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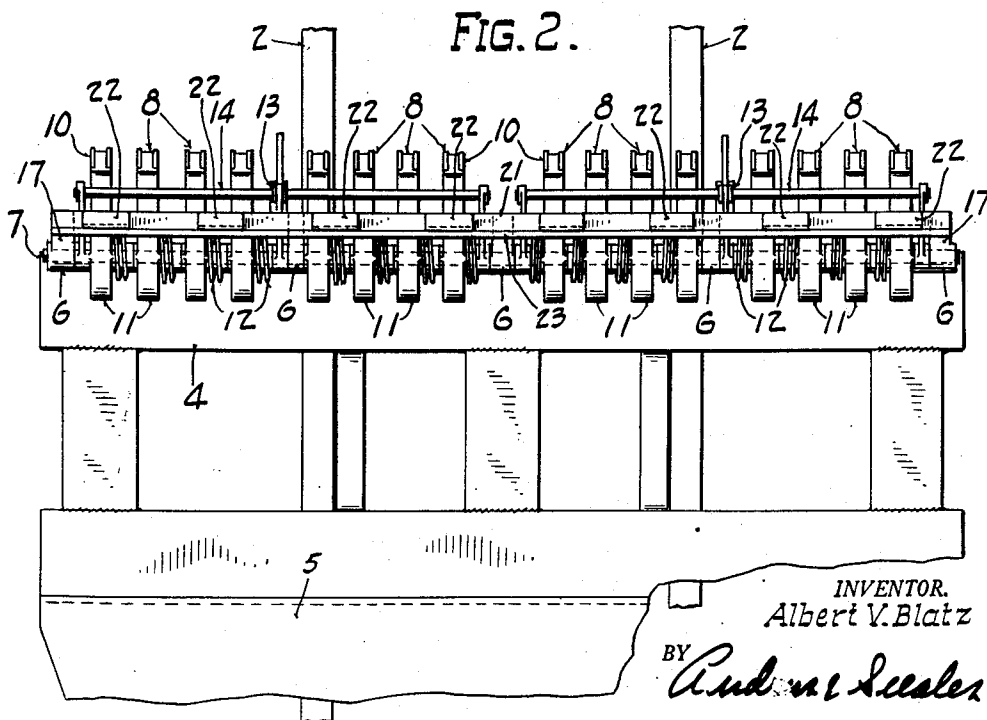
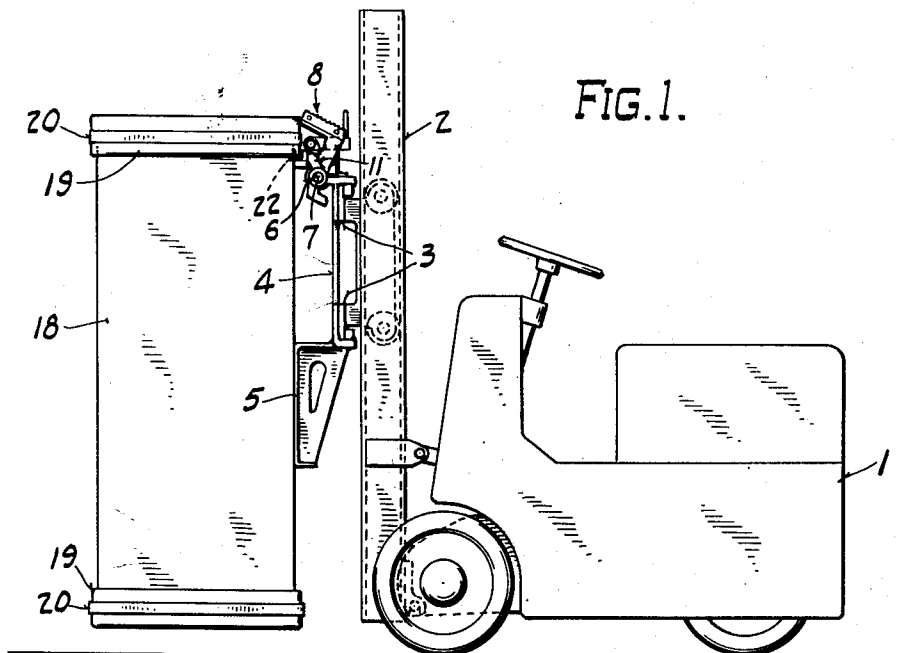
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CARTON AND CRATE LIFTING ATTACHMENT

