

Oct. 17, 1944.

G. SLINGSBY

2,360,799

HAND TRUCK

Filed March 29, 1943

3 Sheets-Sheet 1

Fig.1.

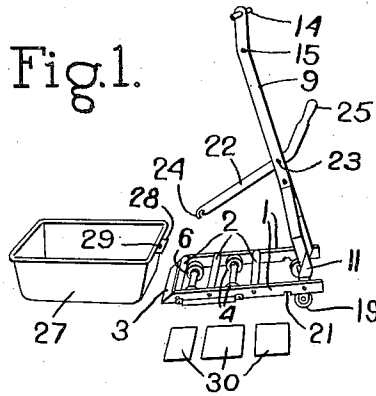


Fig.2.

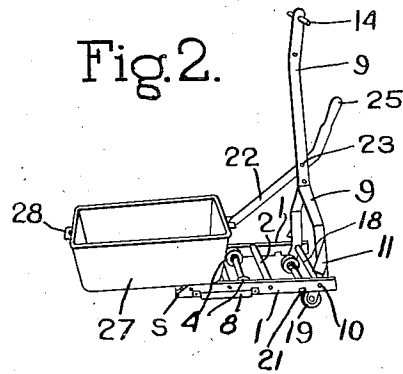


Fig.3.

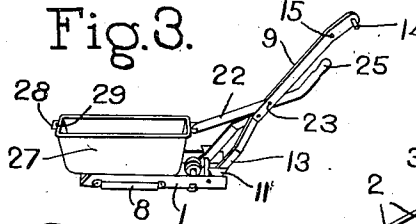


Fig.6.

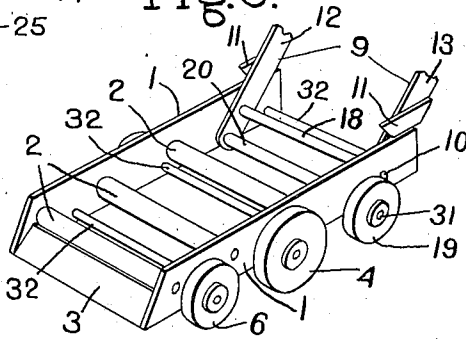


Fig.4.

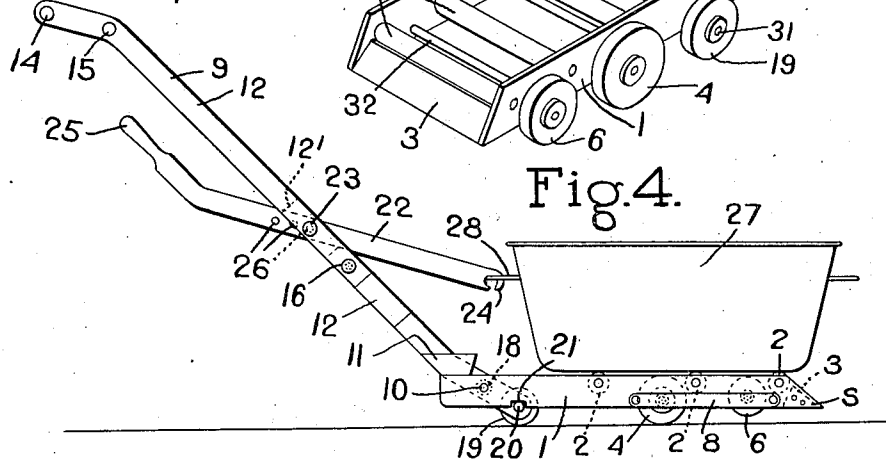
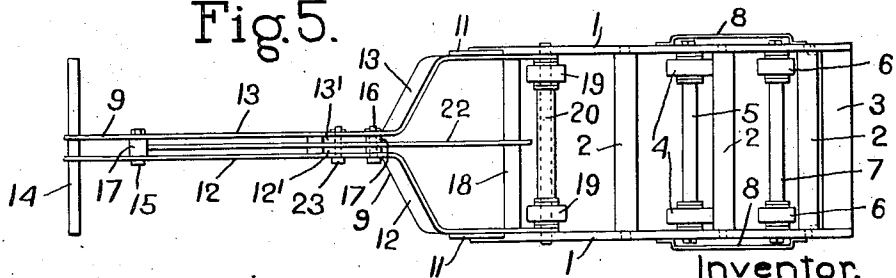


Fig.5.



