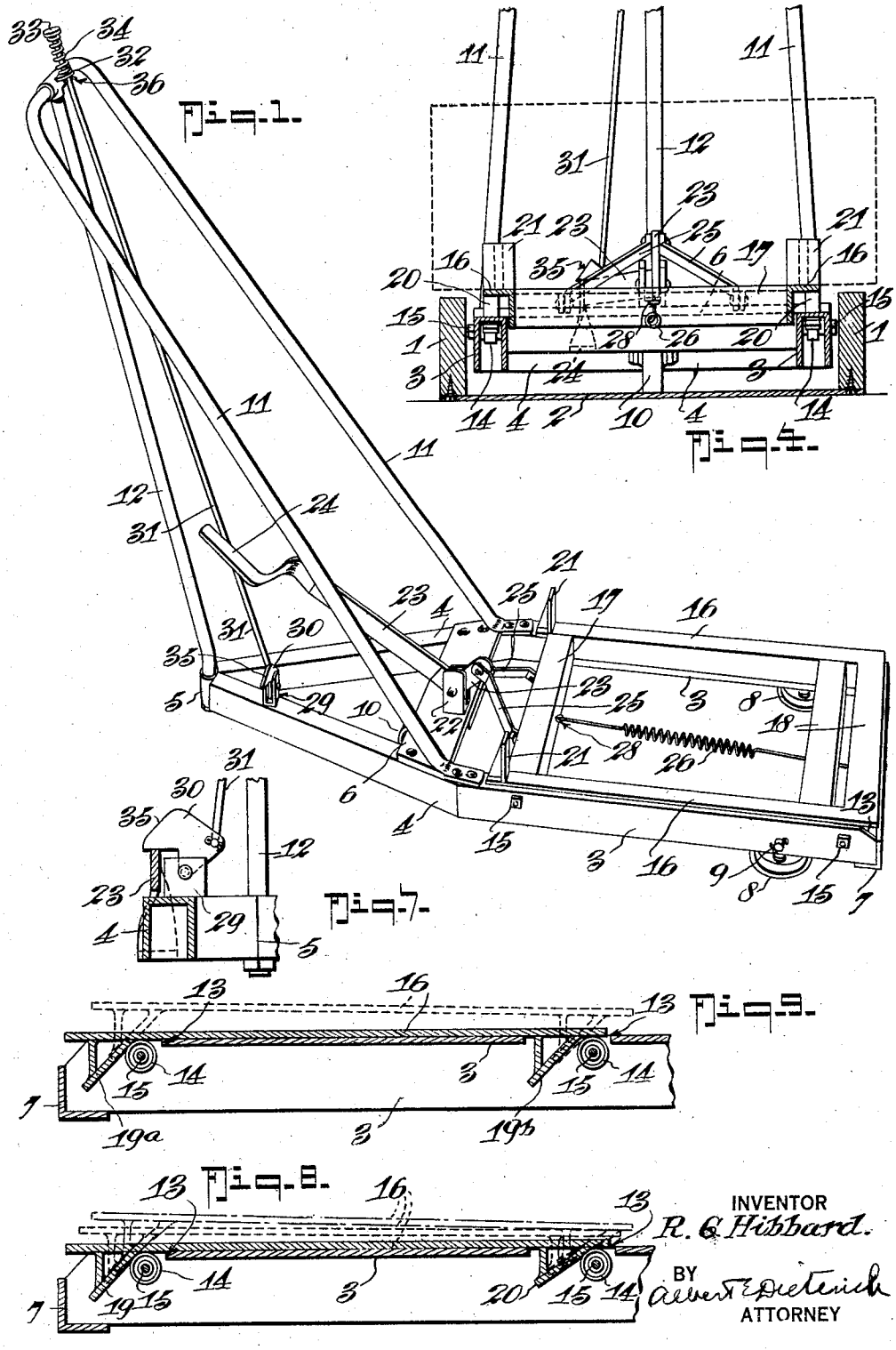
Jan. 28, 1930. R. G. HIBBARD 1,744,894

LIFTING TRUCK

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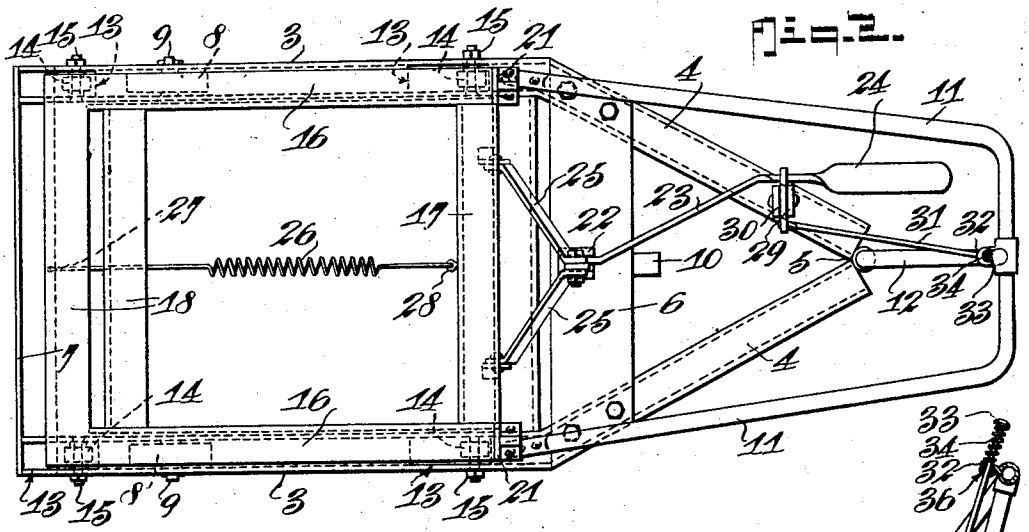

INVENTOR
R. G. Hibbard.
