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[54] **TROLLEY AND HANGER APPARATUS**
13 Claims, 5 Drawing Figs.

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[51] Int. Cl. **B61b 3/00**
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172, 242, 243, 244, 244.1, 245, 246, 247, 248,
106, 89, 94; 105/150, 154; 16/191, 87, 94, 95, 96,
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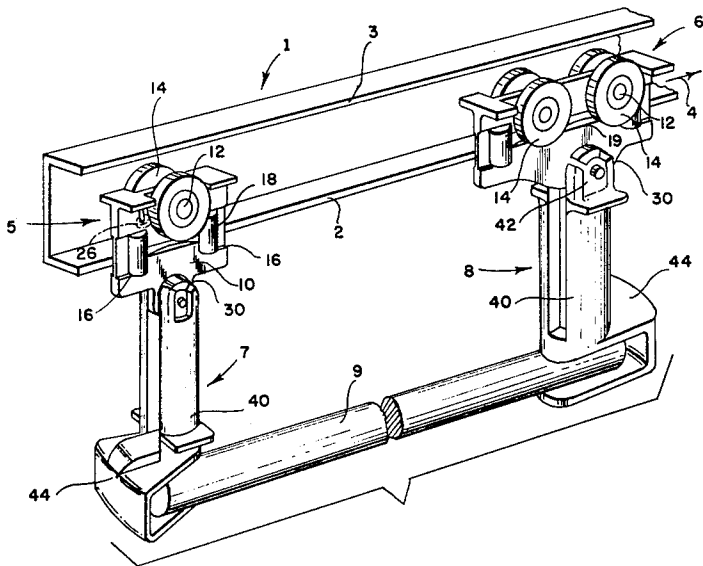
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ABSTRACT: Flat trolley bodies having perpendicular tabs along upper edges thereof for mounting axles and guide rollers to prevent the trolley bodies from scraping along tracks, hangers having integrally formed arcuate bumpers, and combinations of trolleys and hangers having motion-limiting stops near hinged interconnections are described herein.



