June 28, 1966 F. COWLISHAW 3,258,108

BEARING PLATE CONNECTION BETWEEN MINE ROOF SUPPORTS AND CONVEYOR MEANS

Filed May 5, 1964 4 Sheets-Sheet 1

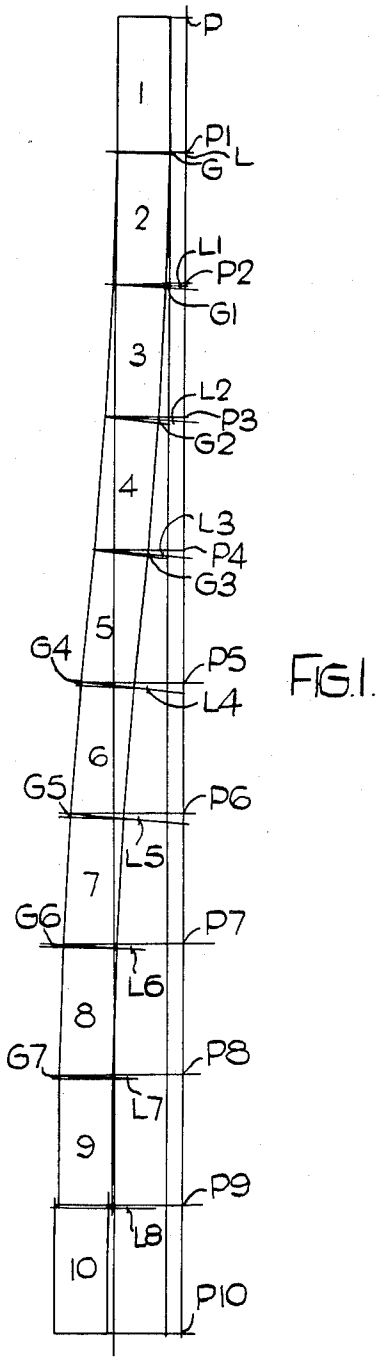

FIG.1.

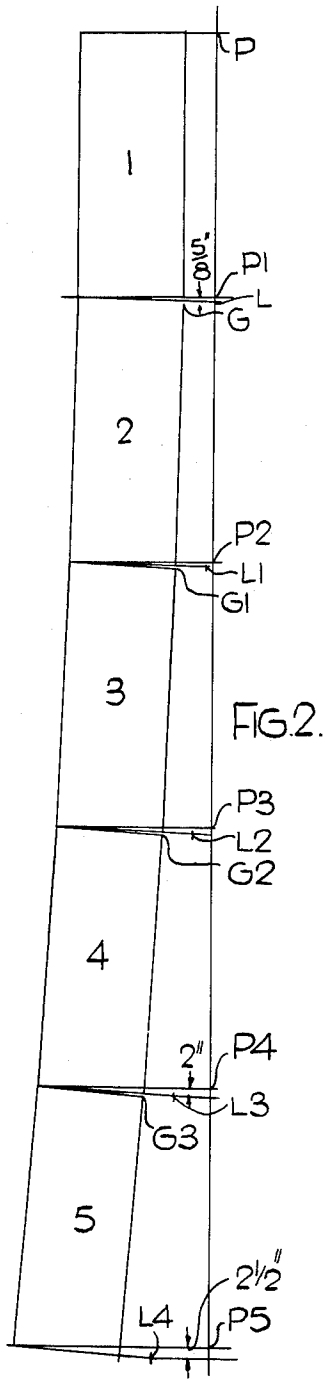

FIG.2.

