Sept. 10, 1963 R. A. MAGNUSON 3,103,035

SLOTTED TUBE TORSION BAR

Filed Nov. 15, 1961 2 Sheets-Sheet 1

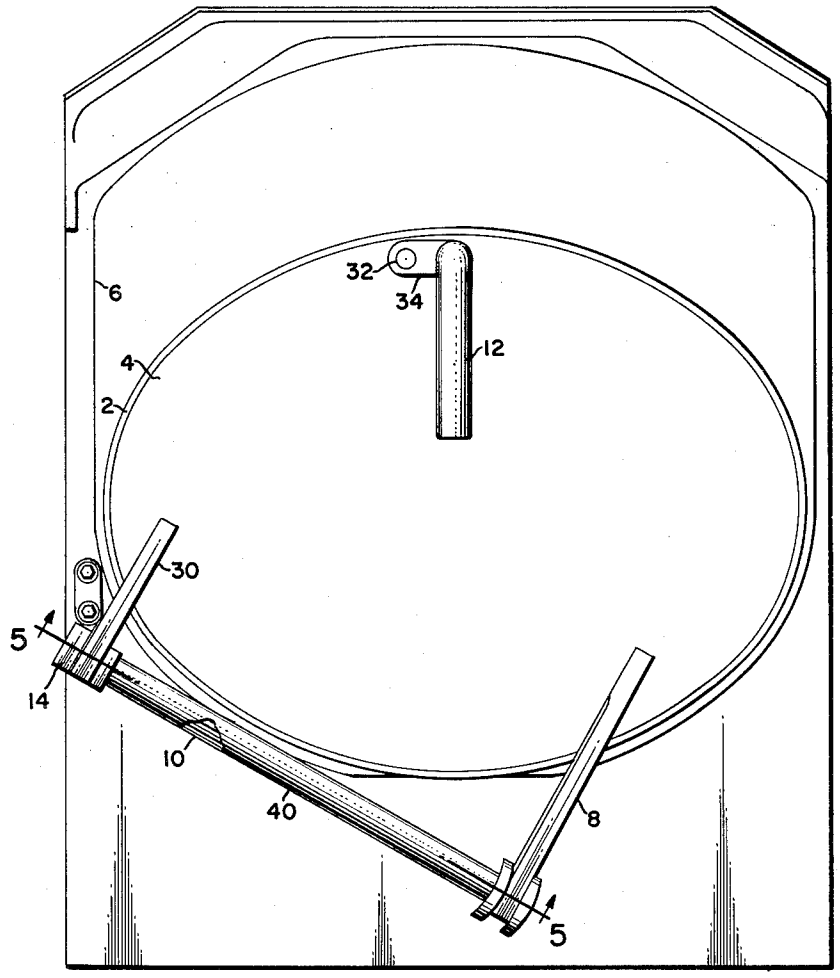


FIG. 3

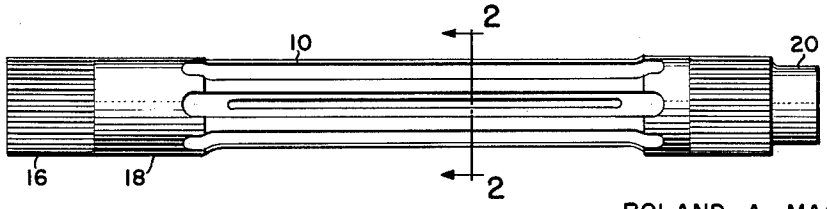


FIG. 1

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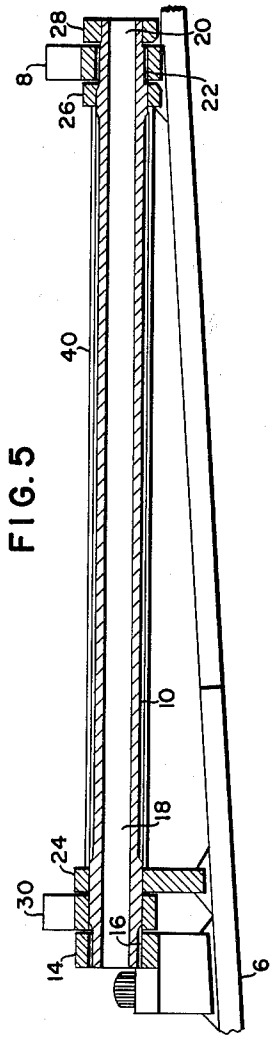


