

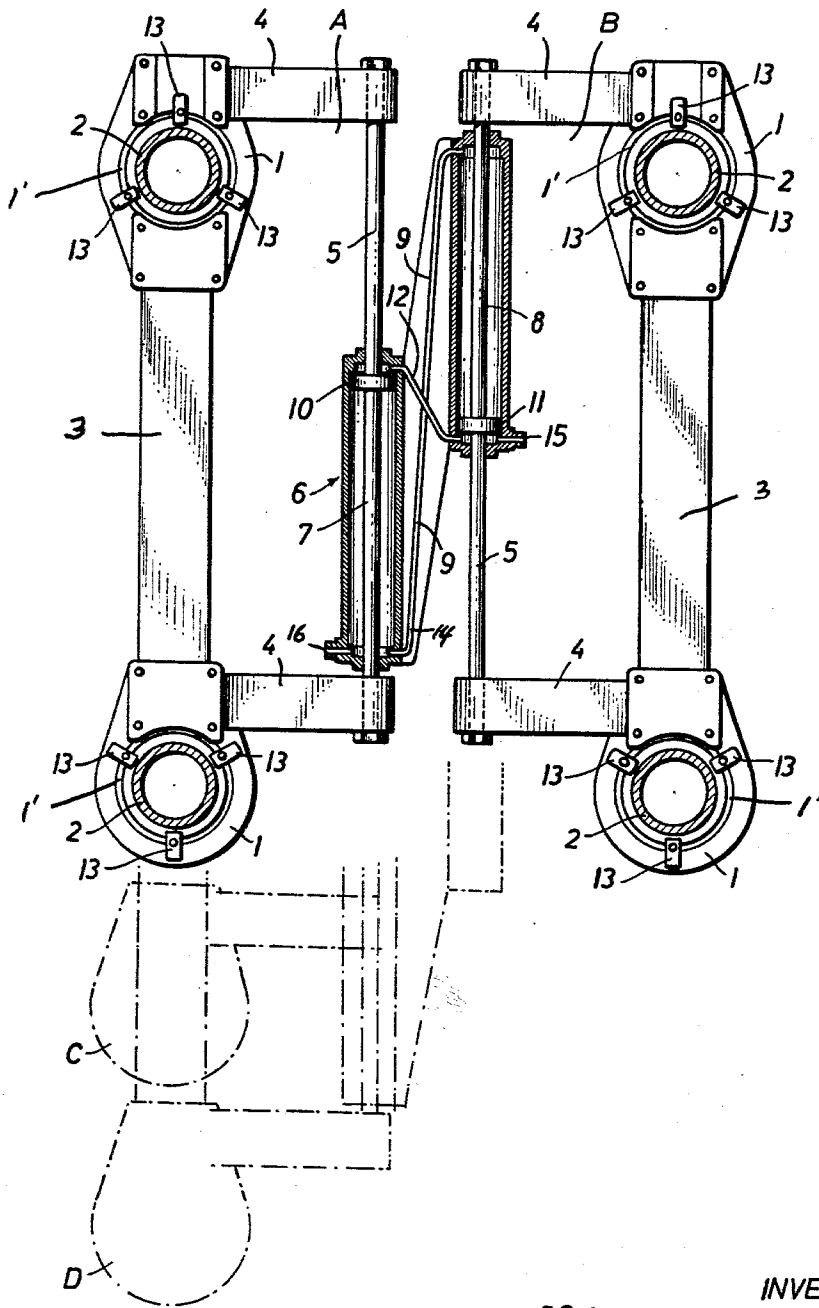
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BASE FOR MINE PROPS AND THE LIKE

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BASE FOR MINE PROPS AND THE LIKE

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This invention relates to mining machinery and particularly to roof supporting apparatus in underground working.

In one type of mining, coal is removed from the seam by a machine which travels along the face of the seam and plows the coal loose and out of the seam. Removal of the coal in this manner leaves the roof unsupported and as the work progresses props must be provided which move up progressively to prevent caving. A convenient form of roof support consists of a plurality of props mounted as a unit and arranged to be stepped forward alternately. Thus, if there are four such props the arrangement permits two of them to be loosened and stepped forward and raised against the roof, whereupon the other two are moved up into position beside the first two.

The pairs of props usually have a common shoe or base so that they move as a unit and the pairs are also interconnected at the roof. They may be connected to provide a substantial bearing area. As coal removal progresses, the roof behind the props may be otherwise supported or permitted to cave.