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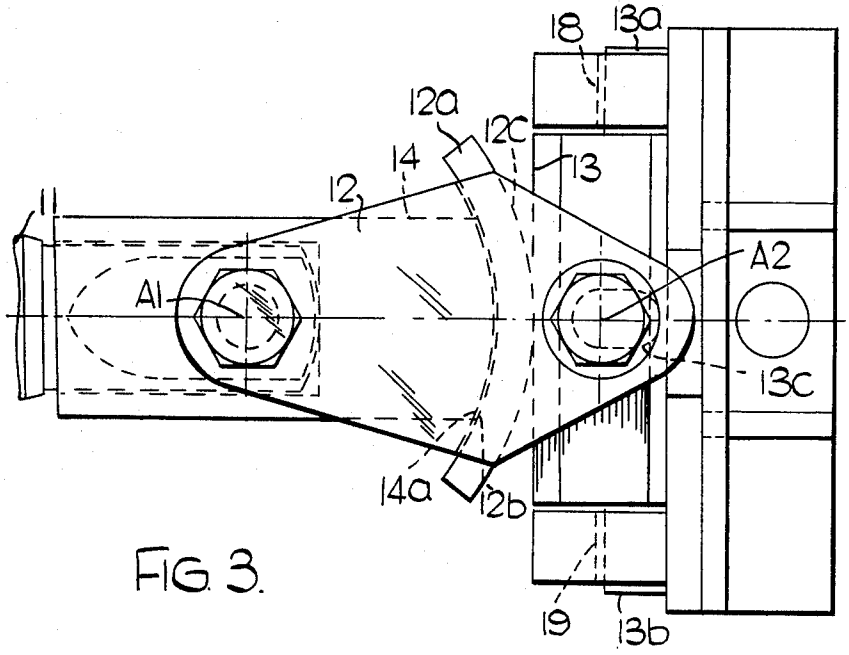

FIG. 3.

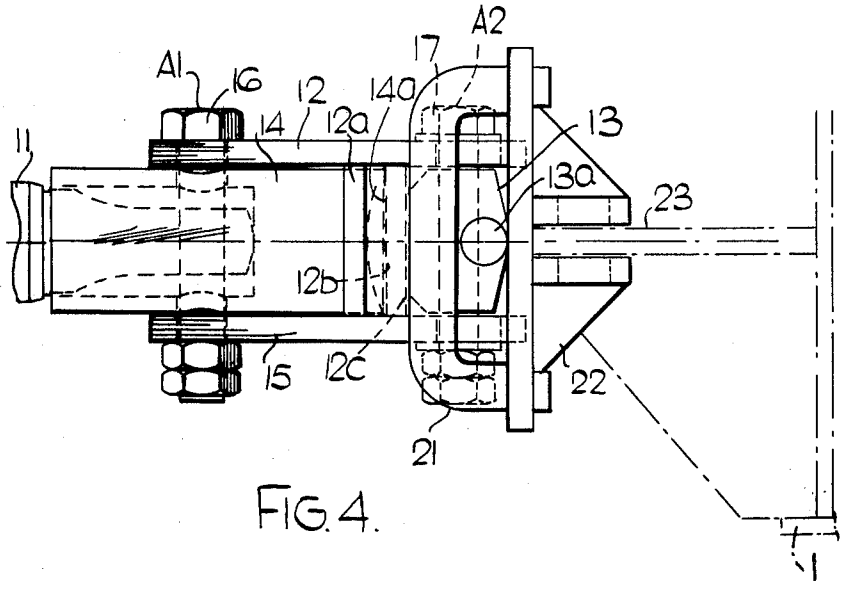

FIG. 4.

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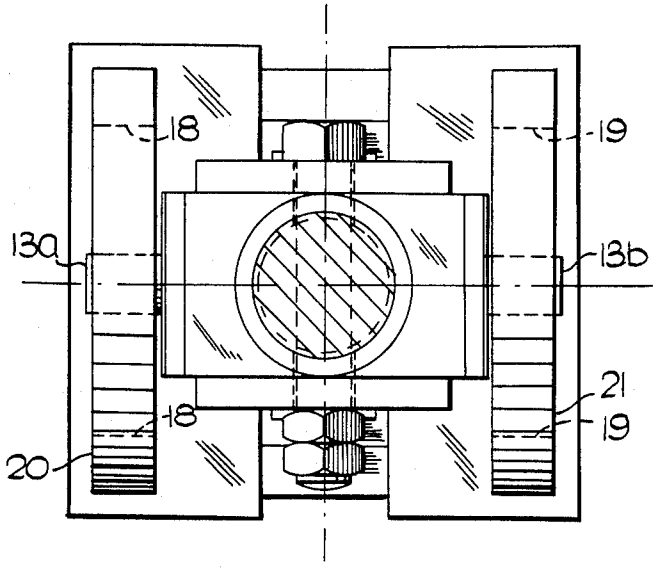

FIG. 5.

