Nov. 24, 1953 A. V. BLATZ 2,660,327

CRATE LIFTING ATTACHMENT

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FIG. 1.

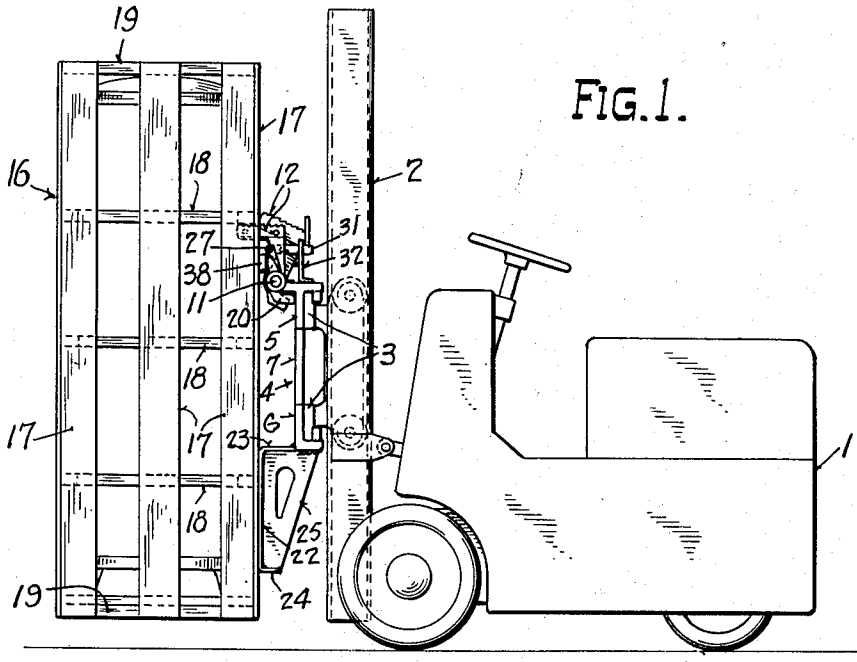
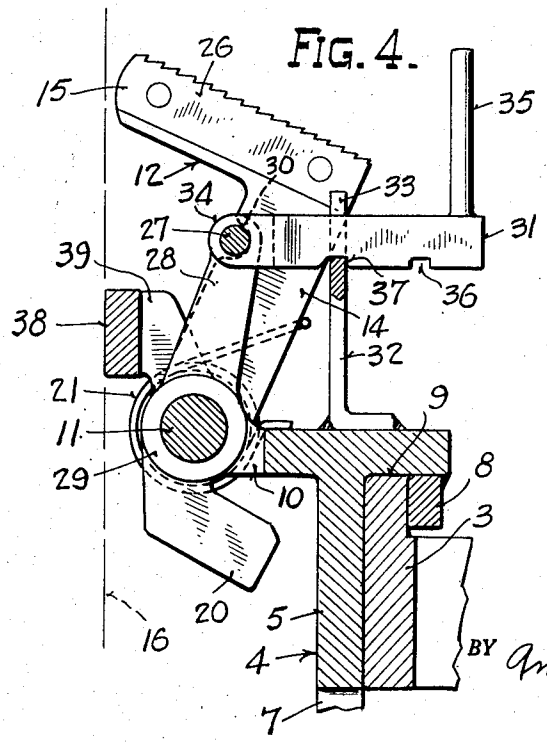


FIG. 4.



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FIG. 2.