This invention provides a base for supporting the props or columns and includes a pair of skid members which are interconnected and provided with an improved mechanism for stepping the skids forward alternately. The props are adapted to be permanently or at least rigidly mounted on the skids so as to move with them.

It is an object of the invention to provide a base for mine props and the like which adapts itself to the contour of the floor and inter-connects the sets of mine props selectively; and which also permits successive advancing of the sets of mine props in a very convenient manner.

A further object of the invention is to provide a sturdy base construction simple to manufacture, easily erected and disassembled, and easily adapted to conditions commonly encountered.

Other objects and the advantages of the construction will be in part pointed out hereinafter.

In the drawing is disclosed an improved and preferred embodiment of the invention as applied to a base for use with four mine props. The view is in plan partially sectioned to illustrate details of construction.

Referring to the drawing, the base of this invention has a pair of frames A and B similar to each other and arranged side by side, each frame being provided with a pair of prop shoes 1 having sockets or apertures 1' for receiving suitable pit props 2 adapted to extend parallel to each other and vertically with respect to the prop shoes. Suitable clamps 13 are provided to hold the pit props in position. Prop shoes 1 are spaced apart and held so by a skid member 3 which may be flexible enough to allow the prop shoes to rest solidly on the rock floor. Extending laterally from prop shoes 1 are a pair of arms 4 supporting at their ends a rod 5 parallel to skid 3. Skid 3, arms 4 and rod 5 comprise a rectangular structure which preferably has no flexibility horizontally.

Frames A and B are connected through a cylinder block 6 which consists of cylinders 7 and 8 as well as a rigid intermediary piece 9. Within cylinders 7 and 8 are provided a pair of pistons 10 and 11, piston 10 being mounted on rod 5 of frame A and piston 11 being mounted on rod 5

of frame B. Rods 5 are cylindrical and smooth to act as piston rods for pistons 10 and 11. Pistons 10 and 11 are situated near the center point of rods 5 and cylinders 7 and 8 extend in opposite directions and parallel to each other. As indicated in the drawing, cylinders 7 and 8 slide on rods 5—5 to permit frames A and B to move parallel and longitudinally with respect to each other, a distance approximately the length of either frame from a starting position in which the frames are side by side. Having been thus moved apart, frames A and B can, of course, be slid back to their original positions.

For imparting such motion, cylinders 7 and 8 are preferably hydraulically actuated. To this end connecting member 9 is provided with an inter-connecting passage 12 leading to the two corresponding ends or heads of cylinders 7 and 8 which are in longitudinal proximity to each other, and a second inter-connecting passage 14 for the other two ends or heads of cylinders 7 and 8 which are longitudinally removed from one another. A suitable fitting 15 is adapted to be connected to a source of hydraulic pressure (not shown) from which is admitted liquid under pressure to cylinder 8 and passage 12 leading to cylinder 7. The reverse actuation is accomplished by admission of such hydraulic liquid at the fitting 16 to cylinder 7, passage 14, and cylinder 8.

As used in a mining operation, frames A and B would normally lie flat on the mine floor supporting the four pit props or jacks to hold up the mine roof. The two lower shoes would be closest to the coal seam and the two prop shoes 1 at the top of the drawing would be away from the seam. As the coal removal progresses, with the removal of coal from the seam, the coal removal machinery would move up toward the seam and it would then be desirable to move the pit props closer to the working face.

With certain types of coal cutting machinery and in some mine formation, it is desirable that the advancing of the pit props be frequent and in short steps. In other cases, it is desirable that the props be moved up a much longer distance. The short steps have the disadvantage of disturbing the roof by the pressure applied as compared with the less frequent disturbance from moving the pit props the maximum allowable distance.

For such purposes, this construction of base is very advantageous. When it is desired to set the props forward, those of frame A will be loosened with respect to the roof and pressure applied at the connection 15. This forces skid 3 forward by advancing piston 10 within the cylinder 7 and simultaneously advancing cylinder 8 with respect to piston 10. If only a short advance is desired, it may be stopped at a position above frame A in which the forward prop shoe 1 will assume the position shown dotted at C. The pit props of frame A would then be jacked against the roof in the usual manner and the pit props of frame B will then be loosened from the roof. Pressure fluid then admitted at fitting 16 reverses the action of cylinders 7 and 8 moving skid 3 of frame B forwardly to side-by-side position with frame A. Thus, with the pit props of frame B being again jacked against the roof, the work can then proceed.

