July 9, 1963 C. T. JOHNSON ET AL 3,096,726

RETRACTABLE RAILS

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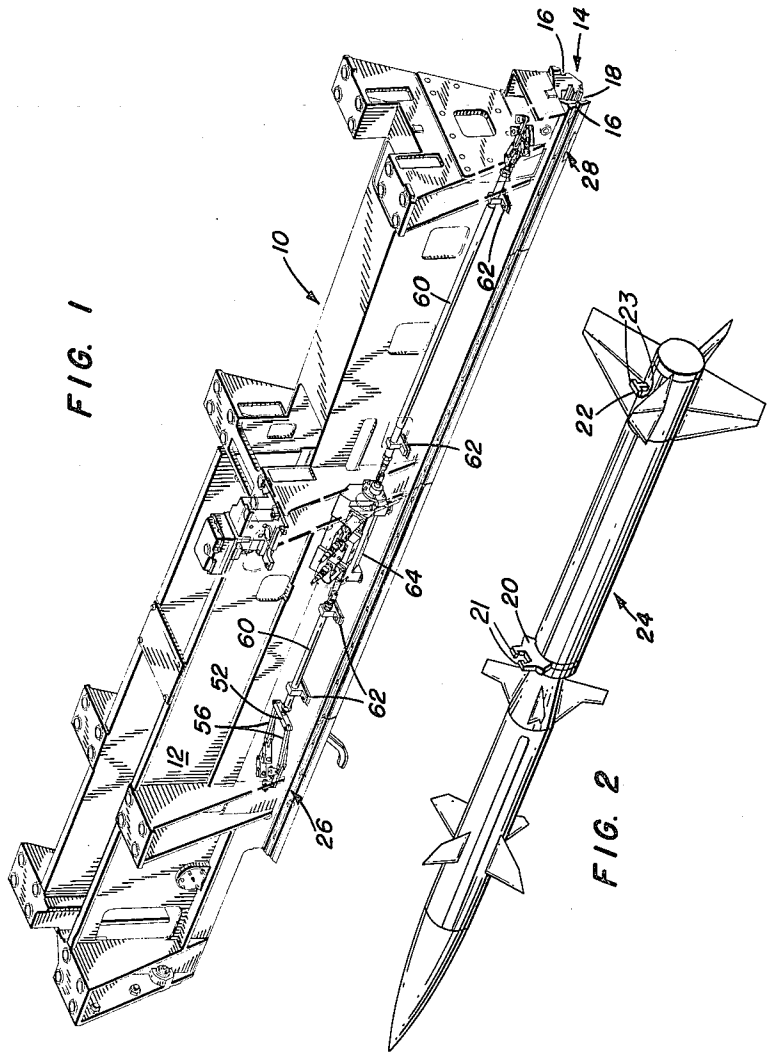


FIG. 1

FIG. 2

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FIG. 3

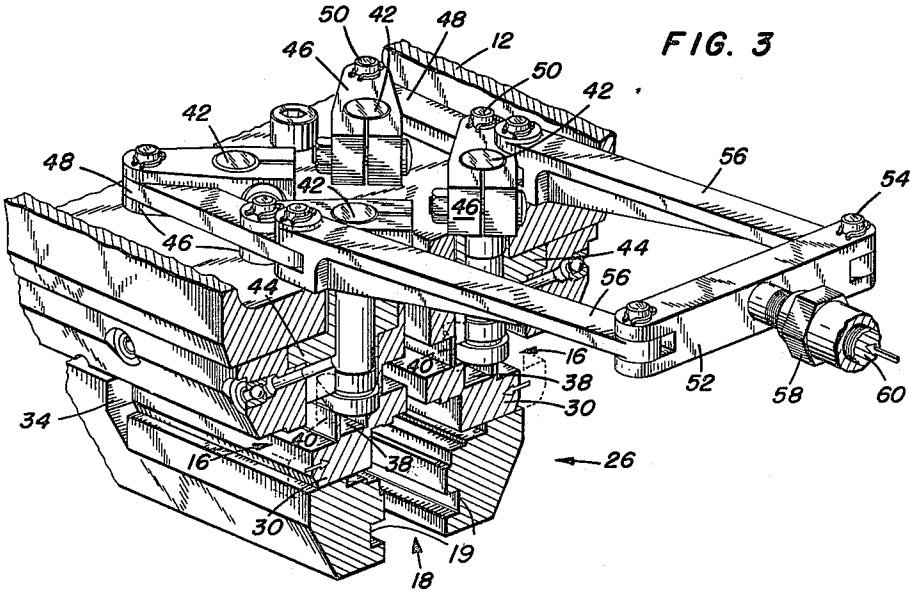
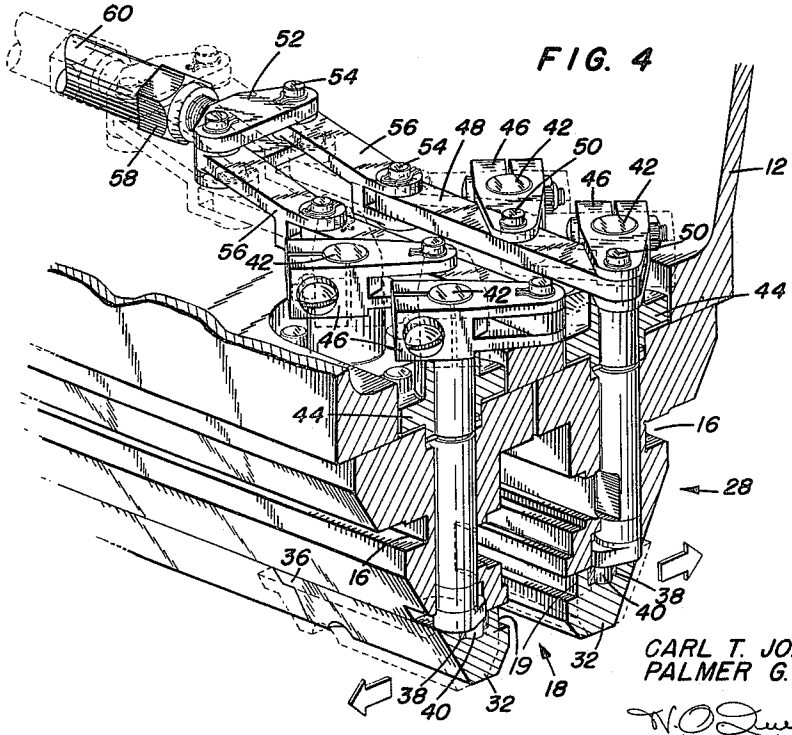


