Dec. 25, 1962 A. T. C. BURROWS 3,070,037

CONVEYOR SYSTEMS

Filed May 1, 1961 2 Sheets-Sheet 1

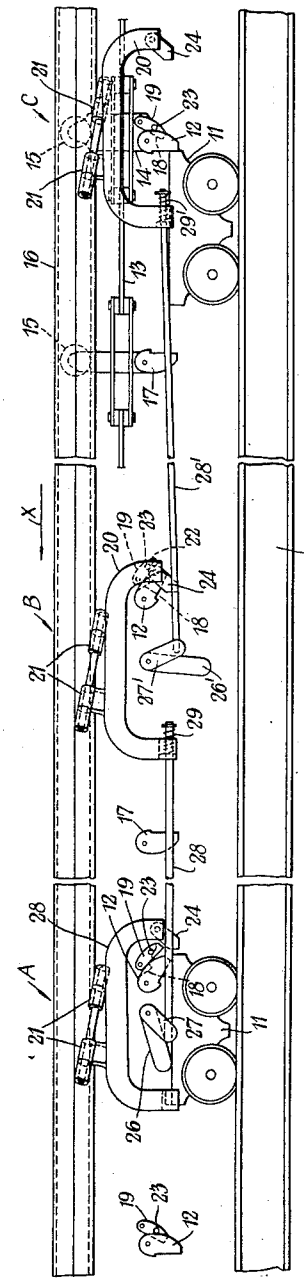


FIG. 1.

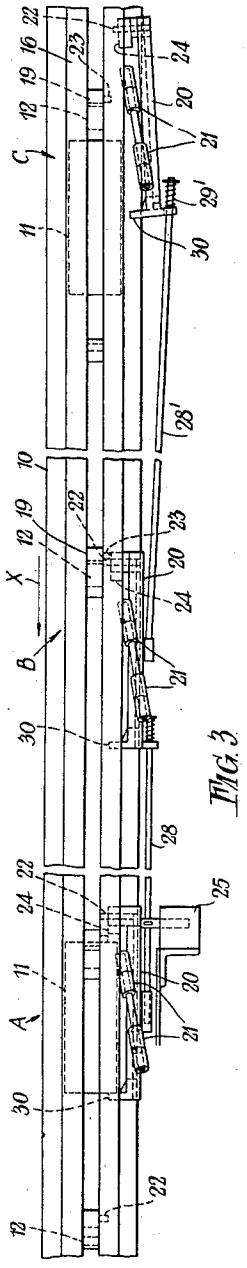


FIG. 3

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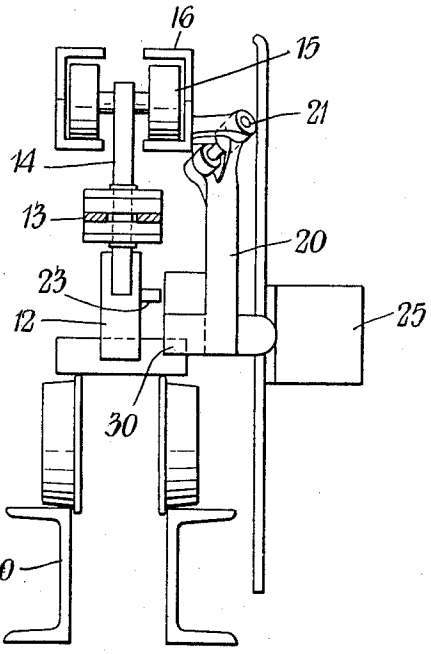


FIG. 2.

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CONVEYOR SYSTEMS

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This invention relates to conveyor systems and more particularly to systems of the kind wherein load carrying trolleys are propelled along a track or runway by virtue of the engagement therewith of depending pusher dogs or driving abutments which are associated with an endless driven chain travelling along a path spaced vertically above the track or runway on which said load carrying trolleys are supported.

It is the principal object of the invention to provide a construction such that the pusher dogs or driving abutments may be rendered inoperative as and when required so that the drive to the load carrying trolleys will be discontinued.

According to the present invention in a conveyor system of the kind referred to all or certain of the depending pusher dogs or driving abutments are pivotally mounted at the lower end of a clevis or like attachment carried by or associated with the endless driven chain and a pivoted retaining pawl is provided for each such dog or abutment. The pawl is adapted for movement from and into an operative position wherein it will engage the dog or abutment and will positively prevent angular or pivotal movement of the latter so that it will be effective to impart a drive to a load carrying trolley. The arrangement is such that when said pawl is in its inoperative position, the dog or abutment will be free to pivot and will be ineffective to impart a drive.

In order that the said invention may be clearly understood and readily carried into effect the same will now be hereinafter more fully described with reference to the accompanying diagrammatic drawings in which:

FIGURE 1 is a side elevational view showing a part of a conveyor system,

FIGURE 2 is an end elevational view looking from the left of FIGURE 1,

FIGURE 3 is a plan view of the apparatus shown in FIGURE 1.

