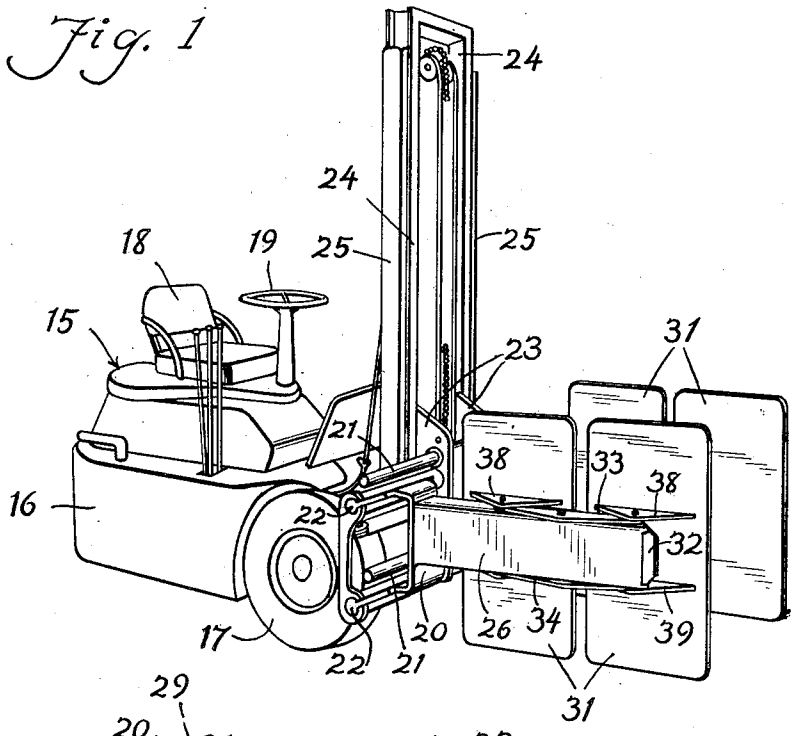
April 6, 1954 L. G. EHMANN 2,674,387

SIDE GRIP CARTON HANDLING MEANS FOR LIFT TRUCKS

Filed Aug. 10, 1950 2 Sheets-Sheet 1

Fig. 1



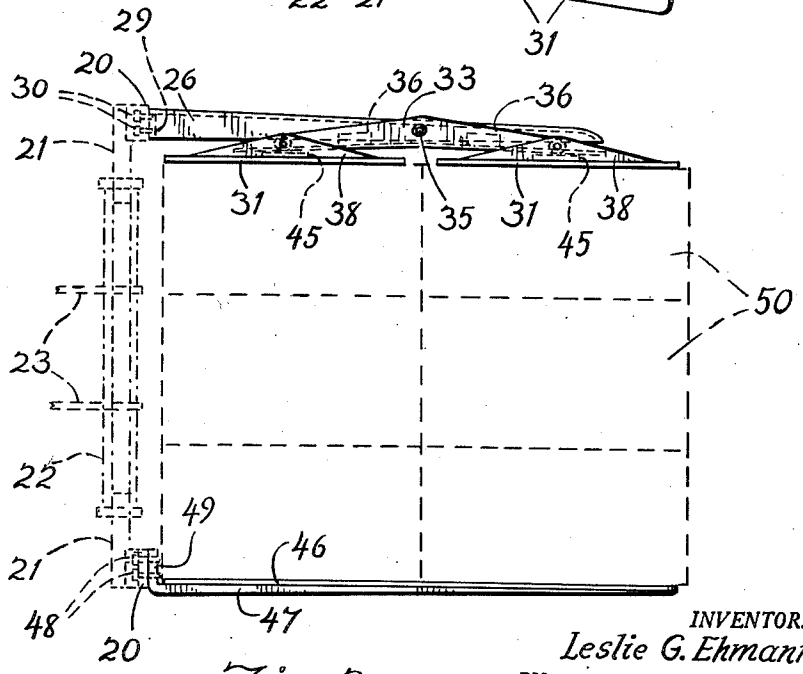


Fig. 2

INVENTOR.
Leslie G. Ehmann
BY Albert G. McCaleb
Atty.