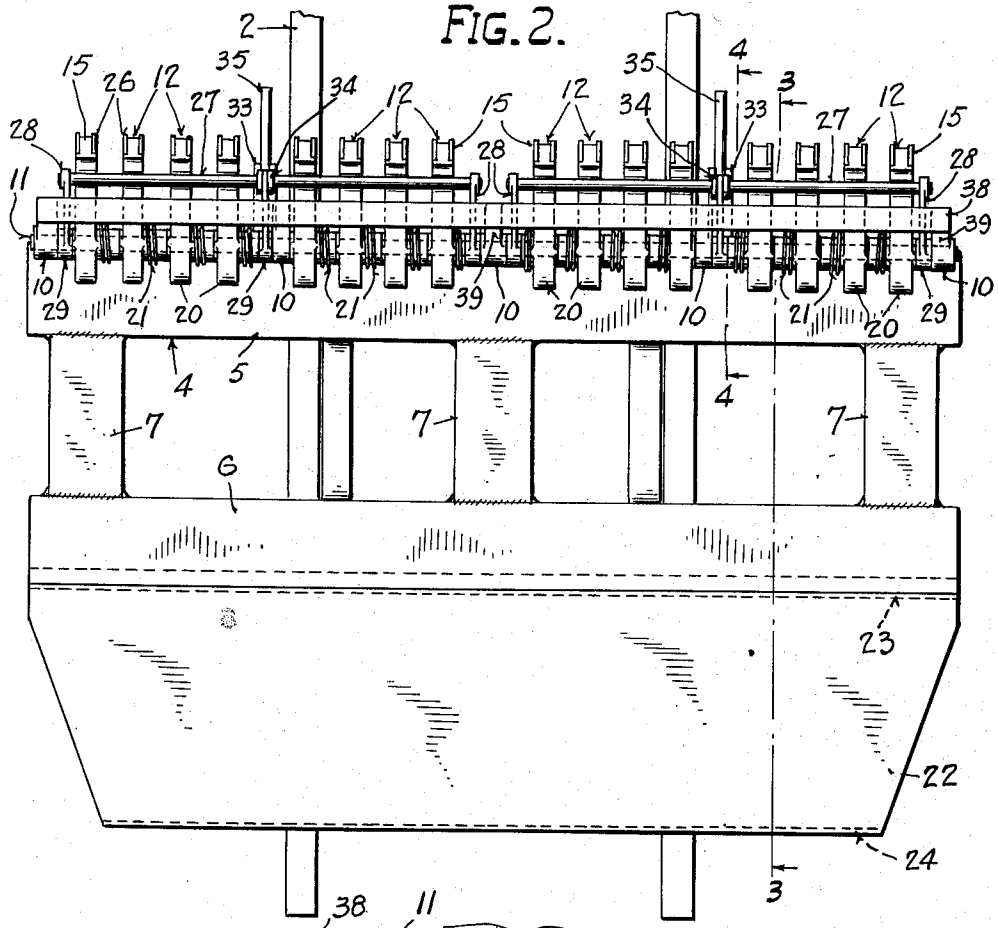
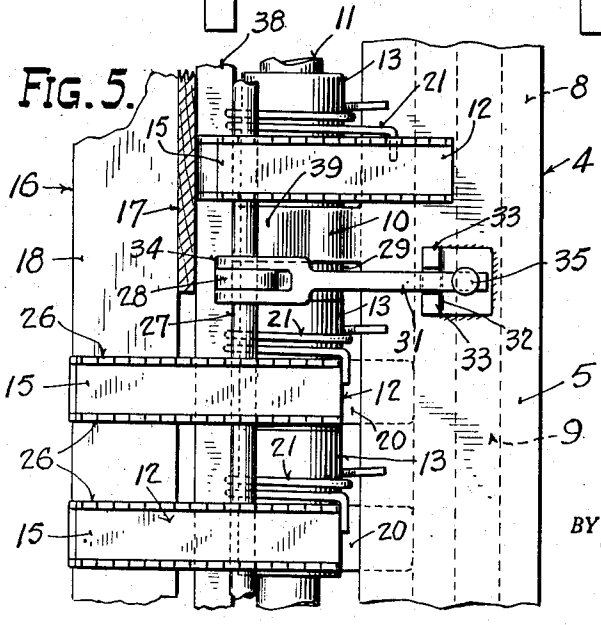


FIG. 5.