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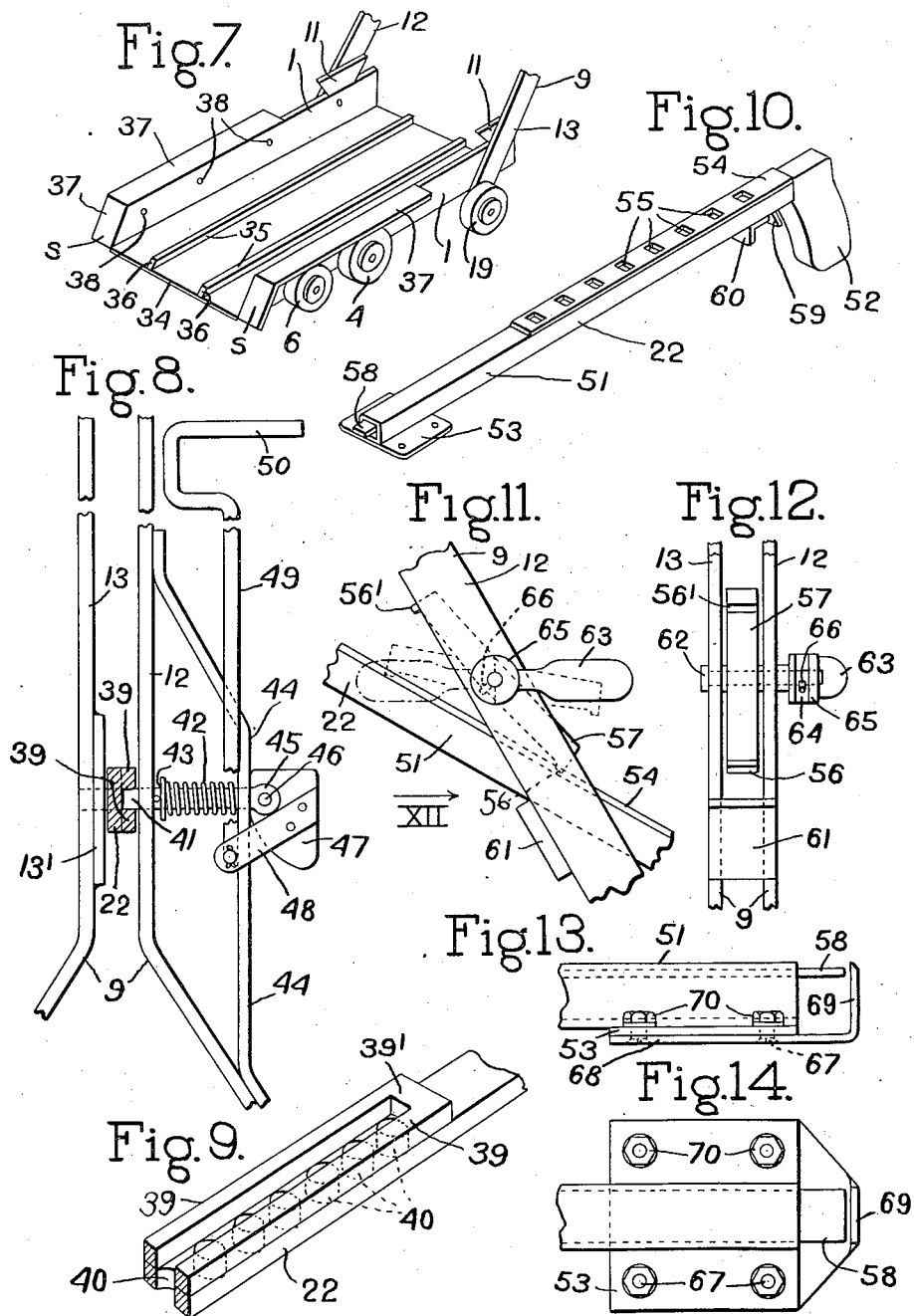
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig.15.

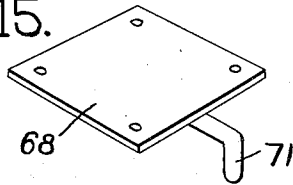


Fig.16.

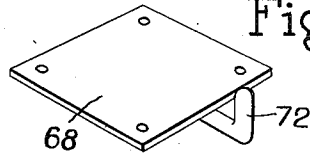


Fig.17.

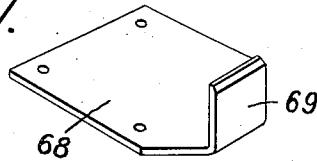


Fig.18.

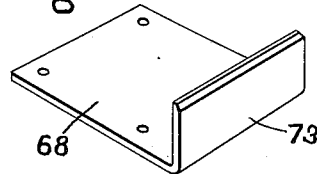


Fig.19.

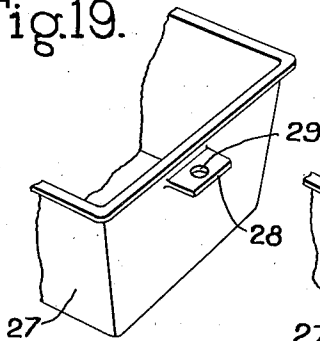


Fig.20.

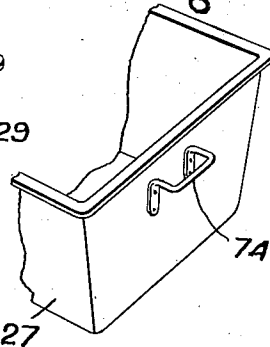


Fig.21.

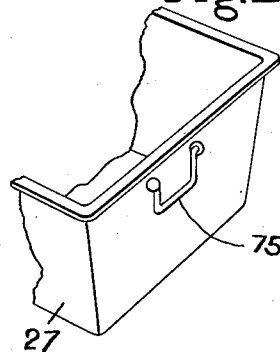


Fig.22.