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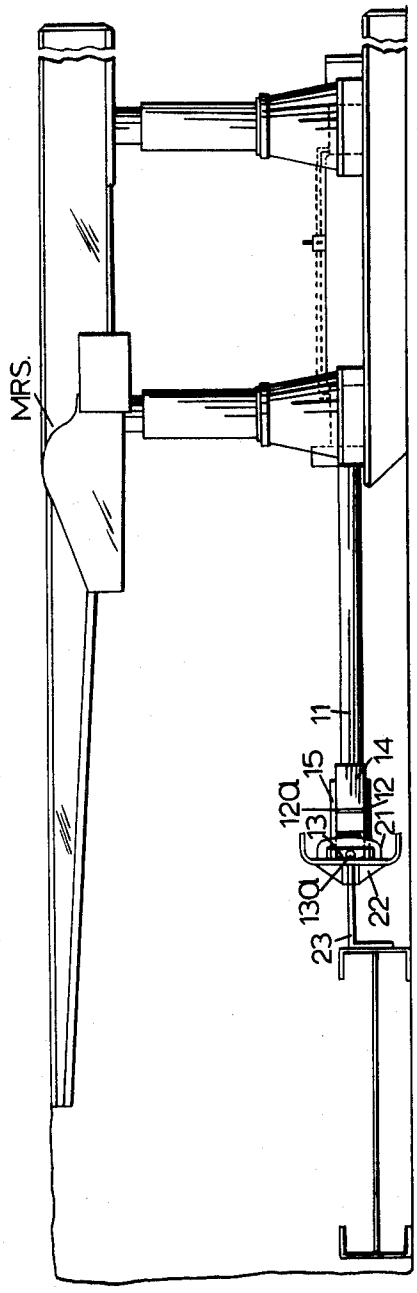

FIG. 6.

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3,258,108

BEARING PLATE CONNECTION BETWEEN MINE ROOF SUPPORTS AND CONVEYOR MEANS

Frank Cowlishaw, Linby, England, assignor to W. E. & F. Dobson Limited

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Claims priority, application Great Britain, May 7, 1963, 17,902/63
8 Claims. (Cl. 198—126)

This invention is for improvements relating to mine roof support and conveyor means of the type in which mine roof supports are connected by hydraulic jacks to end to end sections of a working face conveyor for advance of the conveyor with a "snaking" action.

To allow for the "snaking" action it is permissible for the ends of the conveyor sections to separate by a small amount, the separation securing alternatively at the front or the rear according to whether the sections are on the convex or concave curve of the snaking movement.

It has been found theoretically that the pitch distance of the conveyor sections gradually increases as the sections follow the convex curve of the snaking movement and then gradually decrease to normal on the concave curve, and therefore when hydraulic jacks connect mine roof supports to the conveyor sections, normally at the pitch distance of the conveyor sections, the tendency to increase and decrease the pitch distance results in unsatisfactory reaction between the hydraulic jacks and the conveyor sections.

An object of the invention is to provide means for connecting the hydraulic jacks to the conveyor sections in such improved manner as to make appropriate allowance for the increase and decrease of pitch distance of the conveyor sections, thereby to avoid unsatisfactory reaction between the hydraulic jacks and the conveyor sections.

The invention provides means for connecting a mine roof support by a hydraulic jack to a section of a mine working face conveyor which is adapted to be advanced with a "snaking" action comprising link means attached at opposite ends on vertical axes to the projecting end of the jack and the conveyor section respectively, a bearing member attached to the conveyor section adjacent the conveyor/link pivot, and a thrust member projecting from the jack beyond the jack/link pivot to act through the bearing member against the conveyor section. Conveniently an arcuate bearing plate is interposed between the bearing and thrust members and is secured to the link means. By this means the aforesaid increase and decrease in pitch distance of the conveyor sections is allowed for by the link means while the jack remains in satisfactory thrust relationship with the conveyor section through the thrust and bearing members. Conveniently there are upper and lower spaced links with the thrust and bearing members disposed therebetween. Conveniently also the pivot connection of the link means to the conveyor section is through the intermediary of the bearing member by the link being pivoted to the bearing member. There may be means on the conveyor forming vertical slots for parts of the bearing member to allow relative vertical movement between the hydraulic jack and the conveyor section.

More specifically one end of the upper and lower links may be connected by a vertical pivot bolt to the projecting end of the hydraulic jack, the other end of the upper and lower links may be connected by a pivot bolt to the bearing member, and the latter may have side trunnions disposed in vertical slots formed by U brackets secured at each side of the bearing block to a flanged bracket secured to the conveyor section.

The pivot bolt hole in the bearing member may be

enlarged to allow for limited relative movement therebetween.

The bearing member may be substantially hexagonal in cross section to allow for relative angular movement between the hydraulic jack and the conveyor section in a vertical plane.

The above and other features of the invention set out in the appended claims are incorporated in the construction which will now be described, as a specific embodiment with reference to the accompanying drawings in which:

FIGURE 1 is a diagrammatic plan view of a mine working face conveyor showing its "snaking' advance action.

FIGURE 2 is an enlarged view of a few of the conveyor sections.

FIGURE 3 is a plan view of means according to the invention connecting a hydraulic jack to a section of the conveyor.

FIGURE 4 is an elevational view of said means.

FIGURE 5 is a sectional end view of said means.

FIGURE 6 is a general view of a mine roof support connected to a conveyor by means according to the invention.

Referring to FIGURE 1 the conveyor sections indicated and numbered **1** to **10** are representative of the sections of a coal face conveyor of conventional form for mines being adapted to be advanced with a "snaking" action by successive operation of hydraulic jacks such as at **11** FIGURE 6 extending from mine roof supports such as at MRS to the conveyor.

Section **1** is shown in the normal attitude which is parallel to and spaced from the coal face, and sections **2, 3** and **4** are on the convex curve of the "snaking" movement such that a gap G, G1, G2, G3 forms betwen them at the front or goaf side of the conveyor. Sections **5, 6, 7, 8** and **9** are on the concave curve of the "snaking" movement and accordingly the gaps G4–G7 between them are at the rear side. Section **10** is in the normal advanced position parallel to the coal face.

Referring to FIGURE 2 the permissible width of the gaps between the sections is ⅝" as indicated for gap G, and the normal pitch distance of the sections is indicated at P–P1.

It will be seen with reference to the other pitch points P2–P5 that the leading edges represented by points L–L3 of the conveyor sections progressively creep with a lead over the pitch points, the lead in this example creeping to 2½ inches.

From the pitch points P5 it will be seen in FIGURE 1 that the lead gradually decreases in relation to the leading edges represented by points L4–L8 of the sections **6–9**.

The section **10** is related normally to the pitch points P9, P10.

The variations in effect consist of increases and decreases in the pitch distance of the conveyor sections and in order to prevent consequent unsatisfactory relationship between the conveyor sections and hydraulic jacks connecting them to hydraulic mine roof supports such as shown at MRS in FIGURE 6, the jacks such as at **11** are connected to the conveyor sections **1–10** in the following manner with reference to FIGURES 3 to 5.

Basically the ram **11** of the hydraulic jack is connected to the conveyor section (indicated for example at **1** in FIGURE 4) by at least one link **12**, FIGURE 3, which is attached at one end on a vertical axis A1 to the ram **11** and at the other end on a vertical axis A2 to the conveyor section; attached to the conveyor section there is a bearing member **13**, and a thrust member **14** projects from the ram **11** and has an arcuate bearing surface **14***a*. Between the thrust member **14** and the bearing member **13** there is an arcuate bearing plate **12***a* secured

to at least said one link **12** and having an inner arcuate bearing surface **12***b* co-operating with the bearing surface **14***a* and an outer arcuate bearing surface **12***c* co-operating with the bearing member **13**.

