June 9, 1931. E. V. FRANCIS 1,809,748

TROLLEY CONVEYER

Filed May 4, 1928 3 Sheets-Sheet 1

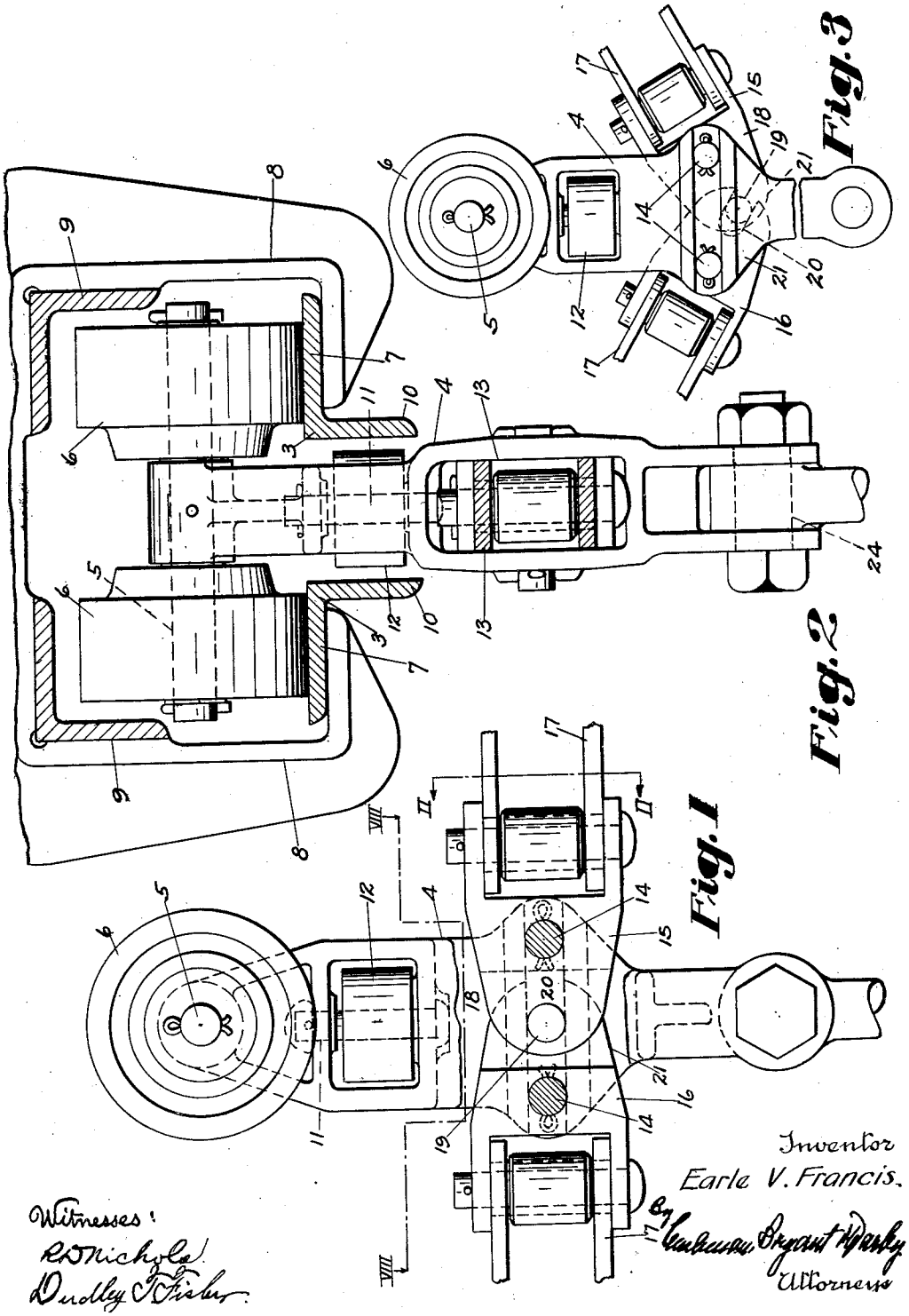


Fig. 3

Fig. 2

Fig. 1

Witnesses:
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TROLLEY CONVEYER

Filed May 4, 1928 3 Sheets-Sheet 2

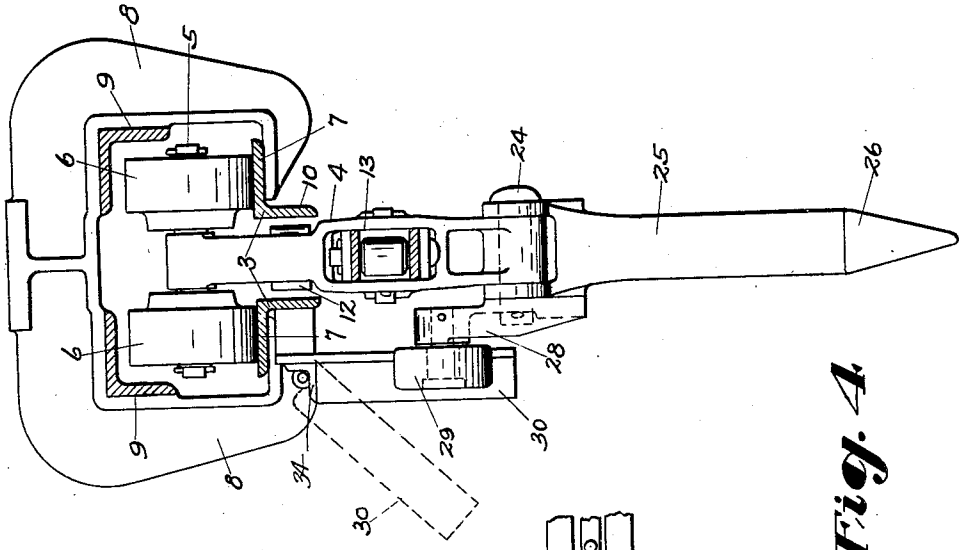


Fig. 4

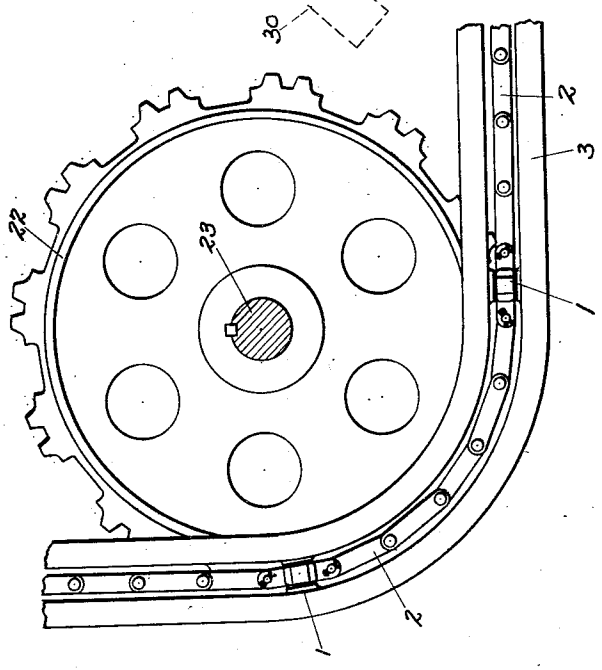


Fig. 5

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TROLLEY CONVEYER

Filed May 4, 1928 3 Sheets-Sheet 3

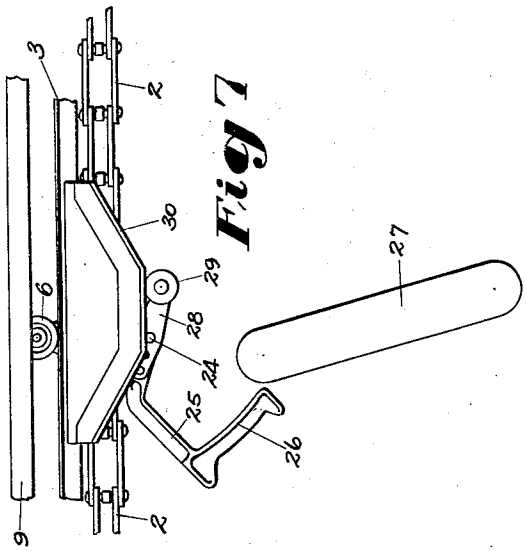


Fig 7

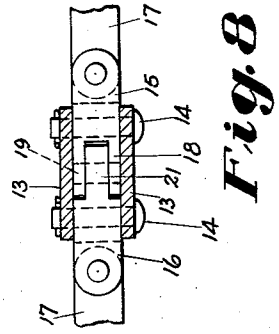


Fig 8

Fig 6

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Patented June 9, 1931

1,809,748

UNITED STATES PATENT OFFICE

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TROLLEY CONVEYER

Application filed May 4, 1928. Serial No. 275,212.

The present invention relates to certain new and useful improvements in trolley conveyers of the class which consists of a series of wheeled carriers supported upon and adapted to travel along an overhead trackway.

An important object of this invention is to provide a trolley hanger which is not forced by the draft load, out of line with the resultant force which is normal to the trackway, so as to prevent damage to and breakage of the various parts of the device and to insure smooth operation and proper bending and flexing of the conveyer in traversing curved trackway, especially on vertical curves.

A further object is to provide means to prevent the oscillation and vibration of the material carrying elements as they pass along the trackway and around the curves therein.

These and other objects will be fully described in the following specification and illustrated in the accompanying drawings of which:

Fig. 1 is a side elevation of one of the trolley carriages entering into my improved conveyer, certain parts being broken away to reveal other parts.

Fig. 2 is a transverse sectional view of my improved conveyer showing particularly an end elevation of one of the trolley carriages, taken on the line 2—2 of Figure 1.

Fig. 3 is a side elevation of the carriage illustrated in Fig. 1 showing particularly the relation of the chain attachment when the carriage is passing around a vertical curve in the trackway.

Fig. 4 is an end elevation of a trolley carrier such as is shown in Fig. 2, equipped with my improved automatically discharging material carrying elements.

Fig. 5 is a fragmentary plan view of my improved trolley conveyer passing around a horizontal curve in the trackway, and particularly illustrating the relation of the conveyer parts to the actuating mechanism.

Fig. 6 is a fragmentary side elevation of my improved trolley conveyer passing around a vertical curve in the runway.

Fig. 7 is a detail of the mechanism for automatically discharging the load from the material carrying elements.

Fig. 8 is a sectional view taken along the line VIII—VIII of Fig. 1.

Like numerals refer to similar parts in the several figures.

In the drawings I have shown one embodiment of my invention comprising a plurality of wheeled carriages 1 joined together at spaced intervals by sections of suitable chain 2 to form an endless series to travel along the trackway 3. The pintles of the chain sections are arranged perpendicularly of the trackway 3 so that the chain links can swing in planes parallel thereto. Each of the carriages 1 comprises a body casting 4 to which is attached two horizontally extending laterally projecting axles 5. Upon each of the axles 