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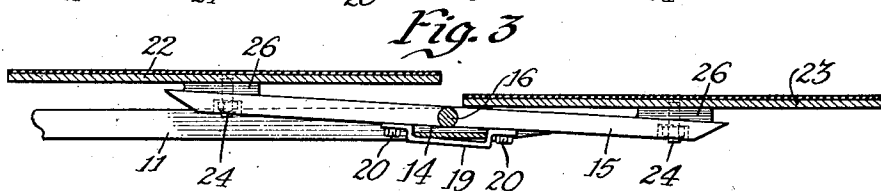
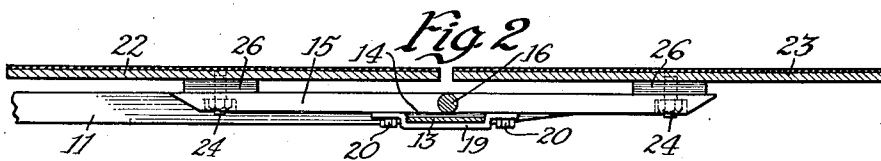
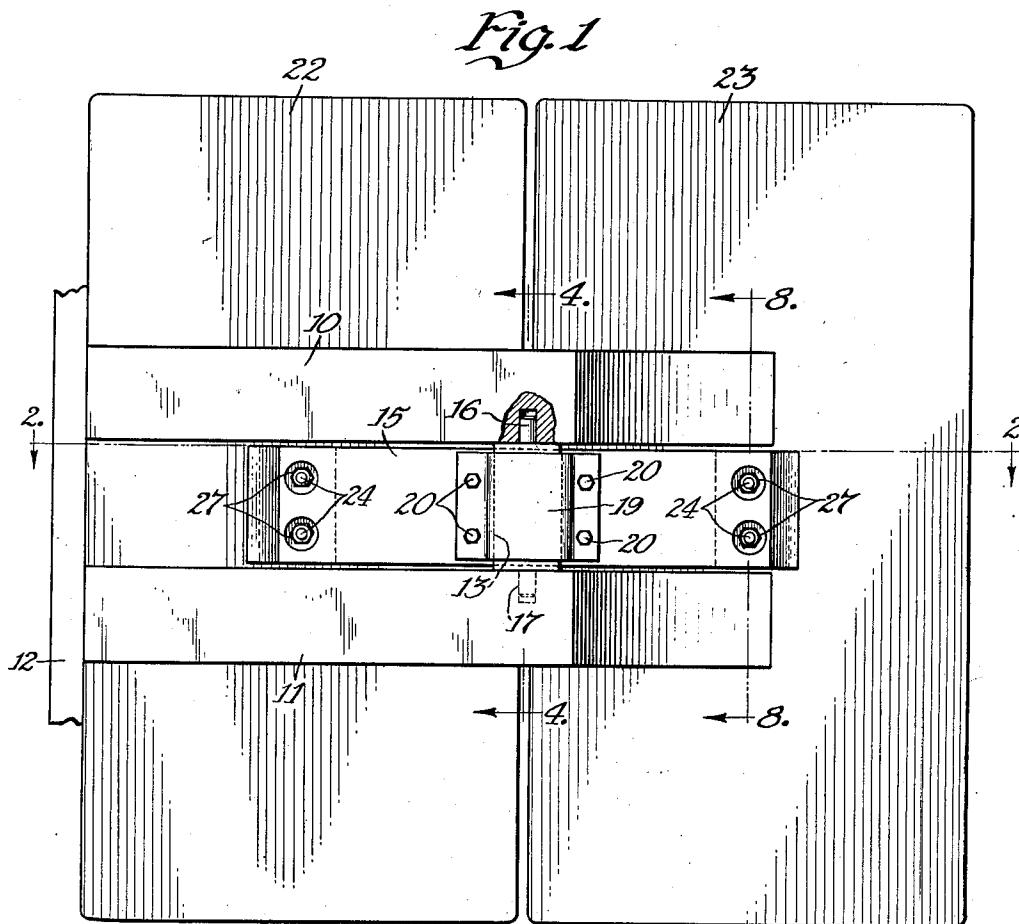
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LOAD GRIPPING MEANS FOR LIFT TRUCKS

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2 Sheets-Sheet 1



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LOAD GRIPPING MEANS FOR LIFT TRUCKS

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This invention relates to load gripping means for lift trucks and it has for its object the provision of a new and improved construction of means for gripping a carton or the like resting directly on a floor, for example, by pressure on the side faces of the article or a pile of the articles to be handled so as to avoid the necessity for the use of a pallet for expediting the operation of picking up such articles.