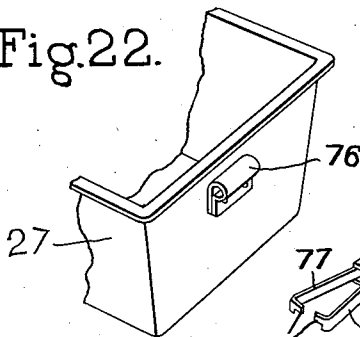


Fig.23.

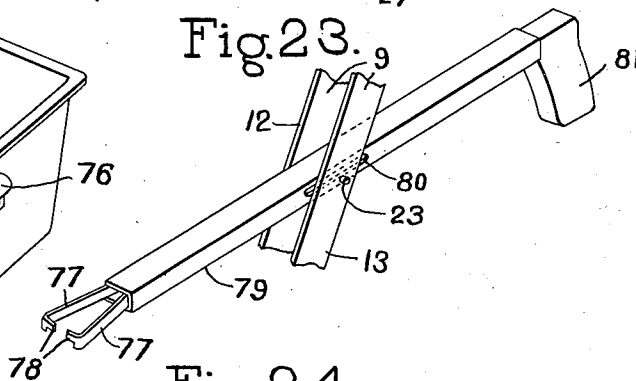
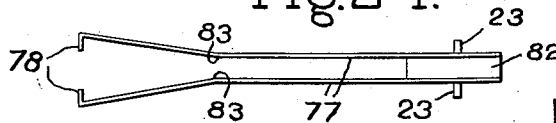


Fig.24.



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UNITED STATES PATENT OFFICE

2,360,799

HAND TRUCK

Guy Slingsby, Enfield, England

Application March 29, 1943, Serial No. 480,909
In Great Britain April 9, 1942

10 Claims. (Cl. 214—65.4)

This invention relates to hand trucks, and aims to facilitate the handling and transport of goods, more especially of small articles or parts in trays, pans or bins (hereinafter termed trays), in factories or the like places where the floor or ground is fairly smooth and level.

In some factories producing or handling small parts, these may be placed in trays, say for example about 22 inches long, 14 inches wide and 8 inches deep, having a handle at each end. Such trays may be formed of metal stampings, and the bottom edges or corners may be bevelled or rounded off, especially at the ends. When filled with parts, such a tray is often too heavy for convenient handling and transport by personal carrying, especially by girls, as it may weigh say 100 lb. to 200 lb. or more according to the nature of the tray and its contents. The invention aims to provide a hand truck especially suitable for, though not necessarily confined to, the handling of such loads.

One of the broader objects of the invention is to furnish a hand truck having a tow-bar or steering arm pivoted to the frame and adapted to act as a lever to move a load from the floor onto the top of the truck.

A further object is to so construct or arrange the truck that one and the same element, preferably pivoted on the truck frame about a horizontal axis, serves as a combined tow-bar and steering arm, and also as a lever for moving the load from the floor onto the truck by a drawing or pulling action, for keeping it in position during transport, and finally for pushing it off the truck again.

Another object is to provide a truck which is simple and rugged in construction, and having simple and durable moving parts most of which are preferably replaceable or renewable.

Preferred features contributing to the above or other objects include a pair of main supporting wheels disposed approximately midway between the truck ends and auxiliary supporting wheels adjacent each end of the truck, the main wheels being larger or otherwise arranged to project normally a greater distance below the frame of the truck than do the auxiliary ones at at least one end; thus the truck can be supported solely by the main wheels for steering purposes by appropriate manipulation of the tow-bar, but the ends of the frame are prevented normally from contact with the floor by the auxiliary wheels.

According to a further feature the effective top of the truck, onto which a normal load in the form of a filled tray is drawn, is formed by anti-

friction means. Such means may be constituted by a plurality of rollers mounted transversely in the frame, or by upstanding longitudinal runners or ribs.

Still further features, contributing to ease in raising the load from the floor onto the truck top, consists in sloping the rear end of the truck frame, keeping the top of the frame reasonably close to the floor, and arranging for the lever, when its handle is moved rearwardly, to tilt the rear end of the truck down substantially into contact with the floor; e. g. by extending the lever, which is preferably cranked or bent near its lower end, beyond its horizontal pivot, and mounting the front auxiliary wheel or wheels at said lower end.

Another object of the invention is to provide appropriate load engaging means associated with the tow-bar lever, and to provide (if necessary, to get the load into a position in which is obtained a desired approximate balance of the truck and load about the axis of its main supporting wheels), for adjustment of the effective distance between the load-engaging and lever-engaging parts of said means. In some cases, e. g. for a long tray, it may be desirable in order to get the tray far enough onto the truck with a convenient arc of movement of the lever handle, to arrange for multiple hauls, i. e. to adjust the said distance during the operation of drawing on the load.

Features achieving these objects include a load-engaging link pivoted to the lever between its handle and its pivotal attachment to the truck, said link being formed or provided at one end with hook-like means for engaging a load-tray handle, preferably extending beyond the pivot to form a link handle, and also being formed with a plurality of orifices, engagement in one or other of which of a part connected to the lever provides for adjustment of the effective length of the link.

