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Thompson

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[54] **TOW TRUCK CONVEYOR CHAIN**

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[52] **U.S. Cl.** ..... **104/172 BT**
[51] **Int. Cl.** **B61b 13/00**
[58] **Field of Search**..... 104/172 BT, 172 C, 172 S

[56] **References Cited**

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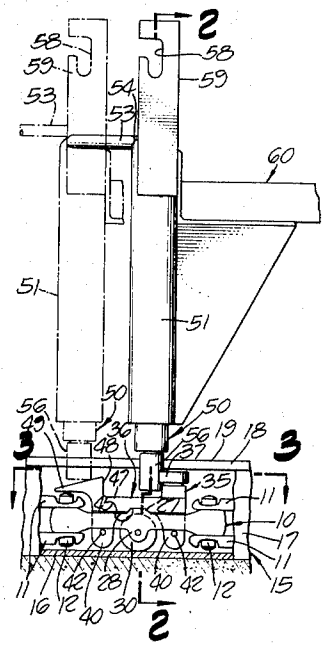
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[57] **ABSTRACT**

A tow truck conveyor chain having an improved center link equipped with roller and latch detent means having multiple functions and advantages. The chain and its enclosing guideway is unusually compact and all parts of the chain proper are supported on rollers and out of contact with the guideway. The rollers and the latch detent are mounted on the center links and utilize to advantage the smaller dimensions of this portion of the conveyor chain to achieve marked savings in space and materials.

17 Claims, 4 Drawing Figures



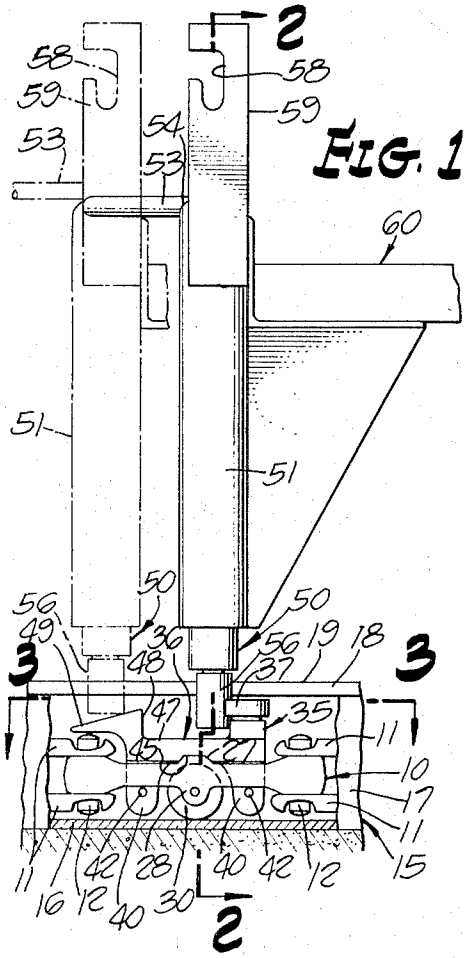


FIG. 1.

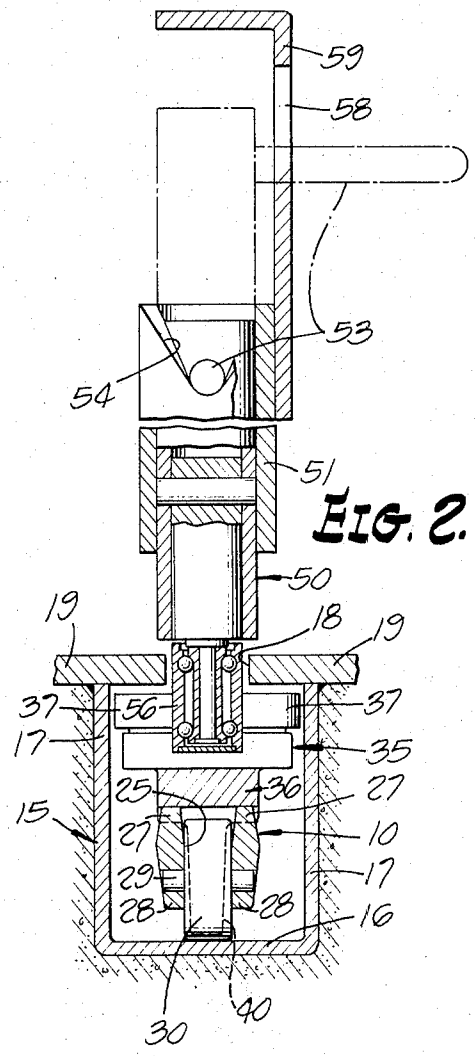


FIG. 2.

