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43
[56] **References Cited**
UNITED STATES PATENTS
3,378,306 4/1968 Lobbe 299/34
FOREIGN PATENTS
1,245,888 8/1967 Germany..... 299/34
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Attorney—Stevens, Davis, Miller & Mosher

[54] **GUIDE RAIL DEVICE FOR A LONGWALL MINING MACHINE**
10 Claims, 5 Drawing Figs.
[52] U.S. Cl..... 299/34
[51] Int. Cl..... E21c 25/68

ABSTRACT: A positive guide device for a chain-driven mining machine such as a coal plow. It has upper and lower angle iron frame members with interconnecting rungs between them. The rungs are H-shaped to provide channels for movement of the drive chain.

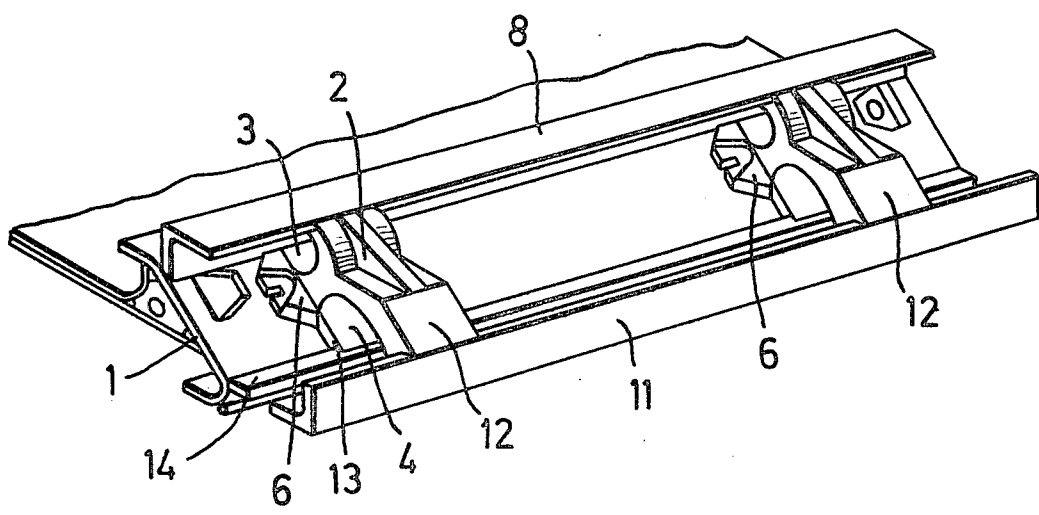


FIG. 1

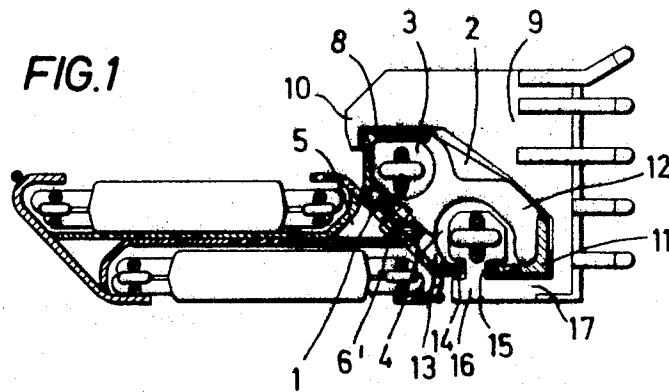
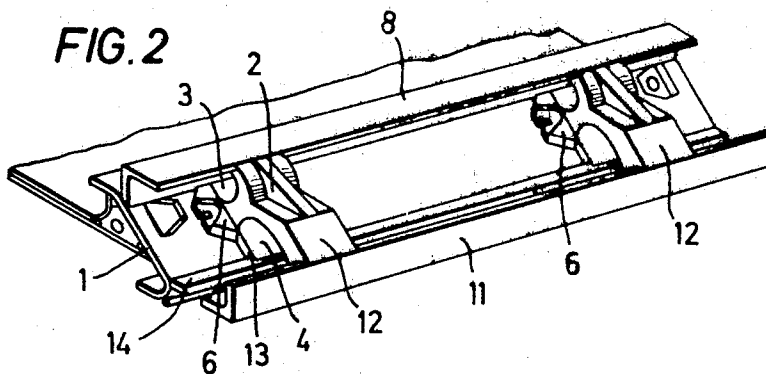
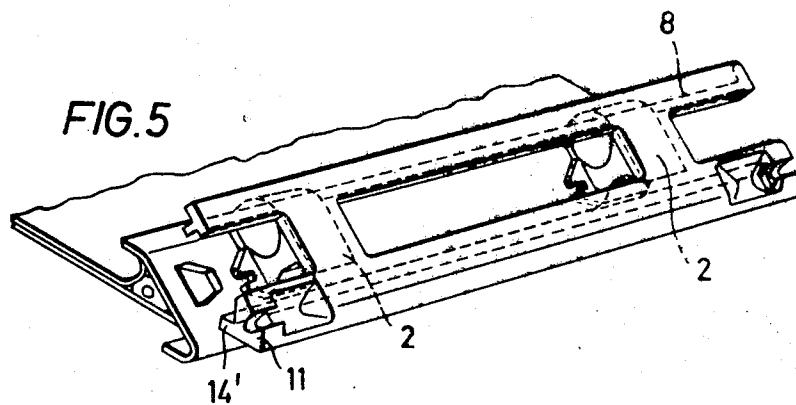
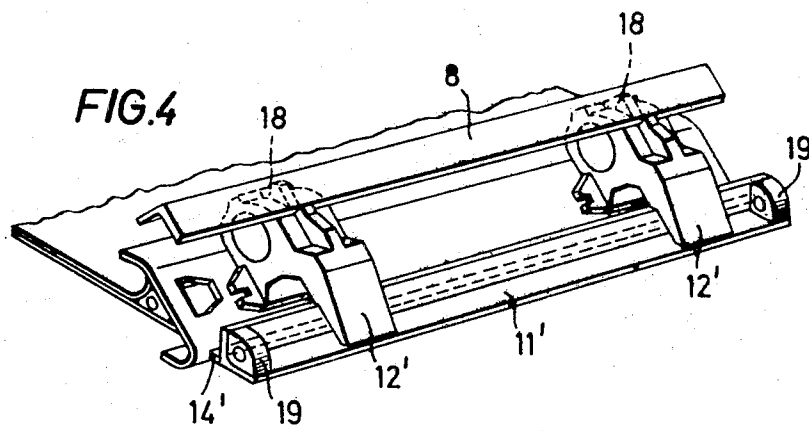
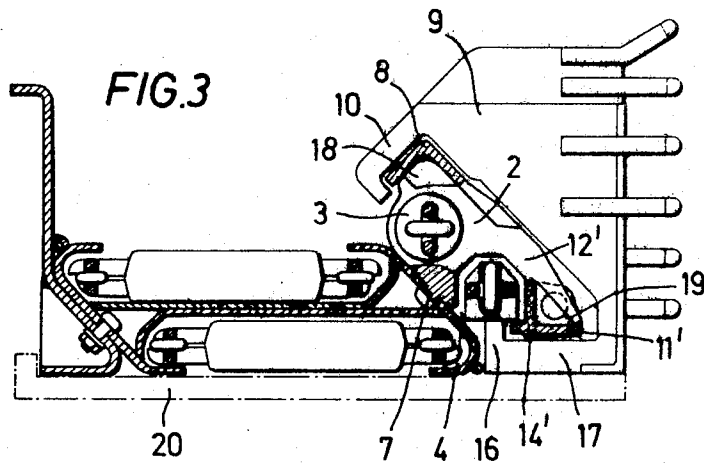


FIG. 2





GUIDE RAIL DEVICE FOR A LONGWALL MINING MACHINE

The present invention relates to a positive guide device for a mining machine, particularly a chain drawn coal plow. This device is adapted to be detachably fastened in ramplike inclined position on an inclined wall of a face conveyor (preferable a scraper conveyor) facing the coal face. It has in this connection vertically, transversely and laterally displaced looplike guides for a plurality of chain strands of the drawing means and on the bottom there is a longitudinally extending guide slot for connecting the lower chain strand with an extension of the mining machine. This slot can be covered on top by a bent over upper part of the mining machine.

The known positive guide devices for such mining machines have, as a rule, been formed of a heavy steelplate bent in the form of a housing and fastened with brackets and other stiffeners in a detachable manner to the sidewall of the conveyor. In order to obtain sufficiently stiff and resistant guide devices, a considerable expenditure for material and manufacture has been necessary.

This object of the present invention is to provide a simple frame construction which has sufficient resistance to torsion and can easily be mounted and monitored which will assure simultaneously the positive guiding of the mining machine and of the hauling chains.

The positive guide device of this invention is accordingly made with a frame shaped somewhat like a ladder which can be laid against the inclined sidewall of the conveyor. It has longitudinal members (corresponding to the side rails of a ladder when laid sideways) which form the upper and lower profiled guide ledges which are surrounded by the mining machine. It also has rung bodies which are spaced at a maximum distance from each other. Each rung has a letter "H" shape provided with looplike chain guide channels which are used as fastening brackets.