BY
Albert G. Dieterich
ATTORNEY

Jan. 28, 1930. R. G. HIBBARD 1,744,894

LIFTING TRUCK

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Fig. 2.



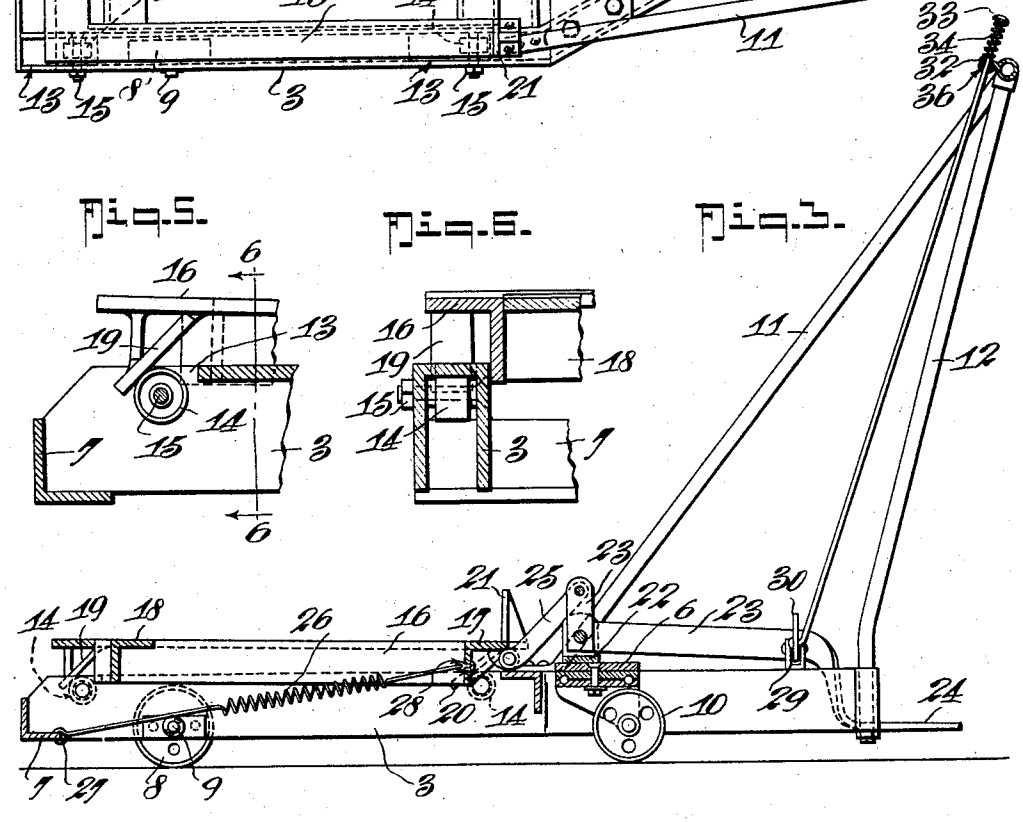


Fig. 5.