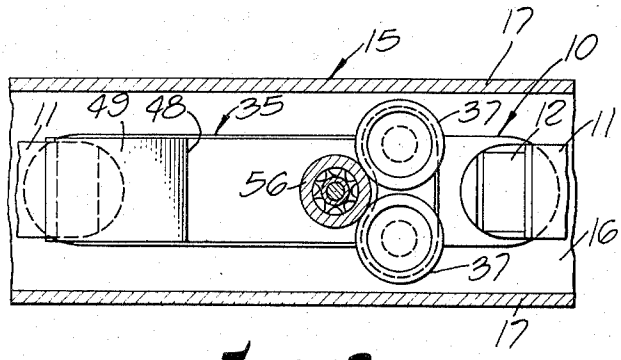


FIG. 3.

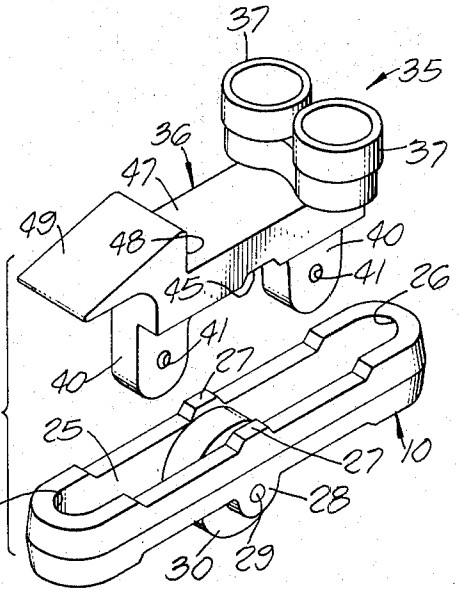


FIG. 4.

TOW TRUCK CONVEYOR CHAIN

This invention relates to conveyor systems, and more particularly to a conveyor system designed to push tow trucks from place to place and featuring a simplified unusually compact tow chain assembly and supporting guideway therefor.

Tow truck conveyor systems are in wide use utilizing conveyor tow chains recessed into the floor and having only a narrow slot opening through the floor to receive the latch connection to the tow truck.

Various attempts have been made heretofore to minimize wear of the conveyor system occasioned by rubbing contact between the moving and stationary components and occuring principally along the guideways for the chain. Some of these suggestions, although successful in minimizing wear, are objectionable because of the excessive space required, greater costs for installation and maintenance, and because many operating environments lack sufficient space in the floor to accommodate the system.

The foregoing and other shortcomings and disadvantages of prior tow truck conveyor systems is avoided by the present invention which is characterized by its simplicity, compactness and overall efficiency. The tow chain makes use of a specially constructed center link mounting a support roller offset slightly downwardly from its longitudinal center axis and engageable with the bottom of the guideway to support adjacent portions of the chain out of contact with the guideway. Saddled over this roller and supported on the center link is a pusher unit provided with a pair of rollers mounted on vertical axes crosswise of the chain and in close rolling contact with the sidewalls of the guideway to maintain the chain centered therein and additionally serving to automatically center the tow truck latch. A camming surface at the forward end of the pusher unit serves to lift the latch and then release it for gravitation into the seating detent directly forwardly of the centering rollers. The underside of the pusher unit is shaped complementally to boss means projecting upwardly from the center link and cooperating to lock the unit against relative lengthwise movement along this link and secured in assembled position therewith by keeper pins.

Accordingly, it is a primary object of this invention to provide an improved and simplified tow truck conveyor chain equipped with means for supporting it centrally of guideway means customarily recessed into flooring.

Another object of the invention is the provision of an improved center link for a tow chain incorporating roller means for supporting the chain proper out of contact with the chain guideway.

