

[54] CHAIN GUIDING STRUCTURE FOR LONGWALL MINING

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[58] Field of Search.....299/34, 43, 32

[56] References Cited

UNITED STATES PATENTS

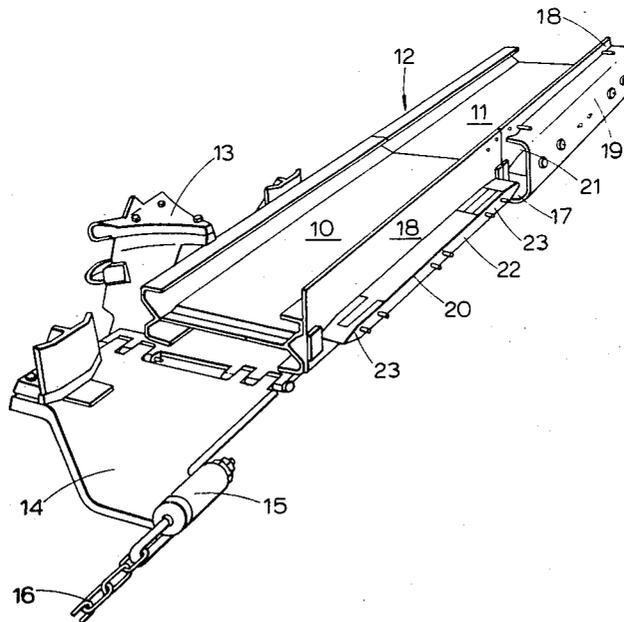
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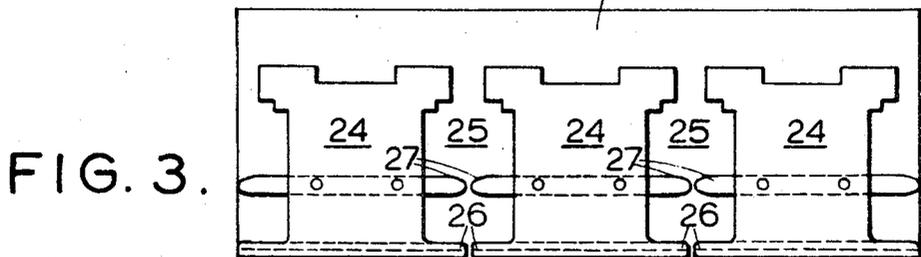
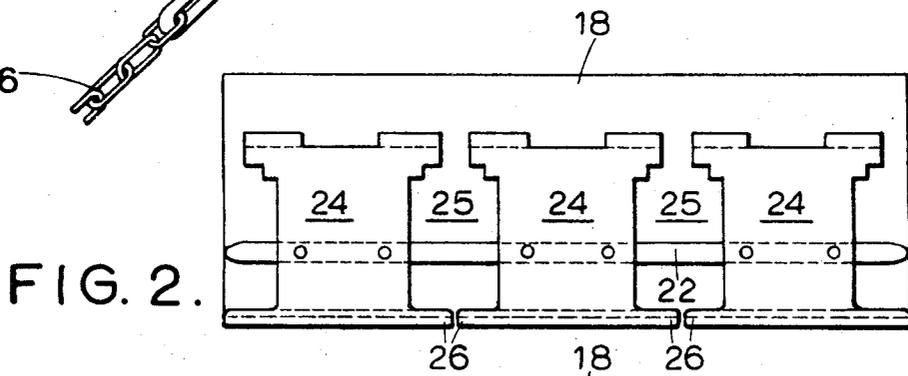
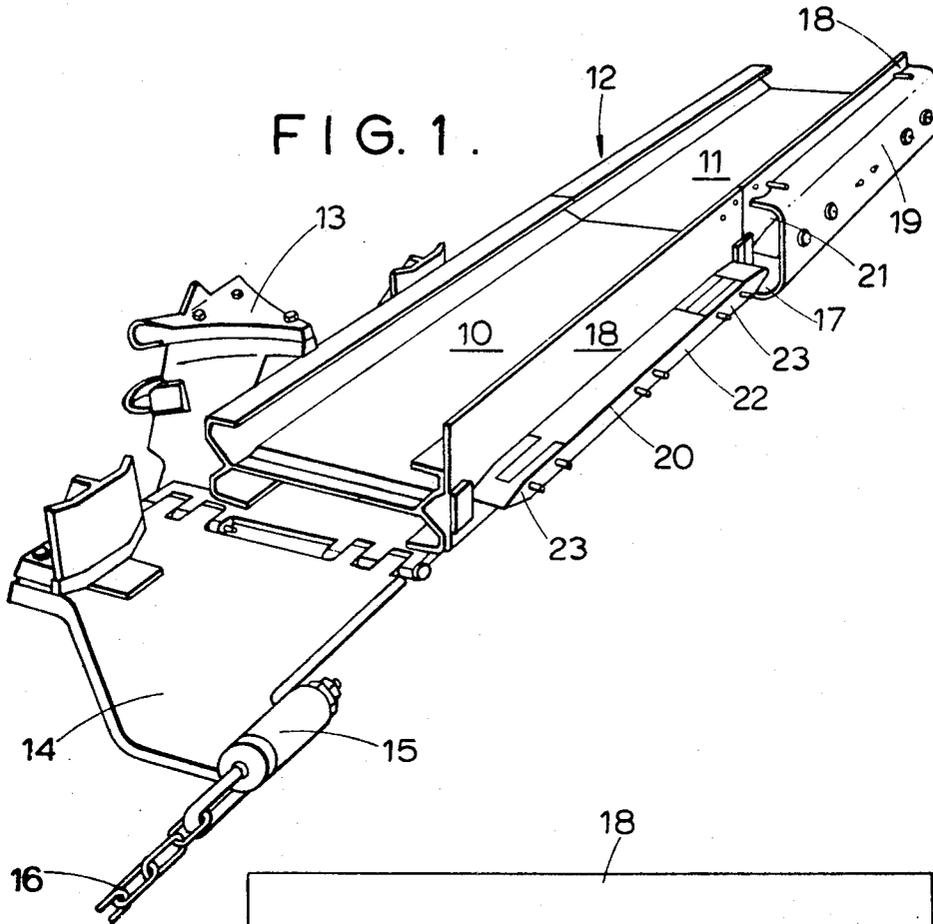
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[57] ABSTRACT