FIG. 4



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RETRACTABLE RAILS

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This invention relates generally to conveyors, and more particularly it pertains to a rail opening mechanism for accepting or releasing a lugged weapon article to or from a tramway.

In an overhead conveyor system of the type wherein an article, such as a missile weapon, consisting of a missile and a booster for launching the missile is suspended and conveyed by U-shaped or T-shaped lugs, it is sometimes required that the article be removed intermediate the ends of the rails. In the past it has been customary to provide a switch in the tramway and remove the lugged article from the end of a short spur.

It is an object of the present invention to provide a retractable rail which when open allows the entry or release of the support lugs of a lugged article to a tramway and when closed forms a smooth continuation of the tramway rail for transport of the article.

Another object of this invention is to provide a retractable rail mechanism which simultaneously opens a conveyor rail at a pair of spaced points to furnish egress for a pair of spaced support lugs of an article thereon.

And another object of this invention is to provide carriage releasing means for machine ways.

Other objects and may of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a skeletonized view, in perspective, of a section of tramway for a guided missile loader system incorporating retractable rails in accordance with one embodiment of this invention;

FIG. 2 is a perspective drawing of a typical lugged article, a missile weapon, which is transported on the tramway of FIG. 1;

FIG. 3 is a transversely sectioned perspective view, much enlarged, of the forward retractable rail as used in the tramway of FIG. 1; and

FIG. 4 is a sectioned perspective view similar to FIG. 2 illustrating the aft retractable rail.

Referring now to the details of the drawings, there is shown in FIG. 1 a section of an overhead tramway 10. The tramway 10 consists generally of a hollow braced weldment 12 having a rail 14 of substantially U-shaped cross-section bolted beneath its lower portion.

A pair of laterally spaced grooves 16 are machined along the outer faces of the sides of the rail 14, and a generally T-shaped cross sectioned slot 18 having opposed channels 19 is formed along the inner faces of its opposing sides along its entire length.

With this configuration, the rail 14 accommodates and provides support and a glide path for the U-shaped front and T-shaped rear support lugs 20 and 22, respectively, of an article such as the missile weapon 24 shown in FIG. 2. The front lug 20 has inward projecting arms 21 which ride in, and are supported by, grooves 16 while the rear lug 22 has outward projecting arms 23 which ride in, and are supported by, channels 19.

At two spaced points, corresponding to the space between lugs 20 and 22 of the article 24, the rail 14 is equipped with a pair of retractable rails 26 and 28.

As best shown in FIGS. 3 and 4, these retractable rails

26 and 28 consist of movable pairs of segments 30 and 32 respectively. The segments 30 of the forward retractable rail 26, by moving inwardly as shown by the arrows in FIG. 3, effectively remove a section of the lower supporting surfaces of the grooves 16. Thus, there is no support for the arms 21 of the forward lug 20 and due to the taper on the rail 14, the lug will drop therefrom.

By moving outwardly as shown by the arrows in FIG. 4, the segments 32 of the aft retractable rail 28 effectively remove a section of the lower supporting surfaces of the channels 19, and the arms 23 of the rear lug 22, having no support, will drop from the rail 14.

The segments 30 of the forward retractable rail 26 are retained and reciprocate in close fitting slots 34 while the segments 32 of the aft retractable rail 28 are supported by tongues 36 extending from their ends and slidably recessed in the adjacent body of the rail 14.