Another object of the invention is the provision of a tow chain having a separable pusher unit of improved compact design and having interlocking assembly engagement with a center link of the chain.

Another object of the invention is the provision of a pusher unit for tow chain provided with rollers cooperating to maintain the chain centered crosswise of a guideway therefor and additionally to enter a tow truck draft latch therebetween.

Another object of the invention is the provision of a tow truck conveyor chain system of reduced size employing a minimum of material and special components and operating to maintain the chain and the towing latch out of rubbing contact with the chain guideway.

Another object of the invention is the provision of a tow truck latch movably securable to a tow truck and having a roller supported on the end thereof and engageable by the pusher of a conveyor tow chain.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated:

FIG. 1 is a fragmentary side elevational view of an illustrative embodiment of the invention showing the tow truck latch in dot and dash lines as it is being elevated and in full lines when seated in its truck towing position;

FIG. 2 is a cross sectional view on an enlarged scale taken along broken line 2—2 on FIG. 1;

FIG. 3 is a cross sectional view on an enlarged scale taken along line 3—3 on FIG. 1; and

FIG. 4 is an exploded view of the improved center link and the associated pusher unit embodying features of the invention.

Referring initially more particularly to FIGS. 1-3, there is shown one preferred embodiment of the invention embodied in a typical conveyor tow chain. This chain comprises center links **10** of drop forged steel interconnected between their adjacent ends lengthwise of the chain by pairs of side links **11,11** and pivot pins **12,12.** In accordance with customary practice, center links **10** have the same pitch as side links **11,11.** As is well known, the tow chain is endless and passes over idler and driving sprockets, not shown, at all turns, the sprockets being supported on vertical axes slightly below floor level. The portions of the tow chain between sprockets is enclosed in a shallow U-shaped guideway **15** having a bottom **16** and sidewalls **17,17** all recessed into the floor along which the tow truck is to be pushed. The upper end of guideway **15** is usually closed except for a slot **18** by bars **19,19** welded to the upper edges of sidewalls **17.** The upper surfaces of these bars preferably lie flush with the adjacent floor surface.

Structural details of center link **10** are best shown in FIG. **4.** This link has a long slot **25** extending lengthwise of the main body and terminating at its ends in semicylindrical portions **26,26** seating the pivot pins **12,12** (FIG. 1). Bosses **27** project upwardly from the mid length of the link sidewalls for a purpose which will be described more fully presently. A second pair of bosses **28** project downwardly from the lower edges of the center portion of the center link **10** and are formed with aligned openings seating the ends of shaft **29** supporting a roller **30.** As is clearly evident from FIGS. **1** and **4,** roller **30** projects into slot **25** and the axis of its supporting shaft **29** is offset downwardly from the longitudinal center line of link **10.** Additionally and importantly, roller **30** has a radius sufficient to support the side links **11** to either side of roller **30** slightly spaced above bottom wall **16** of the U-shaped guideway **15.**

Loosely assembled against the upper side of center link **10** is a tow truck pusher unit designated generally **35.** This unit has an elongated one piece main body **36** supporting a pair of centering rollers **37,37** (FIGS. **2, 3, 4**) in side-by-side relation crosswise of its rear end and mounted on upright pins the lower ends of which

are screwed into main body 36 and readily removable for servicing. The adjacent peripheries of these rollers are spaced very closely together and their remote peripheries are spaced apart a distance somewhat less than the internal width between the upright sidewalls 17,17 of guideway 15. Accordingly, one principal function of these rollers is to hold the tow chain centered between the sidewalls of the guideway and a second important function will be pointed out presently.

Pusher unit 35 is held loosely assembled against the top side of center link 10 by a pair of lugs 40,40 projecting downwardly from its underside with their opposite sidewalls spaced to fit loosely between the sidewalls of the link slot 25. Passages 41 extending through bosses 40 seat keeper pins 42 (FIG. 1) with their opposite ends bearing against the adjacent lower edges of center link 10. The pusher unit is held against relative movement lengthwise of the center link by a pair of upwardly extending bosses 27 which seat in complementally shaped recesses 45 crosswise of the underside of main body 36.