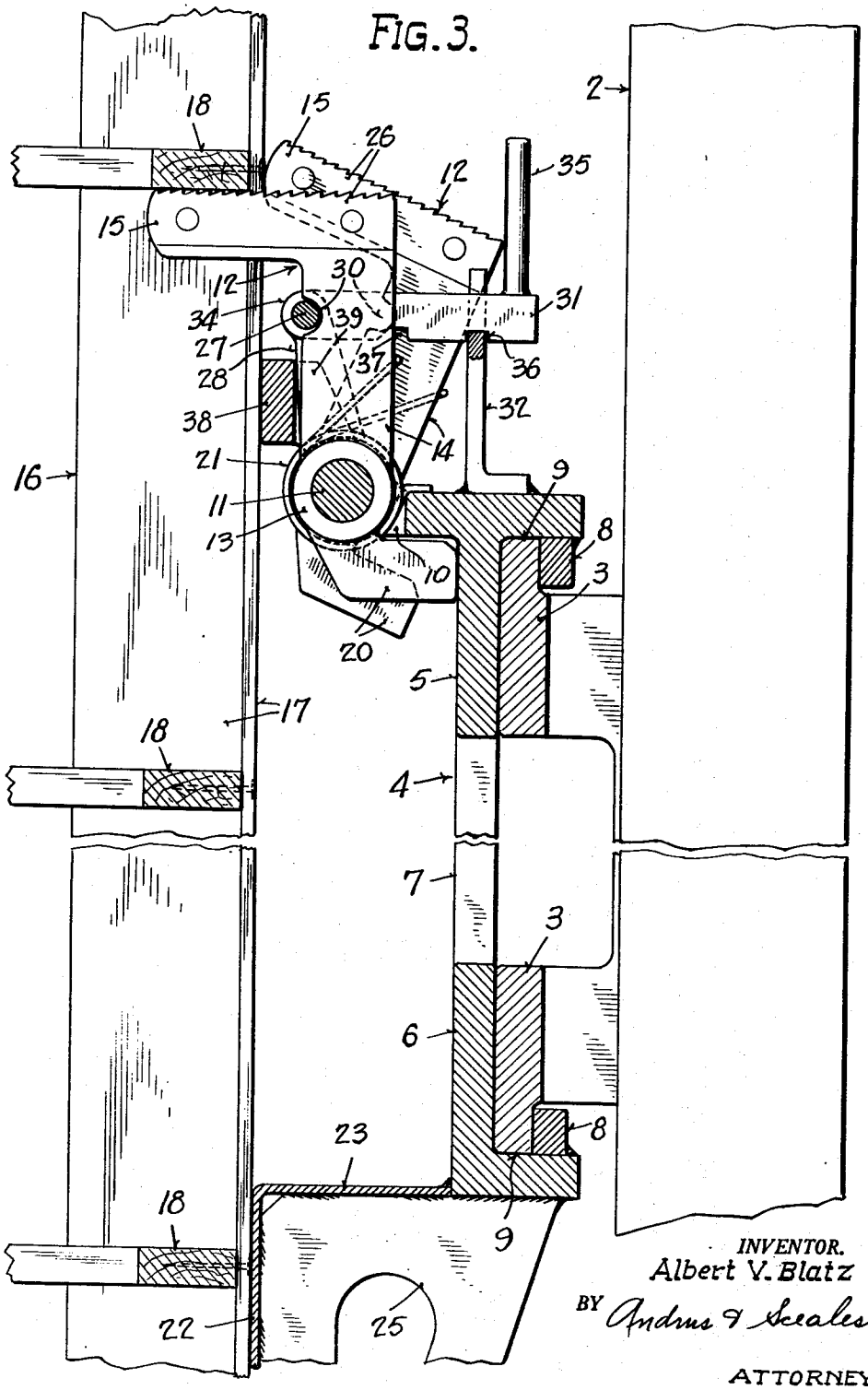
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FIG. 3.