5 is journaled a trolley wheel 6, and these wheels rest upon and are adapted to travel along the outwardly projecting flanges 7 of the parallel angle bars of the trackway. The angle bars 3 are reversely arranged and spaced apart with one set of corresponding flanges 7 spaced apart and arranged in the same plane and the other set of flanges 10 arranged in spaced but parallel planes perpendicular to the plane of the flanges 7. These angle bars are supported upon suitable brackets 8 which may be attached to any suitable and convenient support such as the structural members of the building. To the brackets 8 may also be fixed a second pair of angle bars 9 which constitute guard rails above and at the sides of the trolley wheels 6 to prevent their displacement while traveling along runways extending in directions other than horizontal. The angle bars 9 are also reversely arranged like the bars 3 but with their channels facing toward each other instead of facing outwardly away from each other as with the bars 3.

In the present construction, which is one of many forms the device may assume and is selected merely for illustrative purposes, the hanger body 4, preferably in the form of a casting, is transversely pierced by an aperture positioned between the downwardly extending parallel broad and flat flanges 10 of the angle

bars 3, and in this aperture is positioned a vertically disposed axle 11 upon which is journaled a roller 12 arranged directly beneath the axle 5 and adapted to engage the vertical flanges 10 of the trackway to prevent lateral displacement of the carriage. This roller 12 also serves to smoothly guide the carriage along the trackway, materially reducing the vibration which is characteristic of the older constructions.