Filed Aug. 7, 1950

2 Sheets-Sheet 1



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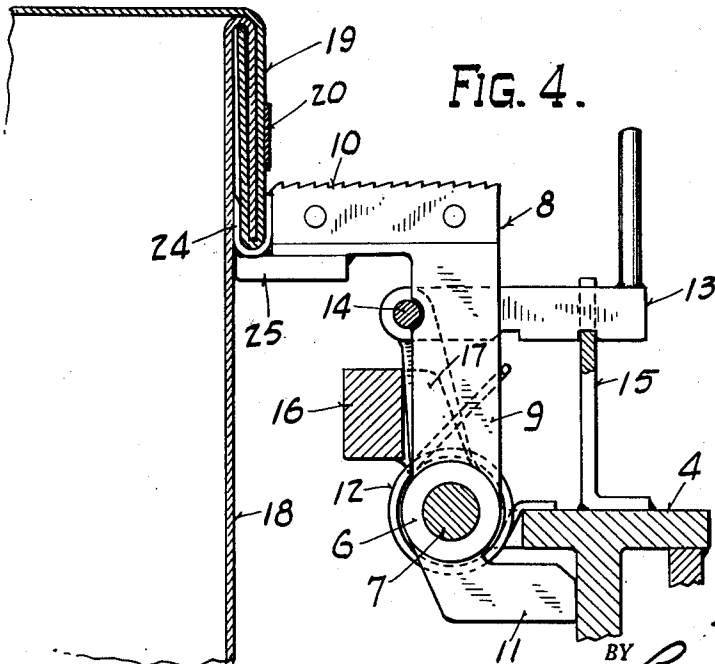
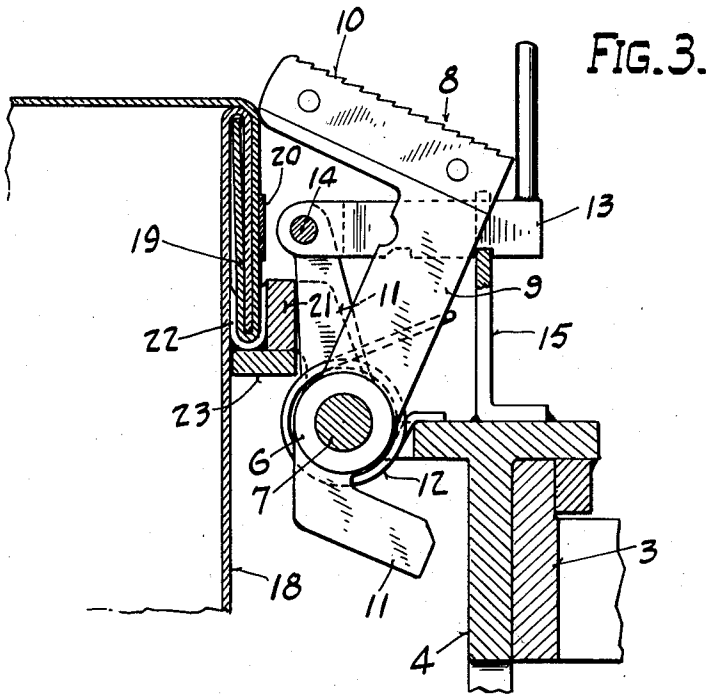
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CARTON AND CRATE LIFTING ATTACHMENT

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2 Sheets-Sheet 2



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CARTON AND CRATE LIFTING ATTACHMENT

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9 Claims. (Cl. 214-653)

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This invention relates to a lift truck attachment, and particularly to an attachment for use in place of the usual forks and pallets in the transportation of cartons, crates, and the like.

An object of the invention is to provide a device for lifting various types and sizes of cardboard containers, for example the drum variety frequently used in the shipping of new hot water heaters.

Another object is to provide a lifting attachment which may be used interchangeably to move either cartons or crates, with no adjustment by the lift truck operator being necessary.

A further object is to provide a lift truck attachment operable to carry cartons and crates at the same time and in either stacked or side by side relation.

Another object of the invention is to provide a lifting attachment which eliminates the need of forks and pallets and which is operable to lift containers in their natural condition, without the necessity of altering the shape of the containers or of attaching straps or lugs thereto.