Referring to the drawings, 10 denotes a fixed track along which load carrying trolleys 11 are propelled by virtue of the engagement therewith of pusher dogs or driving abutments 12 which are associated with an endless driven chain 13. The chain is supported at spaced points along its length by means of hangers or clevis attachments 14 which depend from so called chain carrying trolleys 15 running in a fixed track 16 disposed vertically above the trolley track 10. As will be seen the pusher dogs or abutments 12 are actually carried by the depending hanger or clevis attachment 14. Alternating with the pusher dogs or abutments 12 are retaining dogs 17 which are similarly carried by the hangers or clevis attachments 14. The retaining dogs serve to prevent undesired forward movement of the load trolleys relative to the chain when, for example, the trolleys are on a downwardly inclined path. As so far described, the conveyor system is well known, however according to the present invention each pusher dog or abutment 12 is freely pivotally mounted at the lower end of its supporting hanger or clevis attachment 14 and the pusher dog or abutment 12 is provided at its rear face with an appropriately shaped recess 18 with which a pawl 19 is adapted to cooperate. As will be clearly seen from FIGURE 1 each pawl 19 is pivotally mounted on the hanger or clevis attachment

at the rear of the pusher dog or abutment 12 with which it is adapted to cooperate, the assumption being that the conveyor is intended to travel in the direction indicated by the arrow X. The arrangement is such that when the pawl 19 is in its operative position as shown at the right of FIGURE 1 it will engage in the recess 18 in the associated dog or abutment 12 and will positively hold the latter against pivotal movement in a rearward direction so that said dog or abutment will constitute a rigid driving member capable of imparting motion to or of pushing any load trolley in its path. When the pawl 19 is swung upwardly, however, out of engagement with the recess 18 of its associated dog or abutment 12 as indicated at the left of FIGURE 1 the latter will be free to pivot and will be ineffective to impart any drive. Due to continued movement of the chain 13 any dog or abutment 12 from which the pawl 19 is removed will pivot freely and will pass over the top of any load trolley in its path. The arrangement is such that as the freely swingable dog or abutment 12 passes off the end of the trolley it will swing downwardly into its normal position and if the pawl 19 is free to do likewise it will again engage the recess 18 and render said dog or abutment operative again.

It will be appreciated that if at selected points along the conveyor path means are provided which are operable to trip the pawls 19, i.e. to move them into their inoperative position it will be possible to control the movement of load carrying trolleys i.e. to drive or to discontinue the drive to such trolleys as may be required. One such trolley control or indexing mechanism is shown in the drawings and will now be more fully described.

In the embodiment illustrated three holding stations A, B, C, are provided appropriately spaced apart along a selected section of the conveyor. Each holding station comprises a frame member 20 which as can be seen from FIGURES 1 and 3 is mounted at 21 for hinge movement about an axis inclined in two planes i.e. the hinge or pivot axis is inclined to the horizontal and also outwardly relatively to the direction of travel of the chain. Mounted at the rear of each frame member 20 is a cam element 22 which is adapted on movement of said frame member into its operative position to cooperate with a peg or projection 23 carried by each pawl 19. In its normal or inoperative position the frame member 20 will hang downwardly and in such a position that the cam element 22 will be clear of the pegs or projections 23 on the pawls as the chain 13 travels along. This inoperative position is indicated at the right of FIGURE 3 in station C. At its rearward end each frame member 20 also carries a stop 24 which is adapted when said frame member is in its operative position to be behind any trolley held at the respective station thereby to prevent any tendency to rearward movement of such trolley. The stop member 24 will be freely swingable forwardly to allow passage of any trolley past the same but it will not be displaceable rearwardly from the operative position shown.

At the first or most forward station A the actuation of the frame member 20 is initiated or controlled by means of a solenoid 25 the arrangement being such that on actuation of a switch and energization of such solenoid the frame member 20 will be swung into its operative position to cause stoppage of a load trolley at station A. It will be appreciated that if a trolley is held at station A it will be necessary to hold following trolleys at preceding stations i.e. stations B, C and so on in order to prevent any collision or undesirable pile up of trolleys. To that end there is provided at station A a lever 26 which is pivoted on a fixed pivot carried by a bracket (not shown) serving to support the track 10 such lever being disposed in the path of the load trolleys. Fixed in angular relation to the lever 26 and for movement about the

pivot axis of the latter is a link 27 to which one end of a rod 28 is connected through the medium of a universal type joint. As will be seen the rod 28 is coupled at its other end to the frame member 20 at station B a spring 29 being provided to allow for a certain amount of lost motion. At station B there is provided a similar lever and link 26', 27' which is coupled by means of a rod 28' and spring 29' to the frame member 20 at station C. If the system incorporates further holding stations then the mechanism indicated above will merely be repeated as many times as is necessary.

