Sept. 20, 1960 G. F. OAKLEY 2,953,104

RETRACTABLE LADING STRAP ANCHOR

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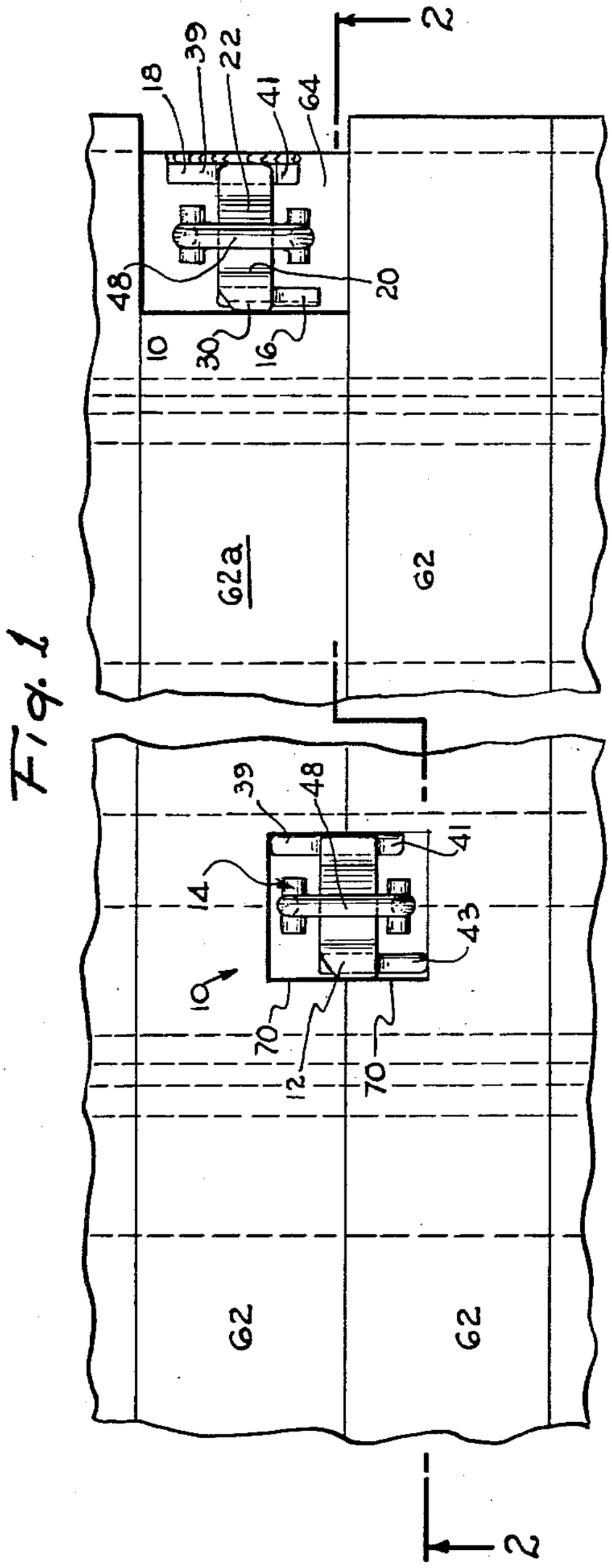