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CRATE LIFTING ATTACHMENT

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Application December 5, 1949, Serial No. 131,163

11 Claims. (Cl. 214—651)

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This invention relates to an attachment for lifting crates or the like.

An object of the invention is to provide a lift truck attachment which may be used in place of the usual forks and pallets for the transportation of crates.

Another object of the invention is to provide a lift truck attachment the use of which eliminates the expense and wasted storage space resulting from the purchase and storage of pallets.

Another object is to provide a crate lifting attachment constructed so that some of the lifting members available in the attachment may be made inoperable when conditions make it undesirable to use all of them.

Another object of the invention is to provide a lift truck attachment the use of which increases the maneuverability of a truck in confined areas as in freight cars.

Another object of the invention is to provide a crate lifting attachment having lifting members each of which is automatically tiltable to an inoperative position so that substantially any number of members may be in use or idle interchangeably, depending on the object being handled.

Another object of the invention is to provide a lift truck attachment which will lift various sizes of crates regardless of the spacing of the crate slats or cleats.

Another object of the invention is to provide an attachment for lift trucks which is operable to stack a large number of crates in a relatively small space and with a substantial decrease in time over former constructions.

The attachment, in general, comprises a row of retractable fingers disposed on a frame which is carried by the elevator of an ordinary industrial lift truck. The attachment is designed so that when it is urged against a crate certain of the fingers will be inserted under one of the horizontal crate cleats. Elevation of the attachment causes these fingers to bear against the cleat and thus lift the crate. Means are provided for permitting retraction of individual fingers which are prevented from being so inserted, for retracting groups of fingers to render the same inoperative, and for preventing the crate from tilting as it is lifted.

Other objects and advantages of the invention will be apparent from the following description of an embodiment of the invention as illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the attachment as employed with an ordinary lift truck;

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Fig. 2 is a front elevation of the attachment and a portion of the elevator of the lift truck;

Fig. 3 is a section taken along line 3—3 of Fig. 2;

Fig. 4 is a section taken along line 4—4 of Fig. 2, and showing the fingers in their retracted position; and

Fig. 5 is a top plan view of the retracting latch and several of the fingers.

The invention is herein illustrated as adapted for use with a suitable lift truck 1 having an elevator 2 which may be tilted from the vertical for approximately 5 degrees away from the truck and 15 degrees toward the truck. The elevator 2 is normally constructed to carry a pair of horizontal slide bars 3 on which various forks, rams, etc., may be interchangeably mounted, the selection of the attachment being governed by the type and size of the load to be transported.

The freight lifting attachment comprises a frame 4 of generally rectangular shape formed at its upper side with a T section bar 5 and at its lower side with an L section bar 6, the said bars being joined by a plurality of spaced vertical braces 7. The back of frame 4 has flanges 8 welded to the inner horizontal surfaces of the respective bars 5 and 6, the flanges 8 being spaced from the vertical body portions of bars 5 and 6 to form upper and lower grooves 9 permitting sliding of the frame 4 over slide bars of various truck elevator assemblies such as the bars 3 shown in the drawings.

The T bar 5 supports a series of bearing lugs 10 which are welded to the front edge thereof and in which a shaft 11 is journaled. The shaft 11 has rotatably mounted transversely thereof a plurality of spaced angularly shaped fingers 12 each of which is formed of a hub 13 journaled on shaft 11, an upwardly projecting body portion 14 integral with the upper part of the hub 13, and a portion 15 integral with the upper end of body portion 14 and projecting forwardly therefrom at substantially right angles thereto for ready insertion into an object to be transported, such as crate 16.

Crate 16 comprises a number of vertical slats 17 held together by horizontal cleats 18 and end covers 19. The spaces between the various slats 17 and cleats 18 are normally made sufficiently large to permit the insertion of some of the fingers 12, which may then be elevated to contact one of the cleats 18 and thus lift the crate 16.