A mineral mining installation with a conveyor extending alongside a mineral face and a plough movable along the conveyor to win and load mineral into the conveyor. The plough is driven by a chain circulated in haulage and return runs arranged one above another at the side of the conveyor remote from the mineral face and these chain runs are disposed in guide channels defined between plates attached to the side of the conveyor and covers attached to the plates. The guide channels are separated by elongate slide members arranged end-to-end between the plates and the covers. The upper chain run slides in contact with the slide members over its entire length to inhibit whipping of the chain.

11 Claims, 6 Drawing Figures





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FIG. 5.

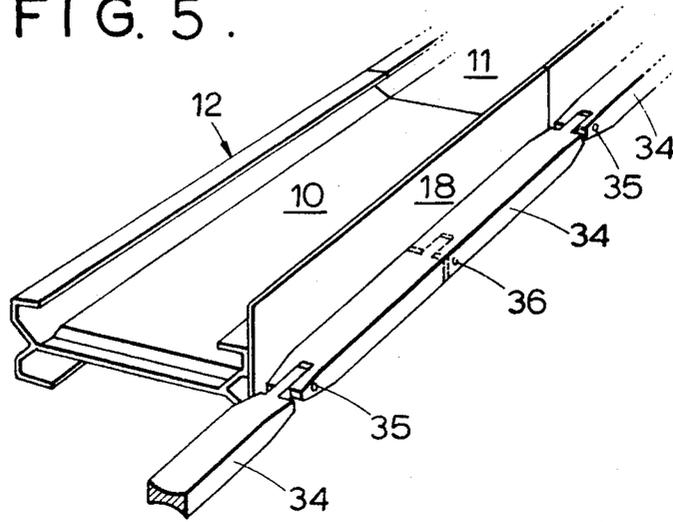


FIG. 4.

