

[54] LONGWALL MINING INSTALLATION WITH DRIVE CHAIN TENSION CONTROL

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[58] Field of Search...299/34, 43; 74/242.8, 242.12, 74/242.13 R, 242.13 A, 242.14 R

[56] References Cited

UNITED STATES PATENTS

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[57] ABSTRACT

A mineral mining installation with a longwall scraper-chain conveyor having a chain at one side for driving a mineral winning machine. The conveyor is detachably affixed at one end to a frame of a drive station for the chain. The drive station has a frame attached to the conveyor which frame has a top wall which is provided on its underside with two guide tubes. These guide tubes slidably support a constructional unit composed of a drive motor and gearing. The gearing has an output shaft which carries a sprocket wheel engaged with the chain and disposed close to the floor of the working. The upper and lower runs of the chain are guided onto the sprocket wheel with little or no angular deviation from their normal rectilinear course parallel to the conveyor. A piston and cylinder device is used for displacing the unit along the guide tubes to vary the tension in the chain.

16 Claims, 2 Drawing Figures

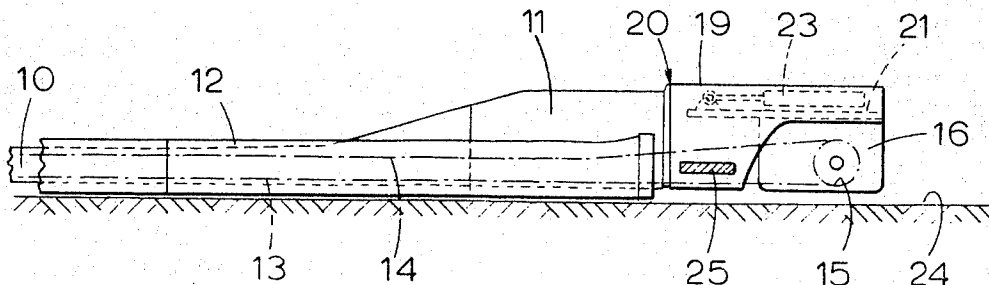


Fig. 1.

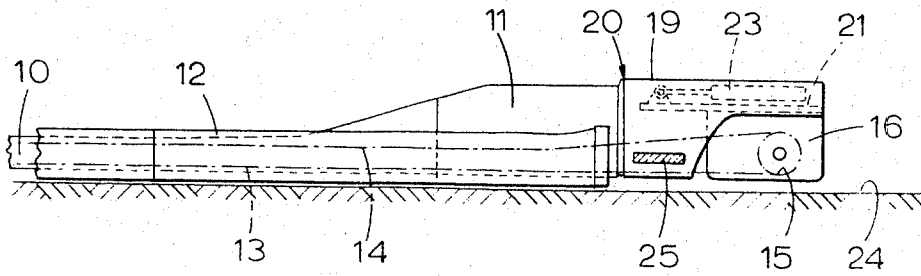
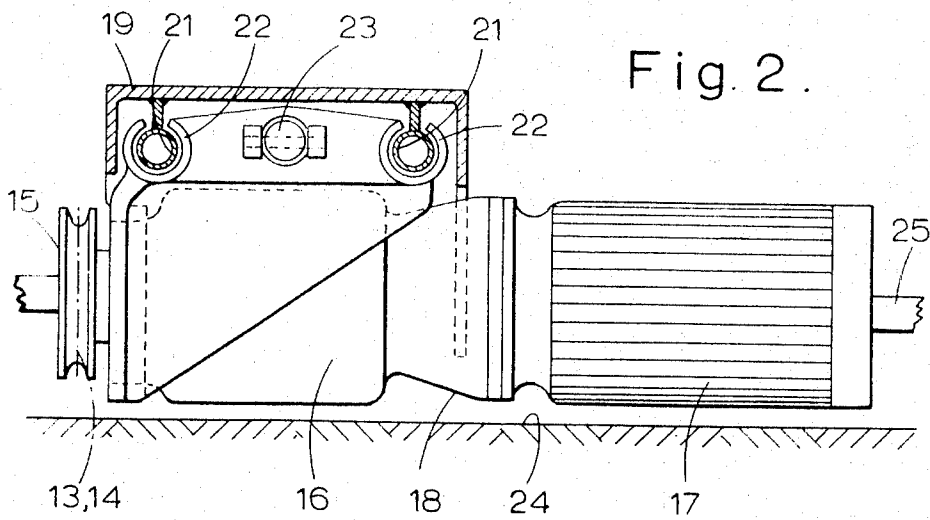


Fig. 2.



## LONGWALL MINING INSTALLATION WITH DRIVE CHAIN TENSION CONTROL

### BACKGROUND TO THE INVENTION

The present invention relates to mineral mining installations of the type comprising a longwall conveyor having a mineral winning machine such as a plough, mounted for movement along one side of the conveyor.

It is known to provide an auxiliary drive station for the winning machine at one end of the conveyor so as to enable the machine to be moved right up to the end of the conveyor thus requiring no stall zone or only a small stall zone at this end of the working. This drive station has an L-shaped frame usually connected to the side wall of the conveyor and supporting the drive means used to drive a drive chain connected to the machine.