April 6, 1954 L. G. EHMANN 2,674,387

SIDE GRIP CARTON HANDLING MEANS FOR LIFT TRUCKS

Filed Aug. 10, 1950

2 Sheets-Sheet 2

Fig. 3

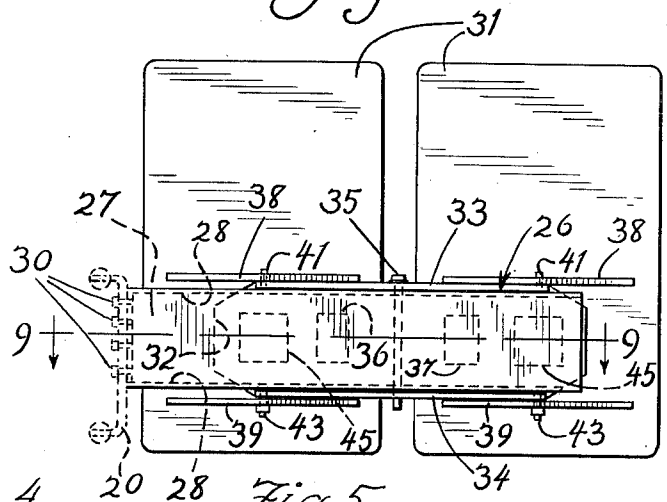


Fig. 4

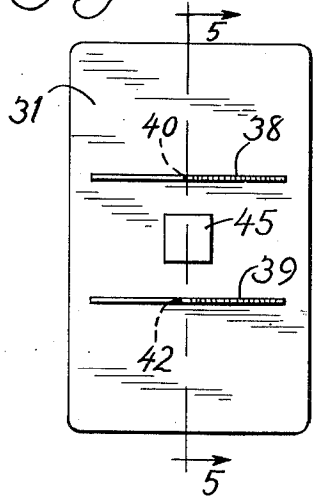


Fig. 5

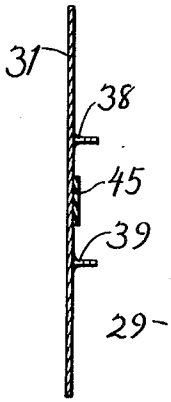


Fig. 6

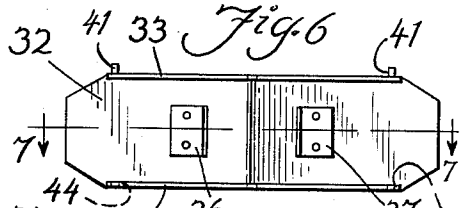


Fig. 7

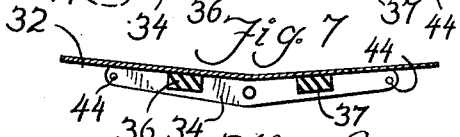


Fig. 8

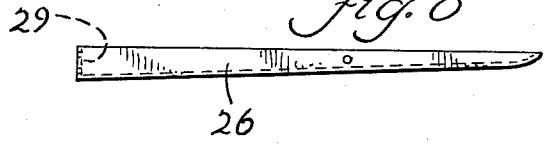
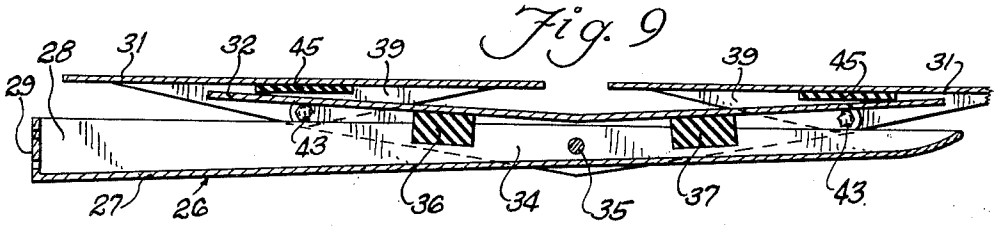


Fig. 9



INVENTOR.
Leslie G. Ehmann
BY Albert G. McCaleb
Atty.