Fig. 1

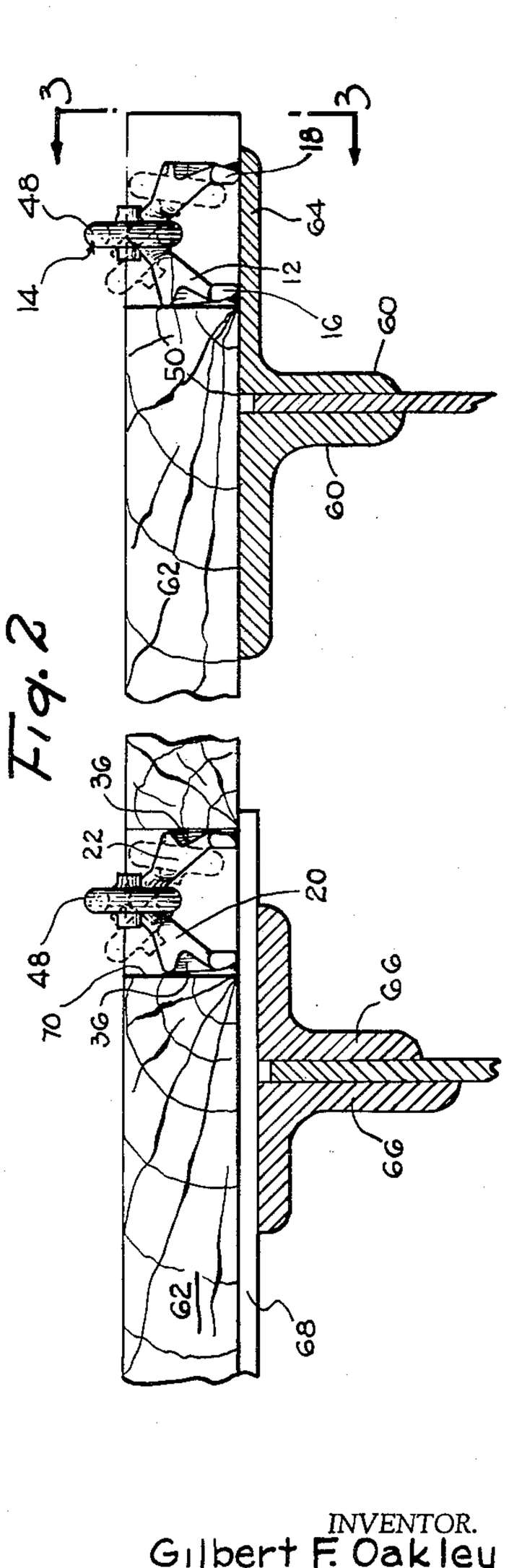

Fig. 2

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Fig. 3

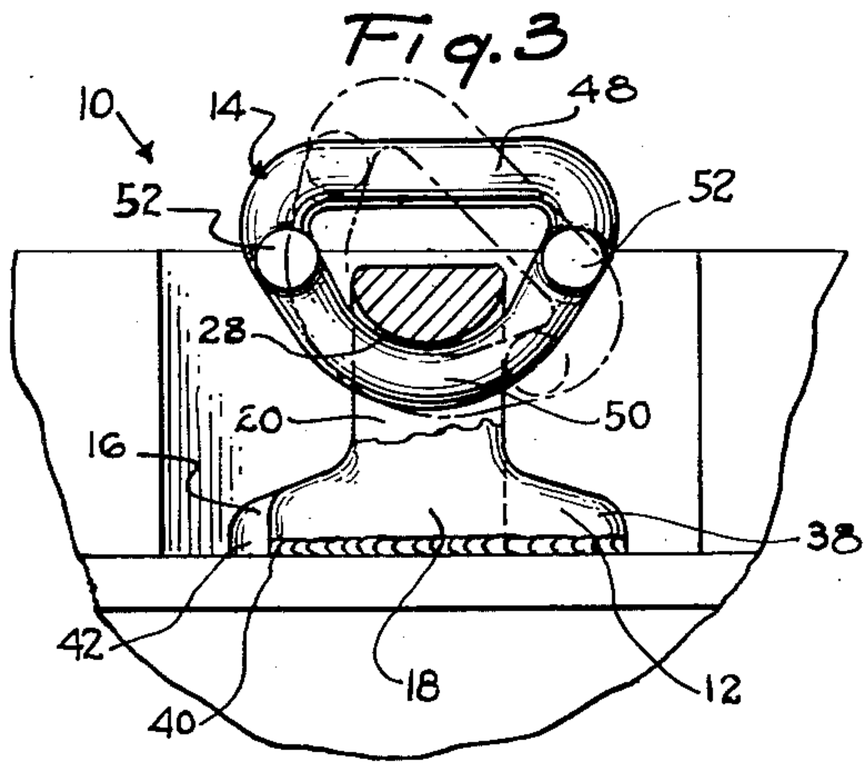


Fig. 4

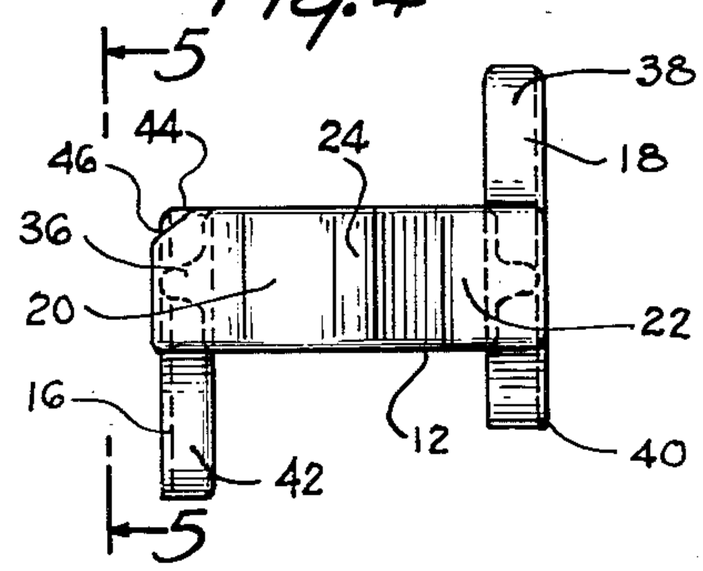


Fig. 5

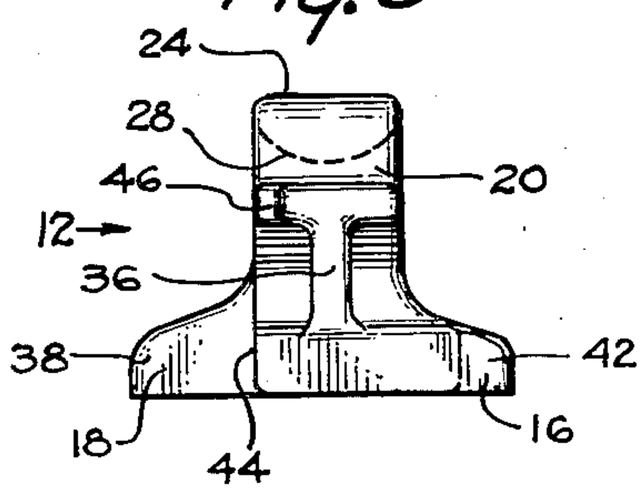


Fig. 6

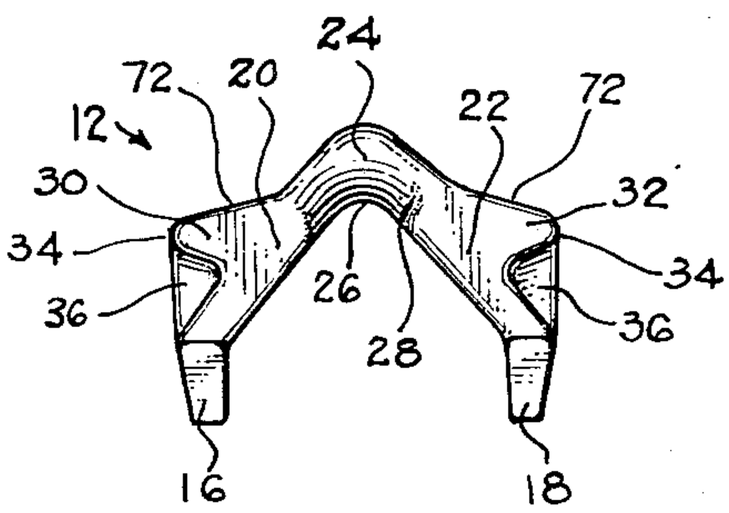
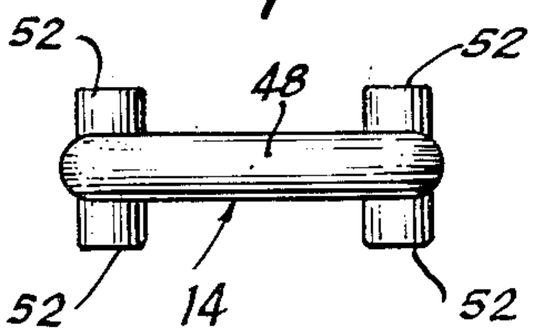


Fig. 7



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RETRACTABLE LADING STRAP ANCHOR

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5 Claims. (Cl. 105—369)

My invention relates to lading strap anchors, and particularly to those of a retractable type adapted for use on flat cars and the like.