Fig. 6.



Fig. 3.

Fig. 10.

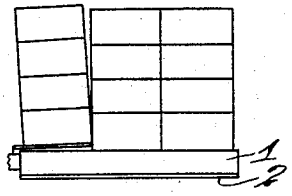
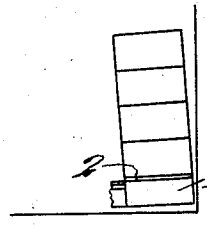


Fig. 11.



INVENTOR
R. G. Hibbard.
BY
ATTORNEY

Patented Jan. 28, 1930 1,744,894

# UNITED STATES PATENT OFFICE

ROWLAND G. HIBBARD, OF MANHATTAN, MONTANA

## LIFTING TRUCK

Application filed February 21, 1928. Serial No. 256,016.

The invention has for its object to provide a simple and economically constructed lifting truck structure for conveying stacked boxes or the like, in which is provided a main frame, an auxiliary frame mounted on the main frame, and means to elevate the auxiliary frame to lift and support a load with a minimum of necessarily expended effort, frictional engagement of parts and wear.

The invention further resides in the provision of means to impart a tilt to the auxiliary frame as it is lifted to tilt-support the load for the purpose of rendering the load more stable during transit upon the truck and to permit lifting of a stack of boxes or the like from beside a contacting stack of boxes without rubbing engagement between the said stacks.

The invention further resides in the provision of novel releasable means to lock the auxiliary frame to its elevated position when desired.

This application is in part an original new application and, as to all matters in common, a continuation of application for United States Letters Patent, Serial Number 168,215, filed by me on February 14, 1927.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, my invention consists in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is a perspective view of the invention, the auxiliary or lifting frame being shown in the lowered position.

Figure 2 is a plan view.

Figure 3 is a vertical longitudinal section of the truck illustrating the elevated position of the auxiliary frame.

Figure 4 is a vertical cross section taken approximately midway between the end frame members 17 and 18 and through the spring 26 in Figure 2.

Figure 5 is an enlarged detail longitudinal section illustrating the corelation of one auxiliary frame lifting track and its associated roller.

Figure 6 is a detail cross section taken on the line 6—6 of Figure 5.

Figure 7 is an enlarged detail face view of the locking latch, associated parts being broken away and in section.

Figure 8 is a diagrammatic longitudinal section illustrating the association of the lifting tracks and rollers.

Figure 9 is a view similar to Figure 8 illustrating a slightly modified arrangement of track and roller equipment.

Figures 10 and 11 are diagrammatic side elevations illustrating the box stack lifting action occasioned by the lifting frame.

My improvement is especially adapted for employment as a warehouse truck and has been found especially useful for conveying "supers" of honey to the warehouse where the combs are extracted and the honey stored. Obviously, however, the invention is not limited to this particular use and may be practically employed in various other connections.

In the warehouse or other place where superimposed boxes or the like are to be received from the truck or otherwise conveyed by the truck I erect two spaced beams or sills 1 that are preferably connected to a metal connecting plate 2. The beams are of a greater height than the main frame of the truck, leaving a free unobstructed path beneath the load supported thereon into which the truck may conveniently be moved.

In some warehouses it is common to use supporting platforms constructed reversely of the supporting devices just above referred to, in which devices the connecting plate is in the nature of a supporting platform supported above the sills instead of connecting the sills at their lower edges. More will be said of the use of such supporting devices later.

In the practical development of the invention I provide a main frame which is in the nature of an open rectangle having an angled extension at one end. The main frame is composed of side beams 3 of inverted chan-

nel construction and which are bent at the front ends as at 4 and connected at 5 to form the said extension.

A cross connector platform 6 is secured on the angled extension of the main frame and a joining angle 7 is secured across the rear ends of the side beams 3.

Suitable supporting wheels 8 are mounted on stub shafts 9 secured in the side angles 3 toward the rear ends thereof and a single caster wheel 10 is carried by the cross platform 6, the said wheels serving to facilitate transportation of the truck over the warehouse floor.