Patented Apr. 6, 1954

2,674,387

UNITED STATES PATENT OFFICE

2,674,387

SIDE GRIP CARTON HANDLING MEANS FOR LIFT TRUCKS

Leslie G. Ehmann, Portland, Oreg., assignor to Hyster Company, Portland, Oreg., a corporation of Oregon

Application August 10, 1950, Serial No. 178,741

2 Claims. (Cl. 214—653)

1

This invention relates to a new and improved form of side grip arms and cooperating means for use with a truck for lifting and carrying cartons or similar articles, and it has for its object the provision of an improved construction by which two oppositely disposed arms, by pressure on opposite sides of a carton or a pile of cartons, are adapted to exert a strong grip on the cartons for enabling the arms to lift and carry or otherwise manipulate the cartons and their contents to the extent required in a manufacturing plant or warehouse, or the like.

By the use of my improved mechanism, I am able very advantageously to handle stacked cartons or other articles without the necessity of having such cartons on pallets or skids for enabling them to be picked up. I have thus avoided completely a very substantial factor of expense and labor involved in the provision, handling and storage of a large number of such pallets. Furthermore, I have contemplated that the materials being handled can be stacked to much better advantage and much more compactly without having the pallets interposed between portions of the stacked materials. By the use of my improvements, the size and arrangement of the load picked up can be controlled and varied from time to time to correspond closely with the space into which the load is to be fitted. By my invention also, I have been enabled to manipulate the picked up load in many instances to much better advantage, as by inverting the pile of cartons, for example, which of course could not be done ordinarily in the use of a pallet and a load of cartons or other articles placed loosely in position thereon.

It has been one of the objects of my invention to provide an improved pressure arm and associated parts having a certain degree of flexibility by which pressure can be applied evenly and effectively on the face of a pile of cartons regardless of slight irregularities in the shape of the pile due to irregular stacking of the cartons or to slight variations in the sizes of the several cartons, and to provide a structure by which the pressure shall be applied effectively over a substantial area for enabling the arms to pick up a large number of comparatively small cartons, with a substantial frictional grip on the faces of the cartons at the outside of the pile so as to hold the pile securely without danger of slipping.

For attaining the desired degree of flexibility in the action of the arm structure, I have provided two pressure plates pivotally mounted on vertical axes on an equalizer member which in

2

turn is pivotally mounted on a vertical axis on the arm. Suitably yielding means is provided in connection with the pressure plates for cushioning them with respect to the equalizer, and other yielding means is provided in connection with the equalizer for cushioning it with respect to the arms.

In the preferred form of my invention, provision is made for using two oppositely disposed arms embodying flexibly supported gripping parts at opposite sides of a pile of cartons; or alternatively, for using at one side of the pile one of said arms having a flexibly supported gripping part and at the other side of the pile a rigid arm or plate. By the use of such alternative arrangement, comprising a rigid pressure plate at one side, I am able to select and grip cartons from much more closely spaced stacks and place them in more closely spaced stacks, since such rigid stationary arm can be made quite thin, while still maintaining the required strength of construction.

Other objects and advantages of this invention will be apparent also from the following description of an exemplary embodiment of my invention disclosed for illustrative purposes by reference to the accompanying two sheets of drawings, in which

Fig. 1 is a perspective view of a lift truck equipped with one preferred form of my invention;

Fig. 2 is a top plan view of a modified form of load handling arms, with a plurality of cartons shown by dotted lines in position between the arms;

Fig. 3 is a face view of a modified construction of flexible arm structure;

Fig. 4 is an outer face view of one of the pressure plates as shown in Fig. 1;

Fig. 5 is a vertical sectional view taken substantially at the line 5—5 of Fig. 4;

Fig. 6 is an outer face view of the equalizer of the Fig. 1 construction;

Fig. 7 is a horizontal sectional view taken substantially at the line 7—7 of Fig. 6;

Fig. 8 is a top plan view of the arm as shown in Fig. 1; and

Fig. 9 is a horizontal sectional view through the arm as shown in said Fig. 1 or Fig. 3, being taken substantially at the line 9—9 of Fig. 3.

