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LIFTING DEVICE FOR PALLETS OR THE LIKE

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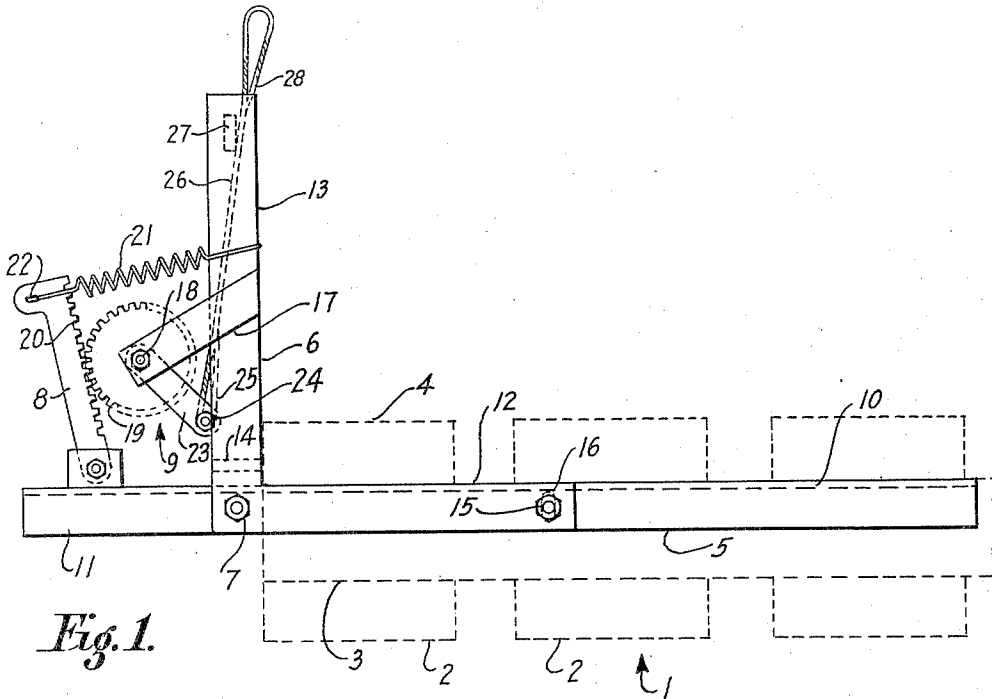


Fig. 1.

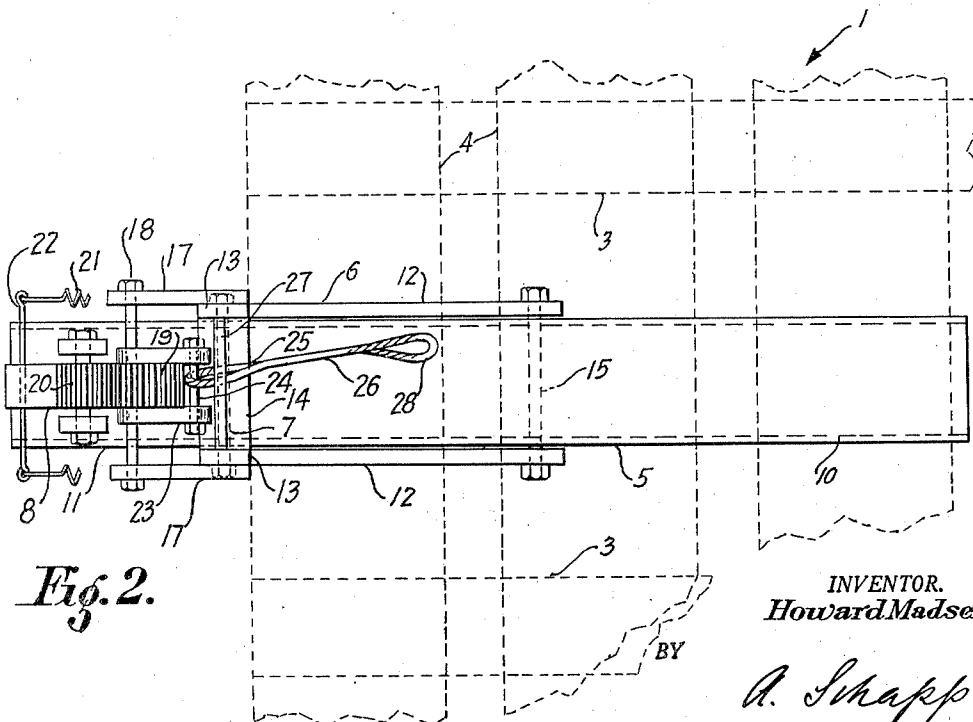


Fig. 2.