This form of drive station necessitates that the drive chain be guided onto a sprocket wheel of the drive means with a relatively large angle of deflection. This is disadvantageous since it increases wear and loses power. The drive means is essentially fixed to the frame and hence the conveyor and it is thus not possible to vary the position of the sprocket wheel and the tension in the chain. Other forms of drive station wherein the upper or lower run of the chain can be guided onto the sprocket wheel without deflection have also been proposed but these drive stations involve other disadvantages.

A general object of this invention is to provide an improved mineral mining installation.

### SUMMARY OF THE INVENTION

According to the invention there is provided a mineral mining installation comprising a longwall conveyor with a drive chain at one side and an assembly disposed at one end of said conveyor said assembly being composed of a frame detachably fixed at said one end of the conveyor and drive means for driving said chain, the drive means being displaceable in relation to said frame and in the direction of the longitudinal axis of the conveyor.

In another aspect the invention provides an assembly for use with a mineral mining installation having a longwall conveyor; said assembly comprising a frame attachable to one end of said conveyor and drive means with a sprocket wheel engageable with a drive chain disposed at one side of the conveyor, said drive means being displaceable in relation to said frame in the direction of the longitudinal axis of the conveyor whereby to vary the tension in said chain.

The aforesaid assembly can constitute an auxiliary drive station for a winning machine connected to the chain.

The drive means is preferably slidably suspended from said frame. The drive means may have a sprocket wheel engaging with said chain, the sprocket wheel being disposed closely adjacent the floor of the mine working. In this way the chain can be guided onto the sprocket wheel so that one or both runs of the chain is undeflected from its normal rectilinear course.

The frame may be provided with at least one elongate guide member extending parallel to the longitudinal axis of the conveyor and the drive means has a shaped guide element which slidably locates on said guide

member. Preferably there are two guide members spaced apart laterally of the conveyor and two guide elements each located on a respective one of said guide members. The frame may be of inverted U-shaped configuration with two side walls and a top wall adjoining said side walls, the, or each, guide member being provided on the inner face of said top wall.

A piston and cylinder unit or some other means can be provided for moving the drive means in relation to the frame. This unit can be disposed beneath the top wall of the frame between the guide members so that it is protected.

In a preferred form the drive means comprises a drive motor linked through coupling means to gearing having an output shaft carrying the sprocket wheel. The housing of the motor, the gearbox for the gearing and a casing for the coupling means may be rigidly interconnected to form a constructional unit extending laterally of the conveyor.

Further according to the invention there can be provided a bracing means for bracing the conveyor. This bracing means preferably acts on the frame of the assembly and can take the form of chocks. However, it is preferred to use a bracing beam, known per se, which extends across the frame and between the drive and return runs of the chain. The beam may pass through apertures in the side wall of the frame. It is expedient to connect the assembly to a further frame provided at the end of the conveyor and supporting a drive or reversing drum for the scraper-chain assembly. The two frames may have inter-engageable flanges for this purpose.

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 DRAWING

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawing, wherein

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

FIG. 2 is an end view of the installation.

### DESCRIPTION OF PREFERRED EMBODIMENT

As shown in the drawing a mineral mining installation has a longwall scraper-chain conveyor 10. On the side of the conveyor 10 facing the mineral face there is provided a guide 12 which may be the side wall of the conveyor, for slidably guiding a winning machine or plough (not shown). The winning machine is in known manner moved back and forth along the conveyor 10 to detach mineral from the face. A drive chain having a lower run 13 and an upper run 14, is used to propel the winning machine along the conveyor. The end of the conveyor 10 is formed with a frame 11 which supports the drive or reversing drum for the scraper chain assembly of the conveyor. To this frame 11 is attached an assembly made in accordance with the invention and constituting an auxiliary drive station for the winning machine. This assembly in fact provides the drive for the chain 13,14. The chain 13,14 is entrained around a sprocket wheel 15 which is drivably coupled to a drive motor 17. More particularly, the wheel 15 is carried by the output shaft of gearing mounted in a gear box 16 and coupling means mounted in a casing 18 connects the gearing to

the output shaft of the motor 17. The casing 18, the gear box 16 and the housing of the motor 17 are rigidly interconnected to form a constructional unit which is suspended from a frame 19 which is connected, via flanges 20, with the frame 11. The frame 19 is basically of inverted U-shape with a top wall and side walls. The inner face of the top wall is attached to two laterally spaced guide members in the form of rods or tubes 21 which extend generally parallel to the conveyor 10. The aforesaid constructional unit 16,18,17 is provided with, or connected to, guide elements 22 which are slidably located on the members 21 and which partially extend around the latter. In this way the unit 16,18,17 and the sprocket wheel 15 can be displaced in relation to the frame 19. To effect such displacement there is provided a piston and cylinder unit 23 which is operably connected between the frame 19 and one of several plates connected to the unit 16,18,17 and having shaped portions constituting the elements 22. The unit 23 can thus be used to displace the sprocket wheel 15 and hence tension or untension the chain 13,14.