Although many attempts have been made in the past to produce completely satisfactory lading strap anchors of the retractable type for use in car floors, they have all been subject one or more of various deficiencies which have resulted in substantially less than ideal operation. Among these defects are, first, that even though the anchor is designed to be retractable and to lie flush with or below the surface of the flat car floor, retraction has not been certain without manual manipulation and individual attention has had to be paid to the condition of each of the anchors. As a second problem, dirt, cinders, snow and ice have interfered with the operation of such anchors, particularly in the retraction thereof. As a third problem, anchors have been carelessly mounted on railroad cars so that they have been cramped and jammed by improper floor board placement or the installation cost has been too high. Fourth, they often lack sufficient ability to adapt themselves for loads imposed through ties extending therefrom at extreme angles.

My invention has as its object the provision of a retractable anchor which will solve such problems which have arisen with previously known strap anchors. It retracts freely and automatically. It requires minimum accommodations in the car floor or at the side sill and yet can be employed with a wide variety of fastening means including steel strapping up to the wider sizes commonly in use. It is inexpensive to manufacture and install, and it incorporates provision for easy availability and freedom from jamming under any circumstances of use.

Other objects and advantages of my invention will be apparent from the following description and the several views of the drawings, wherein:

Fig. 1 is a top plan view illustrating a lading strap anchor embodying my invention both in an installation in which it is secured to the cover plate or other floor supporting member of a flat car and set within the peripheral limits of the car floor and as secured to the side sill of the car at one margin of the floor;

Fig. 2 is a sectional view taken substantially on a line 2—2 of Fig. 1, looking in the direction indicated by arrows and showing the two strap anchors of Fig. 1 in side elevation;

Fig. 3 is an end elevational view of the outer end of the strap anchor substantially as seen from a line 3—3 of Fig. 2, looking in the direction of the arrows, and wherein the anchor is broken away in part to show details of the structure;

Fig. 4 is a top plan view of one part of the anchor structure;

Fig. 5 is an end elevation of one end of the anchor part substantially as viewed from a line 5—5 of Fig. 4, looking in the direction indicated by arrows;

Fig. 6 is a side elevational view of the anchor part shown in Figs. 4 and 5; and

Fig. 7 is a top plan view of another part of the anchor structure.

A lading strap anchor 10, of the type herein disclosed, consists of two parts, a fulcrum 12 and a link 14. The fulcrum is an arched member having mounting feet 16 and 18 and legs 20 and 22 inclined angularly toward one another from the feet 16 and 18 and extending from the upper sides of the feet to meet at a curved apex 24. The underside 26 of the apex is downwardly rounded in longitudinal section, as shown in Fig. 6. The undersides of the upper ends of legs 20, 22 and the apex 24 are also rounded in transverse section, as illustrated in Figs. 3, 5 and 6 at 28.

The legs have integral shoulders 30 and 32 on the outside thereof which project generally horizontally from approximately the mid-regions of the legs, so that the ends 34 thereof are in substantial vertical alignment with or extend slightly beyond the outside edges of the feet 16 and 18. As viewed from the top, as in Fig. 4 ,the shoulders are of generally the same width as the legs 20 and 22. Webs 36 of thinner section extend vertically between the ends of the shoulders 30 and the outer edges of the feet 16 and 18 to support and strengthen the shoulders 30 and 32 against possible breakage.