Opening upwardly from the mid portion of the pusher unit is a deep recess forming a latch detent 47. The rear end of this detent is formed by the centering rollers 37,37 and the forward end has an upright wall 48 merging with a downwardly and forwardly inclined latch camming surface 49. This surface underrides the latch and elevates it for subsequent gravitation into latch detent 47.

A tow truck of conventional construction, indicated at 60 in FIG. 1, is provided with a vertically reciprocal latch 50 slidably supported in the tubular housing 51 suitably fixed centrally of the front end of the truck. A pin 52 extending radially from the upper end of latch 50 is seatable in a notch 54 of housing 51 to permit the ball bearing roller 56 on the lower end of the latch to be lowered through slot 18 in the floor and into the path of the centering rollers 37 of pusher unit 35. At other times the latch is elevatable by pin 53 and seatable in the bayonet slot 58 of a bracket 59 fixed to latch housing 51. When pin 53 is seated in notch 58 the latch is held supported substantially above floor level.

From the foregoing, it will be recognized that latch 50 centers itself automatically and effortlessly centrally of the guideway by reason of the mutually cooperating action of rollers 37,37 on pusher unit 35 and roller 56 at the lower end of latch pin 50. Each of these rollers, as well as the center link supporting rollers 30, are preferably provided with sealed bearings to exclude foreign matter and retain a supply of lubricant for long trouble-free service life. Additionally, it will be readily apparent that the anti-friction roller 56 permits latch 50 to center itself without need for rotation in sleeve 51 which would be resisted by the strong bending forces customarily prevailing in this area as the tow truck is taken in tow. Should roller 56 or its bearing become worn, it is easily replaced at minimum cost. This is likewise true of rollers 30 and 37 as well as of center link 10 and of the pusher unit main body 36.

Each of the center links 10 may be equipped with the pusher unit 35 although, in a more usual case, only certain ones of the center links are so equipped. If the operator wishes the truck to be towed he simply aligns latch 50 with slot 18 in the floor and releases it with its lifting pin 53 aligned with notch 54 and with roller 56 on the end of the latch protruding through the conveyor slot 18. As the camming surface 49 of a pusher unit 35 approaches roller 56 from the right as viewed in FIG. 1, the camming surface 49 underrides roller 56 and lifts the latch and then allows it to drop and seat in the latch detent 47. Further advance of the tow chain brings the latch roller 56 into contact with the centering rollers 37. This roller is then automatically centered between rollers 37 thereby holding the latch out of contact with the opposite edges of slot 18. At the same time rollers 37,37 hold the tow chain centered between sidewalls 17 of guideway 15. It will therefore be recognized that, at all times all portions of the tow chain are supported by rollers 30 slightly above and out of contact with the bottom 16 of the guideway whereas rollers 37 hold the truck latch out of contact with the edges of slot 18. While the particular tow truck conveyor chain herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention and that no limitations are intended to the detail of construction or design herein shown other than as defined in the appenddd claims.

I claim:

1. An article of manufacture comprising a center link for a conveyor tow chain of the type having center links interconnected by pairs of side links, said center link comprising a flattened loop-like casting having a single slot extending substantially from end-to-end thereof lying in a vertical plane, a single roller journalled within and crosswise of the mid-length of said slot on horizontal axis pin means, said roller being sized to support both ends of said center link and of said side links connectable to the opposite ends of said slot of said center link out of contact with guide channel means in which conveyor tow chains commonly operate, and the portions of said slot to either side of said single roller being unobstructed and seating downwardly projecting bosses of a pusher unit assembled lengthwise of the upper side of said center link.

2. An article of manufacture as defined in claim 1 characterized in that said single roller is mounted crosswise of said loop-like casting with its axis offset vertically from the longitudinal center line of said center link.

3. An article of manufacture as defined in claim 2 characterized in that the opposite ends of said loop-like casting are semi-cylindrical and adapted to seat respective pivot pins for holding the opposite ends of said center link assembled between one end of respective pairs of side links.

4. Conveyor apparatus as defined in claim 1 characterized in that said center link includes a tow truck pusher unit centrally of the upper side thereof, said pusher unit having an upwardly opening latch seating detent therein and including a pair of rollers supported side-by-side crosswise thereof the rear end of cooperating to engage and hold a tow truck latch centered between said pair of rollers as said latch is pushed by said pair of rollers and said conveyor tow chain.