Such a ladderlike guide frame corresponds in length to a conveyor-trough section, is simple in construction and manufacture and when made with correspondingly strong profiling of the longitudinal member and rung bodies is a flat frame which has substantial dimensional rigidity and resistance to torsion and is particularly well suited for placing against the inclined sidewall of a face conveyor. Because of the inclined position and the cooperation with the inclined sidewall of the conveyor, the coal which is loosened and pushed off by the mining machine passes into the conveyor 21 without any substantial hindrance. The open ladderlike positive guide frame holds the material in loosened condition and thereby supports the transfer movement of the material by the hauling chain. With the open frame, the chains remain positively guided in the same way as the mining machine, and in case any disturbances occur, they can easily be noted and eliminated. The ladderlike construction of the frame of this positive guide device permits flexibility in use such as the provision for a ramp plate which is detachably fastened to the ladder rung bodies.

In a preferred embodiment of the invention, the longitudinal members of the ladderlike frame are formed of shaped iron sections corresponding approximately to the length of one trough section and the rung bodies are formed of letter "H" shaped bodies welded between said longitudinal members which are provided with guide channels and fastening means. The simple but strong shaped iron sections are spaced apart by the cast or die-forged rung bodies. Such a ladderlike frame is particularly well suited to form curved sections of this positive guide device, or one can follow any desired change in the ramp angle of the conveyor.

If needed, the ladderlike frame can be made as a single casting, particularly if the lengths of the sections are not made too great.

The frame can be made of standard equal-armed angle iron, approximately the same size being used for both the longitudinal members. These angle irons make possible the formation and defining of the guide channels in the rung members as well in the guide slot for the plow extension which will be connected with the lower chain strand.

When using the ladderlike frame as a positive guide device, it is possible in special cases to provide bearings on the ends of the lower guide members and coupling means for two successive longitudinal members.

The ladderlike frame for this positive guide device creates a good base upon which to arrange the upper longitudinal spar of the frame and this does not impede loading to a higher level than the upper edge of the sidewall of the conveyor. In this connection a transfer gap can remain open below the longitudinal member and a part of the material can be discharged by means of the conveyor strands towards the conveyor via this opening in the positive guide device.

Other object and advantages will become apparent from the following description of a preferred embodiment in which:

FIG. 1 is a sectional view of a first embodiment;

FIG. 2 is a perspective view of the first embodiment;

FIGS. 3 and 4 show the second embodiment of the positive guide device in vertical cross section and in perspective side view respectively;

FIG. 5 shows a third embodiment in perspective side view.

In all the embodiments shown, the ladderlike frames are placed on and detachably fastened to the sidewall 1 of a face conveyor which faces the coal face and is inclined at an acute angle of, for instance, about 45°. The ladderlike frames consist of the upper longitudinal member 8 used as a guide ledge and the lower longitudinal member 11 also used as a guide ledge, and at least two rung bodies 2 which are arranged at a considerable distance apart and space the longitudinal members 8 and 11 from each other and are welded between them. These welded together frames are relatively flat and are substantially parallel on the top and bottom sides.

The rung bodies 2 may be cast or forged or die forged in one piece and have approximately the shape of a letter "H" with an upper chain channel 3 and a lower chain channel 4. In the region between these chain channels 3 and 4, the rung bodies are wider on the bottom to present flattened wings 6 in the longitudinal direction of the conveyor which have means for attachment to the conveyor sidewall. The connection with the sidewall 1 can be effected by bolts 6' the heads of which are inserted in keyholelike recesses in the sidewall of the conveyor, in the region of the space 5, and the nuts of which lie in depressions in the wings 6 of the rung bodies. On the bottom of the rung bodies there are provided projections 7 protruding between the wings 6 (see FIG. 3), which serve as centering pins and enter correspondingly located recesses in the sidewall of the conveyor. In FIG. 2 the bolts 6' have not been shown.

In the embodiment shown in FIGS. 1 and 2, the upper chain channel 3 is closed by a standard commercial equal-armed angle iron which forms the longitudinal member 8 of the frame. The arms of this angle iron are welded to the two upward-directed arms of the rung body 2. A bent-over extension 10 of the coal plow 9 extends from above over the angle iron of the longitudinal member 8.

The lower longitudinal member 11 is also formed of similar angle iron 11 and is identical in cross section with the profile of the upper longitudinal member 8.

In the above-mentioned construction, the angle irons of both longitudinal members 8 and 11 are arranged as mirror images of each other, the arms being directed towards each other. One arm of the angle iron extends horizontally and the other vertically. The vertically upwardly directed arm of the lower angle iron is welded to the outer fork arms 12 of the rung body 2. The edge of the lower angle-iron arm forms the inner limitation for the lower chain channel 4 in which the pulling strand of the plow chain is guided.