An upstanding handle structure 11 is rigidly secured to the main frame in the manner clearly illustrated in Figures 1 and 2 of the drawings and is suitably braced by an upright 12.

The side beams 3 of the main frame have their upper faces cut out as at 13 and an anti-friction roller 14 is mounted in the said side beams on a stud bolt 15 beneath each such cut out portion, the purpose for which will later be described.

A lifting frame is provided and is constructed of side angles 16 and front and rear cross angles 17 and 18 respectively. The vertical flanges of all of the said angles being arranged inwardly so that the lifting frame may normally rest on the upper face of the main frame with the said flanges projected down in the open portion of the said main frame in the manner clearly indicated in Figure 1.

Two sets of inclined tracks are provided, one set 19 being secured in any approved manner to depend forwardly-downwardly from the front end of the lifting platform and the other set 20 thereof being similarly carried by the rear end of the said lifting platform and by reference to Figures 3 and 8 it will be observed that the rearmost set of tracks are arranged on an angle of inclination of from four to ten degrees less than the angle of inclination of the foremost set 19. As the lifting frame 16 is moved longitudinally rearwardly by mechanism later to be described the tracks 19 and 20 are caused to ride over the anti-friction rollers 14 carried by the main frame, and the said lifting frame is thereby elevated above its normal position at rest on the said main frame and by reason of the variation in inclination of the tracks 19 and 20 the said lifting frame will be lifted on an incline instead of horizontally. See Figures 3 and 8.

Upstanding stops 21 are secured upon the frame 16 to stop further movement of the truck after it has been moved a suitable distance under the load to be lifted.

A bracket 22 is secured by welding or otherwise upon the cross platform 6 and a bell crank operating lever 23 having a long and short arm is pivotally mounted in the said bracket. The long arm of the lever 23 terminates in a foot pedal 24 and the short end of the said lever is connected by suitable links 25 to the front cross angle 17 of the lifting frame. Thus when the foot pedal 24 is forced downwardly from the position illustrated in Figure 1 of the drawings to the position illustrated in Figure 3 of the drawings the lifting frame will be moved longitudinally and lifted from the normal position illustrated in Figure 1 of the drawings to the elevated position illustrated in the said Figure 3. A spring 26 is provided and has one end thereof connected at 27 to the main frame and the other end thereof connected as at 28 to the lifting frame. The said spring thus serves to return the lifting frame to its normal position illustrated in Figure 1 of the drawings when pressure on the lever 23—24 is released.

A bracket 29 is mounted on the angled extension of the main frame and a latch dog 30 is pivoted in the said bracket and serves to lock the lever 23—24 in the lifting platform elevated positions as indicated in Figures 2 and 3 of the drawings. A release and holder rod 31 is pivoted off center to the latch dog 30 and passes through a bracket carried by the upstanding handle. Above the bracket 32 the rod 31 is equipped with a presser head 33 and a spring 34 is interposed between the head 33 and bracket 32 and tends to force the rod upwardly and serves to normally hold the latch dog in the latching position.

The latch dog 30 is provided with a cam face 35 so positioned that when the lever 23—24 is pressed downwardly it will engage the said cam face and automatically deflect the latch dog which will lock over the upper edge of the lever after it has passed beneath the said dog as shown in Figure 7. Upward movement of the rod 31 at the instance of the spring 34 is limited by a stop cotter pin 36.

In operation, assuming the parts to be in the position illustrated in Figure 1 of the drawings, the operator moves the truck longitudinally between the supporting sills 1 and beneath the load to be lifted until the stops 21 engage the load assuring proper positioning thereof on the truck when lifted. By pressing down on the foot lever 23—24 the lifting frame 16 is moved longitudinally and the tracks 19 and 20 thereof are caused to ride up on the anti-friction rollers 14 serving to elevate the said lifting frame and thereby lift the load off of the supporting sills 1 in the manner indicated in Figure 4 of the drawings.