According to a further feature, provision may be made for the lever to accommodate different forms of link, for ready or even automatic adjustment of the effective length of a link, and for fitting different types of hook-line means for engaging the varying types of handles of various load trays at present in use in factories.

According to further features the hook-like means at the end of the link may be a simple part-circular hook and open at its lower part; or it may be a part bent upwardly or downwardly substantially at right angles or rather more which may be arranged to co-operate with

a bolt like member slidable on the link. Where the tray has a curled over part forming a closed circular or oval tubular handle, a further feature furnishes a two part member, each part formed with a hook and means for forcing said hook parts together to engage in the ends of the tubular handle.

With the above and further objects or features which may hereinafter appear or be obvious to those versed in the art in view, the invention is more particularly described with reference to the accompanying illustrative drawings, which are more or less diagrammatic.

In the drawings:

Figs. 1, 2 and 3 show perspective side views of one embodiment of the invention, in different operative positions of the combined tow-bar, steering arm and operating lever, corresponding with the positions of the load-tray also shown;

Fig. 4 is a side elevation to a larger scale of a similar truck with load-tray in transport position, and

Fig. 5 is a plan view of the truck shown in Fig. 4.

Fig. 6 is a partial perspective view of a modified form of truck with larger wheels for use on rougher floors or ground.

Fig. 7 is a partial perspective view of another modified form.

Fig. 8 is an end view of part of the lever, showing means permitting the effective length of the load engaging link to be adjusted readily.

Fig. 9 is an explanatory perspective view to a larger scale of part of the link shown in Fig. 9.

Fig. 10 is a perspective view of an alternative form of link adapted for more or less automatic adjustment of its effective length during operation of the lever;

Fig. 11 is an explanatory side view of parts of the lever, showing a fixed cross-piece and a pivotally mounted weight-loaded pawl engaging a link of the type shown in Fig. 10.

Fig. 12 is an end view looking in the direction of the arrow XII in Fig. 11 but with the link removed.

Figs. 13 and 14 are respectively side elevation and plan views to a larger scale of the form of link shown in Fig. 10, showing one method of detachably affixing different forms of hook.

Figs. 15 to 18 show various forms of hook adapted for detachable fixture to a link as shown in Fig. 10, and intended to engage different forms of tray handle.

Figs. 19 to 21 show various forms of tray handle.

Fig. 22 shows another type of tray handle, and

Fig. 23 illustrates a form of link or hook arm to engage therewith.

Fig. 24 is a detail plan view of the actual link, i. e. the lever engaging and tray handle engaging parts shown in Fig. 23.

Referring now more particularly to Figs. 1 to 5 inclusive, the truck frame shown comprises a pair of longitudinal side members 1, the rear upper surfaces of which preferably slope upward as shown at S, three transverse rollers 2, and a transverse upward sloping plate 3 secured to the side members 1 at the rear end of the truck. Additional transverse bracing elements may be added, if and where requisite.

On the side frame members 1 and intermediate their ends, a pair of main supporting wheels 4 are mounted, preferably within the frame upon roller bearings on an axle 5. A pair of auxiliary supporting wheels 6, preferably of smaller dia-

meter, may be similarly mounted adjacent the rear ends of the members 1 on an axle 7. Guard members 8 mounted on members 1 preferably protect the ends of the axles 5 and 7.

A combined tow-bar, steering-arm and operating lever, indicated generally by the reference 9, is pivotally mounted adjacent the front end of the truck by means of a pivot pin or bar 10 engaging the frame side members 1. The extent of the rearward and forward movement of the lever 9 is limited by appropriate abutment means, such as stops 11 fixed to or forming part of the lever 9 engaging the top surfaces of the members 1.

The lever 9 preferably comprises, as shown, two parts 12 and 13 (see Fig. 5) which may be parallel and spaced apart a convenient distance (e. g. 1 inch) at the upper end of the lever, and forked outwards at the lower end to lie adjacent the side members 1. An operating handle 14 is preferably mounted at the upper end of the lever 9, which latter is also preferably conveniently cranked or bent adjacent each end (as best seen in Fig. 4). The two parts 12 and 13 of lever 9 may be braced together by bolts 15 and 16 with spacing pieces as 17 (Fig. 5) mounted thereon, whilst at the lower end a cylindrical spacing piece 18 may be mounted on the pivot pin 10 (Figs. 4 and 5). As may be seen the lower ends of the parts 12 and 13 of the lever 9 extend beyond the pivot 10 and carry a second pair of auxiliary wheels 19 on an axle 20. So that these wheels 19 may normally project in running position a small distance below the frame, they are preferably smaller than wheels 4 and the lower edges of side members 1 may be recessed at 21 (best seen in Fig. 1) to accommodate at least part of the axle 20 if it projects beyond parts 12 and 13. The wheel arrangement is such that the truck with load can be supported on the main wheels 4 whilst both pairs of auxiliary wheels 6 and 19 are out of contact with the ground.