The feet 16 and 18, in my illustrated embodiment, are not identical. Foot 18 has an end portion 38 extending laterally beyond leg 22 on one side thereof and for a predetermined distance to serve as a spacer separating the legs of the anchor from the floor boards of the flat car to avoid the crowding of the anchor within its pocket as will be subsequently described. The projecting end portion 38 on the one side provides a sufficient area of attachment for anchoring of the foot 18 of the fulcrum to the car that extension of the extended end portion 40 of the foot 18 on the other side of the leg 22 need not be as long. Some degree of extension on this side, however, is desirable to serve as a guide and retainer for the link 14, particularly when the anchor is mounted on a car side sill.

Foot 16 is provided with an extended portion 42 on only one side of the leg 20, the extension being approximately equal in length to the extended portion 38 of foot 18, but on the opposite side of leg 20. In this way, the extended portions 38 and 42 on legs 18 and 16 respectively, assure sufficient lateral spacing of the legs 20 and 22 from the floor boards or from the walls of a hole or pocket to provide adequate clearance for movement of the link 14 in any circumstance of use.

Foot 18, having the greater bottom area for attachment to the car substructure, is desirably used as the outside leg when the anchor is applied to the car, so that it faces the periphery of the car and receives a high proportion of loads pulling inwardly of the car. Foot 16 does not project at all on the side of leg 20 opposite the projecting portion 42 as may be noted at 44, Figs. 4 and 5. Also, shoulder 30 is bevelled at its outer corner 46 opposite the extension 42 and adjacent end surface 44 to facilitate the assembly of the link and fulcrum.

The link 14, as depicted herein, is generally cylindrical in section and approximately D-shaped in outline. It includes a straight upper segment 48 and a curved lower segment 50 adjoined to the ends of the straight segment through smoothly rounded corners. The lower segment 50 has four studs 52 integrally formed thereon and extending out from each side of the lower segment adjacent each end thereof.

Each component of the anchor, as illustrated herein, may be either cast or forged. The link 14 is mounted on the fulcrum 12 by inserting the extension 42 of foot 16 into the aperture of the link, moving the link over the other, non-extended end 44 of foot 16 and over shoulder 30, the bevelled corner 46 of shoulder 30 permitting such

passage. The assembled structure takes the form illustrated in Figs. 1, 2 and 3.

The anchor is attached to the substructure of a flat car, for instance, as illustrated in Figs. 1 and 2, by welding the lower surfaces of the feet to a structural member of the car. As shown at the right-hand side of Figs. 1 and 2, the anchor is depicted as mounted along the outer edge of a flat car having side sill angles **60** and floor boards **62** resting on the angles. In this instance, one of the floor boards **62***a* is cut short so as to leave exposed a portion of the horizontal flange **64** of the outer side sill angle **60**. Conventional floor boards of flat cars are 2¾ inches thick and a little more than 5 inches wide. As shown in Fig. 1, the removal of an end portion of a floor board provides a pocket in the floor surface between adjacent boards which is of more than adequate width for the mounting of the anchor therein. The feet **16** and **18** are welded to the exposed surface **64** of the outer side sill angle **60**, the foot **18** being secured adjacent the outside edge of the angle and the foot **16** inwardly thereof. The end of the shortened floor plank **62***a* is situated immediately adjacent or against the outer end **34** of shoulder **30**.

In the other or left illustration of a mounted anchor in Figs. 1 and 2, my strap anchor is applied inwardly of the edges of the car. In these drawings, center sill angles **66** support a cover plate **68** on which the floor boards **62** rest. In this method of mounting the anchor, aligned notches **70** are cut in the facing edges of adjoining floor boards **62**, which notches together define an aperture of a width, transversely of the car, to accommodate and receive the fulcrum from shoulder **30** to shoulder **32**, and of a length, longitudinally of the car, to accommodate and receive the fulcrum longitudinally of the projecting portions **38** and **42**, thereby to permit the installation of a strap anchor therein on an accurate transverse orientation with respect to the car. This notching out of the floor boards leaves exposed a portion of the cover plate **68**, to which portion the lading strap anchor is secured, as by welding.