The attachment, in general, comprises a frame carried by a lift truck elevator and upon which is mounted a row of spring biased forwardly projecting retractable fingers and a row of upwardly projecting hook members vertically spaced from the fingers and disposed rearwardly thereof. In transporting objects with interspaces, such as crates, the fingers are inserted beneath a horizontal crate cleat and lifting achieved by elevation of the attachment, with the forward faces of the hooks serving as buffer members to determine the degree of finger insertion. Solid objects, for example drum type cardboard cartons, are likewise handled by first urging of the attachment against the carton wall and then elevating the same, so that the fingers are retracted by engagement with the wall and the hooks are slid upwardly beneath the interlocking joint of the carton in carrying engagement therewith. In another embodiment of the invention, a hook is attached to the end of each finger and lifting contact attained by either finger insertion or hook insertion, depending upon the nature of the object being transported.

Other objects and advantages of the invention will be set forth more fully in the following description of embodiments of the invention illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the attachment as employed in lifting a drum type cardboard carton;

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Fig. 2 is a fragmentary front elevation of the lifting attachment, illustrating the spacing of the fingers and hooks;

Fig. 3 is a cross-sectional view showing the hooks as inserted beneath the interlocking joint of a drum carton; and

Fig. 4 is a view, corresponding to Fig. 3, but showing an embodiment of the invention wherein the forward end of each finger is provided with a carton lifting hook.

The attachment is illustrated in the drawings as adapted for use on a suitable industrial lift truck 1 having an elevator mast 2 which may be tilted rearwardly from the vertical in order to decrease the load strain on the elevator mechanism and to minimize the possibility of the jarring loose of objects being handled. The elevator 2 is provided with a pair of vertically spaced horizontal slide bars 3 upon which is mounted, in interlocking relation, the generally rectangular frame 4 of the attachment now to be described.

Frame 4 is provided at its lower edge with a depending apron 5, which serves to prevent the object being handled from pivoting during lifting as well as to partially carry the load when the elevator mast 2 is tilted backwardly, and at its upper forward edge with a series of bearing lugs 6 having a horizontal shaft 7 mounted therein for the purpose of providing pivotal support for a plurality of spaced fingers 8.

As best shown in Fig. 3, the fingers 8 are right angular in shape, having an upwardly extending portion 9 journaled on shaft 7 and a forwardly projecting portion 10 adapted to be inserted into crates and the like to lift the same. In order to prevent the fingers from rotating forwardly under the weight of the load being lifted, a limit block 11 is welded to the underside of the hub portion of each finger and shaped to engage the frame 4 when the fingers are in the desired angular position.

Backward rotation of the fingers 8, which occurs when the fingers are urged against a carton wall or a solid portion of a crate, is opposed by a plurality of biasing springs 12 coiled around the finger hub portions. In addition to this individual finger retraction, groups of fingers may be retracted manually through the use of notched latch members 13 which are journaled on rods 14 mounted transversely of the forward faces of finger portions 9. To retract a particular group of fingers, the operator pulls the related latch backwardly and hooks it over a corresponding bifurcated bar 15 welded to the upper surface of frame 4, with the number of fingers retracted

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depending upon the length of the rod 14 with which the latch is associated.

For a more complete description of the attachment as adapted for use in handling crates and other objects with interspaces, reference is made 5 to my copending application Serial No. 131,163 for a Crate Lifting Attachment, filed December 5, 1949, and assigned to the assignee of the present invention. The device described in the application referred to embodies, in addition to the above mentioned elements, a buffer or bumper bar spaced to prevent the fingers from being inserted too deeply into the crate and possibly injuring the contents thereof. This bar, which is the same as the bar 16 of the embodiment of the invention illustrated in Fig. 4 hereof, is positioned transversely of finger portions 9 beneath rods 14 and is welded to a number of ears 17 formed integral with the upper surfaces of bearing lugs 6.

Although the referred to crate lifting attachment has proved to be very satisfactory in the handling of crates and the like, the increasing use of cardboard containers has made it desirable to provide a device capable of transporting, without forks or pallets, certain types of cartons such as the rectangular drum carton 18 illustrated in the drawings. Referring to Fig. 3, the walls of the carton 18 are assembled with the end covers thereof by means of an interlocking joint 19. The joint 19 is made exteriorly of the carton walls and is reinforced by a steel strap 20, so that strong overhanging portions are provided beneath which lifting hooks may be inserted.

According to the invention, the attachment is adapted for lifting either crates or various types of cardboard containers by replacing the bumper bar 16 with a hook bar 21 (Figs. 1-3) having a plurality of spaced U-shaped lifting hooks 22 welded to the forward face thereof. The hooks 22 open upwardly and may be reinforced by a bar 23 disposed longitudinally to the bar 21 and welded to the lower surface thereof and to the curved under portions of the hooks. In order to provide for ready insertion of the hooks beneath the carton joint 19, the forward edges of hooks 22 are tapered upwardly and outwardly, as shown in Fig. 3, to a relatively sharp edge.