The entire assembly 15,16,17,18 extends laterally of the conveyor and is disposed closely adjacent the floor 24 of the working. This is advantageous particularly in regard to the fact that the lower run 13 of the chain 13,14 can be guided directly onto the sprocket wheel 15 without deviation from its normal course. The upper run 14 of the chain is also only deflected by a small degree from its normal course.

A bracing beam 25 known per se is used to brace the conveyor 10. This beam 25 acts on the conveyor 10 via the frame 19 and the beam 25 passes through apertures in the side walls of the frame 19 and is located between the upper and lower chain runs 13,14.

I claim:

1. In a mineral mining installation including a long-wall conveyor, a chain guide mounted on the side of the conveyor, an endless drive chain running in the chain guide for moving a winning machine along the side of the conveyor, a chain drive station comprising:

- a. a frame mounted on the discharge end of the conveyor;
- b. drive means having a shaft-carried sprocket wheel engaging the drive chain;
- c. means for slidably suspending said drive means from said frame to permit movement of said drive means in the direction of the longitudinal axis of the conveyor; and
- d. means for moving said drive means relative to said frame to vary the tension of the endless chain.

2. A drive station according to claim 1, wherein said frame has substantially an inverted U-shape including a top wall and two side walls, said suspending means has at least one elongate member disposed at the underside of said top wall, and said drive means has at least one guide member mounted therewith, said guide member being telescopically mounted on said elongate member.

3. A drive station according to claim 18, wherein said frame is generally of inverted U-shape having a top wall and two side walls, said suspending means includes two elongate members disposed on the underside of said top wall and spaced apart laterally of the conveyor, and said drive means includes two guide elements slidably engaged on said elongate members.

4. A mineral mining installation comprising;

- a. a longwall conveyor;

- b. guide means mounted on said conveyor for guiding a winning machine along one side thereof;
- c. a drive chain carried by said guide means for moving the winning machine along said conveyor; and

- d. a drive station assembly mounted on said conveyor for driving said chain, said assembly comprising;
  - i. a frame attached to the discharge end of said conveyor;
  - ii. drive means drivably coupled to said chain;
  - iii. means for slidably suspending said drive means from said frame for movement in the longitudinal direction of said conveyor; and
  - iv. means for slidably displacing said drive means relative to said frame to vary the tension in said chain.

5. An installation according to claim 4, wherein said drive means has a sprocket wheel in engagement with said chain.

6. An installation according to claim 5, wherein the chain has an upper run and a lower run disposed one above the other, at least one of the runs of the chain being guided onto the sprocket wheel so as to follow a substantially rectilinear course.

7. An installation according to claim 4, wherein said displacing means includes a piston and cylinder unit operably connected between said frame and said drive means.

8. An installation according to claim 4, wherein the frame is provided with at least one elongate guide member extending parallel to the longitudinal axis of the conveyor and the drive means has a shaped guide element which slidably locates on said guide member.

9. An installation according to claim 8, wherein there are two guide members spaced apart laterally of the conveyor and two guide elements each located on a respective one of said guide members.

10. An installation according to claim 8, wherein the frame is of inverted U-shaped configuration with two side walls and a top wall adjoining said side walls, the guide member being provided on the inner face of said top wall.

11. An installation according to claim 4, wherein the drive means comprises a drive motor and gearing coupled to said motor, the gearing being contained in a gear box connected to the motor housing.

12. An installation according to claim 11, wherein there is also provided coupling means operably disposed between the motor and the gearing, the coupling means being contained in a casing connected to said gear box and said motor housing to form a constructional unit extending laterally of the conveyor.

13. An installation according to claim 12, wherein the gearing has an output shaft which carries a sprocket wheel engageable with the chain.

14. An installation according to claim 4, and further comprising means for bracing said conveyor via said assembly.

15. An installation according to claim 14, wherein said bracing means is in the form of a beam on which the frame is supported and wherein the bracing beam extends laterally across the frame between the drive and return runs of the chain.

16. A mineral mining installation comprising;

- a. a longwall conveyor;

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- b. guide means mounted on said conveyor for guiding a winning machine along one side thereof;
- c. a drive chain carried by said guide means for moving the winning machine along said conveyor;
- d. a frame attached to the discharge end of said conveyor; 5
- e. elongate guide members provided on the underside of said frame, said guide members being disposed substantially parallel to the longitudinal axis of said conveyor and being spaced apart laterally with respect to said conveyor; 10

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- f. a drive unit including a motor, a shaft geared to said motor, and a sprocket wheel keyed to said shaft, said sprocket wheel engaging said chain;
- g. guide elements affixed to said drive unit and slidably carried by said elongate guide members; and
- h. a piston and cylinder unit connected between said frame and said drive unit for effecting displacement therebetween.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,790,210 Dated February 5, 1974

Inventor(s) Werner Georg

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 3, column 3, line 59, "claim 18," should be

--claim 1,--

Signed and sealed this 16th day of July 1974.

(SEAL)  
Attest:

McCOY M. GIBSON, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents