

[54] COUPLING MEANS FOR CIRCUIT CONVEYOR

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[56] References Cited

UNITED STATES PATENTS

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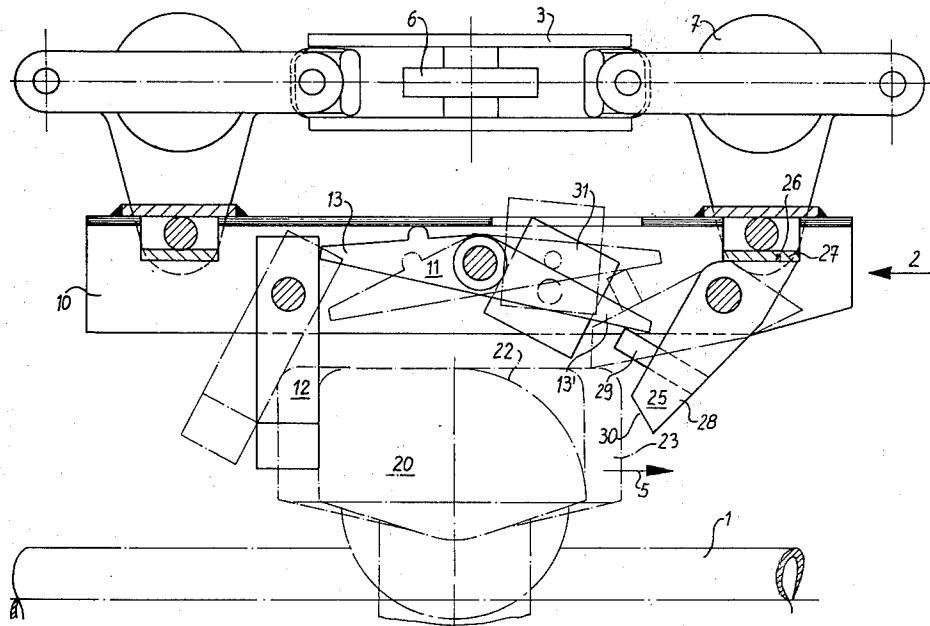
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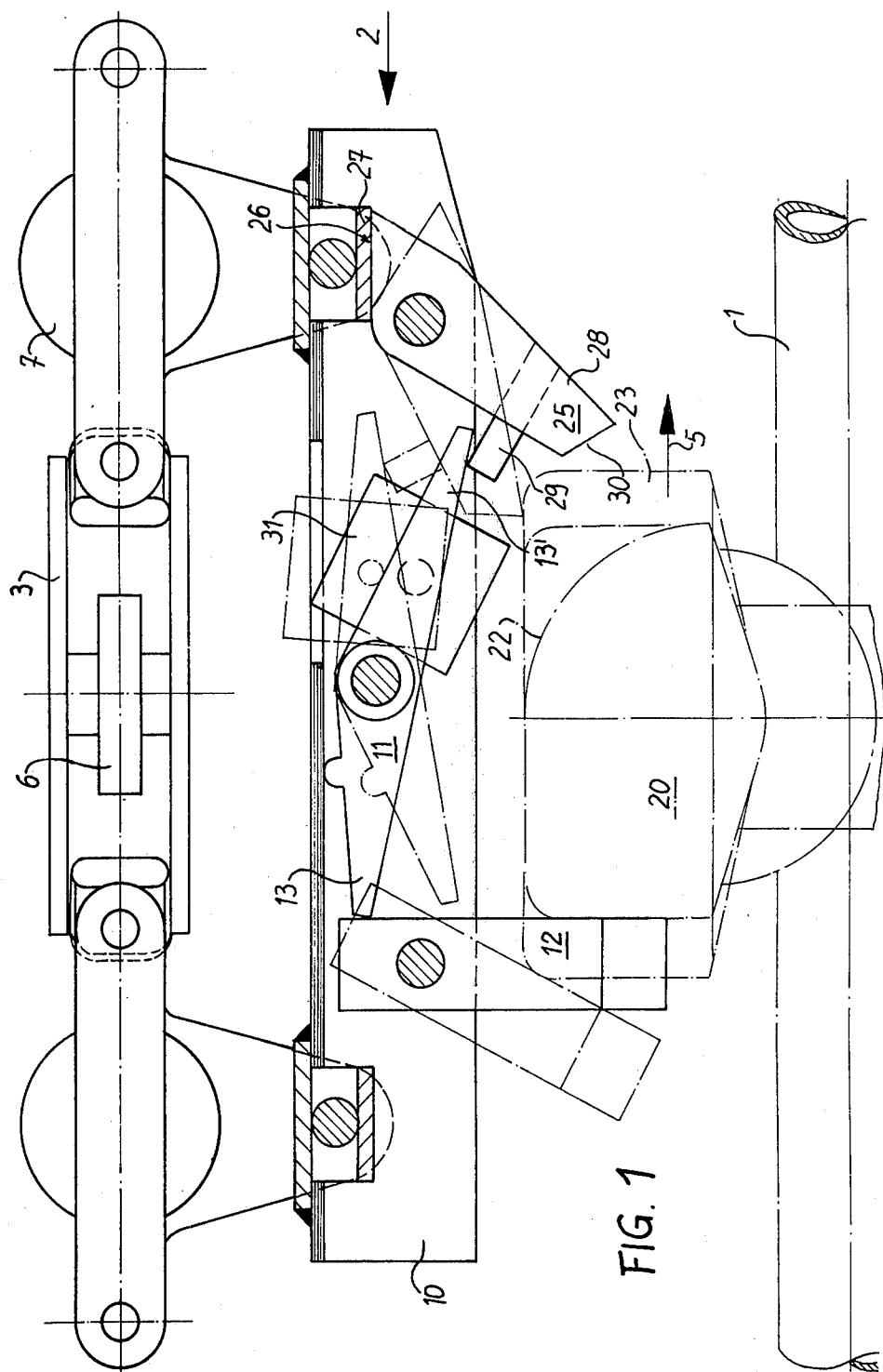
[57] ABSTRACT

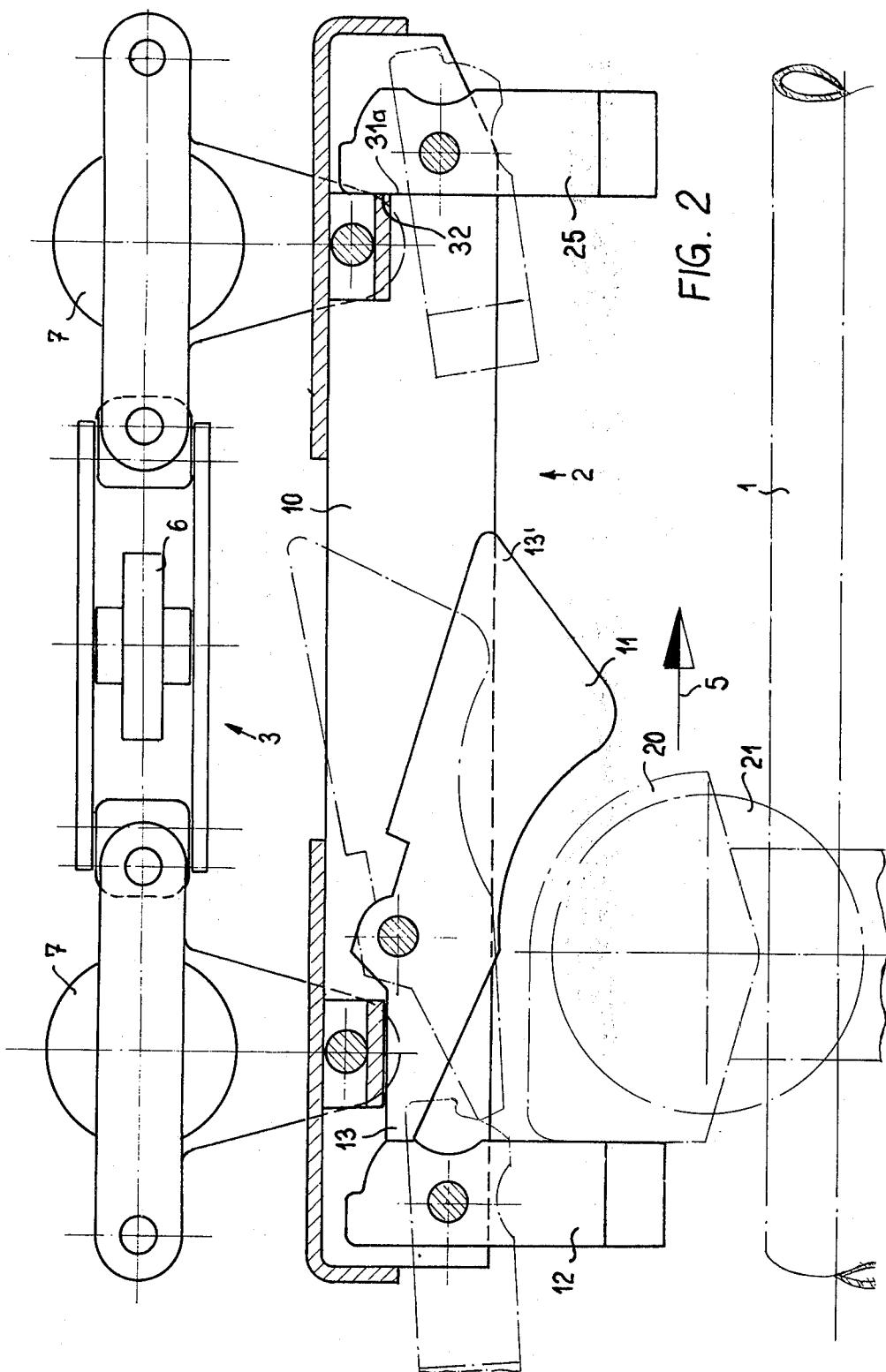
In accordance with the invention a coupling means is provided for a circuit conveyor of the type comprising

a pulling chain having ratchets presenting fingers, a suspended track below the chain for bogies having forward and rearward drive units rolling on said track, coupling components having movable members mounted on the pulling chain, said bogies having fixedly mounted coupling elements cooperating with said coupling components, said coupling components on said pulling chain including a housing supporting a ratchet finger and a latch lever pivotally mounted on horizontal axes for pivotal movement in opposite directions, said latch lever normally retaining said ratchet finger in position for engagement, each rearward drive unit having a running path for cooperation with said ratchet finger to move said ratchet finger upwardly, one said bogie having a roller with a cap and said cap supporting a roller and having a forward curved portion defining said running path and a rearward vertical abutment surface, and a rearward roller having a cap having vertical forward and rearward surfaces, said ratchet lever serving also as a latch lever and presenting a nose adapted to stop said ratchet finger in vertical position above the axis of rotation thereof and when in raised position release said ratchet lever, and the combination of said latch lever and said ratchet lever and finger further including a drop lever pivotally supported in said housing having a lower end adapted to cooperate with a roller cap and an abutment in said housing for engagement by an end of said drop lever.

5 Claims, 2 Drawing Figures







COUPLING MEANS FOR CIRCUIT CONVEYOR

In U.S. Pat. No. 3,712,241 of the inventor of the present structure, a coupling means for circuit conveyors is described having two bogies equipped with drive units arranged below a suspended track disposed under the conveyor chain where the movable coupling parts are disposed on the ratchets of the conveyor chain and the coupling components of the bogies that cooperate therewith are fixedly disposed on the drive units. Furthermore, the coupling components that are disposed on the ratchets of the conveyor chain comprise a housing in which one ratchet finger and a setting lever that is in operative connection with it are journaled for pivotal movement about horizontal axes in opposite directions in a manner that the setting lever normally holds the ratchet finger in engagement position and brings about pivoting of the ratchet finger upwardly during the raised position of an ascent cam provided on the ascent portion of the drive unit on the bogie which is rearward with respect to the advancing direction. Furthermore, the roller supports or carriers of the bogies are simultaneously constructed as the coupling components or runner parts associated with the bogies, and for this purpose they carry cam members which are in the form of roller caps. The cap which is in front with respect to the direction of movement has a rounded portion forwardly and is equipped at the rear with a vertical abutment surface, while the roller cap which is rearward with respect to the direction of travel presents vertical front and rear ends. The setting lever that simultaneously serves as a latch lever is provided with a nose that stops the ratchet finger which it engages about its pivot axis in a vertical position and releases the same, while in raised position for pivotal movement upwardly in direction opposite to the direction of forward movement. Finally, the latch lever is provided on its lower side with a recess that corresponds to the rounded portion of the forward roller cap of the bogies and the side facing the nose of the ratchet lever is likewise provided with a recess into which projects the nose for releasing the ratchet finger.

With this form of construction of the coupling means, it was intended to provide besides simplest possible construction of the bogies that the spacing or distance between the bogies and chain can be made as small as possible, and that the power that is necessary for releasing the coupling operation is very small.

The circuit conveyors for which this coupling device is intended are frequently built in such a manner that the pulling chain and the suspended track disposed below it for bogies having two drive units have to overcome upward and downward gradients, while as a rule the upward as well as the downward gradients are disposed at an angle of about 30° with respect to the horizontal. No difficulties or problems exist with horizontal straightforward travel of the bogies, as well as also while overcoming an incline in the forward direction. It is different, however, when overcoming descending stretches in the direction of forward travel. Here the bogies may release themselves out of the coupling with the pulling chain and run ahead. To be sure, they are caught up with at the end of the declining stretch or at a connecting side track and the coupling with the pulling chain is restored. Nevertheless, this unintended release of the bogies from the coupling can lead to complications.

Accordingly, it is an object of the invention to further develop the structure so that it will also insure satisfactory coupling between bogies and pulling chain in the area of the downward stretches in the forward direction, and this is to be accomplished without essential mechanical or additional production expense.

The problem is solved in accordance with the invention by means of a coupling arrangement such as described above, but where the safety latch or lever is 10 supplemented by a further drop lever which is likewise pivotable about a horizontal axis in the housing of the device, and whose lower end cooperates with the roller caps of the bogies in the manner of the ratchet finger that cooperates with the latch lever, and which has 15 above its pivot axis in the housing an end edge that cooperates with an abutment in that location.

The safety lever may be equipped with an additional counterweight on its second arm that faces the drop lever, especially if it is made of light material.

The further drop lever can arrive in engagement with the roller caps of the bogies alone by utilizing the force of gravity acting on it. However, it may also be equipped with a pin that cooperates with the latch lever. Advantageously, the additional drop lever may be 20 constructed in exactly the same manner as the same ratchet finger, so that in the production it is not necessary to make a separate part, but that the same tools may be used for constructing the ratchet finger on the one hand and the drop lever on the other hand.

By means of the drop lever and its form of construction, it is ascertained on the one hand that the coupling operations follow the same course as with the coupling installation. On the other hand, however, the possibility is eliminated that the bogies are able to run out of the 25 coupling along descending stretches in the direction of forward travel.

The subject of the application is described schematically and by way of example with reference to the embodiments illustrated in the drawings in which:

FIG. 1 shows one embodiment of the subject of the application,

FIG. 2 illustrates a modified embodiment.

The bogies or carriages which are not illustrated are moved in the direction of the arrow 5 on suspension tracks 1 indicated in dot and dash lines by means of ratchets 2 on the pull chain 3 which in the embodiment illustrated is in the form of a universal joint coupling. Merely one roller cap 20, 23 having a roller 24 is indicated which is likewise shown in dot and dash lines. The pull chain 3 runs continuously in a guide device or profile (likewise not illustrated). It is conducted in vertical, as well as also in horizontal direction in the guide profile by means of rollers 6 and 7.

The guide profile and the suspension tracks 1 for the bogies of the circuit conveyor or drag chain may follow any desired curves horizontally and vertically. If, however, they depart from the horizontal, inclining and declining stretches are encountered that have to be overcome by the bogies. While there are no problems during horizontal straightforward guidance and along inclining paths in connection with the coupling of the bogies with respect to the conveyor chain, the bogies can 50 run out of the coupling along declining stretches that as a rule are disposed at an angle of 30° with respect to the horizontal.

The ratchets or catchers 2 of the conveyor chain 3 are equipped with a housing between the vertical side

walls, between which a latch lever 11 and a ratchet finger 12 that cooperates therewith are journalled for pivotal movement about horizontal axes. The double armed latch lever 11 stops the ratchet finger 12 in its vertical downwardly directed position by means of its one end 13, as long as the end 13' of the ratchet lever 11 is in the lower position. This position of the two levers is indicated in solid lines in the accompanying drawings. If the end 13' of the ratchet lever is swung upwardly, the end 13 thereof is moved in a position below the pivot axis of the ratchet finger 12 so that the same is released and can move upwardly with respect to the direction of feed indicated by arrow 5. This position of the two levers is illustrated in dot and dash lines.

The roller cap 20 of the forward roller of the bogies has an upper curvature 22 at the forward end as seen in the direction of travel. The roller cap 23 of the rearward roller of the bogies, however, is not curved. In FIG. 1 several forms and sizes of roller caps are indicated which illustrate that this does not adversely affect the operating ability of the installation.

Here the safety or latch lever per se cooperates with the roller caps. In order to prevent the possibility of the bogies running out of the coupling with the conveyor chain along declining stretches, a third lever is now provided which is an additional drop lever 25, that is disposed at the forward end of the housing 10 and is likewise pivotable about a horizontal axis ahead of the safety lever 11 as seen in the direction of travel.

This drop lever 25 is provided with an end edge 26 in the embodiment according to FIG. 1 which cooperates with an abutment 27 in housing 12 and thus limits the pivotal movement of the drop lever in the direction of forward travel. In addition to that, the drop lever 25 has a lower end 28 which cooperates with the roller caps of the bogies or also with the cam members (not illustrated) of a stop means provided at any desired position in the direction of forward travel. The end 28 of the drop lever 25 is furthermore equipped with a pin 29 which cooperates with the end 13' of the latch lever 13.

The drop lever 25 thus first takes care of the problem in this embodiment which was taken care of by the latch lever 11. However, it also prevents the bogies or the caps thereof from disengagement out of the coupling with the drag chain 3 by means of the abutment defined by its lower front edge 30. The drop lever 25 is likewise illustrated in solid lines in its coupled position, and in uncoupled position in dot and dash lines.

Since safety lever 11 is preferably made of light material and thus the excess weight of the end 13' may be too small with respect to the end 13 to insure proper operation of the installation, the end 13' may be equipped with an additional counterweight 31.

In the second embodiment the pivotal movement of the drop lever 25' is limited by an abutment edge 31a in the direction of forward movement which edge cooperates with an abutment 32 in housing 10. For the

sake of simplicity this abutment can be constituted at the same time by the suspension of the connecting member from the ratchet housing 10 to the conveyor 3. The raised position of the drop lever 25' is again indicated in dash and dot lines. With this embodiment the drop lever acts solely under the influence of the force of gravity. A direct cooperation with the safety lever 11' is no longer necessary.

For the sake of simplification and economy, the drop lever 25 may be of the same configuration as the ratchet finger.

Having now described my invention with reference to the embodiments illustrated in the drawings, what I desire to protect by letters patent of the United States is set forth in the appended claims.

I claim:

1. Coupling means for circuit conveyor of the type comprising a pulling chain having ratchets presenting fingers, a suspended track below said chain for bogies having forward and rearward drive units rolling on said track, coupling components having movable members mounted on said pulling chain, said bogies having fixedly mounted coupling elements cooperating with said coupling components, said coupling components 20 on said pulling chain including a housing supporting a ratchet finger and a latch lever pivotally mounted on horizontal axes for pivotal movement in opposite directions, said latch lever normally retaining said ratchet finger in position for engagement, each rearward drive unit having a running path for cooperation with said ratchet finger to move said ratchet finger upwardly, one said bogie having a roller with a cap and said cap supporting a roller and having a forward curved portion defining said running path and a rearward vertical abutment surface, and a rearward roller having a cap having vertical forward and rearward surfaces, said ratchet lever serving also as a latch lever and presenting a nose adapted to stop said ratchet finger in vertical position above the axis of rotation thereof and when in raised position releases said ratchet lever, and the combination of said latch lever and said ratchet lever and finger further including a drop lever pivotally supported in said housing having a lower end adapted to cooperate with a roller cap and an abutment in said housing for engagement by an end of said drop lever.

2. Coupling means for circuit conveyor in accordance with claim 1, where said drop lever includes a pin which cooperates with the end of the latch lever.

3. Coupling means in accordance with claim 2, where 50 the arm of the latch lever defines one end thereof and is provided with a counterweight.

4. Coupling means in accordance with claim 1, where said drop lever is subject solely to the force of gravity.

5. Coupling means in accordance with claim 4, comprising an additional drop lever corresponding in shape to that of the ratchet finger.

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