To lift the carton 18, the attachment is urged against a carton wall and is elevated until the hooks 22 are slid beneath joint 19 in lifting engagement with either the lower or upper edge thereof, depending upon the relative heights of the hook and the joint. The elevator mast 2 is then tilted back, so that some of the load is borne by the apron 5, and the carton is moved to the desired spot and deposited by reversal of the procedure.

The described carton carrying operation is not interfered with by the fingers 8 since they either retract automatically upon engaging the carton wall or, where desired, they may be retracted manually by means of the latch members 13 previously described. Conversely, the hooks 22 in no way prevent the use of the attachment in transporting crates. This is because the forward faces of the hooks 22 are disposed, by lessening the thickness of bar 21 or altering the angularity of ears 17, to serve in place of the bumper bar 16 in limiting the amount of finger insertion.

Although the embodiment of the invention illustrated in the drawings is constructed with U-shaped hooks, any upwardly and vertically projecting tapered members may be used, it only being necessary that there be proper bearing sur-

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face with the joint 19 and freedom from interference with the operation of fingers 8. The length of the hooks, longitudinally of bar 21, should be substantial in order to provide relatively large bearing surface with the cardboard joint. It is desirable, however, that there be sufficient space between the hooks to prevent them from cutting the corners of the cartons being handled, especially where a plurality of cartons are to be carried side by side. If it is only desired to carry a single carton, a single vertically projecting member may be employed so long as bar 21 is of sufficient length to cause the carton to be carried in a stable manner and without tearing or being punctured.

Referring to Fig. 4, there is illustrated an embodiment of the invention which is identical to the crate lifting attachment described in the referred to co-pending application except that a U-shaped hook 24 is welded at the end of each finger portion 10. The hooks 24 are preferably the same width as the portions 10 but are made slightly less in height, so as to prevent interferences with the crate lifting function of the attachment.

As in the case of the first embodiment of the invention the hooks are slanted or tapered at their upper forward edges and are strengthened by bars 25 welded to the under surfaces of finger portions 10 and to the curved lower hook portions. The amount of insertion into a crate or the like may be made the same as under other embodiments by merely shortening the finger portion 10 a distance corresponding to the thickness of the hooks.

In operation, the crate lifting function of the attachment is the same as previously, the hooks 24 being totally inoperative when the fingers are inserted into the crate and also when the fingers are rocked backwardly by engagement with a crate slat or cleat. To lift a carton such as the drum carton 18, the hooks 24 are slid up the carton wall and thus inserted beneath the joint 19 as in the case of hooks 22 of the first embodiment. The elevator mast 2 is then tilted back as before, and the carton moved to the desired location.

The apparatus described in connection with both embodiments of the invention constitutes extremely simple and flexible means of transporting either cartons or crates, or both cartons and crates simultaneously, without the necessity of employing expensive and space consuming forks and pallets. The resulting decrease in container handling cost, together with the labor saving caused by the fact that no straps need be placed around the load and no lugs attached thereto, has materially decreased the cost of shipping and storing manufactured articles.

Various embodiments of the invention may be employed within the scope of the accompanying claims.

I claim:

1. In an attachment for lifting both crates and containers with overhanging joining and reinforcing portions, a support frame carried by elevator mechanism, a horizontal row of forwardly projecting substantially horizontally extending retractable fingers mounted on said frame for insertion into the interspaces of a crate, said fingers being individually biased to a forward position, and an upwardly projecting member mounted on said frame and shaped for insertion beneath an overhanging joining and reinforcing portion of a solid container, said up-

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wardly projecting member being insertable beneath said overhanging joining and reinforcing portion upon retraction of said fingers due to engagement thereof with said solid container.

2. A container lifting attachment for use with an industrial lift truck, which comprises a supporting frame carried by the elevator of the lift truck, a horizontal row of forwardly projecting fingers retractably mounted on said frame for insertion into the interspaces of a container, means biasing said fingers forwardly but permitting retraction of fingers which are prevented by engagement with the container from being so inserted, and a horizontal row of upwardly projecting members mounted on said frame and shaped for insertion beneath a raised portion of a container, said upwardly projecting members being vertically spaced from said fingers and disposed to the rear of the forward ends thereof to limit the amount of finger insertion and to perform their container lifting function upon retraction of said fingers and elevation of said attachment.