Formed in the lower portion of the body casting 4 is a longitudinally extending aperture, the relatively broad and flat side walls 13 of which constitute the side bars of a connecting link in the endless chain series of the conveyer. The side walls 13 are pierced by suitably spaced apertures through which extend the pintles 14 upon which are mounted, for oscillatory movement in vertical planes, the attachment links or clevises 15 and 16. The outer ends of the links 15 and 16 are forked and suitably shaped for connection with the end links 17 of the chain sections 2 by means of vertical pivot pins. Formed on the attachment link 15 is an inwardly projecting bifurcated extension 18 in which is fixed a pintle 19 adapted to engage in a suitable notch 20 formed in the projection 21 of the opposite attachment link 16. These parts are so proportioned and arranged that swinging movement of one of these attachment links about its pivotal support 14 produces an equal and opposite swinging movement of the companion attachment link. By this relative movement of the links 15 and 16 upon the pintles 14, the chain sections 2 extend from the trolley body 4 in substantially equal angular relation thereto at both sides thereof, thereby tending to hold the body of the carriage 1 substantially radial to the curve of track angles 3 whether these angles extend in horizontal planes or in planes other than horizontal, thereby contributing to the smooth and easy movement of the conveyer.

As is well known in trolley conveyers, the leading and trailing portions of the draft chain on opposite sides of pivotally suspended trolley hangers creates a draft load, the reaction or resultant force of which is normal to the trackway, or in other words, is on a center line extending through the pivot of the hanger and its lower end. In the absence of the inter-engaging means between the links 15 and 16, the trolley hanger in passing about vertical curves, would be forced, by the draft load, out of line with the center line of the trolley which is normal to the trackway and such movement of the hanger would cause the same to rotate about the axis of roller 6, thereby causing bending tendencies of the chain in directions opposed by the chain pintles frequently resulting in damage to the side bars of the chain and clevis links and shearing off of the heads or means for holding the pintles in place. Moreover, such reaction produces considerable binding action between the links and between the trackway and links detrimental to the life of the conveyer. By inter-connecting the links 15 and 16 and thereby causing them to assume corresponding angular relation with respect to the hanger, the resultant force or line of reaction is always maintained normal to the trackway and the foregoing objections to this type of trolley hanger are eliminated or reduced to a very negligible quantity.

The radial relation of the hangers with respect to the track must be maintained both longitudinally and transversely of the track to insure smooth operation of the conveyer. This transverse radial relation is maintained by the rollers 12 engaging the flanges 10 of the track and this maintains the axes of the rollers at right angles to the line of travel to prevent sliding action of the rollers and insure smooth travel of the hangers. The cooperation of the inter-engaging means 19 and 20 and the rollers in maintaining the hangers radial to curves in the track also insures retention of the hangers at right angles to straight portions of the track in passing therealong.

Because of the lateral flexibility of the chain 2, the actuating sprocket wheel 22 is mounted upon a vertical shaft 23 which may be connected in any preferred and convenient manner with any suitable and convenient source of rotative power. This driving element is necessarily placed in a horizontal curve of the trackway where suitable contact may be maintained between the sprocket wheel 22 and the chain 2 to drive it.

Considering the foregoing device from the aspects of a chain alone, it will be appreciated that the hanger body 4, in effect, constitutes a link which pivotally connects the two clevises 15 and 16. If desired, any suitable load carrying device may be associated with this connecting link.

Suspended beneath the carriage body 4, from the transversely extending pivot bolt 24, is a material or load carrying element which may take one of various forms to adapt it to different conditions of service. The material supporting element here illustrated is especially adapted to the transportation of automobile tires and similar articles, and as here shown it consists of a bar 25 pivotally suspended from the bolt 24 and terminating at its lower end in an angularly extending arm 26 which is adapted to engage the inner periphery of an automobile tire 27 to support it. This load supporting bar 25, below its pivotal support 24, is bent as at 31 at an obtuse angle to dispose a part 32 of the bar laterally of the upper portions of the bar 25 and in the same plane therewith. This part 32 at its lower end is provided with a bend 33 in the same direction as the bend 31 to dispose the load supporting arm 26 at an acute angle relative to the upper portion 25 of the

bar and in the same vertical plane therewith.