In the drawings, 15 indicates a lift truck of the type shown and described in my prior application Serial Number 32,429, filed June 11, 1948, having a body 16 adapted to serve as a counterbalance for the weight of a load to be picked up,

and having its front end supported by carrying wheels 17. A driver in a seat 18 is able to steer the truck by the use of the usual steering wheel 19, the rear end portion of the truck being supported preferably by a single caster wheel (not shown) so as to enable the maneuvering of the truck to advantage for handling materials to be transported and stacked.

The truck 15, as shown by my drawings, is provided with head members 20 at opposite sides movable transversely of the truck on supporting rods 21 slidably mounted in tubular guides 22 carried by frame plates 23 forming parts of a load carriage as described by my said earlier application Serial No. 32,429. The load carriage and the head members 20 are also movable vertically with respect to the vertical beams 24 of a frame which, in turn, is movable vertically relative to a frame comprising vertically positioned beams 25 carried by the body of the truck.

On the head members 20 at opposite sides of the truck, as shown in Fig. 1, arms 26 are fixedly mounted, the arm at each side being made from sheet metal in the form of a channel bar (see Fig. 9) comprising a web portion 27 and flanges 28, and having a mounting plate portion 29 at the end strongly connected with the web and the flanges to provide a rigid connection of the arm with the head 20 by fastening means, such as machine screws 30. Each of the arms 26 is provided on its inner face with two bearing face members in the form of pressure plates 31 arranged side-by-side in substantially vertical position, in slightly spaced relationship to each other. Each of the plates 31 is pivotally mounted on an axis parallel to the surface, so as to be adapted to swing with respect to the arm 26 independently of the other plate. Said plates 31 are also movable alternatively toward the arm 26, being mounted in position by means of an elongated pressure member in the form of an equalizer in such arrangement that when one of said plates moves toward the arm the other plate is moved in the direction away from the arm.

As is shown in Figs. 4 to 9, each of the equalizer members is in the form of a heavy metal sheet 32 having its end portions angled with respect to each other and reinforced and strengthened in such angled arrangement by flanges 33 and 34 at the top and bottom edges respectively of such sheet 32, the equalizer being thus in the form of a channel and being pivotally mounted on the arm 26 by a heavy headed pivot pin 35 passing through the flanges 28, 33 and 34 so as to permit the equalizer to swing freely with respect to the arm. For cushioning the swinging movement of the equalizer on the arm, the equalizer is provided with resilient blocks 36 and 37 of rubber or like material on its face at opposite sides of the pivot pin 35, being of such thickness as to permit the equalizer to move freely through limited swinging movements without coming into contact with the web plate 27 of the arm, but so as to give the desired cushioning effect when the angle of swinging movement is increased.

The pressure plates 31 are mounted on the equalizer 32 through rib members 38 and 39 secured by welding on the back faces of said pressure plates. Each of the rib members 38 is provided with an opening 40 therethrough adapted to fit on a pin 41 extending upwardly from the flange 33 of the equalizer 32, the rib members 39 being provided with correspondingly positioned openings 42, with bolts 43 secured through said openings 42 and openings 44 in the end portions

of the flange 34. Rubber cushioning blocks 45 are mounted on the rear faces of the pressure plates 31 in position to engage the face of the equalizer so as to limit the swinging movements of the plates with respect to the equalizer and the arm 26.

The action of the cushioning blocks 36, 37 and 45 as stops for limiting the swinging movements of the equalizer members on the arms and the swinging movements of the pressure plates on the equalizer members serves to keep the equalizers and the pressure plates normally in position for the application of pressure on the face of a carton or a pile of cartons. Also by reason of the arrangement of stop means as shown, either one of the pressure plates on one of the arms is adapted to be used independently of the other plate on said arm for pressing a carton against the arm at the opposite side. This enables a truck to handle a load of comparatively small size with such load positioned closely adjacent to the face of the load carriage on the truck.

