprise a sliding block part extending downwards from the heel part of the strap for making sliding contact with an upper face of the foot-part of the first frame.

In order to connect the strap with the second frame the strap can be fitted in a pocket on the foot-part of the

second frame, a wedge in the pocket pressing the strap down onto a wedge-shaped surface in the pocket.

For advancing them the units can be provided with rams which can be connected with ropes for drawing the units forwards.

In accordance with a further feature of the invention one of the advancing rams can be mounted in the rod.

One embodiment of the invention is now described with reference to the accompanying drawings.

FIG. 1 shows a roof support unit in accordance with the invention from the side.

FIG. 2 is an end view of the unit as shown in FIG. 1.

FIG. 3 is a plan view of the unit in accordance with FIG. 1, the caps engaging the roof being omitted.

FIG. 4 is a longitudinal section through a bush or slide forming part of the unit, on a larger scale.

The roof support unit includes extending and retracting vertical hydraulic pit-props 1 and is made up of two support frames which are generally denoted by reference letters A and B. The top parts of the frames are formed by two cap parts 2 joined together and the props are connected with them by ball joints. The lower ends of the props are carried in tubular sockets 3 and 4 which are mounted on foot-parts 5 of the frames. Spring rods 6 and spring straps 7 hold the pockets 3 and 4 in an upright position so as to allow for resilient displacement to take up forces acting in a horizontal direction.

The two frames A and B are connected together by the following parts.

The frame B carries a guide rod 10 which is carried in terminal brackets 11 so that it is parallel to and adjacent to the foot-part of the frame B.

A slide in the form of a bush 12 can move along the rod 10 between abutments 13 fixed at the ends of the rod.

A spring steel strap 14, composed of two leaves 14a and 14b (see FIG. 2) is so attached to the bush 12 constituting the slide that a heel part 15 extends to the right, that is to say away from the frame A and carries a sliding block-like part 16 which can move along the upper surface of the foot-part 5 of the frame B. The other end of the spring steel strap 14 extends into a pocket 17 attached to the top surface of the foot-part 5 of the frame A and is held in this pocket by means of a wedge 20 which presses it down against a wedge-shaped counter-plate 19.

Besides these parts connecting the two frames together the unit has drive means for alternately advancing the two frames A and B. In accordance with the embodiment shown this drive consists of rams 21 and 22 which are mounted in the foot-parts of the two frames. The plungers of the rams 21 and 22 are connected with ropes 23 having loops 24 at their free ends which can be connected with a coal face conveyor, not shown, or another stationary piece of mine equipment not likely to be displaced by the action of the advancing rams 21 and 22.

As can be seen from the drawings the ram 21 lies to the outside of the frame B, that is to say on the side of the foot-part remote from the frame A while the ram 22 lies to the inner side of the foot-part of the frame A, that is to say to the side adjacent to the frame B.

As a modification the guide rod 10 can be hollow and of sufficiently large diameter to accommodate the advancing ram 21 within it.

The arrangement described holds the frames A and B at the same distance apart at the point of connection by means of the strap 14.

If it is assumed that the mine floor 30 slopes through an angle α in FIG. 2, so that the frame B will be at a lower level than the frame A, on advancing of the frame A when its props have been depressurized, there will be a tendency for frame A to tilt. This tilting is opposed by

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the heel part of the strap 14. The tilting of the frame B is opposed by the section of the strap 14 between the slide and the pocket 17. The slope is exaggerated in the figure.

For applications in which the slope is in the opposite direction, similar units can be used but the guide rod 10 must be mounted on the frame A and the pocket 17 on the frame B.

The rod 10 can be made of spring steel and also serve as a spring element which is resiliently deformed during use of the unit.

The two advancing rams 21 and 22 can be arranged to be at the outsides of the foot-parts but the arrangement shown, that is to say as shown in FIG. 3, is the most favourable.

The advancing drive means constituted by the rams 21 and 22 can be provided with means for limiting the stroke which can be mounted in the ram cylinders. In the embodiment actually shown advancing movement is limited by the abutments 13 on the rod 10 which cooperates with the ends of the bush 12.

The particular form of bush is shown in FIG. 4 while designed to maintain the frames at the same distance apart at the position of the strap has a bore which converges from both ends so that a limited swivelling action of the bush about the rod is possible in three mutually perpendicular planes, that is to say in two mutually perpendicular vertical planes and in a horizontal plane.

What I claim is:

1. In a mine roof support unit comprising first and second frames with extendable roof support props, drive means, elongated foot-parts of the frames extending in the direction of advance, and guide means connecting bottom parts of the frames for preventing movement of the frames away from each other in a direction perpendicular to the direction of advance, the improvement that the unit further comprises a bar parallel to and adjacent to the foot-part of the first frame, a slide able to move along the bar, a resilient strap which extends approximately horizontally from the bar, is attached to the slide, and is connected with the foot-part of the second frame, the strap having a heel part extending away from the rod in a direction away from the second frame and ar-

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ranged to make sliding contact with the foot-part of the first frame to limit relative tilting of two frames.

2. A unit in accordance with claim 1, in which the slide is able to swivel a limited extent about the rod in three mutually perpendicular planes.

3. A unit in accordance with claim 1, in which the slide is in the form of a bush and surrounds the rod and has a bore converging from both its ends.

4. A unit in accordance with claim 1, in which the strap is of spring steel.

5. A unit in accordance with claim 1, further comprising a sliding block-like part extending downwards from the heel part for making sliding contact with an upper face of the foot-part of the first frame.

6. A unit in accordance with claim 1, further comprising, on the foot-part of the second frame, means forming a pocket into which the strap is inserted, and a wedge arranged to press the strap down onto a wedge-shaped surface in the pocket.

7. A unit in accordance with claim 1, further comprising advancing rams in the foot-parts placed to one side of each foot-part.

8. A unit in accordance with claim 7, further comprising ropes attached to the rams for drawing the frames forwards.

9. A unit in accordance with claim 1, in which the rod is hollow and the unit further comprises an advancing cylinder mounted inside the rod.

References Cited

FOREIGN PATENTS

1,386,999	12/1964	France.
1,161,834	1/1964	Germany.
947,252	1/1964	Great Britain.
6410069	3/1965	Netherlands.

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