Due to the disposition of the load carrying arm 26 at an acute angle with respect to the upper portion of the bar 25 and the proportion and arrangement of parts disposing the pivot 24 of the arm 25 above the load supporting arm 26 midway of its length, any load placed upon the arm 26 will cause the latter to be disposed in a horizontal plane regardless of whether the load carrying members are moving through horizontal or vertical planes. This arrangement will serve in retaining the load upon the arm 26 and prevent its accidental displacement therefrom. When no load is imposed upon the arms 26, the load carrying elements will seek a new center of gravity and will be disposed so that the load carrying arms 26 are angularly disposed relative to a horizontal plane.

Fixed to the side of the bar 25 and extending in the same direction thereof, is an upwardly projecting arm 28 having a contact roller 29 mounted on a horizontal axis adapted to engage an abutment in the form of a cam 30 fixed to the track structure at the unloading station. During the operation of the conveyer, contact of the roller 29 with the cam 30 produces swinging movement of the bar 25 upon the pivot bolt 24, causing the load carrying arm 26 to be inclined from the horizontal and downwardly at a sufficient angle to drop the tire 27 from the carrier as illustrated in Fig. 7.

The cam 30 may be rigidly attached to the track structure if only one unloading station is desired, or a plurality of such cams may be supported upon a hinged member 34 in such manner that any cam may be moved into or out of the path of travel of the rollers 29 to permit the optional choice of unloading stations.

By the devices above described, I have produced an improved trolley conveyer adapted to travel over trackways extending in any preferred direction, either in horizontal planes or in planes other than horizontal, without vibration or oscillation, and adapted to automatically discharge its load at a selected one of a plurality of unloading stations.

Various changes in the arrangement, size and shape of the various parts may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

I do not claim herein the trackway and its suspension means, this arrangement being claimed in a continuing application filed May 11, 1931, Serial No. 536,614.

What I claim is:

1. In a conveyer, the combination with a trolley hanger, a pair of draft members movably associated therewith and adapted to be normally arranged in longitudinal alignment; of means cooperating with said draft members for causing them to assume substantially the same angular relation with respect to said trolley hanger at both sides thereof.

2. In a conveyer of the class described, the combination of a track, of a wheeled carriage adapted to be supported by and travel along said track and having an elongated frame extending substantially perpendicular to the longitudinal lines of the track, flexible draft elements connected to said frame at each side thereof, and means to maintain substantially similar angular relation between said draft elements and said frame at both sides thereof as and for the purpose set forth.

3. In a conveyer of the class described, the combination with a track, of a wheeled carriage adapted to be supported and travel along said track and having an elongated frame extending substantially perpendicular to the longitudinal lines of the track, two inter-engaging attachment elements pivotally mounted upon the carriage so proportioned and arranged that pivotal movement of one attachment element produces equal and opposite pivotal movement of the other attachment element, and flexible draft elements connected to said attachment elements as and for the purpose set forth.

4. In a conveyer of the class described, the combination of a track, of a wheeled carriage adapted to be supported by and travel along said track and having an elongated frame extending substantially perpendicular to the longitudinal lines of said track, two inter-engaging attachment elements pivotally mounted upon said carriage for relative movement in a plane parallel to the longitudinal lines of said frame and so proportioned and arranged that pivotal movement of one attachment element produces equal and opposite pivotal movement of the other attachment, and draft elements connected to said attachment elements flexible in a plane perpendicular to the longitudinal lines of said frame as and for the purpose set forth.

5. In a conveyer, the combination with a track; of a wheeled carriage adapted to be supported upon and travel along said track and having an elongated frame extending substantially perpendicular to the longitudinal lines of said track, a pair of inter-engaging attachment elements pivotally mounted upon said carriage, one of said elements having a slot and the other element having a projection operating therein whereby pivotal movement of one attachment element produces equal and opposite pivotal movement of the other attachment element, and flexible draft elements connected to said attachment elements.