The lever 9 is furnished with means for operatively engaging the load, and such means may comprise, as shown, a link or hook-arm 22 pivotally connected with the lever 9 nearer the pivotal connection with the frame 1 than the handle 14, for example by a pivot pin or bolt 23. Packing pieces 12' and 13', preferably welded to parts 12 and 13 respectively, prevent undesired side play on pivot 23. One end of the link 22 is formed or provided with hook-like means 24, whilst the other preferably extends beyond the pivotal connection with the lever and is furnished with a handle part 25. Preferably, so that the load can be moved or drawn by the lever 9 into such a position that the truck substantially balances about the axis of the main wheels 4, the effective length of the link is adjustable. For example, in Fig. 4 the pivot pin 23 can be passed through any of three or more holes 26 in the link, thus providing an initial adjustment according to the dimensions of the load-tray 27. A preferred form of load-tray 27 is shown in Figs. 1 to 4 and is of standard form except that at least one of the handles 28 at the ends is pierced at 29 (Figs. 1 and 19) to receive the hook 24. The engagement of hook 24 and handle 28 and the general construction is such that operation of the lever 9 can pull or raise the load from the floor onto antifriction means such as the rollers 2 forming the effective top of the truck, maintain it in desired position during transport, and finally push the loads onto the floor again. The lower edges

of tray 27 are usually rounded, especially at the ends, as best seen in Fig. 4.

Fig. 1 also shows, detached, plates 30 to be fitted between or on the side member 1, between and preferably below the upper surfaces of the rollers 2; these form a secondary truck top on which loads other than ones contained in or formed by a tray 27 can be carried.

Operation.—Referring more particularly to Figs. 1 to 3, the method of operation is substantially as follows: the truck is wheeled by the handle 9 up to one end of a load-containing tray 27, and the lever 9 is moved rearwardly by the handle 14 into approximately its most rearward position (Fig. 1), the operator grasps the handle part 25 of link 22 and engages the hook end 24 with one handle 28 of the tray. Rearward movement of the lever 9 depresses the wheels 19, raising the front or lever end of the truck frame, and depressing the rear end thereof substantially into contact with the ground. Pulling the handle 14 of lever 9 forwardly raises or pulls the load-tray up the sloping rear end of the truck onto the rollers 2 forming the truck top (Fig. 2), and the operator may conveniently place a foot against the pivot bar 10 (or a spacing piece 18 fitted thereon) to get a purchase and prevent the truck running forward. The movement of the lever 9 into its forward position preferably suffices to pull a standard tray onto the truck top into a position where the truck and load are substantially balanced about the axis of the main supporting wheels which are preferably mounted somewhat to the rear of the centre of the truck; this is assumed to occur in Figs. 3 and 4. Appropriate manipulation of the truck by means of the handle 14 of the combined tow-bar, steering-arm and operating-lever 9, then permits the truck and load to be transported and steered.

If the load tray be a long one and cannot therefore be pulled far enough onto the truck to be supported properly and to balance the truck substantially on the main supporting wheels 4, use is made of a link adjustment hereinbefore mentioned, examples of which are illustrated in Figs. 8 and 9, and in Figs. 10 to 12. If necessary, during link adjustment to get a multiple pull or push with the lever 9, one hand of the operator may hold the handle 14 thereof, and the other hand operate the link by its handle.

It may be appreciated that in the form shown in Figs. 1 to 5 the wheels 4, 6, and 19, are all arranged within the truck frame, and are of such diameter that whilst they project adequate distances below the frame to keep it clear of the floor in running position, they do not reach the effective top of the truck.

Whilst the invention is not confined to any particular construction or dimensions of the parts, provided they are suitable for the purposes indicated, it may be mentioned that the longitudinal side members 1 of the truck may be flat iron or steel bars about 24 inches long by 2½ inches deep by ½ inch thick, and about 12 inches apart. The standard load-trays 27 supplied with the trucks may conveniently be of the dimensions previously stated, but as there are other sizes and types of load-trays in common use in factories, other types of load-engaging link may be used to secure desired effects.

Dealing now with the modification shown in Fig. 6, which illustrates a hand-truck designed for use on rougher floors or ground, and therefore embodying larger wheels, the construction and operation may be generally similar to that

of the form shown in Figs. 1 to 5 subject to changes desirable for working with such larger wheels (say 6 inches and 5 inches in diameter, instead of say 3 inches and 2½ inches). The longitudinal side members 1 are therefore made deeper, and the wheels 4 and 6 mounted thereon upon stub axles outside the frame, and the axle 20, on which the wheels 19 are mounted at the lower end of the lever 9, is extended beyond the frame as at 31 so that these wheels 19 also are outside the members 1. To keep low the effective top of the truck, the transverse rollers 2 forming it are mounted some distance below the top edges of the deeper side members 1, and the sloping plate 3 as before leads up to the roller 2 at the rear end of the truck. In this form cross bracing elements such as bars 32 are preferably used between the side members 1. As the normal load, in the form of a filled tray, should be pulled by the lever 9 onto the rollers 2 between side members 1, the latter are preferably spaced apart a greater distance in Fig. 6 than is necessary in the form shown in Figs. 1 to 5, and the tops of the wheels (especially of the main wheels 4) may be above the effective top of the truck and even above the top edges of the side members 1. The overall width of the form of truck in Fig. 6 may be say 22 inches, compared with say an overall width of say 14 inches for Figs. 1 to 5.