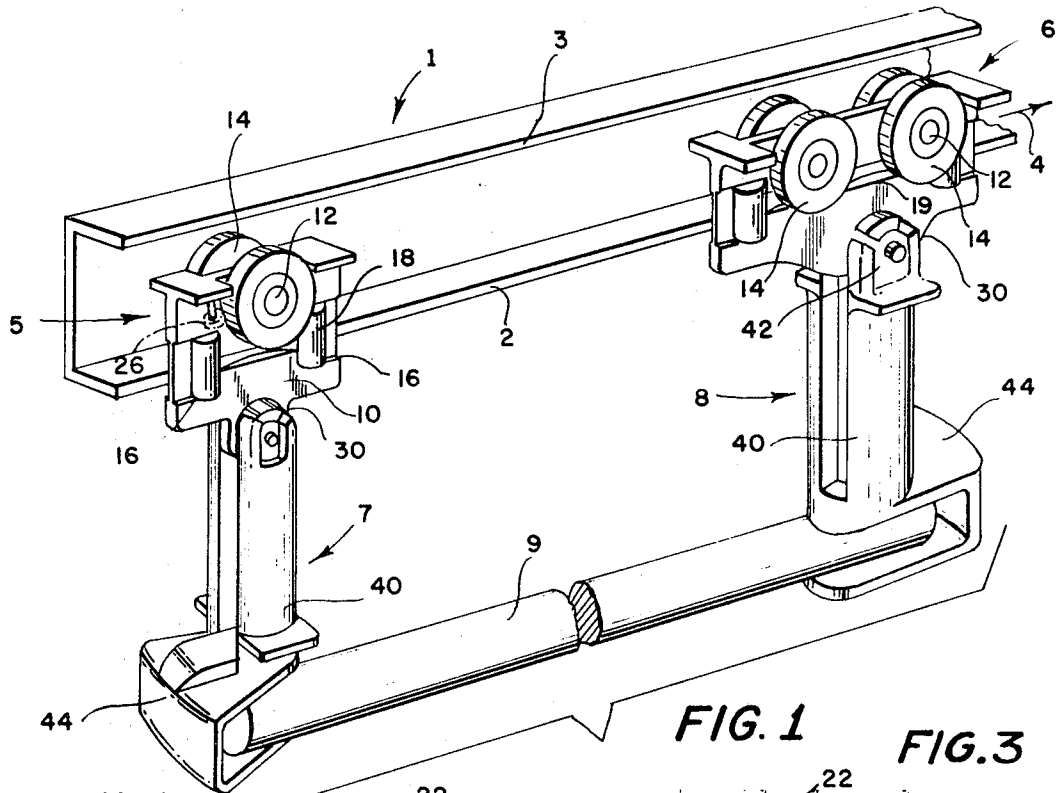


FIG. 1

FIG. 3

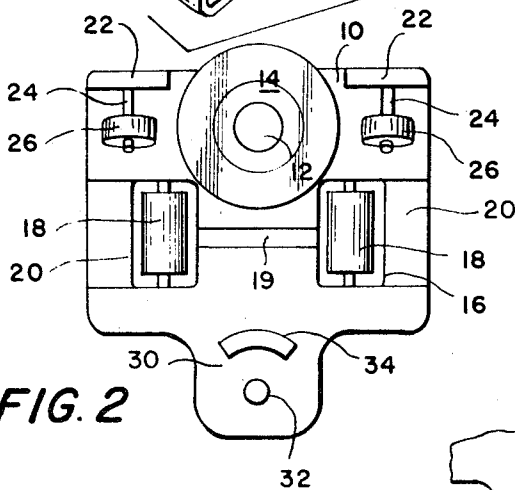


FIG. 2

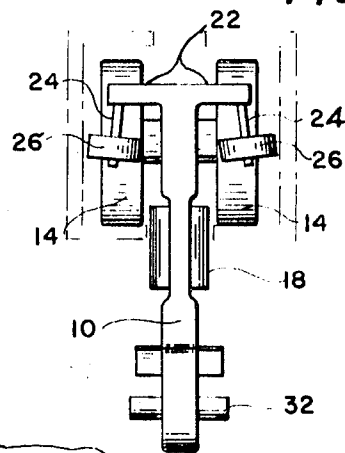


FIG. 5

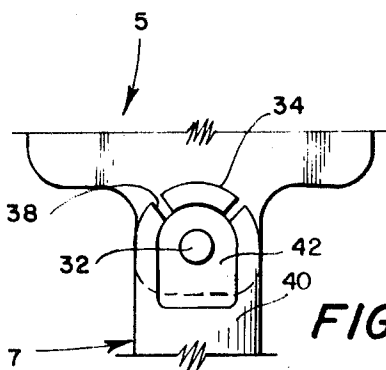
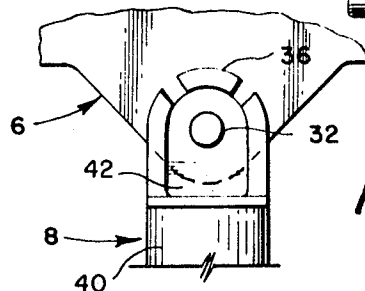


FIG. 4



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TROLLEY AND HANGER APPARATUS

BACKGROUND OF THE INVENTION

As labor costs are increased, as production lead times are diminished, and as inventory storage and retrieval times become more important, the need for improved material handling apparatus is magnified.

To promote long wear of material-handling apparatus and to reduce maintenance to a minimum, it is imperative that there be as little sliding friction and wear between parts as possible. In systems where roller-supported trolleys are moved along elongated tracks, there are many possibilities for misalignment of the trolleys with the tracks to the extent that portions of the trolleys will scrape along the tracks. Because in many cases trolleys freely move along tracks and are pushed along by separate driving means or by hand, there is danger that trolleys may be jammed together. This requires the increase of structural strength of trolleys beyond normal load-carrying requirements and presents possibilities of damage to trolleys. Hence, two main sources of wear and maintenance problems in conveying systems are the relative scraping of trolleys and tracks, which causes damage to the trolleys and to the tracks, and the knocking or jamming together of trolleys which causes damage to the trolleys.