A longitudinal channel 38 is machined in the top surface of each segment 30 and 32 to closely receive an eccentric pin 40 in the lower end of a shaft 42. These shafts 42 are vertically mounted in bearings 44 set into the lower face of the weldment 12.

The shafts 42 are provided in pairs, with one pair for each segment 30 or 32 spaced lengthwise thereof. A clevis 46 is clamped to the protruding top end of each shaft 42. The clevises 46 for each pair of shafts 42 are attached to links 48 with pins 50, the latter on centers corresponding to the spacing of their associated shaft pairs. The links 48, in turn, are joined in pairs to a tie bar 52 with pivot pins 54 and intermediate tie links 56.

By means of an adjustable threaded connection 58, the tie bars 52 of each forward and aft retractable rails 26 and 28 are attached to separate connecting rods 60, which are arranged for longitudinal reciprocation in pillow blocks 62. These blocks 62 are bolted to the top side of the bottom face of the weldment 12 as best shown in FIG. 1.

The ends of the rods 60 are attached to the opposite ends of a hydraulic actuator piston 64 so that when the actuator piston 64 shifts, one rod 62 is pulled while the other rod 62 is pushed. This reciprocating motion is translated by the links 48 and clevises 46 to a simultaneous 90 degree rotation of all the shafts 42. The eccentric pins 40 working in the channel 38 of the segments 30 and 32 cause the latter to move inwardly or outwardly as shown by the arrows in FIGS. 3 and 4.

While the invention has been described and illustrated in connection with skid type lugged articles it is not intended to be so restrictive. For example, the rail ways may be shaped for receiving wheeled carriages in monorail transport systems and the retractable rails would obviously be a valuable adjunct thereto.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A conveyor rail for conveying articles having support lugs thereon comprising a rail having fixed and movable sections and grooves extending substantially the length of said rail sections, said grooves having a configuration suitable for physical engagement by the lugs, the movable sections of said rail being movable transversely relative to said fixed sections between a first position wherein the grooves in said movable sections are in alignment with the grooves in said fixed sections and a second position wherein the grooves in said movable sections are out of alignment with the grooves in said fixed sections thus removing the support for the lugs, and movable means mounted on said rail for moving said movable sections

between said first and said second positions whereby the article is released when said movable sections are moved to said second position.

2. A conveyor rail as set forth in claim 1 wherein said rail is of a substantially inverted U-shaped cross-section, said grooves extend along both the inner and outer faces of each of the depending leg portions of said rail, whereby a U-shaped lug may be engaged by grooves along said outer faces and a T-shaped lug may be engaged by the grooves along said inner faces.

3. A conveyor rail as set forth in claim 2 wherein said movable means comprises pin members eccentrically mounted upon rotatable shafts, said movable sections having slots therein, said pins operating within said slots to cause said sections to shift laterally of said fixed sections, thereby releasing said lugs from said grooves, and mechanically linkages operable to remotely actuate said rotatable shafts.

4. A conveyor rail for conveying articles having suitably shaped engageable means, extending therefrom comprising, an elongated rail body, groove means extending along the length of said body for engaging said engageable means, and releasing means for releasing said engageable means from said groove means wherein said releasing means comprises retractable rail portions and actuating means therefor, said retractable rail portions being laterally slidable to move from an engaging position to a releasing position, said rail portions conforming to the cross-sectional configuration of the rail body and its associated groove means when in their engaging positions and which effect removal of the load-bearing portions at selected points along said groove means when in their releasing positions.

5. A conveyor rail as set forth in claim 4 wherein said actuating means comprises longitudinal channels formed in the upper surface of said retractable rail portions, an eccentrically mounted pin working within each of said channels whereby variable actuation of said pins laterally reciprocates said retractable rail portions to engage and release said engageable means.

6. A conveyor rail as set forth in claim 5 further comprising an actuator piston, mechanical linkages driven thereby, rotatably mounted shafts operably connected to said mechanical linkages and driven thereby, each of said shafts carrying one of said eccentrically mounted pins.

7. A conveyor rail for conveying articles having U-shaped and T-shaped engageable means thereon comprising an elongated rail body having an inverted U-shaped configuration in cross section forming two depending legs, groove means on said body comprising grooves extending along both the inner and outer faces of each of said depending legs, whereby the grooves extending along the outer faces are adapted to engage the U-shaped engageable means and the grooves extending along the inner faces are adapted to engage the T-shaped engageable means and releasing means for releasing said engageable means from said groove means.

8. A conveyor rail as set forth in claim 7 wherein said releasing means comprises retractable rail portions and actuating means therefor, said retractable rail portions being laterally slidable to move from an engaging position to a releasing position, said rail portions conforming to the cross-sectional configuration of the rail body and its associated groove means when in their engaging positions and which effect removal of the load-bearing portions at selected points along said groove means when in their releasing positions.

9. A conveyor rail as set forth in claim 8 wherein the retractable rail portions associated with the grooves extending along the outer faces of said rail body are laterally inwardly movable to their releasing positions and the retractable rail portions associated with the grooves extending along the interior faces of said rail body are laterally outwardly movable to their releasing positions.

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