Fig. 7 shows another modification, principally designed to move two or more trays stacked on one another. For this purpose the effective top of the truck must be kept very low to avoid having to exert too much effort in pulling the load onto the truck, and to avoid tilting unduly the trays which might dislodge the upper one or ones. Consequently it is desirable that not only should the main supporting wheels 4 and auxiliary wheels 6 be mounted on side members 1 by stub axles, but that the auxiliary wheels 19 should also be on stub axles on the extended ends of parts 12 and 13 of the lever 9. Such an arrangement permits the side members 1 to be connected by a frame or base plate 34 extremely low down, whilst cross bracing (not shown) may be provided underneath the plate 34, and if desired at the front end of the truck (which would generally not be reached by the load).

The antifriction means forming the effective top of the truck may in this case comprise a pair of steel or like runners 35 fixed to the plate 34, preferably bevelled or sloped at their rear ends 36. As in the other forms, the arrangement of the wheels is such that, in normal running position, the lever or tow-bar 9 can disengage both sets of auxiliary wheels 6 and 19 to allow steering movements on the main supporting wheels 4.

To enable this form of truck to be used to support and carry loads wider than plate 34, and more or less to guard the wheels, the upper surfaces of the side members 1 may be furnished with outwardly projecting flanges as 37, suitably secured as by bolts 38.

Referring now more particularly to Figs. 8 and 9, which illustrate means whereby the effective length of the load engaging link can be adjusted readily, the link 22 may be generally similar to that above described except for a mid-portion, which is modified by being formed or provided with one or more parts 39 forming a longitudinal guide slot at one side of the link to engage the pivot pin. The guide slot and a

plurality of pivot pin receiving holes 40 through the link 22 can be seen most clearly in Fig. 9 (though in practice the holes 40 would probably be further apart than shown).

The ends of the guide slot are preferably closed as shown at 39', so that when the pivot pin is retracted from the holes 40 the link can still be retained in the lever 9 though free to be moved longitudinally the length of the slot. The means illustrated for disengaging a modified pivot pin from any of the holes 40, whilst leaving it engaging in the guide slot formed by parts 39, comprise an extended pin 41 which normally passes through a hole in part 12, the slot mentioned, one of the holes 40 in the link 22, and preferably through a hole formed through the packing piece 13' into a hole or recess in part 13. It is normally held or pressed towards such a position by a spring 42 or the equivalent, shown mounted on the pin 41 and acting upon a cotter pin or the like 43. The other end of spring 42 bears against an additional part 44 secured, as by welding, to part 12 of lever 9. The pin 41 passes through a hole in part 44 and its rear end is formed with an eyed portion 45 to receive a pin 46 by which it is attached to an operating cam 47. This cam engages the outer side of part 44, and can be operated to withdraw the pivot pin clear of the holes 40 into the guide slot formed by the one or more parts 39, by means of a lever 48 fixed to the cam and a hand-operated link 49 pivoted to the end of lever 48. The link 49 extends substantially parallel to the lever 9, to which it is movably attached by a guide piece (not shown), and at its upper end is furnished with a hand grip 50 conveniently adjacent the handle 14.

This means illustrated in Figs. 8 and 9 thus provides for ready adjustment of the effective length of the load-engaging link 22 during operation; e. g. if the normal movement of lever 9 be insufficient to pull the load into desired substantially balanced position on the truck and to maintain it there a multiple haul can be secured, by in effect shortening the link. Thus the load may be drawn normally as far as possible onto the truck by moving lever 9 forwardly, retained there by gripping the handle part 25 of link 22, whilst the other hand grips handles 14 and 50, to disengage pin 41 from any of holes 40, and to push the lever 9 rearwardly some distance for link shortening. Then handle 50 is released and pin 41 allowed to engage an appropriate different hole 40, whereupon lever 9 is again pulled forwards.

Figs. 10, 11, 12, 13 and 14 illustrate a more elaborate form of load-engaging link adapted for semi-automatic adjustment of its effective length, and for more positive locking of the hook or load engaging means.

Fig. 10 shows the link 22 consisting of a rectangular tubular body portion 51 with a pistol-type hand grip 52 at one end, and means such as a rectangular plate 53 at the other end for attachment of a detachable hook to engage the load. On the top of the body portion 51 is secured, as by welding, a rack plate 54 formed with a plurality of recesses or notches 55 for selective engagement by one of the teeth 56, 56' (see Fig. 11) of a pawl member 57. Within the body portion 51 a flat bar or bolt 58 is slidably mounted, being normally projected adjacent a hook to form a kind of bolt closing the hook after engagement with the load. This bolt 58 can be normally projected, as seen in Figs. 10, 75

13 and 14, by its own weight or with more certainty by a suitably arranged spring, and its end 59 be bent down adjacent the grip 52 to form a trigger for retracting the bolt 58 when engaging or disengaging a hook with a load. The trigger end 59 of bolt 58 projects through a suitable slot (not shown) in the bottom of the body 51, which latter carries a fixed trigger-guard and stop device 60.