Many efforts have been made to improve trolleys and combination trolley and hanger systems to reduce maintenance problems caused by such drawbacks. While many of the solutions have been partially satisfactory, the search continues for improved systems which are more satisfactory and which provide long and dependable maintenance-free operation with reasonable size and materials in the tracks and in the trolleys.

SUMMARY OF THE INVENTION

The present invention overcomes the problems of trolleys jamming together by providing combined trolleys and hangers in which the hangers carry bumpers to maintain the trolleys spaced from next adjacent trolleys. The hangers and trolleys are interconnected for relative rotation, but the rotation is limited by limit means disclosed herein to prevent relative rotation beyond positions which maintain the trolleys separated.

While trolley and track alignment may be maintained when pushing trolleys with mechanical apparatus, in many inventory and manufacturing systems, free trolleys are pushed along tracks by workmen between some stations or when separating trolleys at a single station. Such pushing often is accomplished casually and may be accompanied by forces having components in directions perpendicular to the tracks. This causes the trolleys to tilt within the track and, in the case of conventional systems, causes the trolleys to scrape on the tracks.

Many materials-handling systems employ channel-shaped tracks having central downward openings in which trolleys ride and through which trolleys or hangers project. Consequently, tilting of trolleys causes scraping along inner walls of the channels. This invention provides guide rollers mounted near the top of the trolleys to prevent sliding contact between the top of the trolleys and channel walls. Lugs project outwardly from upper edges of the trolleys; axles are mounted generally vertically in the lugs; and guide rollers are rotationally mounted upon the axles. When trolleys are tipped, the guide rollers contact the vertical walls of the channels. So that the rollers will contact the walls with maximum area, the axles are slightly outwardly inclined making the surfaces of the rollers flat against the walls when the trolleys are tipped.

To prevent sliding contact and wear between trolleys and tracks, the present invention provides guide rollers mounted within openings in the trolley bodies for engaging walls associated with the tracks. In the case of internally mounted rollers, the vertical walls which the rollers engage are edges between parallel tracks on which trolleys ride.

While the trolleys and hangers described herein are primarily intended for use with overhead channel-shaped tracks, the teachings of this invention have application to many forms of

materials-handling systems. For example, the trolleys may be incorporated in a continuous chain which holds the trolleys. The trolleys may be freely mounted within a continuous track, and a drive chain having trolley-engaging means may be moved in a parallel run. The hangers may extend at an angle from the trolleys, or the track may be floor mounted with trolleys and hangers extending upward therefrom.

From the teachings of this invention, many variations and modifications within the scope of this invention will be ascertainable to those skilled in the art.

One objective of this invention is the providing of an improved materials-handling system employing tracks, trolleys and hangers in which the trolleys and hangers are hinged and have motion-limiting stops for preventing excess relative motion between the trolleys and hangers.

Another objective of this invention is the provision of trolleys having outwardly mounted guide rollers for contacting walls of channel-shaped tracks.

Another objective of this invention is the provision of trolleys having flat bodies with openings therein for mounting guide rollers to prevent contact of the trolley bodies with vertical walls associated with the tracks.

This invention has as a further objective the provision of hangers having integrally formed cylindrical segment bumpers which extend outward beyond corresponding extensions of trolleys carrying the hangers.

Further objectives of this invention will be apparent from the specification, including the claims, and from the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the trolley and hanger apparatus of this invention.

FIG. 2 is a side elevation of a rear trolley.

FIG. 3 is an end elevation of the rear trolley shown in FIG. 2.

FIG. 4 is a detail of the interconnection between the rear trolley and hanger.

FIG. 5 is a detail of the interconnection between the front trolley and hanger.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIG. 1 a channel track is generally indicated by the numeral 1. For purpose of clarity only one-half of the channel track is shown in the drawing. Channel track 1 has a downward opening 2 through which trolleys and hangers project. An upper elongated opening 3 is provided in track 1 so that pushers may extend toward the trolleys to move the trolleys along track in a direction shown by arrow 4.

The trolley means of this invention comprises a rear trolley 5 and a front trolley 6, which respectively supports hangers 7 and 8. Between the hangers, a carrier bar 9 is pivoted.