This invention relates particularly to the type of apparatus as disclosed by my earlier application Serial Number 178,741, filed August 10, 1950, which employs contact plates movably mounted on pressure arms arranged oppositely with respect to each other, and it has for a particular object the provision of improved means for mounting and controlling the positions of such contact plates so as to insure that the plates shall normally be in position for the application of pressure smoothly and evenly to opposite sides of a carton or the like, and to insure that when such contact plates are moved toward each other into gripping relationship, pressure may be applied by the plates in such a way as to grip tightly the material being handled regardless of slight irregularities in the shape of the article or the pile.

To this end, it is one of the objects of my invention to provide an improved construction of pressure arms and pressure plates mounted thereon so constructed that the plates shall be adapted to swing slightly either vertically or horizontally or at any desired angle with respect to the pressure arms for making sure that upon the application of pressure the contact plates may yield in any direction to the extent necessary for the application of gripping pressure evenly to the article to be handled.

Other objects and advantages of my invention will appear more fully from the following description and from the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring now to the two sheets of drawings:

Fig. 1 is a face view of a load arm provided with two contact plates movably mounted thereon;

Fig. 2 is a horizontal sectional view taken substantially at the line 2-2 in Fig. 1;

Fig. 3 is a view similar to Fig. 2 but showing a changed position of the contact plates with respect to the load arm;

Fig. 4 is a vertical sectional view taken substantially at the line 4-4 in Fig. 1;

Fig. 5 is a view similar to Fig. 4 but showing the

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parts in separated condition for better illustrating their form;

Fig. 6 is a horizontal sectional view taken substantially at the line 6-6 in Fig. 4;

Fig. 7 is a face view of a fragmentary portion of an equalizer bar forming part of my improved apparatus; and

Fig. 8 is a vertical sectional view taken substantially at the line 8-8 in Fig. 1.

Referring now particularly to Fig. 1 of the drawings, 10 and 11 indicate the upper and the lower load arms respectively mounted in horizontal position on a head 12 in vertically spaced relationship to each other at one side of a lift truck, such head being movably mounted on the truck so as to be adjustable transversely for carrying the arms 10 and 11 toward and from load arms on another head at the opposite side of the truck. At a point in substantially spaced relationship to the head 12, the arms 10 and 11 are connected together by a plate 13 rigidly secured in position by welding to said arms, as is best shown in Fig. 4. Next to the inner face of the plate 13, there is a rubber pad 14 adapted to be held in position by the adjacent parts as hereinafter described.

In the space between the upper load arm 10 and the lower load arm 11, I have mounted an equalizer bar 15 so as to be movable angularly to a slight extent with respect to said load arms. In my improved construction, the equalizer bar is provided at about its middle portion with vertically extending mounting pins or trunnions 16 and 17 which engage aligned openings 18 in the face portions of the load arms 10 and 11, the arrangement being such that the equalizer bar in the position as shown in Fig. 4 engages the face of the rubber pad 14. The parts are held in their operative position as shown by a keeper 19 in the form of a yoke extending across the face of the plate 13 and secured in position by machine screws 20 mounted by means of screw threads in openings 21 in the equalizer bar, as clearly shown in Fig. 5.

Contact plates 22 and 23 are mounted on the opposite end portions of the equalizer bar 15. As is best shown in Fig. 8, said contact plates are mounted in position by means of studs 24 secured by welding in openings 25 in the plates. Said studs 24 extend through suitable openings in a rubber pad 26 and in the equalizer bar (see Fig. 8), having nuts 27 mounted on their end portions for securing the bolts strongly in position on said equalizer bar.