3. In a device of the class described, a supporting frame carried by the elevator of a lift truck, a row of forwardly projecting fingers retractably mounted on said frame for insertion into the interspaces of a crate, a horizontal row of upwardly projecting members mounted on said frame and shaped with relatively sharp upper edges for insertion beneath an overhanging joint of a carton, said upwardly projecting members being vertically spaced from said fingers and disposed to the rear of the forward ends thereof, means to retract said fingers to prevent the same from interfering with the carton lifting function of said attachment, and an apron located beneath said members to bear against the object being handled and prevent the same from pivoting during the transportation thereof.

4. An attachment for lifting both crates and containers with overhanging joining and reinforcing portions, which comprises a support adapted to be carried by the elevator of a lift truck, a horizontal row of forwardly projecting fingers retractably mounted on said support for insertion into the interspaces of a crate, a plurality of hook members mounted on the forward ends of said fingers and having upwardly extending portions axially spaced from said finger ends, said hook members being provided with relatively sharp upper edges for ready insertion beneath a joining and reinforcing portion of a container upon elevation of the attachment to lift the container, and an apron member mounted a substantial distance beneath said fingers to bear against the object being handled and prevent the same from pivoting during the transportation thereof.

5. An attachment adapted to be employed with the elevator of an industrial truck, comprising a frame carried by said elevator, hook means arranged at the forward portion of said frame, said hook means having a generally horizontal portion shaped to be engaged by the lower edge of the overhanging joint of a rectangular drum carton and a relatively thin vertically extending portion adapted for upward insertion between said joint and the corresponding wall of said carton, and apron means mounted a substantial distance beneath said hook means to engage said carton and prevent the same from pivoting during the lifting thereof, both said hook means and said apron means having sufficient bearing surface to prevent the attachment from tearing or

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puncturing said carton upon coming into lifting engagement therewith.

6. A lift truck attachment for handling both crates and solid containers having overhanging joining and reinforcing portions, which comprises a frame adapted to be carried by the elevator of a lift truck, a relatively short finger mounted on said frame and projecting forwardly therefrom for insertion into an interspace of a crate, an upwardly extending member mounted on said frame and having a thin upper edge portion for ready insertion into an overhanging joining and reinforcing portion of a solid container, said finger and upwardly extending member being relatively retractable to prevent each from interfering with the operation of the other, and an apron mounted on said frame beneath said finger and upwardly extending member to bear against the object being handled and prevent the same from pivoting forwardly during the lifting thereof.

7. A lift truck attachment for handling both crates and rectangular drum cartons having overhanging joints, which comprises a frame adapted to be carried by the elevator of a lift truck, a vertically disposed upwardly extending member mounted on said frame and having a tapered horizontal upper edge for ready insertion beneath the overhanging joint of a drum carton to carry the carton in a generally vertical position upon elevation of the attachment, a horizontal row of fingers mounted on said frame and projecting forwardly therefrom for insertion into the interspaces of a crate, said fingers being manually movable to a retracted position to prevent interference with the operation of said upwardly extending member, and an apron plate mounted beneath said fingers and upwardly extending member to bear flatwise against the object being handled and prevent the same from pivoting during the lifting thereof.

8. A lift truck attachment for handling both crates and rectangular drum cartons having overhanging joining and reinforcing portions, which comprises a frame adapted to be carried by the elevator of a lift truck, a vertically disposed upwardly extending member mounted on said frame and having a relatively thin upper edge for ready insertion between an overhanging joint portion of a drum carton and the corresponding wall thereof, a horizontal row of fingers pivotally mounted on said frame and normally projecting forwardly therefrom for insertion into the interspaces of a crate, said fingers being manually pivotable to a retracted position to prevent the same from interfering with the carton lifting function of said upwardly extending member, means mounted on said fingers to prevent said crate from falling therefrom during the handling thereof, and apron means mounted beneath said fingers and upwardly extending member to bear flatwise against the object being handled and prevent the same from pivoting during the lifting thereof.

9. In an attachment for an elevator mechanism for lifting both crates and solid containers with overhanging joining and reinforcing portions, a frame adapted to be carried by said elevator mechanism, a plurality of forwardly and upwardly projecting finger-like means mounted on said frame for insertion into the interspaces of a crate, and a second means mounted on said frame and of a generally U-shape to adapt the same to project forwardly and vertically of the frame for insertion beneath an overhanging

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joining and reinforcing portion of a solid container, said latter means being mounted with relation to said finger-like means to prevent interference with the crate lifting function of said finger-like means.

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