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LIFTING DEVICE FOR PALLETS
OR THE LIKE

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The present invention relates to improvements in a lifting device for pallets or the like, principally intended for use in connection with ship-loading operations.

Pallets of this character usually consist of two layers of planks secured upon interposed spacing blocks. The articles to be loaded are stacked upon the pallets and the latter are then lifted and transported by suitable cranes or other hoisting machinery.

The bottom layer of planks usually rests on a suitable supporting surface, and the most convenient way of gripping the pallet for hoisting operations is by means of a bar introduced sideways between the two layers intermediate the spacing blocks.

Upward pull on this bar is necessarily applied outside the pallets, and if such upward pull is exerted by means of a hoisting cable, the bar tends to slant away from the bottom face of the upper layer, with the result that the lifting effect is confined to the extreme edge of the outer plank and that the bar tends to slip away from underneath the upper layer of planks.

In the present invention it is proposed to provide a lifting mechanism in connection with the said bar which utilizes the lifting effort for forcing the full length of the bar into lifting contact with the upper layer of planks so that the load is uniformly distributed over the full length of the bar and any danger of slipping is eliminated.

Pallets of this character are usually rectangular in form, and when the articles, such as boxes or cartons, are stacked on the pallet, they are usually made to rise vertically from the edges of the pallet so that the entire vertical space above the pallet is occupied by the merchandise to be stored and there is no room in said space for the accommodation of any part of the lifting mechanism.

It is, therefore, further proposed in the present invention to arrange the lifting mechanism in such a manner that no part thereof projects over the space above the pallet.

Further objects and advantages of my invention will appear as the specification proceeds, and the novel features of my invention will be fully defined in the claims attached hereto.

The preferred form of my invention is illustrated in the accompanying drawing, in which

Figure 1 shows a side view of my lifting device, the pallet being shown in dotted lines, and

Figure 2, a top plan view of the same.

While I have shown only the preferred form

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of my invention, I wish to have it understood that various changes and modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawing in detail, a portion of the pallet 1 is shown in dotted lines as comprising a lower layer of planks 2 arranged in slightly spaced relation, a series of spacing blocks 3 superimposed on the planks transversely, in widely spaced relation, and an upper layer of planks 4 superimposed on the spacing blocks to register with the lower planks. The planks are usually made of two inch material and the spacing blocks of 4 x 4's, and all the members are securely fastened to one another to form a rectangular loading platform. As a rule three spacing blocks are employed, leaving two intermediate spaces for accommodation of my lifting devices, of which four are normally applied, two for each side. The four lifting devices are adapted for connection to a common hoist by means of cables or the like.

Only one of the lifting devices is illustrated in the drawing and it comprises in its principal features a bar 5 adapted for introduction from the side into one of the spaces provided between the spacing blocks, a bell crank lever 6 to which the bar is anchored as at 7, a link 8 pivoted to the extreme outer end of the bar, and a lever mechanism 9 operative on the link 8 for urging the inner end of the bar upward in response to an upward pull exerted on the lever mechanism.

The bar 5 is preferably made in the form of an inverted channel and is of sufficient length to allow its inner end 10 to project into the pallet for a considerable distance, while its outer end 11 projects outside the pallet.

The bar is pivotally supported near its outer end between two spaced sections of the bell crank lever 6, each section comprising a horizontal leg 12 running substantially parallel to the bar and a vertical leg 13 rising vertically therefrom, and the two sections being connected to form a rigid unit, by means of a cross-member 14. The pivot 7 is located in the elbow of the lever, and the horizontal sections of the bell crank lever are made to straddle the bar.