By the use of my improved construction comprising the rubber pads 14 and 26, the equalizer bar is swingingly mounted with respect to the load arms and the contact plates are swingingly mounted with respect to the equalizer bar. This construction provides for free swinging of the equalizer bar to a limited extent in any direction with respect to the load arms, and for free swinging of the contact plates to a limited extent in any direction with respect to the equalizer, each of the contact plates being adapted to swing independently of the other plate.

By the provision of my improved construction, the contact plates are very strongly mounted in position, while at the same time the arm as a whole is very thin so as to be capable of being inserted into a comparatively very narrow opening for picking up a load, and to be capable of stacking cartons or the like in a compact pile with a very small opening between the component units of the pile. The contact plates are free to swing angularly in any direction as may be required for effective gripping of the carton or other material to be handled, and the parts are normally held in the desired positions ready for the application of pressure through the contact plates for gripping a load.

I have found in practice that by the use of my improved construction I am enabled to lift a very heavy load with a minimum of pressure on the sides of a carton or a pile of cartons or other objects. With the contact plates arranged to move angularly in any direction to a limited extent so as to cause the application of pressure effectively on the side faces of an irregularly shaped load at points spaced from each other either vertically or horizontally, I am enabled to lift a load without highly concentrated pressure at any point regardless of the irregularities in the shape of the load, serving thus, by the reduced pressure necessary for gripping the load for a handling operation, to cut down very substantially the tendency to crush the carton or other article being handled. In this way also the likelihood that an undersized carton shall slip out of position in a pile being handled is very greatly reduced. By the use of my improved construction, the tendency for a package to be distorted by a skewing action as a result of a handling operation is substantially eliminated, as is also the tendency for a package or other load to rotate, out of the normal position for handling, about an axis between oppositely disposed points of pressure.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a load gripping structure for applying pressure on the side faces of a load, the combination of an arm, means for mounting said arm in substantially horizontal position on a lift truck, an equalizer bar, means for connecting said equalizer bar at an intermediate point therealong with said arm comprising a block of resilient material adapted to yield for permitting the bar

to swing angularly with respect to said arm, two contact plates, and means for flexibly connecting said contact plates with opposite end portions respectively of said equalizer bar comprising at each end portion of the equalizer bar a block of resilient material adapted to yield for permitting the contact plate to swing angularly in any direction with respect to said equalizer bar.

2. In a load gripping structure for applying pressure on the side faces of a load, the combination of two arms, means for mounting said arms on a lift truck in parallel spaced relationship to each other one above the other, a vertically positioned plate connecting said arms together at an intermediate point therealong, a resilient rubber pad on the face of said plate, an equalizer bar between said arms in engagement with said resilient rubber pad, pivot pin means carried by said equalizer bar adapted by engagement with said arms to support said bar swingingly in position and to limit the movement of the bar toward said vertically positioned plate, means carried by said bar adapted by engagement with the outer face of said vertically positioned plate to limit the movement of the bar in the direction away from said vertically positioned plate, and contact plates flexibly connected with opposite end portions of said equalizer bar.

3. A load gripping structure as specified in claim 2, in which said movement limiting means carried by the equalizer bar in position to engage the outer face of said vertically positioned plate is in the form of a keeper serving to hold the resilient rubber pad in position between said vertically positioned plate and said equalizer bar.

4. In a load gripping structure for applying pressure on the side faces of a load, the combination of an arm, means for mounting said arm in substantially horizontal position on a lift truck, an equalizer bar, means for flexibly connecting said equalizer bar at an intermediate point therealong with said arm so as to enable the equalizer bar to swing with respect to the arm, and two contact plates flexibly connected with opposite end portions of said equalizer bar so as to be movable angularly either vertically or horizontally with respect to said equalizer bar, said flexible connecting means for each of said contact plates comprising stud bolts projecting from the face of the plate and extending through openings in the equalizer bar, and a flexible resilient pad interposed between the plate and the bar.

5. A load gripping structure as specified in claim 4, in which the flexible connecting means between said arm and said equalizer bar comprises a flexible resilient pad adapted to yield so as to permit the bar to swing angularly with respect to said arm.

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