By reason of the fact that the sets of tracks 19 and 20 are inclined in varied degree, the lifting frame will be lifted on an inclination which is very desirable as will be clearly understood by reference to Figures 10 and 11 of the drawings. When it is desired to convey a stack of boxes or the like which have been mounted beside and in engagement with another stack of boxes, as indicated in Figure

10, or in engagement with a wall as indicated in Figure 11, by lifting the said stack of boxes on an inclined platform they are not lifted truly vertical in a manner which would cause them to rub against or interlock with the boxes of the abutting stack but are lifted away from and in angular relation to the abutting stack of boxes or the wall as indicated in the said Figures 10 and 11. When thus lifting the load on an inclination toward the rigid handle 11 an additional advantage is occasioned in that the load is more stable and less liable to topple off the truck while being conveyed over the warehouse floor.

In the said Figure 10 referred to the series of stacks of boxes are mounted on a pair of supporting sills connected as indicated in Figure 4 of the drawings. In the said Figure 11 the other type of supporting sill structure hereinbefore referred to is indicated in which form the supporting structure is carried with the load on the truck. The two forms of supporting devices are disclosed merely to indicate the uses and advantages of my improved lifting truck.

In Figure 8 I have disclosed the preferred embodiment of my invention in which the front and rear sets of trackways are positioned on varied degrees of inclination and which contact the anti-friction rollers 14 simultaneously. In this form of the invention the degree of inclination of the lifting frame varies progressively as the lifting action progresses so that the maximum inclination of the lifting frame will not be effected until the completely elevated position has been reached. This gradually increasing inclination effecting feature is particularly desirous for reasons above stated.

In Figure 9 of the drawings I have disclosed a slightly modified arrangement of the lifting trackways. In this form of the invention the sets of trackways are indicated at $19^a$ and $19^b$ and arranged on like angles. The tracks $19^b$ are so positioned that their function is retarded and they will not contact the cooperating set of anti-friction rollers 14 until the other set of tracks $19^a$ has started to ride up their cooperating set of rollers. Thus the desired inclination of the lifting frame is accomplished by sets of trackways having the same inclination, but in this case the degree of inclination of the said frame is uniform throughout the whole of the lifting action.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the novel details of construction, the manner of use and the advantages of my invention will be readily apparent to those skilled in the art to which it relates.

What I claim is:

1. A lifting truck comprising a main frame, a lifting frame, and means including movable inclined planes and relatively fixedly located rollers cooperating with the respective frames to elevate the lifting frame above the main frame and in inclined relation to the surface upon which the truck is supported.

2. A lifting truck comprising a main frame, a lifting frame adapted normally to rest on the main frame with its load engaging surfaces horizontal, and means including movable inclined planes and relatively fixedly located rollers cooperating with the respective frames to elevate the lifting frame above the main frame with its load engaging surfaces inclined to the horizontal in one direction.

3. A lifting truck comprising a main frame, a lifting frame, and means including movable inclined planes and relatively fixedly located rollers cooperating with the respective frames to elevate the lifting frame above the main frame and in inclined relation to the surface upon which the truck is supported, and in a manner whereby the degree of inclination will increase gradually until the maximum lift is attained.

4. A lifting truck comprising a main frame, a lifting frame, and means including movable inclined planes and relatively fixedly located rollers cooperating with the respective frames to elevate the lifting frame above the main frame and in inclined relation to the surface upon which the truck is supported, said elevating means including two sets of cooperative inclined track and roller equipments, the inclined tracks of the respective sets being inclined on varying degrees of inclination relatively to the horizontal.

5. A lifting truck comprising a main wheeled frame, a lifting frame resting on the main frame, a set of angled rails depending from each end of the lifting frame, each set of said rails being positioned on an angle varying from the angle of the other set of said rails, anti-friction elements carried by the main frame and engaging the rails, and means for exerting a pull against the lifting frame to cause the rails to ride upwardly on the anti-friction elements to raise the lifting frame on an inclined plane.

6. A lifting truck comprising a main wheeled frame, a lifting frame resting on the main frame, a set of angled rails depending from each end of the lifting frame, each set of said rails being positioned on an angle varying from the angle of the other set of said rails, anti-friction elements carried by the main frame and engaging the rails, and means for exerting a pull against the lifting frame to cause the rails to ride upwardly on the anti-friction elements to raise the lifting frame on an inclined plane, said main frame having cut out portions to receive the angled rails.