Fig. 11 shows how the link 22, 51 fits between the parallel parts 12 and 13 of lever 9, being supported by a cross piece 61 fixed to parts 12 and 13 as by welding, upon which it can swing or pivot. Downward and rearward endwise motion of the link body 51 is limited by engagement of trigger guard and stop device 60 with piece 61; but in operation engagement of one of the teeth 56, 56' of the pawl member 57, pivoted on the lever 9 by being non-rotatably fixed on a pin 62 passing through both parts 12 and 13, co-operates with cross piece 61 to form in effect a pivotal connection of the link 51 with lever 9. The pawl member 57 is loaded by a weighted handle 63 mounted on pin 62 which latter is rotatable in parts 12 and 13 by the handle through a lost-motion connection formed by a slot 64 in the boss 65 of the handle 63 and a set screw 66 in pin 62 engaging in said slot 64. The amount of lost motion allowed between the positions in which set screw 66 is engaged by the ends of slot 64 is sufficient to allow the weighted handle 63 to be swung freely approximately 170°, without operating pin 62 and pawl 57, so that the weight may operate effectively to load the pawl in either of the two engaging positions shown in Fig. 11. As pivotal movement of lever 9 on the truck naturally affects the position of the weighted handle 63 the latter would probably work best if about horizontal in either direction when lever 9 is in the mid-position, whereas Fig. 11 shows lever 9 at or near its most forward position. Obviously the slot 64 could be formed to give the other result.

The weighted handle 63 would be swung over to the full line position Fig. 11 for pushing the load off the truck, to cause the pawl tooth 56 to engage one of the notches 55 (Fig. 10) in rack 54; if the load could not be pushed far enough by rearward operation of lever 9 the latter would be pulled forward to cause the pawl tooth 56 to ride over the rack to operatively engage another notch upon resumed rearward operation of the lever 9.

When pulling a load onto the truck from the floor into desired approximate balancing position, the weighted handle 63 would be swung over into the broken line position on left of Fig. 11 to cause the other pawl tooth 56' to engage the rack, and forward operation of the lever 9 would keep tooth 56' in engagement in one of the notches 55; if the load could not then be drawn far enough onto the truck it could be prevented from running off by grasping link grip 52 whilst moving lever 9 rearwardly causing the pawl tooth 56' to ride over the rack to engage another notch 55 on resumed forward pulling of the lever 9.

Thus semi-automatic adjustment of the effective length of the link 22, 51 can be secured, by a weight loaded pawl double ended 57, the weighted handle 63 being swung by hand into position to cause the appropriate end of said pawl to engage a rack on the link.

Figs. 13 and 14 are practically self-explanatory and show, enlarged, the hook end of link 51, and how modified forms of hook can be detachably

secured to it, as by bolts 67 passing through holes in plate 53 and a plate 68 formed or provided with such as 69. The bolts are furnished with nuts 70 as usual. Figs. 13 and 14 also show how the bolt 58 serves to close the opening of the hook 69, after engagement with a load, thus providing an extremely secure connection between link 51 and a load.

Figs. 15, 16, 17 and 18 show respectively various forms of load engaging hooks 71, 72, 69 and 73 adapted for similar securement to a link plate 53.

Fig. 19 shows on an enlarged scale the handle 28 of a load-tray 27, formed with hole 29 for engagement with a link hook, such as hook 24 (Figs. 1 to 4).

Figs. 20 to 22 show other forms of handle 74, 75 and 76 respectively, found on trays used in factories.

The handles 28, 74 and 75 can be readily engaged by one or other of the link-hooks previously mentioned, but obviously the curled round, more or less cylindrical or elliptical handle 76, call for hook-like means to engage in each end of the handle 76.

Figs. 23 and 24 illustrate such means. The link shown in this case comprises two parts 77 with inwardly bent hook-like ends 78 which normally spring apart, and an operating casing 79 to force them together, to engage in each end of handle 76. The casing 79 is slotted as shown at 80 to allow it to be slid by manual operation of a handle or grip 81. The device is pivoted on lever 9 by a pivot pin or bolt 23 engaging parts 12 and 13.

The plan view Fig. 24 shows how the two parts 77 are spaced apart parallel adjacent the pivot pin 23 by a spacing member 82, which for convenience in preliminarily adjusting the effective length of the link formed by parts 77 may be welded or otherwise attached to them, the parts 77 and 82 being then formed with a plurality of holes serving the same purpose as holes 26 in Fig. 4. As may be seen the parts 77 are bent apart at 83 to form a gradual taper engageable by the operating casing 79 for the purpose above mentioned.

It may be noted that many of the main parts of the hand-truck described with reference to the accompanying drawings can be standardised, or standard sizes of suitable metal can be used if necessary with adaptation by bending, drilling or tempering or the like normal operations. The main part of the operating lever 9 for example, consisting of two parallel parts 12 and 13 spaced apart say 1 inch can accommodate the widest forms of link described (those of Figs. 10 and 23), packing pieces being preferably used for narrower links.