6. In a conveyer, the combination with a track; of a wheeled carriage adapted to be supported upon and travel along said track and having an elongated frame extending

substantially perpendicular to the longitudinal lines of said track, a pair of inter-engaging attachment elements movably associated with said carriage, one of said attachment elements having a forked end and the other of said elements having a pin operating therein whereby pivotal movement of one attachment element produces equal and opposite pivotal movement of the other attachment element, and flexible draft elements connected to said attachment elements.

7. In a conveyer chain comprising pivotally connected links, a pair of pivoted elements included therein and having their axes arranged at right angles to the axes of the chain links, and means to maintain said elements in substantially corresponding angular positions with respect to their respective axes.

8. In a conveyer chain comprising pivotally connected links, a pair of pivoted elements included therein and having their axes arranged at right angles to the axes of the chain links, one of said elements having a slot and the other of said elements having a projection operating therein.

9. In a conveyer chain comprising pivotally connected links, a pair of pivoted elements included therein and having their axes arranged at right angles to the axes of the chain links, and said elements having interfitting forked ends, and one of said elements having a fixed pin slidably mounted in the fork of the other element.

10. In a conveyer, the combination with a curved track, a hanger suspended from said track and adapted to travel along the same, draft members movably associated with said hanger, and means cooperating with said draft members for retaining said hanger substantially radial to the curve of said track in passing about the same.

11. In a conveyer, the combination with a curved track, a hanger suspended from said track and adapted to travel along the same, draft members movably associated with said hanger, and means cooperating with said draft members for causing them to assume substantially the same angular relation with respect to said hanger at opposite sides thereof for retaining said hanger substantially radial to the curve of said track when passing about the same.

12. In a conveyer, the combination with a curved track, a hanger suspended from said track and adapted to travel along the same, a flexible draft element movably associated with said hanger at each side thereof, and means to maintain said draft members in substantially the same angular relation with respect to the hanger at both sides thereof.

13. In a conveyer, the combination with a curved track, a hanger suspended from said track and adapted to travel along the same, a flexible draft element movably associated with said hanger at each side thereof, and interengaging means between said draft members for retaining said hanger substantially radial to the curve of said track when passing about the same.

14. In a conveyer, the combination with a curved track, of a conveyer chain composed of pivotally connected links, a hanger suspended from said track and adapted to travel along the same, said hanger being connected to adjacent links of said chain, and means cooperating with said adjacent links for causing them to assume substantially the same angular relation with respect to said hanger when passing about said track.

15. In a conveyer, the combination with a curved track, of a conveyer chain composed of pivotally connected links, a hanger suspended from said track and adapted to travel along the same, said hanger being connected to adjacent links of said chain, and said adjacent links having interengaging means for causing them to assume substantially the same angular relation with respect to said hanger when passing around said track.

16. In a conveyer, the combination with a curved track, of a conveyer chain composed of pivotally connected links, a hanger suspended from said track and adapted to travel along the same, said hanger being connected to adjacent links of said chain, and said adjacent links having interengaging means causing them to move in opposite directions as they pass around said track.

17. In a conveyer, the combination with a curved track, a conveyer chain composed of pivotally connected links, means for rendering said chain flexible in passing about said curve without unduly stressing the chain links, comprising a hanger engaging the track to move along the same, a pair of links of said chain being pivotally connected to the hanger on axes perpendicular to the axes of said chain links, and interengaging means between said pair of links for causing them to assume substantially the same angular relation with respect to the hanger.

18. In a conveyer, the combination with a curved track, a conveyer chain composed of links pivotally connected on vertical axes, a hanger engaging the track to move along the same, a pair of links of each chain being pivotally connected to the hanger on horizontal axes, and interengaging means between said pair of links for causing them to assume substantially the same angular relation with respect to the hanger at both sides thereof.

19. In a conveyer, the combination with a curved track, a conveyer chain composed of pivotally connected links, means for rendering said chain flexible in passing about said curve without unduly stressing the chain links, comprising a hanger engaging a track to move along the same, a pair of links of said chain being pivotally connected to the

hanger on axes perpendicular to the axes of said chain links, one of said links having a projection, and the other of said links having a recess to receive said projection for causing said links to assume substantially the same angular relation with respect to the hanger.