7. A lifting truck comprising a main

wheeled frame, a lifting frame resting on the main frame, a set of angled rails depending from each end of the lifting frame, each set of said rails being positioned on an angle varying from the angle of the other set of said rails, anti-friction elements carried by main frame and engaging the rails, and means for exerting a pull against the lifting frame to cause the rails to ride upwardly on the anti-friction elements to raise the lifting frame on an inclined plane, means to secure the lifting frame to the lifted position, said pull exerting means comprising a pivoted bell crank lever having its long arm terminate in a foot pedal and its short arm link connected to the lifting frame, and said securing means comprising a lock latch adapted normally to lie in the latching position and having provision for being deflected by the bell crank long arm when forced down to automatically latch over said arm after it passes, and means to release said latch.

8. A lifting truck comprising a main frame having an angled extension at one end, wheels journaled at one end of the frame, a caster wheel supported by the angled extension, a lifting frame normally resting on and having its body portion received in the main frame, load positioning stop elements carried by the main frame, downwardly arranged angularly disposed rails carried by the lifting frame, anti-friction rollers carried by the main frame and engaging the rails, a spring connecting the lifting frame and the main frame to hold the lifting frame to its normal position, a handle rigidly secured to and upstanding from the main frame, a bell crank lever pivoted upon the main frame extension and having a long arm terminating in a foot pedal and a short arm, means to connect the bell crank short arm with the lifting frame, a pivoted securing latch normally lying in position to latch over and lock down the bell crank long arm, and releasable yieldable means carried by the handle to hold the latch to its normal position, said latch having a cam face for being automatically deflected to let the bell crank long arm pass under it when pressed down.

9. A lifting truck comprising a main frame formed of inverted channel beams to form an open rectangle having an angled extension at one end, wheels rotatably mounted in and projecting beneath the frame channel beams near one end, a cross platform secured on the frame extension, a caster wheel depending from the platform, a handle projecting upwardly from and rigidly mounted on the angled extension, a lifting frame normally resting on the main frame, downwardly arranged angularly positioned rails carried by the lifting frame, said main frame channel beams having cut out portions to receive the rails and permit them to project down in said beams, anti-friction rollers carried in said channel beams in engagement with the said rails, and means mounted on the cross platform and connected to the lifting frame to cause the rails to ride upwardly longitudinally on the rollers to elevate the lifting frame.

10. A lifting truck comprising a main frame formed of inverted channel beams to form an open rectangle having an angled extension at one end, wheels rotatably mounted in and projecting beneath the frame channel beams near one end, a cross platform secured on the frame extension, a caster wheel depending from the platform, a handle projecting upwardly from and rigidly mounted on the angled extension, a lifting frame normally resting on the main frame, downwardly arranged angularly positioned rails carried by the lifting frame, said main frame channel beams having cut out portions to receive the rails and permit them to project down in said beams, anti-friction rollers carried in said channel beams in engagement with the said rails, and means mounted on the cross platform and connected to the lifting frame to cause the rails to ride upwardly longitudinally on the rollers to elevate the lifting frame, said rails being arranged in two individual sets, the rails of each set being disposed on like angles slightly varying from the angle on which the rails of the other set are arranged whereby to cause the lifting frame to be elevated on an inclined plane.

11. A lifting truck comprising a main frame formed of inverted channel beams to form an open rectangle having an angled extension at one end, wheels rotatably mounted in and projecting beneath the frame channel beams near one end, a cross platform secured on the frame extension, a caster wheel depending from the platform, a handle projecting upwardly from and rigidly mounted on the angled extension, a lifting frame normally resting on the main frame, downwardly arranged angularly positioned rails carried by the lifting frame, said main frame channel beams having cut out portions to receive the rails and permit them to project down in said beams, anti-friction rollers carried in said channel beams in engagement with the said rails, and means mounted on the cross platform and connected to the lifting frame to cause the rails to ride upwardly longitudinally on the rollers to elevate the lifting frame, said rails being arranged in two individual sets, the rails of each set being disposed on like angles slightly varying from the angle on which the rails of the other set are arranged and all said rails being arranged to contact the rollers simultaneously whereby to cause the lifting frame to be elevated on an inclined plane which gradually increases in degree of inclination as the lift is accomplished.

12. A lifting truck comprising a main frame, a lifting frame, and means to elevate the lifting frame above the main frame and in inclined relation to the surface upon which the truck is supported, and rigid means on one of said frames and projecting into engagement with the other frame continuously to maintain said frames in interengaged relation.

ROWLAND G. HIBBARD.