

March 11, 1941.

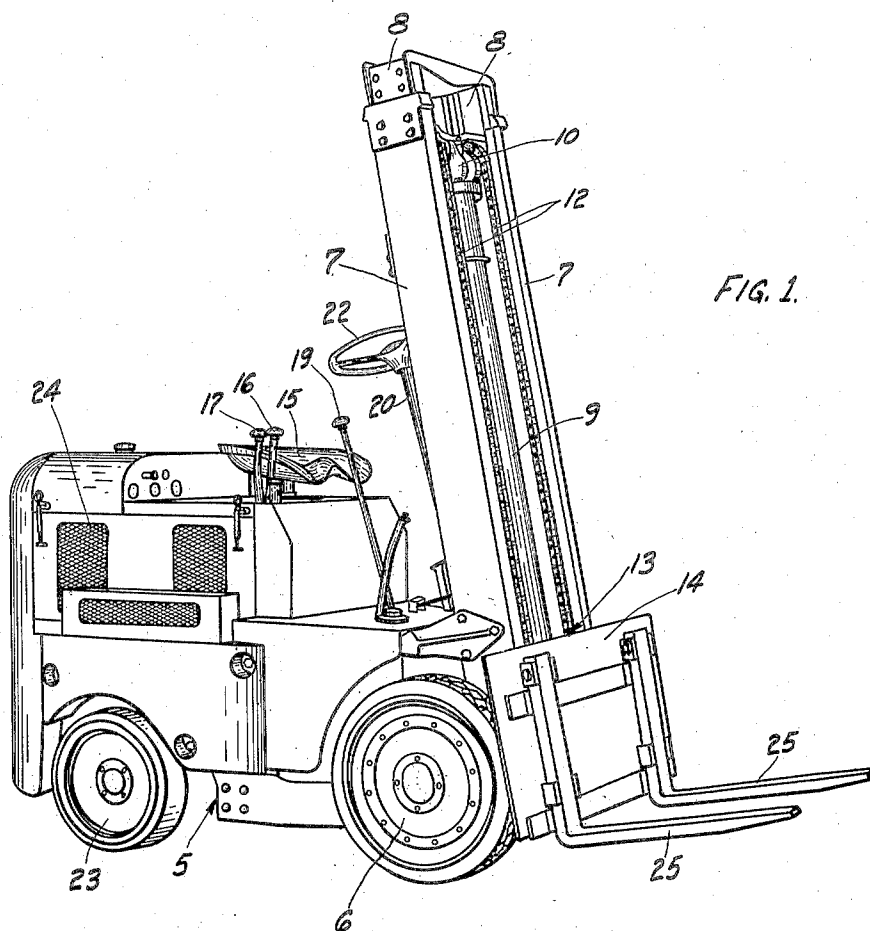
K. O. ASPER

2,234,851

INDUSTRIAL TRUCK

Filed April 20, 1939

2 Sheets-Sheet 1



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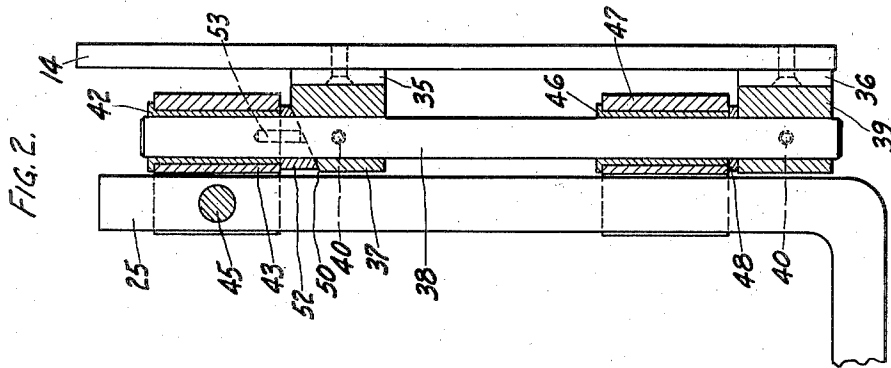
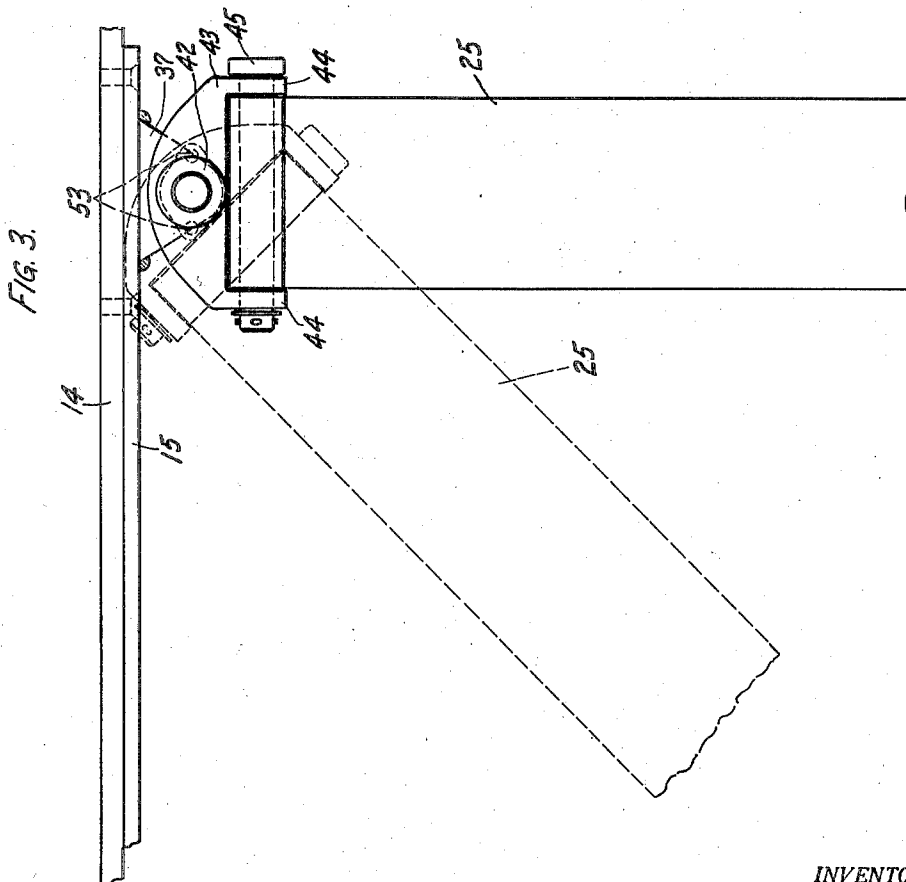
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INDUSTRIAL TRUCK

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,234,851

INDUSTRIAL TRUCK

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4 Claims. (Cl. 214-113)

This invention relates to industrial trucks, and more particularly is directed to trucks of this type adapted for transporting, lifting and tiering goods, wares and merchandise in factories, warehouses, shipping docks and the like.

The present invention concerns itself particularly with the provision of an improved construction of load supporting carriage which facilitates the tiering of the truck in congested areas, and allows a reduction in the over-all length of the truck when required for various purposes.

In particular, the present invention is directed to a load supporting carriage which is mounted for vertical movement upon a pair of pivotally mounted uprights or guides, these guides being arranged for tilting movement forwardly and rearwardly of a normal vertical position. The carriage is guided on rollers engaging suitable guide surfaces on the uprights, and includes a pair of lift fingers or forks which may be inserted under the load to transfer the same to the carriage for moving the load to any desired location.

In the majority of such trucks with which I am familiar the fingers are mounted so as to project forwardly of the vehicle, and are arranged in laterally spaced position with means provided for varying the lateral spacing of the fingers. However, the forwardly extending portions of the fingers increase materially the over-all length of the truck and thereby decrease its maneuverability in narrow passageways or in turning corners.