It may, of course, be understood that the strap anchors are desirably located and secured in place on the car frame structure while the flooring is being laid and secured in place, or at least while the flooring in immediate region of the anchor is removed for cutting and to facilitate the welding of the fulcrum. The height of the apex **24** of the fulcrum above the lower surfaces of the feet **16** and **18** is somewhat less than the thickness of the floor boards. As will be evident from the drawings, the link **14** fits loosely on the legs **20** and **22** and the apex **24** of the fulcrum, so that the upper straight segment **48** of the link can be lifted to a position well above the level of the flooring of the car and, in this position, it is well adapted to receive lading ties in the form of wire, cable, chain or steel strapping. By virtue of the rather sharp angle at the apex of the fulcrum, it will be further evident that the link may move through a wide degree of angularity in the longitudinal plane of the fulcrum to accommodate various angles of applied tension. (Note the dotted link of Fig. 2.) Likewise, by virtue of the transverse curvature **28** of the underside of the apex **24** and the curvature of the segment **50**, the link is permitted a range of movement of about 60° on either side of vertical for transverse angularity of loading.

The studs **52** are directed to the performance of two functions. When the transverse angularity of load exceeds about 60° away from the vertical, or in other words in a situation in which the fulcrum is least able to withstand a load concentrated at a single point, one or both of the studs at one end of the lower segment are brought to bear against the legs of the fulcrum in addition to the load placed on the apex thereof, thereby to relieve the apex of the total applied force and distribute that force to other points on the fulcrum. The second function performed by studs **52** lies in their contribution to the automatic retraction of the links.

Upper surfaces **72** on the shoulders **30** and **32** at their highest points, or the points at which the shoulders meet the legs **20** and **22** are displaced downwardly from the apex **24** of the fulcrum a distance approximately equal to the thickness or diameter of the straight segment **48** of the link **14**. When the link **14** is not under load or has been released from load, it will drop downwardly with the straight segment **48** resting on one of the legs of the fulcrum **12**. The slope of the legs **20**, **22** adjacent the apex **24** is such that the link will not stand on this portion of the legs but will slide down the legs on one side or the other of apex **24** until it meets one of the surfaces **72** of the shoulders **30** or **32**. The shoulders being spaced below the apex a distance at least as great as the sectional diameter of the straight segment **48** and the apex being slightly below the level of the flat car floor, the link then necessarily will be below the level of floor surface, and completely out of the way. While it is possible that the link might balance on top of the apex **24**, the equilibrium of such a balance is so unstable that the slightest joggling of the car, whether from movement or from placing a load thereon, will be sufficient to jar the link off the apex.

The perpendicular distance from the underside of the legs **20** and **22** to the outer ends **34** of the shoulders **30** and **32** is greater than the height of the link aperture from the straight segment **48** to the most distant portion of the lower curved segment **50**. Therefore, while the link will drop on to the surfaces **72** of the shoulders **30** and **32**, they cannot pass over the ends thereof and the shoulders, therefore, support the link in retracted position for ready availability. Furthermore, the outer height of the link is desirably less than the floor board thickness, so that the link hangs on the fulcrum without resting on the car structure to which the fulcrum is secured.

The studs **52** of the link **14** prevent the link from being rotated on the fulcrum more than about 60° in either direction, as previously mentioned herein. In other words, the studs encounter the sides of the legs **20** and **22** if further rotation is attempted and prevent that rotation. If it were not for the studs, it is evident that the link could assume, for instance, a position of 90° displaced from that illustrated in full lines in Fig. 3. In such case, the link could wedge down over the apex or one of the legs and one corner of the link with the result that it would stand above the level of the car floor. The acute angle which the straight segment **48** makes with the curved segment **50** adjacent the corners of the link could easily result in a jamming of the link down on one of the legs of the fulcrum and make dislidgment from that position relatively difficult either for purposes of achieving smoothness of the floor or of drawing the link out for anchoring purposes. By limiting the arcuate movement of the link on the fulcrum, the studs thus achieve a double purpose of assuring full retraction of the link below the level of the floor when the link is released from load and assuring that the link will occupy a position on the fulcrum where it will be loose and free for attachment of lading ties.