FIG. 5

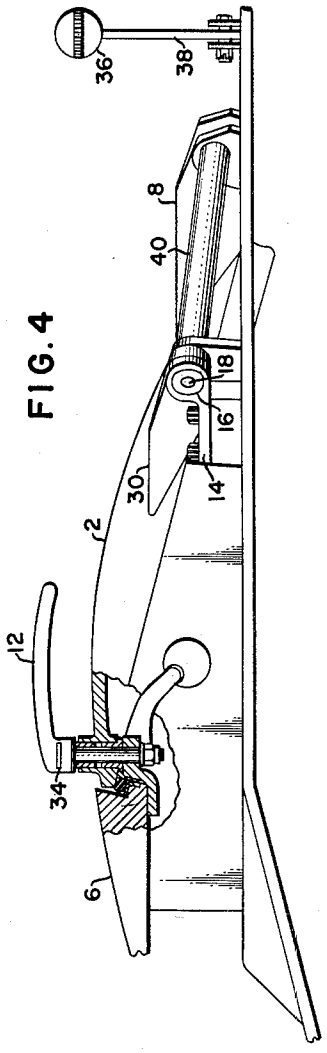


FIG. 4

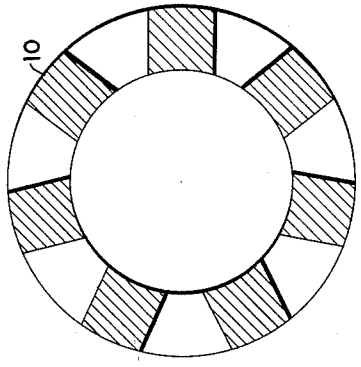


FIG. 2

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3,103,035

SLOTTED TUBE TORSION BAR

Roland A. Magnuson, Seattle, Wash., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Army

Filed Nov. 15, 1961, Ser. No. 152,978
1 Claim. (Cl. 16—180)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of royalty.

This invention relates to the driver's hatch of a track-laying vehicle.

More particularly, the object of my invention is to provide a hatch door that can be automatically urged into open position so as not to obstruct vision or exit through the hatch port. Urging the hatch door open is accomplished by use of a wound torsion bar as the hatch hinge pin. This generally is well known in the art and is not considered to be my invention. The novelty of my device resides in the specific type of torsion bar used with the hatch.

Due to the location and configuration of the subject driver's hatch, it is necessary to provide a torsion bar with a relatively short length, but which is still able to exert a moment that can rotate the hatch through a large angle. To achieve a large wind-up in a short length, a torsion bar must have a small cross-section, otherwise the physical limits of the bar material will be exceeded.

Obviously, a short bar with a small cross-section will be unable to develop the necessary moment to open the hatch. Thus, it is necessary to provide a number of such bars in order to develop the desired moment.

Accordingly, my torsion bar consists of a tube with a number of slots running parallel to the longitudinal center line of the tube. A like number of bars of roughly rectangular section are thus formed. The bars are tied together at both ends since the slots do not extend to the end of the tube.

Thus, my bar provides a short, unitary means of obtaining a high resistance to torsional displacement of one end of the bar to the other while allowing large angular wind-up without exceeding the physical limits of the bar material.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

The practical embodiments of the invention are illustrated in the accompanying drawings, wherein:

FIG. 1 is a longitudinal elevation view of my torsion bar.

FIG. 2 is a section taken through line 2—2 of FIG. 1.

FIG. 3 is a plan view of the hatch and mounting ring with the hatch in closed position. Part of the tube casing is broken away to show my slotted tube torsion bar.

FIG. 4 is an elevational view of the hatch door and mounting ring, with part of the hatch and ring broken away in order to show the latch lever.

FIG. 5 is a section taken through line 5—5 of FIG. 3.

Referring now to FIGS. 3 and 4 of the drawings, the hatch door is indicated by the reference numeral 2. As

the hatch door 2 closes port 4 on mounting ring 6, hatch arm 8 winds up torsion bar 10. The slotted tube torsion bar 10, as best seen in FIG. 1, is kept in wound condition by maintaining the hatch 2 in closed position using latching lever 12, the specific details of which are shown but not described as per se they are not considered part of the invention. When lever 12 is actuated to release, the torsion bar 10 unwinds urging door 2 open to a substantially vertical position.

More specifically, this operation is accomplished by the apparatus seen in FIG. 5. Here torsion bar 10 is anchored to mounting ring 6 through bracket 14. The bar 10 and bracket 14 are engaged by corresponding splines 16 located at bar end 18 and within bracket 14. The other end 20 of torsion bar 10 is joined to hatch door 2 through hatch arm 8. The bar 10 and hatch arm 8 are engaged by corresponding splines 22 located at bar end 20 and within hatch arm 8. The slotted tube torsion bar 10 is rotatable within support members 24, 26, and 28, which are provided to support and maintain bar 10 in its desired position. Hatch arm 30, which like arm 8 supports hatch door 2 on bar 10, is rotatable relative to bar 10.

Thus, when hatch arm 8 is rotated, it will carry with it end 20 of torsion bar 10 and will twist or untwist the bar in relation to fixed end 18.

Winding the torsion bar is accomplished by moving hatch door 2 from open position (where the torsion bar is unwound) to closed position, arm 8 transmitting this movement to bar 10. The torsion bar is able to move through a large angle only because of my slotted tube concept.

After the latch lever 12 has been actuated to release, and the hatch sprung open, it is secured in open position by engaging the recess 32 in tab 34 with the ball 36 of catch member 38.

Tube casing 40 is provided to protect bar 10 from weathering.

I claim:

A torsion tube hinge for supporting a vertically swinging hatch door about a horizontal axis relative to a supporting frame, said torsion tube having an odd number of identical peripheral slots extending through the wall of the tube and running parallel to the axis of said tube, said slots comprising no less than seven in number, said slots equally spaced concentrically to provide at least seven substantially identical independent linear torsion bars so as to have each bar diametrically opposite one of said slots, said slots being formed with their sides converging toward the inside of said tube in such a manner that the sides of each torsion bar are substantially parallel to each other, said tube having an inside diameter such that the wall of the tube has a thickness that is approximately equal to the width of said torsion bars whereby each torsion bar has a cross-sectional area that is substantially square in configuration and the cross sectional area of the slots is approximately equal to the cross sectional area of the torsion bars.

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