April 28, 1931. B. F. FITCH 1,802,888

LOAD ENGAGING DEVICE

Filed Dec. 26, 1928 3 Sheets-Sheet 1

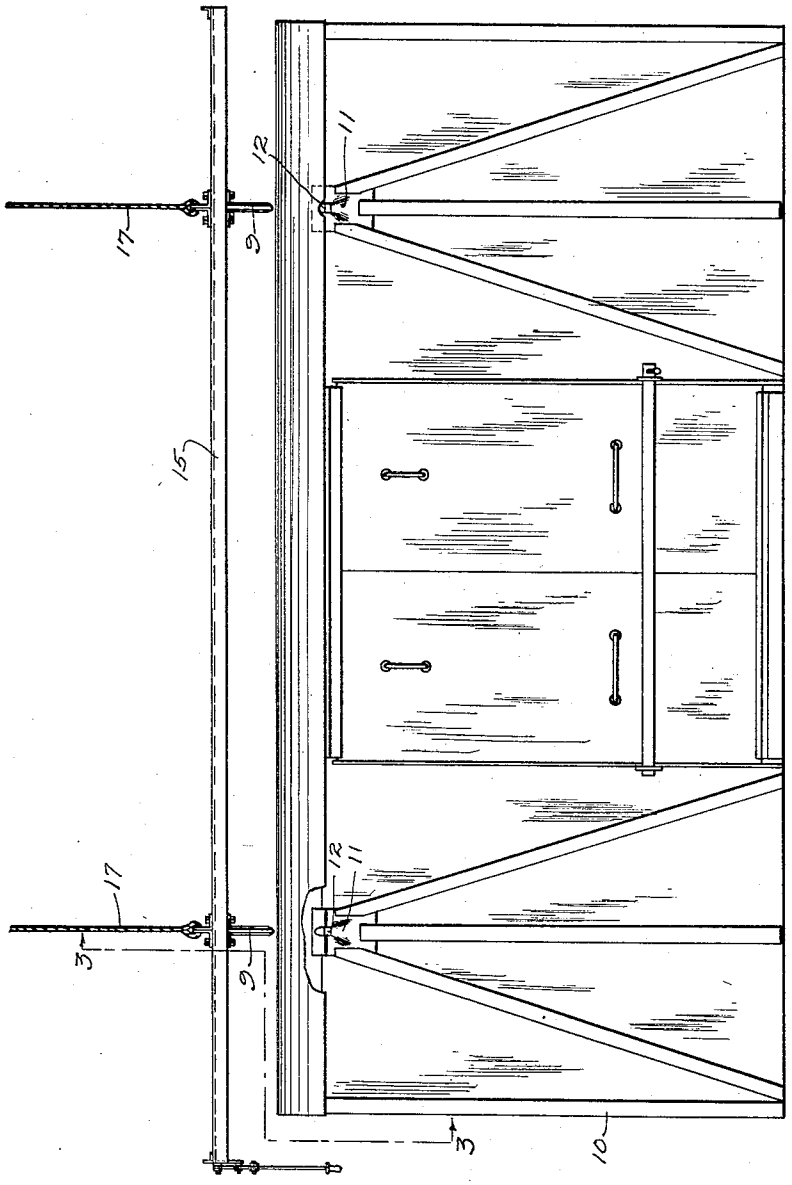


Fig. 1

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LOAD ENGAGING DEVICE

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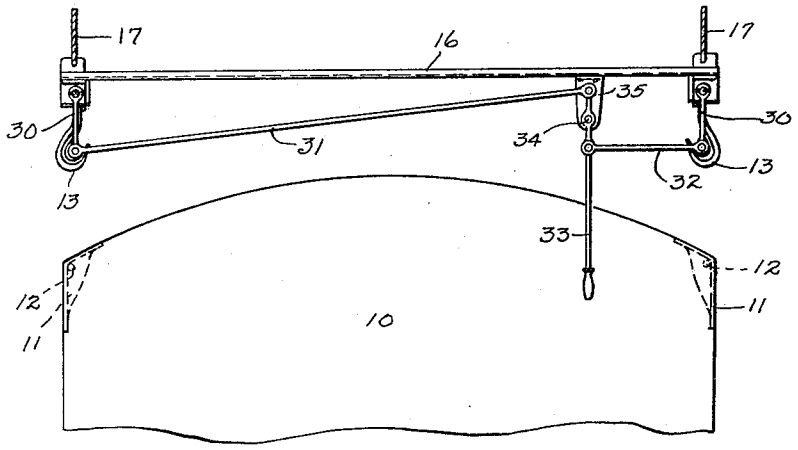


Fig.-2

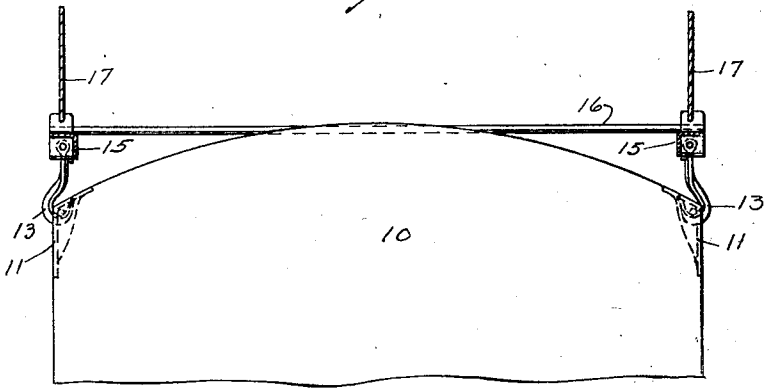


Fig.-3

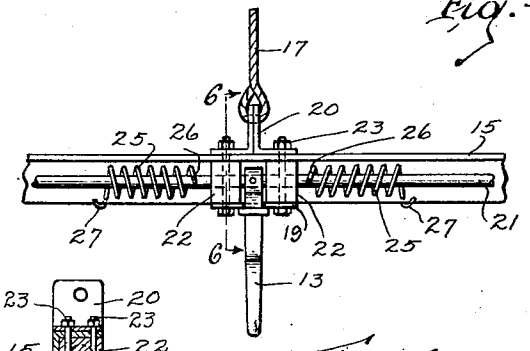


Fig.-4

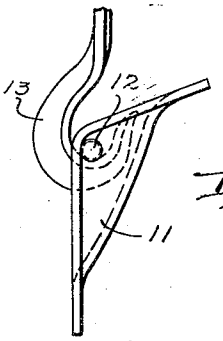


Fig.-5

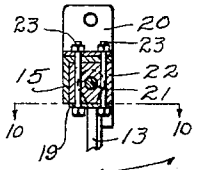


Fig.-6

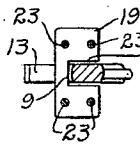


Fig.-10

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April 28, 1931. B. F. FITCH 1,802,888

LOAD ENGAGING DEVICE

Filed Dec. 26, 1928 3 Sheets-Sheet 3

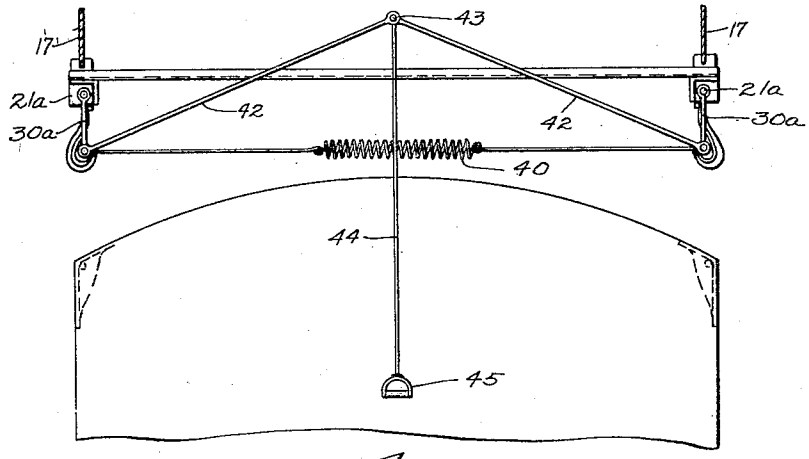


Fig.-7

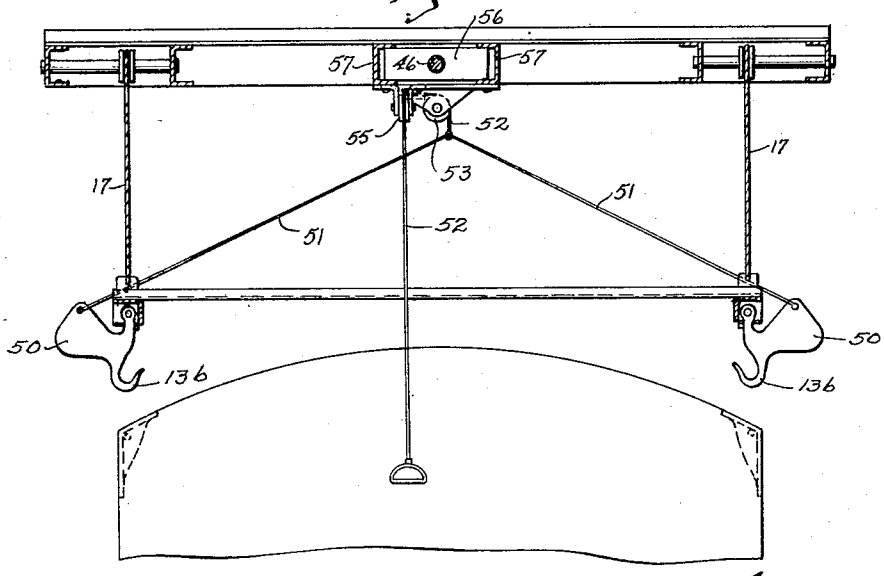


Fig.-8

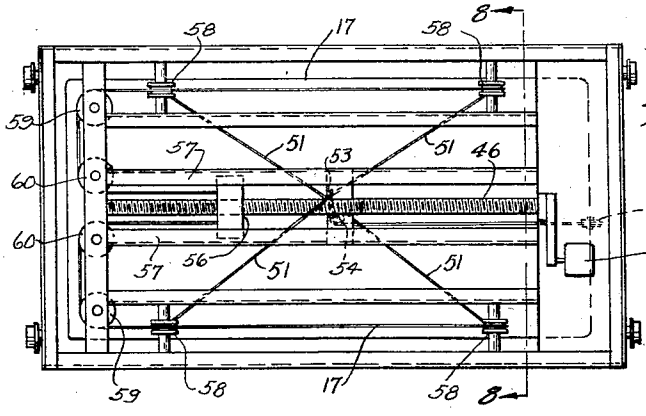


Fig.-9

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Patented Apr. 28, 1931 1,802,888

UNITED STATES PATENT OFFICE

BENJAMIN F. FITCH, OF GREENWICH, CONNECTICUT, ASSIGNOR TO MOTOR TERMINALS COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

LOAD-ENGAGING DEVICE

Application filed December 26, 1928. Serial No. 328,519.

This invention relates to apparatus for connecting a load to a load-lifting mechanism, and is particularly adapted for use in connection with the handling of freight in demountable automobile bodies, or containers, wherein the load is engaged at four points from an overhead hoisting mechanism. In Letters Patent of the United States #1,485,972 issued to me, March 4, 1924, I have shown a load lifting mechanism as comprising an articulated frame, which is suspended by four cables from an overhead crane and which carries four load engaging members in vertical alignment with the cables. Such patent also shows the container as having sockets in which the load engaging hooks may extend to effect contact with the load. After a container has been deposited upon a support the frame suspended by the cables is operated to move the load engaging members, usually hooks, outwardly and away from the side of the container. Where the distance between the container top and the overhead crane trackway is relatively large, as for example, where one container is intended to be transported by the crane over other containers, then the mechanism shown in my patent is satisfactory.

In locations where the headroom is restricted, however, a difficulty arises of maintaining the cables in the guide sheaves when the load engaging members are swung outwardly. This is obvious when it is considered that the sheaves on the crane are spaced apart about eight feet, while the hooks must be moved laterally until the ends of the cables are spaced apart about nine feet. Under such conditions, the cables tend to leave the sheave grooves.

The object of the present invention is to maintain the advantages inherent in the use of laterally movable load engaging members and at the same time to avoid cable inclination with reference to the guide sheaves when it is necessary to shift the load engaging members to the proper position. Another object of my invention is to attain the desired result with an apparatus which is simple in construction, and which may be readily actuated by an operator from a convenient location.

In the drawings, Fig. 1 is a side elevation of a container with a load engaging device suspended thereabove and embodying my invention; Fig. 2 is a vertical section through the device taken on a plane indicated by the line 2—2 in Fig. 1; Fig. 3 is a section taken through the device shown in Fig. 1 with the load engaging members in contact with the container; Fig. 4 is an enlarged sectional detailed view through the apparatus adjacent the load engaging member; Fig. 5 is an end view of a supporting element removed from the container and showing one of the load engaging elements in the form of a hook in contact therewith; Fig. 6 is a section taken on the line 6—6 in Fig. 4; Fig. 7 is an end view of a modified form of device embodying my invention; Fig. 8 is a transverse section through another modified form; Fig. 9 is a plan view of a hoist illustrating the apparatus shown in Fig. 8, and Fig. 10 is a section taken through one of the hooks in the line 10—10 in Fig. 6.

My invention, as heretofore indicated, is particularly adapted for use in connection with the raising and lowering of containers, in the form of demountable automobile bodies, such as is indicated at 10 in Fig. 1. Such container has provision for engagement at four points by an overhead hoisting mechanism, and in the form illustrated, the container has sockets 11 near the eaves which carry bars 12, and beneath which load engaging hooks 13 may extend. The hooks are carried by a rigid frame having side bars 15, and end bars 16, and are spaced upon the side bars to register with the sockets when the frame is lowered. Cables 17 depend from suitable hoisting apparatus and are attached to the side bars, as by apertured angle plates 20, shown in Fig. 4.

To transmit lifting stresses from the cables directly to the hooks, I have shown each hook as being rigidly mounted upon a shaft 21 which extends along the side bars and is journalled in bearing blocks 22 on each side of the hooks. Suitable securing members 23

extend through the plates 20, side bar 15, bearing blocks 22 and plate 19 to complete the assembly. By means of this arrangement, the hooks are vertically aligned with the cables, and bending moments are not placed upon the frame. Torsional springs 25 may each have one end fastened as at 26 to the shaft 21 and the other end fastened as at 27 to the side bar, and thus function to hold the shafts and therefore the hooks in normal coupling or load engaging position.

To move the hooks outwardly from the frame, so as to effect disengagement with the container, each shaft may have one end thereof projecting beyond the end of the frame and may have an arm 30 rigidly attached thereto. The free end of the arm on one side is pivotally connected to a cross link 31, while that on the other side is pivotally connected to a link 32. Links 31 and 32 are then pivotally connected to an operating lever 33 which may be pivoted at 34 to a bracket 35, which is attached to and extends downwardly from one of the end bars 16. The lever 33 is provided with a handle and functions when moved in one direction to swing the hooks outwardly where they can be held until the frame is raised a sufficient distance for enabling the hooks to clear the container. The plate 19, as shown in Fig. 10 has a U-shaped recess 18 in which the associated hook swings. The back wall 9 of each recess, thus serves as a stop to limit inward movement of the hooks under the action of springs 25.

This mechanism is effective to produce simultaneous movement of all hooks, and since the frame extends beyond the ends of the container, an operator may satisfactorily actuate the hooks from one end of the container. During such movement, the cables 17 remain in the normal vertical position. Hence, this mechanism will operate satisfactorily even though the top of the container is in close proximity to the crane.

In Fig. 7, I have shown a modified form of my invention wherein the hook supporting shafts 21*a* have links 30*a* rigidly affixed thereto adjacent one end of the frame. The free ends of these links are urged inwardly by a spring 40 which extends between the links. Links 42 are hinged together at 43 and are pivotally connected to the links 30*a* at the free ends thereof. A bar 44 depends from the hinge 43 and is provided with a handle 45 by means of which the bar may be drawn downwardly to move the hooks outwardly at the desired time.

Another modification of my invention is shown in Fig. 8 wherein the hooks 13*b* are counterweighted as at 50 so as normally to be urged inwardly. The hooks may be swung outwardly by means of cables 51 which extend diagonally inwardly and upwardly from the respective hooks to the center of the frame where they are connected to a common cable 52, which may pass over sheaves 53 and 54 adjacent the center of the hoist, and may then pass outwardly and downwardly over a sheave 55 adjacent the end of the frame. With this arrangement the operator may readily actuate the hooks by drawing downwardly on the free end of the cable 52 and holding it in such position until the hooks have cleared the eaves of the container.

In Fig. 9, I have shown a suitable hoisting mechanism for raising the cables 17 as a unit. In such figure, 46 indicates a screw shaft, 56 a traveling nut and 57 guide bars for the nut. The cables 17 pass upwardly from their free ends over suitable guiding sheaves 58, 59 and 60, and are finally anchored to the nut 56. An electric motor 61 is suitably geared to the screw shaft. Thus, rotation of this shaft operates to raise or lower simultaneously all four of the load engaging cables.

From the foregoing description, it is evident that by means of this invention, load engaging hooks may be automatically brought into contact with a load as the frame is lowered. Thereafter, as the container is raised, the lifting stresses are transmitted directly from the cables through the hooks to the engaging bars. When disengagement is desired the operator may easily actuate the necessary lever, or other manually operable member, to move the hooks out of the container sockets and he may conveniently hold the hooks out of engagement until the frame has been raised a sufficient height to clear the container eaves. Upon release of the operating member, the hooks automatically return to the normal coupling, or load engaging position.

It may be noted that the embodiment shown in Fig. 8, though covered by claims hereof, forms the subject matter of my divisional application No. 445,668 filed April 19th, 1930, and is there more specifically claimed.

I claim:

1. In a device of the character described, the combination with a frame having side bars and end bars, rock shafts carried by the side bars, load engaging members mounted on the rock shafts, yieldable means operating upon the rock shafts to move the members inwardly of the frame and manually operable means for opposing the yieldable means to move the members outwardly with relation to the frame.

2. In a device of the character described, the combination with a frame having side bars and end bars, load engaging members pivotally mounted upon the side bars, means associated with the members for normally urging them inwardly toward the frame, there being manually operable means for

moving the members outwardly with reference to the frame.

3. The combination of an open rectangular suspensible frame adapted to be lowered about the crowned roof of a demountable automobile body, hooks carried by the sides of said frame and adapted to engage body-supporting devices located at the eaves of said body, and manually operable means for swinging said hooks, said manually operable means being so located that it may be beyond the end of an automobile body coacting with said hooks.

4. The combination of a rectangular frame having provision for the connection therewith of supporting cables at the four corners of a rectangle, swinging devices carried by the sides of said frame and adapted to engage a demountable automobile body, and manually operable means for swinging said devices, said manually operable means being so located that it may be beyond the end of an automobile body coacting with said devices.

5. The combination of a rectangular frame having provision for the connection therewith of supporting cables, four swinging devices carried by the sides of said frame and adapted to engage a demountable automobile body, and a single manually operable cable divided and connected with said devices, said cable being so located that it may be beyond the end of an automobile body coacting with said hooks.

6. The combination of a rectangular frame suspended by four cables connected therewith at the four corners of a rectangle, a pair of rock shafts carried by the sides of said frame, rock arms on said shafts located at one end thereof, a pair of links connected with the respective rock arms, manual means at the end of the frame for spreading said links to rock the shafts, and hooks on the rock shafts.

7. The combination of a rectangular frame, a pair of rock shafts carried by the sides of said frame, rock arms on said shafts, a pair of links connected together at their inner ends and connected at their outer ends to the respective rock arms, means depending from the mutual joint of the links for spreading said links to rock the shafts, a spring tending to rock the shafts in the opposite direction, and hooks on the rock shafts.

8. The combination of a four-sided rigid frame adapted to be suspended from a crane, four independently movable load-engaging hooks pivotally carried by the frame and counterweighted so that they tend to swing about their pivotal connections into position to engage a load, and manually operable means for moving the hooks simultaneously out of load engaging position.

9. In a device of the character described, the combination with a frame having side bars and end bars, two load engaging members pivotally mounted on each of the side bars, there being means for urging the members inwardly to engage opposite sides of a body at four points, and flexible manually operable means for moving the members outwardly.

10. The combination of a four-sided rigid frame adapted to be suspended from a crane, four load engaging hooks pivotally carried by the frame and counterweighted so that they tend to swing about their pivotal connections into position to engage a load, cables connected to the respective hooks, and means for operating said cables simultaneously to swing the hooks in opposition to their counterweights.

In testimony whereof, I hereunto affix my signature.

BENJAMIN F. FITCH