Because of the contours of adjacent surfaces of the link and fulcrum, there is no normal or natural tendency for the link to pass over the bevelled corner **46**. Furthermore, when mounted as disclosed herein, the floor boards restrict the angular movements of the link relative to the fulcrum, so that the link cannot reach a position in which it would tend to pass over the bevelled corner **46** or become jammed, as a result of angular movements, at the outer ends of the shoulders. The oppositely extending portions **42** and **38** on the feet **16** and **18** provide a gauge integral with the anchor structure for determining the minimum or correct spacing between the flooring and anchor in one direction which will not impair the functioning of the anchor. The extensions **38** and **42** are proportioned to determine a minimum sized opening within which the link can freely

swing from side to side and take a position angled toward the direction of extension of a lading tie which is secured thereto. It is without the possibility of jamming or producing any sharp bends in the tie.

In contrast to other anchors which have been developed and which are intended to have retractable tie anchoring portions, it may be observed that the anchor disclosed herein is effectively retractable to an out-of-the-way position even when the pocket in which it is mounted becomes partially filled with dirt, foreign matter, snow, ice and the like. Thus, even when the pocket in which my anchoring device is mounted contains a substantial amount of dirt, so that the curved segment **50** cannot drop straight down, effective retraction of the link to a point below the level of the car floor is obtained, since the link may and will simply lie over. In this case, curved segment of the link shifts laterally of the fulcrum and the straight segment **48** lies against the top surface of one of the shoulders.

It will be evident from the foregoing description that I have provided a retractable lading strap anchor which is simple, strong, automatic in operation and which operates under very adverse conditions. It is easily constructed, assembled and mounted. It is jam-proof in itself, and contains integral provision against the possibility of jamming against other car part. It is also desgned to accommodate loads under extreme and compound angles.

While I have described herein one embodiment of my invention, many alternatives to structure, application and use may become apparent. I, therefore, desire that my invention be regarded as being limited only as set forth in the following claims.

I claim:

1. A retractable lading strap anchor for attachment to the supporting structure for the floor of a railway car or the like and comprising a fulcrum in substantially the form of an inverted substantially U-shaped arch having a mid-portion of predetermined sectional size and mounting portions separated from the mid-portion and securable to the floor supporting structure, a substantially D-shaped link having curved and substantially straight segments defining an opening of a size loosely to ring the mid-portion of said arch, and means on said link and projecting laterally therefrom to provide stops engageable with said arch to maintain the straight segment of said link uppermost in relation to the fulcrum, said mid-portion of the arch having a sectional size sufficiently smaller than the opening in said link that said link may be raised to extend substantially above the level of said arch, said arch also having shoulders on each side of said mid-portion which extend angularly and outwardly in the general plane of the arch from the exterior of the arch, said shoulders being at positions below the exterior of the mid-portion of the arch a distance at least equal to the thickness of the straight segment of the link to support the straight segment of said link at a height no greater than that of said mid-portion of the arch when the link gravitates relative to the arch, and said shoulders also extending away from opposite sides of the mid-portion of the arch to positions for engagement with the straight segment of the link when the curved portion of the link either engages or gravitates from the mid-portions of the arch.

2. A retractable lading strap anchor for attachment to the supporting structure for the floor of a railway car or the like and comprising a fulcrum in substantially the form of an inverted substantially U-shaped arch having legs with feed thereon for supporting the arch in an upright position, one of said feet having a single extension projecting to one side of the arch, and the other of said feet having extensions projecting to both sides of the arch, the extensions of said feet on opposite sides of the arch being substantialyly equal in length and the second extension on said other foot being shorter in length than the other extensions, said legs extending convergently upward from said feet and meeting at an apex, said legs having means thereon providing shoulders on the outer surfaces thereof at positions below said apex and above the feet, a substantially D-shaped link having a straight segment and a curved segment and having an aperture therein of a size loosely to encompass the apex of said arch and to pass over said foot having said single extension, said link being loose enough on the apex of said arch to permit said straight segment to be raised substantially above the level of said apex, said link having studs on the curved segment thereof projecting outwardly therefrom in a direction transverse to the plane of the link segments at positions near the ends of said straight segment, said studs providing stops engageable with legs of the arch to prevent the passage of said curved segment of the link from between the legs of said arch, and said shoulders projecting outwardly in obtuse angular relationship to the legs of the arch on opposite sides of the apex and at a level above the feet and spaced downwardly from the top of the apex a distance at least equal to the thickness of the straight segment of the link to support said straight segment of said link below the level of said apex and above said feet upon retraction of said ling to a position of contact with the exterior of the arch, said shoulders extending outwardly from the inner surfaces of the legs on opposite sides of the apex a distance exceeding the height of the aperture in the link.