The bar and the horizontal legs of the lever are free to swing with respect to one another on the pivot 7, but since only a relatively slight amount of play is necessary for the operation of my lifting device, I limit the play by means of a bolt 15 which passes through the horizontal leg of the lever and the bar, near the end of the

former, one of the said members being slotted as at 16 to provide for the necessary freedom of play.

The two vertical legs 13 of the lever 6 have arms 17 projecting outwardly therefrom in a downwardly inclined direction, these arms carrying, on a pivot pin 18, a pinion 19 adapted for meshing engagement with a rack 20 formed upon the rear face of the link 8, the latter being urged upon the pinion by a pair of springs 21 connecting a rod 22 extending transversely through the upper end of the link to the two upright lever legs.

The pinion 19 has two arms 23 projecting downwardly therefrom in an inclined direction and toward the upright lever legs 13, the arms being formed rigid with the pinion, and the outer ends of the arms being connected by a pin 24 adapted to engage over a loop 25 of a cable 26. The pin 24 is located approximately along the outer edges of the upright lever legs 13, and the cable is guided by a cross member 27 for exerting pull in the proper direction when the loop 28 is lifted by means of hoisting apparatus.

The pinion 19 with its arms 23 are substantially the equivalent of a lever pivoted at 18 and operative on the rack rod and will be referred to as such in the broader definition of the invention.

In operation, assuming that the lifting device is suspended from a hoist by means of the cable 26, the hoist is first operated to bring the bar 5 opposite one of the open spaces within the pallet, whereupon the bar is pushed into the space until the vertical arms 13 of the lever reach the edge of the pallet. A slight upward pull on the cable will bring the upper faces of the bar and the horizontal lever legs into contact with the bottom face of the upper layer of planks.

On continuation of the upward pull, as the lifting device takes over the load, the arm 23 and the pinion 19, operating on the link 8, exert downward pressure on the latter which, in turn, forces the outer end of the bar 5 downward and urges the inner end of the bar upward into lifting contact with the pallet planks throughout the length of the bar.

At the same time the upward pull on the arm 23 urges the pivot 18 outward toward the link tending to urge the upright lever leg 13 toward outward slanting position and opposing any tendency of the leg 13 to swing toward inwardly inclined position as it naturally would if upward pull were exerted directly on the upright leg 13, in the absence of my lever mechanism 9.

The resulting effect to the lifting operation is that both the horizontal lever legs 12 of the bell crank lever and the inner end of the bar 5 retain their horizontal positions throughout the lifting operation.

If the lifting devices are employed in opposing pairs so as to maintain the pallet in level position, the bars 5 will retain lifting contact with the upper layer of planks throughout the lengths thereof, and any danger of slipping is eliminated.

It should be noted that the entire lever mechanism 9 is arranged outside of the upright legs 13 so that no part thereof infringes on the vertical space above the pallet.

The lever mechanism 9 is preferably arranged to make the lever arm 23 about twice as long as the radius of the pinion to cause the cable to work at a favorable leverage in urging the outer end of the bar 5 downward.

While my invention has been particularly described for use in connection with a pallet, it is

apparent that it may be used in connection with the lifting of any load or platform having similar characteristics.

I claim:

1. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means so as to extend inwardly underneath the platform, and means for lifting the anchoring means including means responsive to the lifting effort for urging the inner end of the bar upwardly into lifting contact with the platform, the inner end of the bar projecting inwardly beyond the horizontal leg.

2. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means so as to extend inwardly underneath the platform, and means for lifting the anchoring means including a lever pivoted in the anchoring means and means operable by one end of the lever for urging the inner end of the bar upwardly into lifting contact with the platform when the other end of the lever is lifted.

3. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means and having one end projecting inwardly underneath the platform and a second end projecting outwardly beyond the platform, and means for lifting the anchoring means including a lever pivoted in the anchoring means and means operable by one end of the lever for depressing the outer end of the bar when the other end of the lever is lifted whereby the inner end of the bar is forced into lifting contact with the platform.

4. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means and having one end projecting inwardly underneath the platform and a second end projecting outwardly beyond the platform, and means for lifting the anchoring means including a lever pivoted in the anchoring means and means operable by one end of the lever for depressing the outer end of the bar when the other end of the lever is lifted whereby the inner end of the bar is forced into lifting contact with the platform, the inner end of the bar projecting inwardly beyond the horizontal leg.

5. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means and having one end projecting inwardly underneath the platform and a second end projecting outwardly beyond the platform, and means for lifting the anchoring means including a lever pivoted in the anchoring means and a link pivoted in the outer end of the bar and operable by the lever for depressing the outer end of the bar when one end of the lever is lifted whereby the inner end of the bar is urged into lifting contact with the platform.

6. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means so as to extend inwardly underneath the platform, and means for lifting the anchoring means including means responsive to the lifting effort for

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urging the inner end of the bar upwardly into lifting contact with the platform, the horizontal leg of the anchoring means and the bar having cooperative means for limiting relative movement between the same.

7. A lifting device for a platform, comprising an anchoring means having a horizontal leg adapted for introduction underneath the platform, a bar pivoted in the anchoring means and having one end projecting inwardly underneath the platform and a second end projecting outwardly beyond the platform, and means for lifting the anchoring means including a lever pivoted in the anchoring means and means operable by one end of the lever for depressing the outer end of the bar when the other end of the lever is lifted whereby the inner end of the bar is forced into lifting contact with the platform, the horizontal leg of the anchoring means and the bar having cooperative means for limiting relative movement between the same.

8. A lifting device for a platform, comprising an elbow having a horizontal leg adapted for introduction underneath the platform and having a vertical leg adapted for pushing up against the edge of the platform, a bar pivoted to the elbow and having an inner end substantially paralleling the horizontal leg and an outer end projecting outwardly beyond the vertical leg, a lever supported by the vertical leg, and a link connection between one end of the lever and the outer end of the bar, whereby the outer end of the bar is pressed downward for lifting the inner end thereof when upward pull is exerted on the other end of the lever.

9. A lifting device for a platform, comprising an elbow having a horizontal leg adapted for introduction underneath the platform and having a vertical leg adapted for pushing up against the edge of the platform, a bar pivoted to the elbow and having an inner end substantially paralleling the horizontal leg and an outer end projecting outwardly beyond the vertical leg, a lever supported by the vertical leg, and a link connection between one end of the lever and the outer end of the bar, whereby the outer end of the bar is pressed downward for lifting the inner end thereof when upward pull is exerted on the other end of the lever, the lever being supported with

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respect to the vertical leg so as to leave the space above the platform unobstructed.

10. A lifting device for a platform, comprising an elbow having a horizontal leg adapted for introduction underneath the platform and having a vertical leg adapted for pushing up against the edge of the platform, a bar pivoted to the elbow and having an inner end substantially paralleling the horizontal leg and an outer end projecting outwardly beyond the vertical leg, a lever supported by the vertical leg, and a link connection between one end of the lever and the outer end of the bar, whereby the outer end of the bar is pressed downward for lifting the inner end thereof when upward pull is exerted on the other end of the lever, the link connection comprising a link pivoted to the outer end of the bar and having a rack thereon, a pinion on the end of the lever, and spring means urging the rack upon the pinion.

11. A lifting device for a platform, comprising an elbow having a horizontal leg adapted for introduction underneath the platform and having a vertical leg adapted for pushing up against the edge of the platform, a bar pivoted to the elbow and having an inner end substantially paralleling the horizontal leg and an outer end projecting outwardly beyond the vertical leg, a lever supported by the vertical leg, and a link connection between one end of the lever and the outer end of the bar, whereby the outer end of the bar is pressed downward for lifting the inner end thereof when upward pull is exerted on the other end of the lever, the link connection comprising a link pivoted to the outer end of the bar and having a rack thereon, a pinion on the end of the lever, and spring means urging the rack upon the pinion, and the lever being supported with respect to the vertical leg so as to leave the space above the platform unobstructed.

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The following references are of record in the file of this patent:

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