The apparatus above described will operate as follows:

If the solenoid 25 at station A is not energized then the frame member 20 at station A will be in its inoperative position as will be the case with the corresponding frame members 20 at stations B and C and such other preceding stations as there may be. In such a case none of the pawls 19 will be tripped and such load trolleys as are engaged by the then rigid pusher dogs or abutments 12 will be propelled along the track 10. On energization of the solenoid 25 the frame member 20 at station A will be swung inwardly into the position shown in FIGURES 1 and 3 so that the cam element 22 will then be in the path of the peg or projection 23 on the next of the approaching pawls 19 and will be effective to trip such pawl so that its associated dog or abutment 12 will then be ineffective to impart further motion to the trolley with which it was hitherto in engagement. With the frame member 20 so actuated a lateral projection 30 at the forward end thereof will provide a stop for the trolley which will thus be positively held at station A. The released dog or abutment 12 will pivot freely and will ride idly over the top of the trolley and it will be appreciated that as successive dogs or abutments approach station A the pawls 19 thereof will be tripped so that the successive dogs or abutments will also merely ride idly over the top of the trolley which will be maintained stationary. As indicated above the stop 24 at the rear of the frame 20 will be disposed at the rear of the trolley so that any tendency to rearward movement will be prevented. As the trolley moves into station A it will actuate the lever 26 and link 27 thereby to impart a pull to the rod 28 which will cause the frame member 20 at station B to be swung into its operative position thereby to hold the next following trolley at station B. On stoppage of a trolley at station B the lever and link 26', 27' at station B will be actuated to impart a pull to the rod 28' thereby to set the frame member 20 at station C in its operative position thereby to stop the next trolley and so on.

On de-energization of the solenoid 25 at station A the frame member 20 at that station will return to its inoperative position thereby removing the stops 30 and 24 from the front and rear of the trolley and also removing the cam element 22 from the path of the pegs or projections 23 on the pawls 19. Thus as the next pusher dog or abutment 12 approaches station A (it will have been relocked due to automatic resetting or return of the pawl 19 to its operative position after leaving station B) it will engage the trolley formerly at station A and push the same forwardly therefrom. With the removal of the trolley from station A and from contact with the lever 26 the latter will return to its initial position so that the frame member 20 at station B will also be allowed to return to its inoperative position thereby to allow release of the trolley held at that station. The removal of the trolley from station B will allow the release of the trolley at station C and so on. If, as the trolley formerly at station B approaches station A, the solenoid 25 is again energized, such trolley will then be held at A with the result that the trolley formerly at station C will be then held at B and so on. If on the other hand after release of the first trolley from A the solenoid is maintained de-energized for a period then the trolleys will merely continue to pass through the holding or indexing section without interruption.

What is claimed is:

1. A conveyor system comprising a driving chain adapted for movement along a path, hanger means coupled to said chain and extending therefrom, a pusher dog pivotally connected to said hanger means, a pawl pivotally connected to said hanger means adjacent said pusher dog for engaging the latter to couple said pusher dog and pawl together to prevent pivotal movement of said pusher dog whereby said pusher dog is adapted to provide a rigid drive as said chain advances along said path, and means for selectively disengaging said pawl and pusher dog to allow the free pivotal movement of said pusher dog.

2. A conveyor system as claimed in claim 1 wherein said means for disengaging said pawl and pusher dog includes a projection on said pawl and means operatively positioned with respect to said projection and movable between first and second positions to contact said projection to disengage said pawl and pusher dog in one of said positions.

3. A conveyor system as claimed in claim 2 wherein said means to contact said projection includes a frame member pivotally supported at a fixed location relative to said chain, and an extension on said frame member, said extension being in the path of the projection to contact the same with said frame member in said one position.

4. A conveyor system as claimed in claim 3 comprising a movably supported trolley adapted for being driven by said pusher dog with the pusher dog and pawl coupled together, said frame member including stop means for engaging said trolley with the pawl and pusher dog disengaged to prevent movement of said trolley.

5. A conveyor system as claimed in claim 3 comprising means supporting said frame member for pivotal movement about an axis which is inclined in two planes relative to the path of said chain.

6. A conveyor system as claimed in claim 3 comprising a solenoid for pivotally moving said frame member.

7. A conveyor system as claimed in claim 6 including a plurality of frame members located along the path of the chain, and means connecting adjacent frame members for causing pivotal movement of a frame member to said one position with the trolley being stopped by an adjacent frame member.

8. A conveyor system as claimed in claim 7 wherein the means connecting adjacent frame members includes an element movably supported at one of said frame members and displaceable in accordance with passage of said trolley at said one frame member and with the latter in position to disengage the pawl and pusher dog, and link means coupled to said movably supported element and an adjacent frame member to cause movement of the adjacent frame member into position for disengaging the pawl and pusher dog in response to displacement of said movably supported element.

9. A conveyor system as claimed in claim 8 wherein said link means includes a resilient member for allowing lost motion.

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