July 5, 1932. R. BERGMANN 1,865,739

CONTAINER HOIST

Filed Oct. 5, 1931 2 Sheets-Sheet 1

Fig. 5

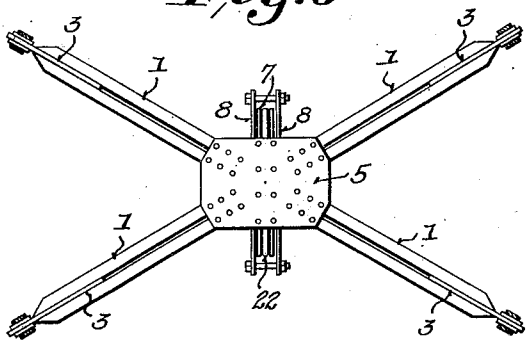


Fig. 1

INVENTOR
Reinhard Bergmann
BY
Louis Lucas
ATTORNEY

July 5, 1932. R. BERGMANN 1,865,739

CONTAINER HOIST

Filed Oct. 5, 1931 2 Sheets-Sheet 2

Fig. 2

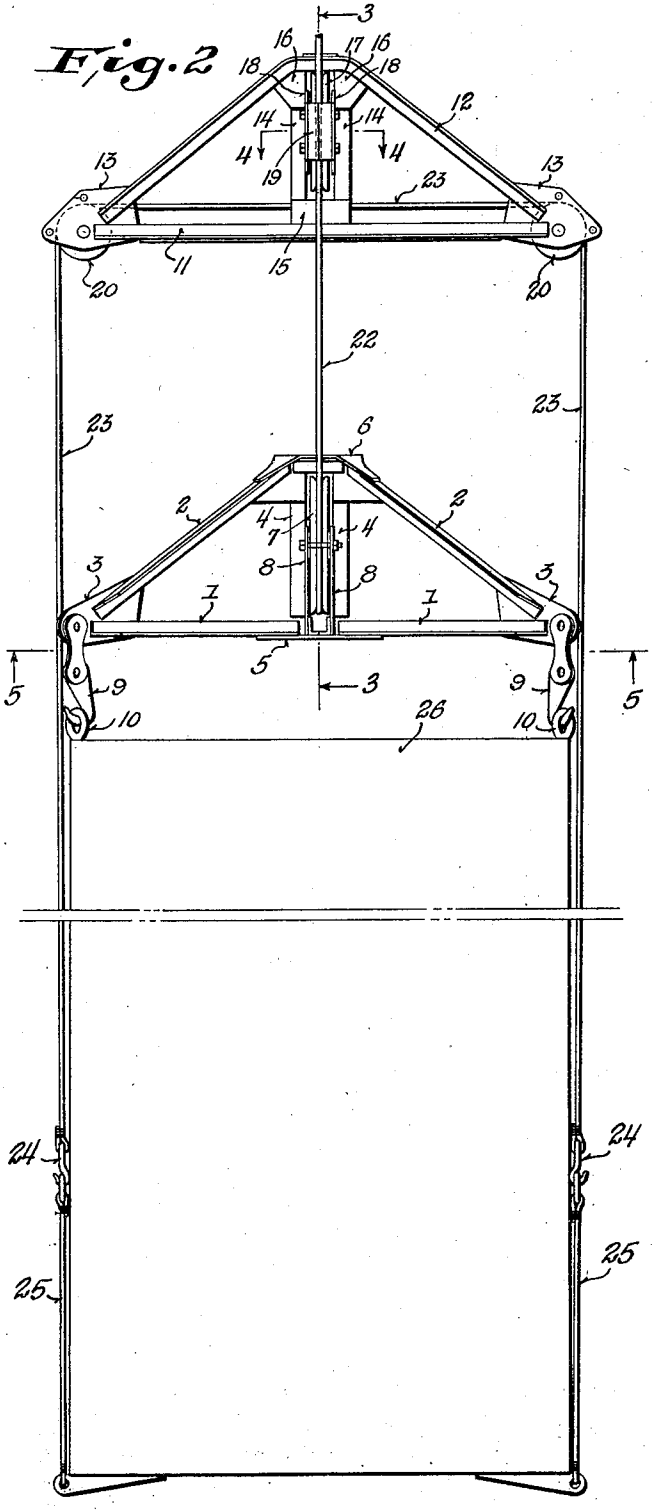


Fig. 3

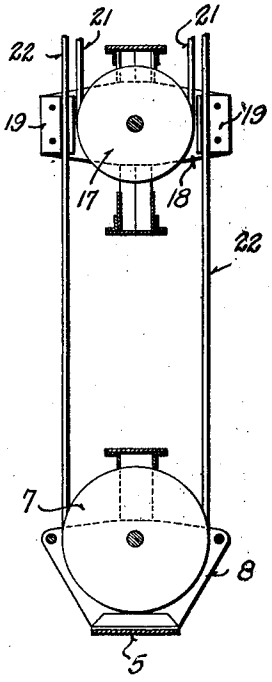
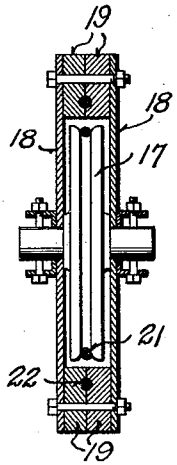


Fig. 4



INVENTOR
Reinhard Bergmann

BY Louis Lucas

ATTORNEY

Patented July 5, 1932 1,865,739

UNITED STATES PATENT OFFICE

REINHARD BERGMANN, OF WEST ALLIS, WISCONSIN, ASSIGNOR TO HARNISCHFEGER CORPORATION, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN

CONTAINER HOIST

Application filed October 5, 1931. Serial No. 566,937.

This invention relates to lifting machinery and has for its purpose the providing of means which may be used in conjunction with a hoist or crane for lifting unit-freight-containers to and from cars, at the same time opening or closing at will doors or the like in the bottom of the container. It is the purpose of this invention to provide the above mentioned means in such form that little head room is required.

Unit containers for the handling of bulk or package commodities make possible a decided improvement in service and economy in freight handling under a number of conditions. The advantages of this method of handling freight are largely dependent upon the speed and facility with which the containers, whether loaded or empty, can be placed upon or removed from the cars and the facility with which the containers, in the case of bulk commodities, can be filled and discharged. The filling of containers in the case of bulk commodities is easily accomplished in a number of different ways, but discharging quickly and cheaply has been accomplished only with expensive and imperfect means.

The unit containers, in order to provide the essential ease of handling, are made of such weight that they can be readily handled with moderate sized hoists or cranes. In order that space be employed economically, however, containers tall enough to occupy the clearance provided by the railways must be employed. A moderate size crane is limited in height and the bottoms of the tall containers necessarily used cannot be lifted by this means above a definite height. The containers must be lifted by the four corners because expensive bracing of the top of each container would be prohibitive in cost. The means employed for extending the support to the corners of the container occupies a considerable portion of the total lifting height or head room of the crane. Above the means for extending the support to the corners of the container the customary hoisting block occupies another important part of the total head room of the crane.

The usefulness of bottom discharge facilities depends greatly upon the height at which the load can be discharged. If the container can be lifted only far enough to discharge the load upon the ground the container might better be placed upon the ground and its contents removed directly. If, on the other hand, the container can be lifted high enough to discharge into elevated hoppers or the like, bottom discharging of the container becomes very useful. Discharging tackle, however, as formerly employed, has required head room in addition to that already occupied by the customary block and the means for extending the support to the corners of the container. So much head room has been occupied by the discharging mechanism that containers could not be lifted by moderate sized equipment to elevated hoppers of reasonable height.

This invention provides means heretofore unknown for opening and closing the bottom of unit-freight-containers while lifting the same, which means occupy very little head room, in fact not more than occupied by older hoisting means alone. The great saving in head room made possible by this invention greatly increases the utility of bottom discharging.

The invention is described with reference to the attached drawings wherein

Fig. 1 represents the manner of using the device of the invention for lifting a container from a car in conjunction with the crane;

Fig. 2 is a side view showing the device in detail;

Fig. 3 is a sectional view taken along the plane 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along the plane 4—4 of Fig. 2;

Fig. 5 is a bottom view of the lower block and frame viewed through plane 5—5 of Fig. 2.

The device of this invention is composed of two principal parts, namely: a lower truss and block combined in a single structure and an upper truss and block likewise combined in a single structure. The lower truss and block is formed of two crossed triangular frames, best shown in Figs. 2 and 5, formed of the horizontal members 1 and the inclined

members 2. These are united at their outer ends by means of the gusset plates 3 and at their inner ends by the vertical members 4 and the tie plates 5 and 6. The vertical members 4 are spaced apart and in the space therebetween is mounted sheave 7 and sheave side-plates 8, which constitute a block. This block is shown in detail in the lower part of Fig. 3. The lower truss is provided with fastening means 9 secured to the gusset plates 3. The fastening means 9 are adapted for attachment with the eyes 10 which form part of the container 26.

The upper truss and block are composed of a single triangular frame comprising the horizontal members 11 and inclined members 12, which are joined at their outer ends by the equalizer pulley plates 13 and at their inner ends by the vertical members 14, tie plates 15 and 16. The vertical members 14 are spaced apart and in the space therebetween is mounted the sheave 17 and sheave side plates 18, which constitute a block. Vertically disposed between the sheave side plates and secured thereto on either side of the sheave are the split guide members 19. These guide members are shown best in the sectional view, Fig. 4, and in the top part of Fig. 3. Rotatably secured between the equalizer pulley plates 13 are the equalizer pulleys 20.

The upper and lower trusses are combined to form the device of this invention by passing flexible member 21 from an appropriate hoisting drum, not forming a part of this invention, around the sheave 17 and returning it to an appropriate location, where it is dead-ended. A second flexible member 22 is passed from another appropriate hoisting drum, not forming a part of this invention, through the opening in one of the guide members 19, around the sheave 7, through the other guide member 19 to an appropriate location, where it is dead-ended. A third flexible member 23 is provided at either end with means for attachment 24, which may be detachably secured to the opening and closing members 25 of the container 26. Flexible member 23 is placed upon the equalizer pulleys 20, crossing the upper truss horizontally and extending downwardly therefrom, as shown in Fig. 2.

The completed device may be operated in the following manner: For example, if a filled container is to be placed upon a car the device is lowered to the container by paying out flexible members 21 and 22 at equal rates of speed. The means of attachment 24 are secured to the closing members 25 and the upper truss raised by taking in flexible member 21 until flexible member 23 becomes taut. The lower truss is then secured to the eyes 10 with means of attachment 9. The container is then lifted by taking in flexible member 22 until all slack in the means of attachment 9 has disappeared, whereupon flexible members 21 and 22 are taken in at equal rates until the container has been hoisted to the degree desired. The container may then be placed upon the car by paying out flexible members 21 and 22, at equal rates, until the container is fairly grounded and the means of attachment 9 and 24 may be easily removed.

To operate the device of this invention to discharge a container while suspended, it is only necessary to pay out flexible member 21 while holding flexible member 22 fast, causing the upper truss to descend, permitting the flexible member 23 and the closing members 25 to move downwardly to the open position, as shown with broken lines in Fig. 1. If, however, the maximum head room during the discharging of the container is required, the discharge may be accomplished in the following manner. Flexible member 21 is held fast and flexible member 22 is taken in, causing the upper and lower trusses to approach each other and in effect causing flexible member 23 and closing members 25 to move downwardly with respect to the container 26, discharging the same.

If desired, the device of this invention may be modified by substituting multiple sheaves for the sheaves 7 and 17 and increasing the number of passes of flexible members 21 and 22 accordingly.

The device of this invention occupies no more head room than formerly occupied by the customary hoisting block and support extension. The lower truss as employed in this invention contains the block as an integral part thereof, leaving head room formerly occupied by the hoisting block free for the upper truss or discharging mechanism, the entire device combined occupying a minimum of head room and making practical the bottom discharge of unit freight containers.

It is desired that it be understood that this invention is not to be limited to any specific form or arrangement of parts except insofar as such limitations are specified in the claims.

What I claim as my invention is:

1. In a device for lifting and discharging unit containers, the combination of a truss provided with means of attachment to a container, a hoisting block within and forming a part of said truss, a flexible member adapted to be retracted and extended engaged with said block, a second truss mounted above the first-mentioned truss, a second block mounted within and forming a part of said second truss, a second flexible member adapted to be extended and retracted engaged with said second block, and means secured to said second truss and extending downwardly therefrom to form attachment with opening and closing members of the container.

2. In a device for lifting and discharging

unit containers, the combination of a truss provided with means of attachment to a container, a hoisting block within and forming a part of said truss, a cable connecting a hoisting drum and an anchorage and engaged with said block, a second truss mounted above the first-mentioned truss, a second block mounted within and forming a part of said second truss, a second cable connecting a hoisting drum and an anchorage and engaged with said second block, and means adjustably secured to said second truss and extending downwardly therefrom to form attachment with opening and closing members of the container.

3. In a device for lifting and discharging unit containers, the combination of a crossed triangular truss provided at its extremities with means of attachment to a container, a hoisting block cooperatively secured within said truss, a flexible member adapted to be retracted and extended engaged with said block, a second single triangular truss mounted above the first-mentioned truss, a second block cooperatively secured within said second truss, guide members secured to said blocks and guiding said first-mentioned flexible member, a second flexible member adapted to be extended and retracted engaged with said second block, means extending downwardly from said second truss to form attachment with opening and closing members of the container, and means for supporting said downwardly extending means from said second-mentioned truss in an equalized manner.

In testimony whereof, I affix my signature.

REINHARD BERGMANN.