3. A retractable lading strap anchor for mounting on railway car floor supporting structure and the like and comprising a fulcrum in substantially the form of an inverted substantially U-shaped arch with spaced legs adjoined through a curved mid-portion and having mounting portions at the ends thereof securable to the floor supporting structure to hold the arch in an upright position relative to the supporting structure, a D-shaped link having straight and curved segments loosely encompassing the mid-portion of said arch with a portion of the link extending between the legs thereof, said link having an opening therein larger than the section of the arch at the mid-portion thereof and being movable on said arch to permit the straight segment of said link to assume a position substantially removed from the exterior of the arch, said arch having shoulders projecting outwardly and sloping downwardly in angular relationship to the exteriors of the legs on opposite sides of the mid-portion thereof and at positions spaced vertically between the top of said mid-portion and said mounting portions, said shoulders being spaced below the top of the mid-portion of the arch a distance greater than the thickness of said straight segment of the link and engageable therewith to support the straight segment of said link at positions below the top of the arch and above said portions at the ends of the legs when the link is free to gravitate to a normal position relative to the arch, and the outward projections of the shoulders from the interior of the mid-portion of the arch exceeding the maximum dimension of the opening in the link from the curved segment to the straight segment thereof.

4. A retractable lading strap anchor for securement to a railway freight car and comprising, in combination, a fulcrum in the form of an inverted generally U-shaped arch having side legs extending in divergent angular relationship to one another from a curved apex, a substantially D-shaped link having curved and substantially straight segments and an opening therein larger than the section of the curved apex of said arch, which link loosely encompasses the arch, means limiting movements of the link relative to the arch to positions in which the straight segment of the link is exterior to the arch, and said arch having integral shoulder means on opposite sides of the curved apex which extend outwardly a distance from the inner surface of the curved apex a distance greater than the dimension of the opening between the curved and straight segments of the link in a direction

normal to the straight segment, said shoulder means also having top surfaces on opposite sides of the apex of the arch which are spaced below the top surface of the apex a distance greater than the thickness of the straight segment of the link.

5. A retractable lading strap anchor for attachment to the supporting structure for the floor of a railway car or the like and comprising a fulcrum in substantially the form of an inverted substantially U-shaped arch having a mid-portion of predetermined sectional size and mounting portions separated from the mid-portion and securable to the floor supporting structure, a link in the form of a closed loop having curved and substantially straight segments and having an opening therein of a size loosely to ring the mid-portion of said arch, said mid-portion of the arch having a sectional size sufficiently smaller than the opening in said link that a straight segment thereof may be raised to extend substantially above the level of said arch, said arch also having shoulders on each side of said mid-portion which extend angularly and outwardly in the general plane of the arch from the exterior of the arch, said shoulders being at positions below the exterior of the mid-portion of the arch a distance at least

equal to the thickness of the segments of the link to support the link at a height no greater than that of the mid-portion of the arch when the link gravitates relative to the arch, and said shoulders also extending away from opposite sides of the mid-portion of the arch to positions for engagement with one segment of the link when another segment thereof either engages the interior of the mid-portion of the arch or gravitates from said mid-portion of the arch.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,953,104 September 20, 1960

Gilbert F. Oakley

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 21, for "subject one" read -- subject to one --; column 4, lines 50 and 51, for "dislidgment" read -- dislodgment --; column 5, lines 26 and 27, for "desgned" read -- designed --; line 74, for "substantialyly" read -- substantially --; column 6, line 25, for "ling" read -- link --.

Signed and sealed this 11th day of April 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

ARTHUR W. CROCKER
Acting Commissioner of Patents