The construction as shown in Fig. 3 is similar to that shown in Fig. 1 except for the changed position of the mounting ribs 38 and 39, such ribs being at a lower level with respect to the plates 31 in the arrangement shown in Fig. 3. By the use of the construction as shown in Fig. 3, pressure can be applied to very great advantage on the sides of a carton or a pile of cartons at points very close to the bottom of a carton or stack.

In the construction as illustrated in Fig. 2, a pressure arm 26, as above described, is used at one side, with a very thin arm structure at the other side. In this ensemble, a pressure plate 46 is supported in a normally vertical position by an arm 47 secured fixedly on one of the head members 20 by machine screws 48 extending through a mounting plate portion 49 positioned at right angles to the arm. By the use of this arrangement, a load comprising a plurality of cartons 50, as shown by dotted lines in said Fig. 2, can be stacked by the truck in very close relationship to the previously positioned cartons of a pile, the arm 47 and pressure plate 46 being so thin as to take very little room between the adjacent portions of the pile.

I have found that in the use of this arrangement, as shown in Fig. 2, with the rigid arm 47 at one side and the more flexible arrangement comprising the equalizer member 33 and the movable pressure plates 31 at the opposite side, the adaptability of the arms for picking up loads of irregular size and shape is such as to make the arrangement effective for meeting all of the requirements in most situations involving the transportation and stacking of cartons or the like.

By the use of my invention, I am enabled without the use of pallets or skids to pick up satisfactorily and safely a box or carton, or a stack of such boxes or cartons, and to stack them to advantage without any likelihood of dropping a box or of tipping it unintentionally so as to lose any of the contents from the box. This ability to handle a suitable pile of cartons or the like is very largely independent of the size of the units handled, the principal essential being that the pile, and particularly the bottom portion of the pile, shall be such as to permit the pivoted plate members 31 to apply pressure at the necessary critical points for enabling the arms to grip and pick up the pile, even though the pile may be of irregular shape and may be made up of boxes of widely different sizes and shapes. I have found that my improved construction is highly effective

for this purpose by virtue of its novel construction and arrangement as described.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of my 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 carton handling structure for applying pressure on the side face of a carton or stacked cartons or the like, the combination of an arm of channel shape, means for mounting said arm in substantially horizontal position on a truck, an equalizer member also in the form of a channel swingingly mounted on said arm, said channels being positioned with their flanges in overlapping relationship with respect to each other, resilient blocks interposed in one of said channels and extending into the other of the channels at opposite sides of the axis about which the equalizer member swings with respect to said arm for cushioning swinging movements of the equalizer member with respect to the arm, pressure plates swingingly mounted on opposite end portions of said equalizer member, and resilient blocks interposed between said equalizer member and said pressure plates for cushioning swinging movements of said pressure plates with respect to said equalizer member.

2. A carton handling structure as specified in claim 1, in which said first-named resilient blocks are mounted on said equalizer member on opposite end portions thereof and said second named resilient blocks are mounted on said pressure plates adjacent to the axes about which said pressure plates are adapted to swing, and in which said resilient blocks by cooperative action serve normally to hold the pressure plates in position with their pressure faces substantially parallel to the position of said arm.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,018,260	Myrholm	Feb. 20, 1912
1,221,765	Penfield	Apr. 3, 1917
1,519,736	Lewis	Dec. 16, 1924
1,862,299	Ciccone	June 7, 1932
2,323,810	Fontaine	July 6, 1943
2,475,367	Avery	July 5, 1949
2,530,375	Cartwright	Nov. 21, 1950
2,536,151	Backofen et al.	Jan. 2, 1951
2,554,433	Warren	May 22, 1951
2,574,857	Ball	Nov. 13, 1951
2,604,220	Frischmann	July 22, 1952

FOREIGN PATENTS

Number	Country	Date
702,625	France	Jan. 26, 1931