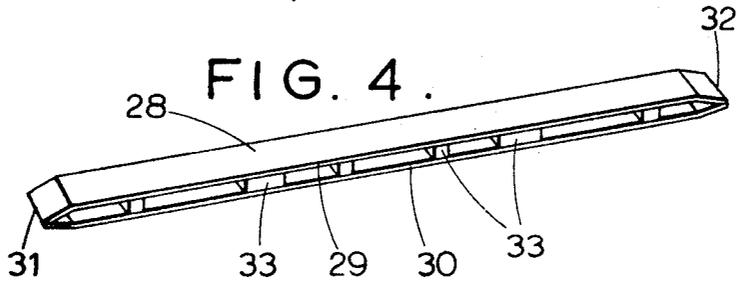
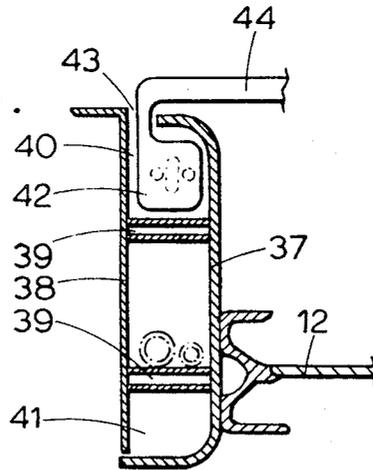


FIG. 6.



CHAIN GUIDING STRUCTURE FOR LONGWALL MINING

BACKGROUND TO THE INVENTION

This invention relates in general to mineral mining installations intended for winning minerals more particularly coal.

In the generally known mining installations consisting of a conveyor and a plough movable therealong to cut and load coal into the conveyor, the latter is adapted at one side or the other for guidance of the chain used for driving the plough. This chain is normally arranged in a haulage and a return run disposed one above the other extending substantially the entire length of the conveyor.

In practice it is found that owing to continually changing load the chain runs perform oscillatory movement transversally to their longitudinal direction. This movement usually termed "whipping" creates considerable noise and causes extreme discomfort to the operating personnel.

A general object of this invention is to provide an installation which will mitigate this problem.

SUMMARY OF THE INVENTION

According to the present invention there is provided a mineral mining installation comprising a conveyor composed of channel sections joined end-to-end, a plough mounted for movement along the conveyor, a chain usable to displace the plough along the conveyor, guide channels formed on one side of the conveyor for receiving the haulage and return runs of the chain disposed one above the other, and means operably associated with said guide channels and adapted to slidably contact one of the chain runs over a distance corresponding at least to the length of one of the conveyor channel sections.

It has been found in practice that the nominal slidable contact between one of the chain runs and the slide means surprisingly enough, prevents the chain run from whipping. In general, the guide channels for the chain are formed by a number of simple interconnected parts which can be rapidly and easily removed and replaced in case of need.

In one form upstanding plates arranged end-to-end are attached to said one side of the conveyor and a cover member is attached to each of said plates, the guide channels being formed between the cover members and plates.

The slide means can then be formed at least partly by elongate slide members disposed end-to-end between said cover members and said upstanding plates and adapted to contact the upper run of the chain.

A number of cover members may be allocated to each conveyor channel section, these cover members being arranged end-to-end with gaps therebetween. Preferably these cover members have lower extensions which combine to form a further slide means adapted to contact the lower run of the chain. In this construction each chain run can be supported over practically its entire length. The whipping of the plough chain can thus be inhibited in both runs.

The cover members may alternatively be of U-shaped construction arranged end-to-end without gaps therebetween with each cover member being allocated to one of the channel sections.

Each slide member can have a central part of relatively soft material and tapered end parts of relatively hard material.

The individual slide members can be pivotably interconnected to one another and to said upstanding plates.

This latter feature enables the conveyor to cope with inclined floors in mine workings.

In another construction each slide member is composed of two parallel strips of material spaced apart by intermediate pieces and having their ends bent towards one another.

If the plough is bulky and heavy and of the swordless type, as is sometimes required for the working of comparatively thick seams the upper run of the chains is the haulage run and the lower run is the return run. In this case the slide means preferably takes another form and is constituted by the upper of two linear rows of elongate slide members arranged end-to-end, the rows being disposed one above another between said cover members and said upstanding plates. With this construction there is a greater distance between the two guide channels than with the other constructions. The capacity of the conveyor can be increased by the use of barrier plates.

The invention may be understood more readily, and various other features of the invention may become more apparent from consideration of the following description.