20. In a conveyer, the combination with a track, of a wheeled hanger adapted to rest upon and travel along said track, said hanger having a slot, an anti-friction roller mounted in said slot and projecting beyond the sides thereof for engagement with the track, said hanger having a second slot, and chain links pivotally connected to said hanger in said second slot.

21. In a conveyer, the combination with a track, of a wheeled hanger adapted to rest upon and travel along said track, said hanger having a slot, an anti-friction roller mounted in said slot and projecting beyond the sides thereof for engagement with the track, said hanger having a second slot, and chain links pivotally connected to said hanger in said second slot, said chain links having interengaging means within said slot for causing them to assume substantially the same angular relation with respect to said hanger.

22. In a conveyer, the combination with a curved track, a hanger suspended from said track and adapted to travel along the same, means to prevent lateral displacement of said hanger, draft members movably connected to said hanger, and means cooperating with said draft members for retaining said hanger substantially radial to the curve of said track in passing about the same.

23. In a conveyer, the combination with a curved track, of a hanger suspended from said track and adapted to travel along the same, means to prevent lateral displacement of the hanger, draft members movably connected to said hanger, and means cooperating with said draft members for causing them to assume substantially the same angular relation with respect to said hanger at opposite sides thereof, and cooperating with said aforesaid means for retaining said hanger substantially radial to the curve of said track when passing about the same.

24. In a conveyer, the combination with a curved track, of a hanger suspended from said track and adapted to travel along the same, means to prevent lateral displacement of said hanger transversely of said track, a flexible draft member movably connected to said hanger at each side thereof, and interengaging means between said draft members for retaining said hanger substantially radial to the curve of said track when passing about the same.

25. In a conveyer, the combination with a track having a curve therein; of a conveyer chain composed of pivotally connected links, a hanger suspended from said track and adapted to travel along the same, said hanger being connected to adjacent links of said chain, means to prevent movement of said hanger transversely of said track, and the adjacent links having inter-engaging means for causing them to assume substantially the same angular relation with respect to said hanger when passing the curve of said track and for retaining the hanger substantially radial to the curve of the track in passing about the same.

26. In a conveyer, the combination with a track having a curve therein, of a conveyer chain composed of links pivotally connected, a hanger engaging the track to move along the same, means for preventing tilting of said hanger transversely of the track, said hanger being connected to adjacent links of said chain, and inter-engaging means between said adjacent links for causing them to assume substantially the same angular relation with respect to the hanger at both sides thereof and to maintain the hanger substantially radial with respect to said curve in the track when passing about the same.

27. In a trolley conveyer, the combination with a load support having an opening therethrough; of a draft chain including linkage extending into said opening and capable of movement therein to cause the links at opposite sides of said load support to assume substantially the same angular relation with respect to said load support.

28. In a trolley conveyer, the combination with a load support having an opening therethrough; of a draft chain including linkage extending into the opening, and means cooperating with said linkage within said opening to cause links in the draft chain on opposite sides of the load support to assume substantially the same angular relation with respect to the load support.

29. In a trolley hanger, a pair of draft links movably associated with the hanger, and means associated with said draft links whereby pivotal movement of one link produces movement of the other link.

30. In a trolley hanger, a pair of draft links pivotally connected with the hanger for movement in a plane parallel to the longitudinal plane of said hanger, and means for inter-engaging said links whereby pivotal movement of one link produces pivotal movement of the other link.

31. In a trolley hanger, a pair of draft links pivotally connected thereto, one of said links having a slot, and the other link having a projection operating in said slot.

32. In a trolley hanger, a pair of inter-engaging draft links pivotally connected thereto, one of said links having a forked notched end, and the other of said links having a pin operating in said notch.

33. A chain including a member, a pair of links connected thereto on parallel axes, and means cooperating with said links whereby

pivotal movement of one causes substantially corresponding movement of the other.

34. A chain including a member, a pair of links connected thereto on parallel axes, one of said links having a slot, and the other of said links having a pin operable in said slot.

In testimony whereof I have hereunto set my hand.

EARLE V. FRANCIS.