Conveniently the link **12** is an upper link disposed over the ram **11**, FIGURE 4, and there is a similar lower link **15** disposed under the ram **11**, with pivot bolts **16**, **17** on the axes A1, A2. The bearing member **13**, the thrust member **14**, and the arcuate bearing plate **12***ar* disposed between the two links, with the bearing plate **12***a* secured to both links.

The pivotal connection of the links **12**, **15** to the conveyor section **1** is conveniently through the intermediary of the bearing block **13**.

More specifically, the pivot bolt **17** extends through the bearing block **13** and the latter is a trunnion block having side trunnions **13***a*, **13***b*, FIGURES 3, 5, which engage in means forming vertical slots **18**, **19**. These means conveniently consist of U brackets **20**, **21** (see FIGURE 4 for bracket **21**) secured to a flanged bracket **22** fastened to the conveyor section and conveniently to the spill plate **23** of the conveyor section, FIGURE 4.

The bearing block is conveniently substantially hexagonal in cross section, FIGURE 4, and for receiving the pivot bolt **17** it has a slotted hole **13***c*, FIGURE 3.

In use, and bearing in mind that all the mine roof supports such as shown at MNS in FIGURE 6 which are connected to the conveyor sections will be connected as above described, the links will allow for the increase and decrease in pitch distance of the sections to take place and the arcuate thrust plate **12***a* will be slightly displaced but will remain engaged with the bearing members bearing surface **14***a* and the bearing member **13** to maintain satisfactory relationship between the rams and the conveyor sections, the arcuate bearing plate **12***a* providing for the transference of thrust (when the conveyor is advanced by the ram **11**) from the ram extension **14** to the bearing block **13** in each of the displaced positions. When the roof support MRS is being pulled by the ram **11**, the slot **13***c* allows slight separation of the bearing plate **12***a* from the bearing block **13**.

Furthermore the arrangement and mounting of the bearing block will allow for relative vertical movement between the ram **11** and the conveyor while still maintaining the bearing of the thrust member on the bearing member.

What I claim is:

1. Means for connecting a mine roof support by a hydraulic jack to a section of a sectionalized mine working face conveyor which is adapted to be advanced with a "snaking" action comprising link means pivotally connected on vertical axes at opposite ends thereof to one end of said jack and to a conveyor section respectively, a bearing member attached to said conveyor section adjacent the pivotal connection of said conveyor and link means and a thrust member projecting from the jack beyond the pivotal connection of said jack and link means to act through the bearing member against the conveyor section.

2. Means according to claim **1** wherein an arcuate bearing plate is interposed between the bearing and thrust members and is secured to the link means.

3. Means according to claim **1** wherein said link means includes upper and lower spaced links with the thrust and bearing members disposed therebetween.

4. Means according to claim **3** wherein one end each of the upper and lower links is connected by a vertical pivot bolt to the projecting end of the hydraulic jack, the other end of the upper and lower links being connected by a pivot bolt to said bearing member, the latter having side trunnions disposed in vertical slots formed by U brackets secured at each side of the bearing block to a flanged bracket secured to said conveyor section.

5. Means according to claim **4** wherein the pivot bolt hole in the bearing member is enlarged to allow for limited relative movement therebetween.

6. Means according to claim **1** wherein the pivotal connection of said link means to said conveyor section is through the intermediary of said bearing member, said link means being pivoted to said bearing member.

7. Means according to claim **1** including means on said conveyor forming vertical slots for parts of said bearing member to allow relative vertical movement between the hydraulic jack and the associated conveyor section.

8. Means according to claim **1** wherein said bearing member is substantially hexagonal in cross section to allow for relative angular movement between the hydraulic jack and the conveyor section in a vertical plane.

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EVON C. BLUNK, *Primary Examiner.*

SAMUEL F. COLEMAN, *Examiner.*

R. E. KRISHER, *Assistant Examiner.*