BRIEF DESCRIPTION OF DRAWINGS.

Embodiments of the invention will now be described, by way of examples only, with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a mineral mining installation made in accordance with the invention;

FIG. 2 is a side view of the goaf side of the installation with modified cover members;

FIG. 3 is a view corresponding to FIG. 2 depicting a further modification to the installation;

FIG. 4 is a perspective view of a further type of slide member for use in the installation;

FIG. 5 is a perspective view of an installation with another arrangement of slide members; and

FIG. 6 is a part sectional end view of the goaf side of a further installation made in accordance with the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS.

As shown in FIG. 1, a mineral mining installation has a scraper chain conveyor 12 disposed alongside the mineral face to be won. The conveyor 12 is composed of individual channel sections 10, 11 joined end-to-end. A plough 13 is mounted for sliding along the mineral-face-side of the conveyor 12 and the plough 13 has an articulated sword plate 14 which extends beneath the underside of the conveyor 12. A circulating chain 16 is used to drive the plough 13 along the conveyor 12 and the sword plate 14 is provided with guide members 15 on the stowage or goaf side of the conveyor 12 which members 15 together with the lower haulage run of the chain 16 are guided in a lower guide channel 17 formed at the goaf side of the conveyor 12. An upper guide channel 21 is also formed on the goaf side of the conveyor 12 above the channel 17 and the upper return run of the chain 16 is guided in the channel 21.

The guide channels 17, 21 are formed by the combination of upstanding plates 18 attached to the goaf side of the conveyor 12, U-shaped cover members 19 and slide members 20. The members 20 are positioned centrally within the members 19 and attached to the plates 18 at a position downwardly offset from the centers thereof. The members 19 are in turn attached to the members 20. Each of the members 18, 19, 20 corresponds in length to one of the channel sections 10, 11 of the conveyor 12 so that each channel section 10, 11 has allocated to it one of the plates 18, one of the members 19 and one of the members 20. Since the members 19, 20 are attached to the lower part of the plates 18 the lower guide channel 17 is open towards the mineral face at its lower extremity whereas the upper guide channel 21 is closed. It is arranged that the upper return run of the chain 16 rests on the upper face of each of the slide members 20 substantially over the entire length of the member 20. This is found to inhibit whipping of the chain 16 which gives rise to excessive noise.

In FIG. 1, each slide member 20 is composed of three separate parts namely a central part 20 interlocked with tapered end parts 23. The part 20 is made from a relatively soft inexpensive material whereas the parts 22 are much harder and more resistant to wear. The parts 22 can be made, for example, of hard manganese steel. The formation of the slide members 20 in this manner is particularly advantageous since the members 20 can have a long working life at relatively low cost.

FIGS. 2 and 3 depict alternative constructions. In FIG. 2, the U-shaped member 19 allocated to one channel section 10, 11 is replaced by shaped cover members 24 which are spaced apart along the length of the channel sections 10, 11 with openings 25 between the adjacent members 24. The openings 25 permit access to the interior of the channels 17, 21 and allow the passage of the chain 16 to be observed. The lower part of each cover member 24 is provided with extensions 26 and the extensions 26 combine to form a further sliding surface for the haulage run of the chain 16 in similar manner to the upper surfaces of the members 22 for the return run of the chain 16. Thus whipping of the haulage run as well as the return run of the chain can be inhibited or prevented.

In FIG. 3 the single multi-part member 20 allocated to each channel section 10, 11 is replaced by three separate members 27 which perform the same function as the member 20. Each member 27 is formed in one-piece or is of multi-part construction and is shaped in the same manner as the member 20.

FIG. 4 depicts another construction form for the slide member (20,27). In this form the slide member here designated 28, is composed of two parallel strips 29, 30 spaced apart by intermediate pieces 33. The ends of the strips 29, 30 are bent towards one another and welded together to form tapered end sections 31, 32 for the member 28. The strips 29, 30 may also be welded to the pieces 33. The slide member 28 can be used in the construction shown in FIG. 1, 2 or 3.