To the lower inner fork arm 13 of the rung body which rests against the conveyor sidewall, there is welded a horizontally extending limiting ledge 14 which narrows the chain channel 4 on the conveyor side. Limiting ledge 14 and the lower longitudinal member 11 form a guide slot 14 in which the vertically directed connecting part 16 of the lower plow extension 17 slides. The slot is sufficiently narrow so that the plow pull chain cannot move downward out of the guide channel. The distance of the limiting ledge 14 and of the horizontal angle-

iron arm from the base surface of the conveyor is great enough that the plow extension 17 has sufficient room for movement without having to lift the conveyor. The upper longitudinal member 8 can also be arranged higher than shown in the drawing and a passage slot for the material to be loaded can be provided between said longitudinal member and the upper edge of the sidewall of the conveyor.

In the second embodiment shown in FIGS. 3 and 4, the upper chain channel 3 is closed on all sides in the rung bodies 2. The upper end of the rung body has in each case a projection 18 on which the angle iron of the upper longitudinal member 8 is placed and welded fast. The angle-iron arms are in this embodiment arranged in roof shape, i.e., each of them inclined downward at an angle of about 45°. A bent-over extension 10 of the coal plow 9 engages the angle iron of the upper longitudinal member 8.

The outer upward directed fork arm 12' of the rung body 2 is welded to the side of the angle iron of the lower longitudinal member 11'. In this arrangement, in which the angle iron of the lower longitudinal member is turned outward by about 45° as compared with the angle iron of the upper longitudinal member, the vertically directed angle-iron arm forms a part of the inner limitation of the lower chain channel 4. This angle-iron arm furthermore presents a limiting ledge 14'.

In FIGS. 3 and 4 the possibility of connecting together several of the lower longitudinal members 11' is shown. Stop members 19 having bore holes for coupling elements are welded near the end of the angle irons.

The embodiment in accordance with FIG. 5 corresponds essentially to the construction of FIGS. 3 and 4. In this case the rung bodies 2 and the longitudinal members 8 and 11, including the limiting ledge 14' are made as a one-piece casting.

In FIG. 3 there is shown another embodiment for the guiding of the plow which is particularly intended for use in a wall of greater thickness. In this case the plow is equipped with an extension 20 which stabilizes the position of the plow. The length of this extension which extends below the conveyor can be adapted to the specific conditions. If needed, the extension extends entirely below the conveyor and is provided at its end with a bent-over guide extension 22. The extensions are constructed in platelike fashion in a known manner. In accordance with this proposed construction, a shareless plow can, if need be, be provided with a share without having to change the positive guide device which, as described, is formed with a ladderlike frame.

FIG. 3 shows furthermore the arrangement of the upper longitudinal member 8 at a greater distance above the upper edge of the conveyor sidewall so that the material loosened by the coal plow can be conducted by means of the plow haulage chains directly into the conveyor.

What is claimed is:

1. A positive guide device for a chain-driven mining machine adapted to be detachably fastened to the face of the conveyor of said machine comprising an upper and lower longitudinal member, a plurality of rungs extending between said members and secured thereto, said rungs having means for securing them to the face of the conveyor, each said rung having vertically and horizontally spaced-apart upper and lower openings, all said upper openings being in alignment with each other to provide guide means for the upper course of said chain, all said lower openings being in alignment with each other and each having a guide slot for passage therethrough of the machine cutter support which is connected to the lower course of said chain.

2. The guide device of claim 1, in which said longitudinal members are shaped iron sections corresponding approximately to a trough section length and the rungs are welded between said members.

3. The device of claim 1, including coupling means adjacent at least one end of at least one of said longitudinal members for attaching successive sections thereto.

4. The device of claim 1, wherein the upper and lower members are angle irons and are mirror images of each other, one arm of each angle iron being parallel to the base of the conveyor and the other being perpendicular thereto.

5. The positive guide device of claim 4, wherein the edge of the lower horizontal angle-iron arm of the lower longitudinal member forms the outer limiting ledge of the guide slot for the cutter support.

7. The positive guide device of claim 4, wherein the lower inner portion of the rung is restrained by a limiting ledge which defines the guide slot for the cutter support on the inside.

6. The positive guide device of claim 5, wherein the lower horizontal angle-iron arm of the lower longitudinal member and the inner limiting ledge are spaced from the base surface of the conveyor a distance at least equal to the thickness of an extension of the cutter support.

8. The device of claim 1, having a closed upper guide channel with the upper longitudinal member secured thereabove in an inverted "V" fashion.

9. The device of claim 8, wherein the lower longitudinal member is an angle iron having its bottom arm approximately horizontal with its two edges fastened to the lower inside end of the rung and a guide ledge projecting from one side thereof.

10. The device of claim 9, wherein a part of the wall of the lower chain guide channel is formed by the upwardly directed arm of the lower longitudinal member and said guide ledge projects into a slot of an extension of the cutter support.

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