One object of the present invention is to provide a construction in which the lift fingers are mounted on the load supporting carriage in such manner that they may be rotated about a vertical pivot to move the forwardly extending portions thereof angularly and thereby decrease the over-all length of the vehicle when desired for movement in congested areas.

Another object of the present invention is to provide a lift finger construction in which the fingers are supported in such manner as to be capable of rocking movement in a horizontal plane with respect to the supporting plate of the carriage, and are provided with means normally restoring the fingers to a forwardly extending position when the turning force is removed.

Still another object of the present invention is to provide a construction of this type which is simple in design, economical, and is adapted to be installed on lift trucks now in use without any radical changes in the construction.

Other objects and advantages of the present invention will appear more fully from the following detailed description which, taken in conjunction with the accompanying drawings, will disclose to those skilled in the art the particular construction and operation of a preferred form of the present invention.

In the drawings:

Figure 1 is a perspective view of an industrial truck embodying the present invention;

Figure 2 is a side elevational view, partly in section, of the construction shown in Figure 1; and

Figure 3 is a top plan view of one of the lift finger assemblies.

Referring now in detail to the drawings, an industrial truck is indicated generally at 5 and is provided at its forward end with the drive wheels 6 adjacent which are pivoted the load supporting uprights or guides 7, in this embodiment of the invention these guides comprising channels mounted in fixed lateral relationship and having telescoping channels 8 secured therein to increase the lifting height of the truck. Between the channels 7 is mounted a hydraulic cylinder 9 carrying at its upper end the cross head 10 having sprocket wheels over which are trained the lift chains 12.

One end of these chains is anchored to the rear portion of the uprights, and the opposite ends thereof are connected to a load-supporting carriage, indicated generally at 13. This carriage may, in its general construction, be similar to that shown in the patent of Elmer J. Dunham, No. 2,178,367, and preferably has a front vertical plate 14 which is mounted in fixed relationship on the carriage and is movable therewith vertically with respect to the uprights 7 and 8.

Rearwardly of the uprights and drive wheels 6 is an operator's seat 15 from which the operator may control the raising and lowering lever 16, and the tilting lever 17 controlling the movement of the carriage 13 and the uprights 7 and 8, and the gear shift lever 18 by which the movement of the vehicle is controlled. A suitable steering post 20 is provided having the steering wheel 22 connected to the rear steering wheels 23 supporting the rear portion of the truck 5. Mounted above the steering wheels 23 on the frame of the truck is an engine enclosed within the hood 24 which is connected through suitable power transmission means to the axle driving the wheels 6.

Considering now the details of the support of the lift fingers 25, which are L-shaped in form, 55

upon the plate 14, reference is made to Figures 2 and 3. The plate 14 has secured to the front face thereof two transversely extending plates 35 and 36 arranged in vertically spaced relation. These plates may be secured to the plate 14 by means of countersunk set screws, rivets, or the like. Welded to the transverse plate 35 is a pair of brackets 37 which are bored to receive the pivot pin or rod 38 extending therethrough. Similarly, the transversely extending plate 36 has brackets 39 carried thereby which are also suitably apertured to receive the lower ends of the rod 38. Suitable locking screws 40 are provided in each of the brackets to lock the rod 38 against longitudinal movement with respect thereto.

Adjacent its upper end the rod 38 is provided with a suitable bushing 42 which may be of bronze or the like, which forms a bearing for the bracket arm 43. The arm 43 is of clevis type having the extending ear portions 44 which are suitably apertured to receive a transversely extending pin 45 projecting therethrough and through a corresponding aperture in the upper end of the lift finger 25. Thus, the lift finger 25 is pivotally mounted between the ears 44 upon the pin 45 and depends therefrom. A corresponding bushing 46 is provided adjacent the lower end of the rod 38 above the bracket 39 to form a bearing support for the bracket arm 47 which is of similar U-shaped construction, but merely serves as a guide or a lateral restraining means for the lower portion of the vertical part of the lift finger 25. Mounted between the bushing 46, bracket arm 47 and the supporting bracket 39 is a thrust washer 48, which takes the load at this point.