Obviously many constructional and detail changes can be made without departing from the spirit and scope of the invention which is more particularly pointed out in the appended claims.

I claim:

1. A hand truck comprising a frame, a tow bar lever pivoted to said frame, a load engaging link, and semi-automatically operating means on said lever selectively engageable with spaced parts of said link, the arrangement being such that the link is in effect pivoted to said lever and the distance between its load engaging end and the lever can be varied.

2. A hand truck comprising a frame, a tow bar lever pivoted to said frame, a load engaging

link, means on said lever selectively engageable with spaced parts of said link, the arrangement being such that the link is in effect pivoted to said lever and the distance between its load engaging end and the lever can be varied, and hand operated means for disengaging said selectively engageable means, said hand operated means being operable while the tow bar lever is in use in moving a load from the floor into the desired position on the truck or vice versa.

3. A hand truck comprising in combination a frame, an upwardly extending lever pivoted to said frame, said lever comprising two main parts extending substantially parallel, spacing and bracing means therefor, a handle mounted adjacent the upper end of said lever, a length adjustable load engaging link pivotally mounted between said parts, the lower portions of said two lever parts being spread apart to form a fork of nearly the same width as the truck frame where said lever is pivoted to said frame, and abutment means mounted on said fork to be engageable with said frame limiting the extent of the pivotal movements of said lever.

4. A hand truck for transporting load containing trays, comprising in combination two parallel side frame members spaced apart, the upper surfaces of said members at the rear end forming a slope up from bottom to top, a transverse plate with similar slope secured to and between said side members, a plurality of spaced transverse rollers mounted in said members forming the effective top of said truck, a pair of main supporting wheels mounted intermediate the ends of said side members, said wheels being of such size that they maintain the intermediate parts of said members a short distance off the floor, a pair of auxiliary supporting wheels adjacent the rear end of the truck normally maintaining said end a shorter distance off the floor, a forked tow-bar and operating lever pivoted to said members about a horizontal axis adjacent their front ends, the ends of the fork of said lever extending beyond said axis, a second pair of auxiliary supporting wheels mounted on said ends of the lever, and load-tray engaging means associated with said lever, the upper end of said lever being operable by hand to swing about its pivot rearwardly into a position over the truck, permitting engagement of said tray engaging means with a load tray, the front auxiliary wheels being then in their lowest position raising the front end of the truck frame and lowering its rear end substantially into contact with the floor, then to be swung forwardly to draw the tray onto said transverse rollers forming the truck top and there maintain it whilst raising the front wheels to a position in which they keep the front ends of the side members a short distance off the floor and abutment means limiting the extent of the rearward and forward pivotal movement of said lever, the aforesaid arrangement of the main and auxiliary supporting wheels permitting the truck to be steered by manual operation of the said tow-bar and operating lever whilst supported on the main wheels only.

5. A hand truck of the character described comprising a frame having two side members, transversely extending rollers journaled in the side members and adapted to support a load carrying container, and detachable top plates fittable between the rollers and permitting the truck to support loads without a container.

6. A hand truck comprising the combination

of a rigid frame, rotary means normally supporting said frame just clear of the floor, anti-friction means forming the effective top of said truck, a tow bar pivoted adjacent the front end of said frame, a rigid load engaging link connectible with said tow bar for pivotal movement thereon, hook-like means at one end of said link arranged to maintain engagement with a load without jamming whilst the link moves the load in either direction, a handle at the other end of said link beyond its point of connection with the tow bar for engaging and disengaging load and link, parts of said frame at the rear end forming a slope from top to bottom up which the load can be drawn onto the top of the truck and down which it can be pushed onto the floor through the intervention of said link by operating the tow bar as a lever about its pivot on the frame.

7. In a hand truck as claimed in claim 6, a frame comprising longitudinal side members and a transverse bar adjacent the front end forming a pivot for the tow bar and a purchase for a foot of the operator when operating said bar as a lever to draw a load onto the truck.

8. In a hand truck structure, the combination of a tow bar pivoted adjacent one end of the frame about a horizontal axis and operable as a lever to move a load onto and off the truck, and a rigid load engaging link pivotally associated

with said lever, and hook-like means at one end of said link, the inner surface of which hook-like means encloses more than half a circle with a gap at the lower side thus maintaining engagement as desired with a handle on the load when the lever is operated in either direction.

9. In a hand truck structure, the combination of a truck frame, a tow bar pivoted about a horizontal axis adjacent the front end of the truck frame and operable as a lever to move a load onto and off the truck, a rigid load engaging link pivotally connectible with said lever, a hook at one end of said link, and bolt-like means mounted on said link preventing undesired disengagement of said hook from said load and means operable at will for retracting said bolt to allow engagement and disengagement of said hook and said load.

10. In a hand truck structure of the type described, a tow bar pivoted to the frame and serving as a lever for moving the load on and off the truck through the intervention of a load engaging link operatively connectible with said lever for pivotal movement, and means operable whilst loading and unloading the truck permitting variation of the pivotal point of said link and thus providing for multiple hauls and pushes respectively on the load.

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