Forward rotation of fingers 12 under the weight of crate 16 is prevented by limit blocks 20 which are integral with the undersides of hubs 13,

Blocks 20 project rearwardly from hubs 13 so that they will engage the vertical front face of T bar 5 when the forwardly projecting portions 15 of fingers 12 are in a horizontal position.

Backward rotation of fingers 12 is opposed by a plurality of biasing springs 21 which are coiled around laterally extending portions of hubs 13, the hubs 13 being made considerably wider than the body portions 14 of fingers 12 or limit blocks 20 for the purpose of spacing fingers 12 along shaft 11. The ends of each spring 21 are bent so that one end engages the back of body portion 14 of finger 12 and the other end engages the top surface of T bar 5. When a particular finger 12 is forced against an obstruction, for example one of the slats 17, it is rocked backwardly against the pressure of its biasing spring 21. Whether a finger is inserted to operative position under one of the cleats 18 or is rocked backwardly to inoperative position by engagement with a slat 17 depends on both the spacing of the slats 17 and the portion of the crate 16 against which the attachment is urged.

It is desirable in operating the crate lifting attachment that the elevator 2, and thus crate 16, be tilted towards truck 1 after the crate 16 has been lifted from its initial position. This serves to prevent the crate 16 from sliding off the fingers 12 and to cause some of the weight of the crate 16 to be distributed to a vertically disposed trapezoidal apron plate 22 located beneath frame 4 of the attachment. In addition to carrying some of the load after the elevator 2 has been tilted, the apron plate performs the essential function of preventing the crate from pivoting as it is lifted, regardless of whether the elevator is tilted or is left in a vertical position.

Apron plate 22 is provided at its upper edge with a wide flange 23, which is welded to the lower front portion of L bar 6, and at its lower edge with a narrow flange 24. Plate 22 is made rigid by a number of triangular brackets 25 which are welded to the under side of L bar 6 and to the inner surface of plate 22.

It is desirable that the fingers 12 be hooked, serrated on the upper surface, or otherwise provided with means to assure non-slipping contact between the fingers 12 and the cleat 18 under which they are inserted. For instance in the illustration, serrated blades 26 may be riveted to fingers 12 in such a way that the serrations protrude slightly above the top surfaces thereof.

In moving crates with the attachment it may be necessary to select one crate from a row of identical and abutting crates. Assuming that the crates are narrower than the attachment, it would be difficult to move the desired crate without moving an adjoining crate since the fingers would engage the cleats of both crates. Accordingly, means to separately retract various groups of fingers are provided.

These means may include rods 27 which are rotatably connected to shaft 11 by means of a plurality of spaced arms 28, each arm 28 being formed integral with one of a number of the hubs 29 which are journaled on shaft 11. The rods 27 are disposed in end to end relation transversely of fingers 12 in grooves 30 which are cut in the forward faces of body portion 14 of the fingers.

Each rod 27 is connected by means of a latch 31 to a bar 32 which projects upwardly from the top surface of T bar 5 and is bifurcated at its upper end to form arms 33. Latch 31 is provided at one end with a yoked hub 34 which fits

on both sides of an arm 28 along rod 27, and at the other end with an upwardly projecting hand grip member 35. The lower edge of latch 31 is provided with notches 36 and 37, one of which may engage the bifurcated bar 32 when latch 31 is positioned between arms 33.

When notch 36 of a particular latch 31 is in engagement with bar 32, as shown in Fig. 3, the corresponding fingers 12 are in their normal, or operative position. To make the group of fingers 12 inoperative the operator merely grasps the hand grip 35 and engages notch 37 with bar 32, as shown in Fig. 4, thereby causing the rod 27 to retract a group of the fingers 12 against the pressure of springs 21.