The upper surface of the bracket 37 is slabbled off at an angle, as indicated at 50, and a suitable correspondingly angled thrust washer 52 is provided between the surface 50 and the under surface of the bushing 42 and arm 43. This bushing is pinned for conjoint rotation with the bracket 43 by means of a pair of dowels 53 extending therebetween on opposite sides of the pivot rod 38. By reason of this construction the washer 52 rotates with the bushing 42, and thus has a tendency to ride up the tapered surface 50 of the bracket 37 when the lift fingers 25 are rotated in either direction about the post 38. Due to this construction, the lift fingers 25 normally tend to return to a forwardly extending position, and thus when the turning force on these fingers is removed, they will re-assemble their normal position extending forwardly of the plate 14. If desired, suitable spring means might be employed for this purpose, but it has been found that this angled surface is sufficient to insure the return of the fingers to their normal forwardly extending position.

As shown in dotted lines in Figure 3, the fingers have an allowable swinging movement of approximately 45 degrees with respect to the plate 14, and can be rocked in either direction with respect to a line normal to the plate 14. This allows the vehicle, when there is no load on the fingers 25, to turn around corners that would otherwise be impossible, and to move in congested areas with a smaller over-all length than is normally possible in a truck of this type. It will be apparent that the fingers, by reason of the forwardly extending portions, are normally biased about the pivot pins 45 in such manner that the vertical shank portions of the fingers

will remain within the arms of the lower bracket 47 and thus be held against possible lateral movement and consequent undue stress on the pin 45.

Inasmuch as the plate 14 used in the present invention corresponds to and is substantially identical with plates of this type now employed in conventional type lift trucks, it is obvious that only a small amount of modification is necessary to adapt such trucks for the present invention. Further, the parts comprising the pivotal support for the fingers are simple forgings or castings which are economical in manufacture and may be readily assembled by any ordinary mechanic.

It is therefore believed apparent that I have provided a novel type of pivotal support for the lift fingers of an industrial truck of this type, and while various changes may be made in certain of the details of construction, I do not intend to be limited except as defined by the scope and spirit of the appended claims.

I claim:

1. A load supporting carriage for a lift truck comprising a vertically extending plate, a pair of vertically extending shafts secured to the forward face of the plate, a pair of lift fingers, channel-shaped bracket means engaging said fingers and journaled in vertically spaced relation on said shafts providing for limited rotation of said fingers about said shafts, and cam means so constructed and arranged that the weight of said fingers normally urges said fingers into a position at right angles to the plane of said plate.

2. In combination, in a lift truck having a load-supporting carriage, a fixed vertical shaft, vertically spaced means supporting said shaft forwardly of the carriage, axially spaced bushings thereon, brackets carried on said bushings having forwardly projecting U-shaped portions, an L-shaped lift finger having its vertical portion received in said U-shaped portions of said brackets, transverse pin means extending through one of said brackets and the associated portion of the lift finger, and cam means between said one of said brackets and the associated shaft supporting means for normally positioning said finger normal to said carriage.

3. A load supporting carriage for a lift truck comprising a vertically extending plate, a pair of vertically extending shafts secured to the forward face of the plate, a pair of lift fingers, and channel-shaped bracket means engaging said fingers and journaled in vertically spaced relation on said shafts providing for limited rotation of said fingers about said shafts, said journalling means including means providing a transverse pivotal support for the upper ends of said fingers.

4. In combination, a vertically extending plate, a pair of brackets secured to and projecting forwardly of said plate, a vertical shaft carried by said brackets, a pair of U-shaped arms journaled on said shaft above the respective brackets and opening forwardly therefrom, an L-shaped lift finger aligned vertically in said arms forwardly of said shaft, a horizontal pin securing the upper end of said finger in the upper arm and providing slight pivotal movement of said finger in a vertical plane, and means between the upper arm and the upper bracket for biasing said finger to a normal forwardly extending position relative to said plate.

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