Front trolley 6 and rear trolley 5 are similar except for two aspects. Front trolley 6 has two pair of supporting rollers, while the rear trolley has a single pair. In addition, limit means between front trolley 6 and front hanger 8 provide greater freedom of rotation than the similar limit means between rear trolley 5 and hanger 7.

With further reference to FIGS. 2 and 3, the trolleys have cast bodies 10, through which axles 12 extend to mount opposed pairs of supporting wheels 14. Track 1 is shown in phantom lines. Bodies 10 also define openings 16 adjacent side edges of the bodies. Rollers 18 are mounted vertically in openings 16 to engage the vertical walls associated with openings 2 in track 1. Rollers 18 support the trolley bodies 10 spaced from the walls, so that no sliding wear occurs. Recesses 19 span the trolley body between openings 16 in the central area of the body which is opposite opening 2 in track 1. Thus, when the trolleys round corners in the tracks, and when rollers 18 are forced against the track edges, recesses 19 prevent central portions of the trolley bodies from contacting the track edges. Trolley bodies 10 are recessed 20 between openings 16 and side edges of the bodies to fulfill the same function as recesses 19.

Horizontal lugs 22 are integrally formed with trolley bodies 10 at upward and outward extremities of the trolley bodies. Shafts 24 are mounted in lugs 22 and extend downwardly and slightly outwardly at approximately 5° angles with respect to trolley bodies 10. Wheels or rollers 26 are mounted near the extremities of the shafts 24. When hangers are loaded or unloaded or when trolleys are pushed between stations or at stations by hand, there may be tendencies to push the trolleys along the tracks using forces having components in lateral directions. This causes the trolleys to tip, and in the case of conventional trolleys without rollers 26, the tipping and moving of the trolleys cause wheels 14 on one side of the trolleys to contact the inside vertical wall of the channel track 1. With an upper portion of wheel 14 contacting the vertical wall and a lower portion of the same wheel contacting the horizontal portion of the track, a braking force is generated as the trolleys are pushed along the tracks. To ensure that the wheels 14 are maintained spaced from vertical inner walls of the channel track 1, rollers 26 are employed. Thus, when trolleys are tipped, wheels 26 engage the inside walls of the track and prevent contact thereof by wheels 14.

Downward extensions 30 of lower edges of trolleys 10 mount hinge means or pins 32 which support hangers 7 and 8. Segments means 34 and 36 which are integrally formed on the trolley bodies cooperate with the stops 38 on the hangers to limit relative rotation of the hangers and trolleys. Forward trolley 6 has a shorter limit segment 36 than limit segment 34 on trolley 5. Hence, the freedom of rotation between forward trolley 6 and hanger 8 is greater than the freedom of rotation between the rear trolley and hanger.

Hangers 7 and 8 are similarly configured. Each hanger comprises a vertical shaft portion 40 with upper portions 42 which are drilled to receive hinge pins 32. The shaft portions of the hangers have formed at the bottom extremities thereof bumpers 44 which are constructed as segments of cylinders to bear against adjacent hanger bumpers, whether on straight or curved tracks. Bumpers 44 extend outwardly to positions beyond the trolleys so that adjacent bumpers engage when trolleys are collected on a main track or spur. Rotation-limiting means 34, 36, and 38 are provided to ensure that the hangers do not swing or move sufficiently to allow trolleys to touch when other hangers are forced against them, thus leaving trolleys vulnerable to jamming.

Although this invention has been disclosed in part by specific embodiment, it will be obvious to those skilled in the art that several modifications and variations may be constructed without departing from the scope or spirit of this invention. The scope of the invention is defined only in the following claims.

I claim:

1. For a materials-handling system employing tracks, trolleys movable along the tracks, and hangers extending from the trolleys for supporting material to be transported, improved combined trolley and hanger apparatus comprising a trolley having a body and rollers rotationally mounted on the body for contacting tracks and for supporting the body on the tracks, said trolley body having first and second spaced body portions wherein the rollers comprise one pair of wheels mounted on first body portion and more than one pair of wheels mounted on the second body portion, a hinge means mounted to the trolley body, and a hanger connected to the hinge, limit means connected respectively to the trolley and to the hanger adjacent the hinge for limiting relative movement between the trolley and the hanger, said limit means comprising segment means mounted on the body near the axle and centered about the axle and further comprising first and second spaced stops mounted on the hanger near the axle, whereby moving the hanger about the axle relative to the trolley body causes the first stop to engage one end of the segment means and moving the hanger about the axle relative to the body in an opposite direction causes the second stop to engage a second end of the segment means.