Although, the drawings show only two rods 27, and thus only two groups of fingers 12 which may be separately retracted as described above, more rods may be used together with their related latch members to effect a more selective retraction of fingers than is possible with only two rods.

In order to insure that the forwardly projecting portions 15 of fingers 12 will not be inserted too deeply into the crate 16, with likelihood of injury to the contents thereof, a bumper bar 38 is positioned transversely of fingers 12 so that it will contact the slats 17 when the proper amount of insertion has been achieved. Bar 38 may be secured to the attachment in any suitable way, for example, by welding it to a number of ears 39 which are integral with the upper surfaces of bearing lugs 10.

The operation of the crate lifting attachment is as follows: Assume that all of the fingers 12 are in the forwardly projected operative position resulting when notch 36 of latch 31 is in engagement with the bifurcated bar 32. The lift truck operator then maneuvers the truck 1 until the attachment is in forcing contact with one side of crate 16. This trapezoidal apron 22 and the bumper bar 38 will then be in engagement with the crate 16, as will the fingers 12 which are rocked backwardly to inoperative position upon contacting the slats 17. The rest of the fingers 12 will remain in operative position and will be disposed beneath one of the cleats 18 or an end cover 19, depending on the initial elevation of the attachment.

The operator then causes the elevator 2 to elevate the attachment until the operative fingers contact the underside of a cleat 18, or a cover 19, and thereby lift crate 16. As soon as the crate 16 has been lifted slightly above its initial position the operator tilts the elevator 2 towards the truck 1. The resulting angular position assumed by crate 16 causes part of the weight to be distributed to the apron plate 22 and relieves much of the strain on the operative fingers 12 and the cleat 18. The crate 16 is then moved to the desired place, where it is deposited and the truck 1 is backed away.

A standard side shift mechanism, for example, one of the hydraulic type, may be easily adapted for use with the crate lifter described in order to increase its operability in confined areas such as freight cars and narrow factory aisles.

The attachment possesses great flexibility in that many types and sizes of crates may be lifted and moved without the necessity of adjusting the fingers 12. Several narrow crates may be carried side by side at the same time, and wider creates may be carried in stacked relation. When necessary, groups of fingers 12 may be retracted by rods 27 and latch members 31 as previously described.

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

I claim:

1. In an attachment for crate lifting adapted to be employed with a lift truck having an elevator, a support carried by said elevator, a plurality of fingers pivotally mounted on said support and projecting forwardly therefrom for insertion into interstices in a crate to lift the crate upon elevation of the attachment by said elevator, and individual means normally urging said fingers to a forward position but permitting retraction of fingers which are prevented by contact with portions of the crate from being so inserted.

2. A crate lifting attachment for lift trucks which comprises a support, a substantial number of fingers mounted in groups on said support and projecting forwardly therefrom for insertion between component parts of a crate when said attachment is urged against the crate, individual means normally biasing said fingers forwardly but permitting retraction of individual fingers which are prevented by engagement with the crate from being so inserted, and means to separately retract at least one group of fingers to render the same inoperative in the lifting of a crate.

3. In attachment for lifting a container having spaced horizontal members and spaced vertical members, a support, a shaft carried by said support, a plurality of fingers pivotally mounted on said shaft and extending forwardly therefrom for insertion beneath a horizontal member of said container to contact said member and thus lift said container upon elevation of the attachment, and biasing springs disposed between said fingers and support normally urging said fingers forwardly but permitting retraction of the fingers prevented by engagement with parts of said container from being so inserted.

4. In an attachment for lifting a crate having spaced horizontal members and spaced vertical members, a support, a shaft carried by said support, a plurality of fingers pivotally mounted on said shaft and extending forwardly therefrom for insertion beneath a horizontal member of said crate to contact said member and thus lift said crate upon elevation of the attachment, limiting means to prevent said fingers from pivoting forwardly under the weight of said crate as it is lifted, and biasing means normally urging said fingers forwardly but permitting backward pivot thereof when prevented by engagement with parts of said crate from being inserted therein.