FIG. 5 depicts another modified slide member here designated 34. In this construction, the individual slide members 34 are pivotably interconnected at their ends by means of pivot pins 35 each inserted into a mating aperture and lug of the two associated members 34 and engaging in the plate 18. Instead of a single member 34

for each channel section 10, 11 and plate 18 a plurality of such pivotably interconnected members can be provided in the manner indicated by the extra reference numeral 36. In this arrangement the members 34 can serve as holding means for the conveyor 12 in the event that the floor of the mine working is steeply inclined.

A further embodiment is illustrated in FIG. 6, which is intended for heavy swordless ploughs. In FIG. 6 the planar plates 18 are replaced by shaped plates 37. The cover members 19, 24 are replaced by cover members 38 in the form of planar plates each with a flange at its upper end. As slide means there is provided two linear rows of slide members 39 disposed one above the other between the plate 37 and the member 38. Hydraulic conduits and/or electrical cables can be accommodated within the space between the members 39. The members 39 may, for example, be constructed as shown in FIG. 4. The upper guide channel in this construction is designated 40 and is formed above the upper face of the upper row of members 39. The lower guide channel in this construction is designated 41 and is formed below the lower face of the lower row of members 39. The channel 41 is closed at its lower end by a wall formed by bending the lower end portions of the plates 37 and the lower chain run may contact this wall. The channel 40 is open at its upper end through an aperture 43 formed between the plates 38 and the end of a wall formed by bending the upper end portions of the plates 37. In this arrangement the plough has a plate 44 which extends in gantry-fashion over the conveyor 12. The plate 44 is formed with guide members 42 which extend through the gap 43 into the guide channel 40. The channel 40 serves to guide the members 42 and the haulage run of the drive chain. The channel 42 serves to guide the return run of the drive chain.

We claim:

1. A mineral mining installation comprising:
 - a. a conveyor composed of channel sections joined end-to-end;
 - b. a plough mounted for movement along the conveyor;
 - c. a chain operably connected to the plough, the chain being arranged in haulage and return runs disposed one above the other;
 - d. upstanding plates arranged end-to-end and attached to one side of the conveyor;
 - e. cover members arranged end-to-end and attached to said plates to form guide channels for receiving said haulage and return runs;
 - f. slide means formed by elongate slide members disposed end-to-end between the plates and cover members to slidably contact the upper of the chain runs over a distance at least corresponding to the length of one of the conveyor channel sections.
2. An installation according to claim 1, wherein each conveyor channel section has allocated to it one of the upstanding plates and one of the cover members which is of U-shaped cross-section.
3. An installation according to claim 1, wherein each conveyor channel section has allocated to it one of the upstanding plates and several cover members which have gaps therebetween, the cover members having lower extensions which combine to form a further slide means adapted to contact the lower run of the chain over a substantial part of its length.

4. An installation according to claim 1 wherein each slide member is of multi-part construction with a central section of relatively soft material and tapered end sections of relatively hard material.

5. An installation according to claim 1, wherein each conveyor channel section has allocated to it one of the slide members. 5

6. An installation according to claim 1, wherein each conveyor channel section has allocated to it several of the slide members. 10

7. An installation according to claim 1, wherein the slide members are pivotably interconnected to one another and to said upstanding plates. 15

8. An installation according to claim 1, wherein each slide member is composed of two attached parallel strips of material spaced apart by intermediate pieces and having their end portions bent into contact with one another. 15

9. An installation according to claim 1, wherein the upper run of the chain is the return run and the plough has a sword plate extending beneath the conveyor, the sword plate being provided with guide members received in the lower of the guide channels. 20

10. A mineral mining installation comprising:
a. a conveyor composed of channel sections joined 25

- end-to-end;
- b. a plough mounted for movement along the conveyor;
- c. a chain operably connected to the plough, the chain being arranged in haulage and return runs disposed one above the other;
- d. upstanding plates arranged end-to-end and attached to one side of the conveyor;
- e. cover members arranged end-to-end and attached to said plates to form guide channels for receiving said haulage and return runs; and
- f. slide means formed by the upper of two vertically offset linear rows of elongate slide members arranged end-to-end between the plates and cover members, said slide means serving to slidably contact the upper of the chain runs over a distance at least corresponding to the length of one of the conveyor channel sections.

11. An installation according to claim 16, wherein the upper run of the chain is the haulage run and the plough has a gantry plate extending over the conveyor, the gantry plate being provided with guide members received in the upper of the guide channels.

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