2. The improved combined trolley and hanger apparatus of claim 1, wherein the hanger comprises first and second inter-

connected vertical shafts, wherein the hinge comprises first and second axles respectively connected between the first body portion and the first shaft and connected between the second body portion and the second shaft, wherein the limit means comprises first and second limit means associated respectively with the first and second body portions and shafts, and wherein spaces between elements of the first limit means are smaller than corresponding spaces between elements of the second limit means.

3. The improved combined trolley and hanger apparatus of claim 1 wherein a bumper is integrally formed with the hanger and extends beyond the body in a direction transverse to the axle and parallel to the track.

4. The improved combined trolley and hanger apparatus of claim 1, wherein the body is a relatively flat, vertically oriented body, and further comprising lugs extending outward from upper portions of the body, and guide wheels rotationally mounted on the lugs for engaging walls associated with the tracks for preventing contact of the body therewith.

5. The improved combined trolley and hanger apparatus of claim 1, wherein the body has spaced openings spaced inward from edges of the body, and further comprising guide axles vertically mounted in the openings and guide rollers mounted on the axles in the openings and extending outward therefrom for engaging vertical edges of the tracks and for preventing contact of the body therewith.

6. Improved trolley apparatus for use on a walled track comprising:

a body, said body means being substantially flat and vertically oriented,

lugs mounted on an upper portion of the body and extending outwardly and downwardly therefrom,

support rollers rotationally mounted on the body for engaging the track, and for supporting the trolleys on the tracks for movement therealong,

a first set of guide wheels rotationally mounted on the lugs for engaging a wall associated with the tracks and for preventing contact of the body and lugs therewith, and

a second set of guide wheels mounted on the body for engaging a wall associated with the track preventing contact of the body therewith.

7. The improved trolley apparatus of claim 6 and wherein the lugs project horizontally and generally perpendicular to the body from upper portions of the body.

8. Improved trolley apparatus of claim 7, further comprising primary axles mounted horizontally on the body means, and secondary axles generally vertically mounted on the lugs, and wherein the rollers and first set of guide wheels are mounted respectively on the primary axles and on the secondary axles.

9. The improved trolley apparatus of claim 8 wherein lugs are oppositely mounted on upper and outward extremities of the body, and wherein secondary axles are downwardly mounted on the lugs and are slightly outwardly inclined with respect to the body.

10. The improved trolley apparatus of claim 7, wherein the body means defines openings located within the body and spaced from the edges of the body, and wherein said second guide wheels are rotationally mounted within the openings and extending horizontally therefrom beyond the body for engaging a wall associated with the track for preventing contact of the body and the lugs therewith.

11. Improved trolley apparatus for use with a walled track comprising a generally T-shaped body having openings spaced from each other and spaced inward from the side edges of the vertical member of said T-shaped body, first axles horizontally mounted in the body, support rollers mounted on the first axles for contacting the track, second and third axles with guide wheels mounted thereon for preventing contact of said T-shaped body with the track, said second axles mounted substantially vertically from the horizontal member of said T-shaped body, and said third axles mounted vertically in said openings.

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12. The improved trolley apparatus of claim 11 wherein the body means further defines recesses in opposite faces between the openings.

13. Improved hanger apparatus comprising elongated shank means having first and second longitudinal ends, said first end having means for connection to a trolley, bumpers mounted on the second end, the bumpers having a first radial portion divergently extending from the shank means and terminating in an arcuate edge spaced from the shank means, an axial por-

tion defining a cylindrical segment extending generally perpendicular from the arcuate edge of the first radial portion in a direction away from the shank means, and a second radial portion convergently extending from the axial portion generally parallel to the first radial portion and terminating at a position spaced from the shank means in longitudinal alignment therewith.

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