5. In an attachment for lifting a crate, a support, a plurality of retractable fingers mounted on said support and extending therefrom for insertion into the crate, biasing springs disposed between said fingers and support to urge said fingers forwardly but permitting retraction of the fingers which are prevented from being so inserted by parts of said crate, rods mounted transversely of various groups of fingers, and latch means to separately retract said rods together with their associated groups of fingers and thus to render said fingers inoperative in the lifting of a crate.

6. A crate lifting attachment adapted to be employed with the elevator of a lift truck, comprising a frame carried by said elevator, a finger retractably mounted on said frame and projecting forwardly therefrom for insertion into an interspace of a crate to lift the crate upon elevation of the attachment by said elevator, a biasing spring mounted between said finger and frame and normally urging said finger to a forward position but permitting retraction of said finger upon engagement thereof with an obstruction, and an apron plate mounted beneath said finger and having its forward surface disposed in a vertical plane passing through said finger and generally perpendicular thereto, said apron plate operating to prevent said crate from tilting during the lifting thereof and to bear a portion of the weight of said crate in the event of tilting of said elevator towards said lift truck.

7. A crate lifting attachment adapted to be employed with an industrial truck having a vertical elevator, comprising a frame carried by said elevator, a horizontal row of forwardly projecting fingers retractably mounted on said frame and adapted to be inserted into the interspaces of the crate to be handled to lift said crate upon elevation of the attachment, means to lock groups of fingers in a retracted position to render the same inoperative in the lifting of a crate, and an apron plate mounted on said frame beneath said fingers and disposed to bear against said crate to prevent the crate from pivoting on said fingers during the lifting thereof.

8. In an attachment for crate lifting adapted to be employed with a lift truck having an elevator, a support carried by said elevator, a plurality of laterally spaced fingers mounted on said support and projecting forwardly therefrom for insertion into interstices in a crate to lift the crate upon elevation of the attachment by said elevator, and means to retract one or more of said fingers where the same are not required to lift the crate with which the elevator is employed in service.

9. An attachment for mounting on a hoist to adapt the same for handling crates, which comprises a vertical frame adapted to be carried by said hoist, a plurality of finger members pivotally mounted on said frame and projecting forwardly therefrom for insertion into the interspaces of a crate, and a bearing member mounted on said frame a substantial distance beneath said finger members, said bearing member being disposed to engage the vertical face of said crate through which said finger members are inserted to thereby prevent the crate from pivoting on said finger members due to lifting engagement of said finger members with the underside of a component of said crate as said frame is elevated by said hoist.

10. A crate lifting attachment for use on an elevator mechanism, comprising a frame adapted to be carried by said elevator mechanism, a substantial number of finger members mounted on said frame and projecting forwardly and substantially horizontally therefrom for insertion into the interspaces of a crate to lift the crate upon elevation of the frame by said elevator mechanism, the mountings for said finger members providing for the automatic retraction of individual finger members which are prevented by engagement with components of said crate from being inserted into the interspaces thereof, and a bearing member mounted on said frame in vertically spaced relation relative to said finger members, said bearing member being adapted to come into engagement with the vertical wall of said crate through which said finger members are inserted to thereby prevent the crate from pivoting on said finger members as

the same bear upwardly against horizontal crate components.

11. A crate handling attachment, which comprises a frame adapted to be carried by an elevator mechanism, a large number of fingers retractably mounted on said frame in at least one substantially horizontal row, and a corresponding number of springs arranged on said frame and associated, respectively, with said fingers to individually bias the fingers to forwardly projected positions at which the same are insertable into the interspaces of a crate, said arrangement permitting selective insertion of the fingers into a large variety of types and sizes of crates without manual adjustment of the fingers for the particular type and size of crate to be handled.

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