5. Conveyor apparatus as defined in claim 4 characterized in that said pair of rollers are sized to lie closely spaced from the upright sidewalls of said guide channel means to hold said conveyor tow chain centered crosswise thereof and out of contact therewith.

6. Conveyor apparatus as defined in claim 5 characterized in that said side links of each pair thereof lie in vertically spaced apart horizontal planes with the lower

one thereof held spaced above the interior bottom of said guide channel means by said roller means.

7. An article of manufacture comprising a center link for a conveyor tow chain of the type having center links interconnected by pairs of side links, said center link having a roller journalled crosswise of the mid-length thereof on an axis offset vertically below the longitudinal axis thereof and sized to support both ends of said center link and the adjacent ends of side links connectable to said center link ends out of contact with guide channel means in which conveyor tow chains commonly operate, a tow truck pusher unit secured to the mid-length of said center link on the opposite side of said longitudinal center line from said roller means, and said pusher unit having a latch detent adapted to seat a latch projecting downwardly from a tow truck to be towed.

8. An article of manufacture as defined in claim 7 characterized in the provision of means on said pusher unit for centering a tow truck latch centrally of the opposite sides of said center link.

9. An article of manufacture as defined in claim 8 characterized in that said latch centering means includes a pair of rollers mounted side-by-side crosswise of one end of said pusher unit with their remote peripheries adapted to engage the interior sidewalls of guideway means for a conveyor tow chain.

10. An article of manufacture as defined in claim 7 characterized in that one end of said pusher unit slopes inwardly and forwardly toward the adjacent end of said center link and forms means for camming a tow truck latch upwardly and thence into seating engagement with said latch detent.

11. An article of manufacture as defined in claim 7 characterized in that said pusher unit includes a pair of lugs projecting from one side thereof and straddling said roller means, and keeper means for holding said lugs assembled to said center link.

12. An article of manufacture as defined in claim 11 characterized in that said keeper means comprises pins extending through the outer ends of said lugs with their ends engageable with the adjacent lateral edges of said center link to hold said pusher unit assembled thereto.

13. An article of manufacture as defined in claim 7 characterized in that said center link includes boss means thereon positioned to seat in complementally shaped recess means on the juxtaposed portion of said pusher unit to hold said pusher unit substantially against relative movement lengthwise of said center link.

14. An article of manufacture attachable to a center link of a conveyor tow chain of the type in which the center links are held assembled to one another by intervening pairs of side links, said article having an elongated main body formed with an upwardly opening latch seating detent, a pair of rollers in side-by-side relation crosswise of one end of said latch detent and cooperating to engage and center a tow truck latch therebetween, lug means projecting downwardly from the opposite end portions of said main body on the opposite side thereof from said rollers, and means adapted to lock said lugs and said main body assembled to a center link of a conveyor tow chain.

15. An article of manufacture as defined in claim 14 characterized in that the end of said main body remote from said rollers is inclined outwardly and toward the roller supporting end thereof and providing a camming surface for lifting a tow truck latch into latching position in said latch detent.

16. A tow truck conveyor system comprising, U-shaped guideway means mountable in a floor with an upwardly opening entrance slot extending therealong, conveyor chain means concealed in said guideway means and having pusher elements thereon, tow truck means having a tow latch movably mounted thereon for movement between a non-towing retracted position and an extended towing position with its lower end extending through said slot into the path of a pusher element on said conveyor chain means, vertical axis roller means on the lower end of said tow latch, a pair of rollers supported on upright axes in closely spaced side-by-side relation on said pusher element positioned to engage said roller on said tow latch and hold the latter centered between the sides of said slot in said guideway means, and said pair of rollers being engageable with the interior sidewalls of said guideway means to hold said conveyor chain means centered crosswise of said guideway means.

17. A conveyor system as defined in claim 16 characterized in that said conveyor chain means includes support roller means thereon positioned at intervals therealong and engageable with the interior bottom of said guideway means to support other portions of said conveyor chain means out of sliding and rubbing contact with the bottom of said guideway means.

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