This construction affords a means of stepping forward the skid 3 to a very advanced position. The distance indicated at D is an advance comparable with the length of rod 5. Such an advance is possible without in any way straining the connection between the two rods 5 and any bending movement in the connection 9 between cylinders 7 and 8 is not substantially increased in spite of the extreme extension between the frames A and B.

It will be noted that the construction above described is a very economical one in that parts of the two frames A and B or many of them are interchangeable, such as the

two skid parts 3, and the rods 5. For transporting the base the two skid parts 3 via the rod 5 turning in the cylinders 7, 8 can be folded together in a very compact bundle.

Thus, by the above construction, are accomplished among others, the objects hereinbefore set forth.

What is claimed:

1. Advanceable mine prop base arrangement which comprises a pair of flexible skid members each adapted to support mine prop roof bearing means, a rod for each skid member, an arm at each end of the skid members rigidly supporting the rods in parallel spaced relation to the skid members, a pair of cylinders on said rods and a pair of double acting pistons operatively disposed in said cylinders on said rods intermediate the ends of said rods, the ends of each rod extending through the ends of each cylinder, means connecting said cylinders together in staggered endwise fixed relation to each other to maintain said rods parallel to each other and to permit said cylinders to move said rods longitudinally an additive longitudinal distance substantially equal to the length of one rod from a starting position where both rods are side by side.

2. Base arrangement according to claim 1 wherein said cylinders have two corresponding heads in longitudinal proximity to each other and two corresponding heads longitudinally removed from each other, the means connecting said cylinders being provided with passages interconnecting said corresponding cylinder heads for introduction and discharge of pressure fluid respectively into and from said cylinders to actuate said pistons for moving said rods, said rods being rotatable on said cylinders for folding the skid members thereof one upon the other to form a compact bundle.

3. Base for mine props and the like comprising a pair of substantially parallel skid members each adapted to support a plurality of mine props and the like, a rod for each skid member supported thereby in substantially parallel spaced relation to the skid member, said rods being positioned between said skids, and motive means including one longitudinally extending first means displaceably mounted on one said rod, another longitudinally extending first means displaceably mounted on the other said rod, one coacting second means fixedly mounted on said one rod and connected with said one corresponding first means for relative longitudinal movement therewith, and another coacting second means fixedly mounted on the other said rod and connected with the other corresponding first means for relative longitudinal movement therewith, both said first means being operatively interconnected with each other in fixed longitudinal relation and with their longitudinal axes substantially parallel to each other to maintain said rods in parallelism and to

move said rods longitudinally with respect to each other by coaction between the corresponding first and second means of the motive means.

4. Base according to claim 3 wherein an arm is provided at each end of the skid members rigidly supporting the rods in spaced relation to the skid members.

5. Base for mine props and the like comprising a pair of vertically flexible skid members each adapted to support a pair of mine props in spaced relation with respect to each other, a rod for each said skid member supported thereby in spaced relation to the skid member, said rods being positioned between said skid members, motive means including a pair of cylinders displaceably mounted on said rods for relative movement therewith and a pair of pistons fixedly mounted on said rods in said cylinders, and connecting means operatively interconnecting said cylinders with each other in substantially parallel staggered endwise fixed relation to maintain said rods in parallelism and to move said rods longitudinally with respect to each other by coaction of said cylinders with said pistons.

6. Base according to claim 5 wherein each cylinder extends longitudinally over the corresponding rod a distance substantially equal to about one-half of the length of such rod and each piston is positioned at about the longitudinal center of the corresponding rod, whereby the rods and in turn the skids thereof may be moved with respect to each other a longitudinal distance substantially equal to the length of one rod from a starting position where both rods are side by side.

7. Base according to claim 5 wherein said skid members are provided with arms for supporting said rods to form a pair of similar rectangular frames rotatable with respect to each other on said cylinders via said rods for folding said skid members one upon the other to form a compact bundle.

8. Base according to claim 6 wherein said cylinders are provided with two corresponding heads in proximity to each other and two corresponding heads remote from each other.

9. Base according to claim 8 wherein the connecting means for said cylinders is provided with passages interconnecting the corresponding cylinder heads in proximity to each other and with passages interconnecting the corresponding cylinder heads remote from each other.

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