Dec. 8, 1959 S. H. OSBORN 2,916,170

HAND TRUCK

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FIG. 1

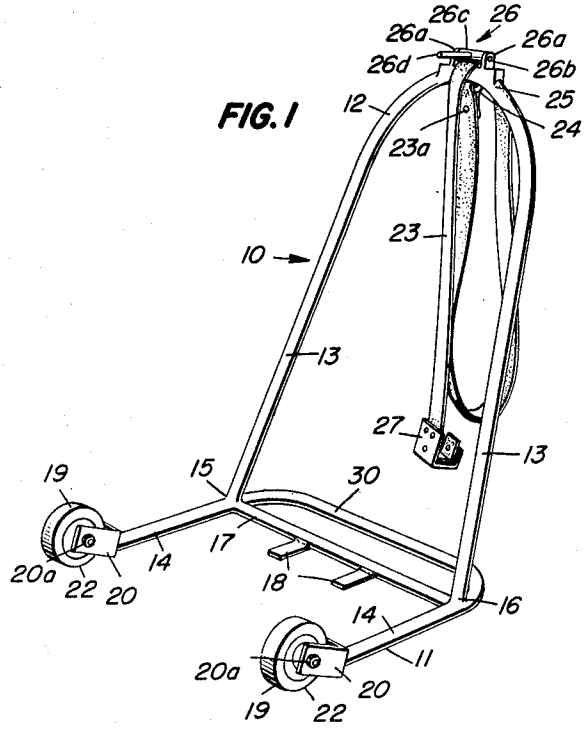


FIG. 3

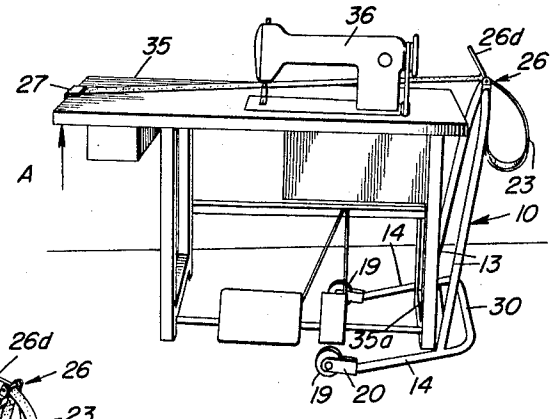
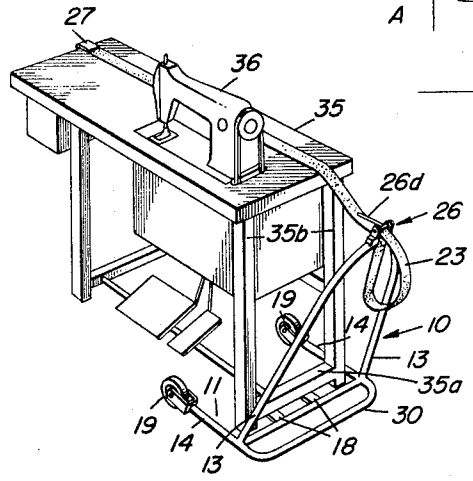


FIG. 2



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HAND TRUCK

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2 Claims. (Cl. 214—375)

This invention relates to hand trucks for lifting and transporting articles such as boxes, crates or machinery tables and affords improvements in the handling and movement of objects which in the absence of aid of mechanical means do not easily lend themselves to being carried.

An object of the present invention is the provision of a practical and reliable hand truck by means of which heavy or cumbersome items may be moved from place to place with greatly diminished physical exertion by a user of the truck.

Another object of this invention is to provide a device with which one person, unassisted, may lift and transport weighty or unwieldy long objects without suffering hurtful strain.

A further object is the provision of a normally operated article lifting and transporting device which is compact, strong and easy to construct and which mechanically relieves the burden of lifting the article, the burden of holding the article lifted and the tiring effect of moving the article to another location.

A still further object of the invention is the provision of a hand truck which may be easily and positively connected to an article to be resituated and which truck after being connected reliably sustains the article in a desired relative position to the body thereof so that the article may be hauled to another location.

Another object is that of providing a hand truck which balances out at least a portion of the weight of the article across the rolling contact means on which the article is being transported.

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

The invention therefore resides in the apparatus, and in the combination of the several elements and features of construction, the scope of the application of which is indicated in the following claims.

In the accompanying drawing, representing a preferred embodiment of hand truck constructed in accordance with the invention:

Figure 1 is a perspective view of the hand truck;

Figure 2 is a perspective view of the hand truck in position preparatory to the lifting of a table and a machine on the table; and

Figure 3 is a perspective view of the truck and table, the table being manually lifted up at arrow A and thus tilted so that all four legs of the table are off the floor and the load is carried by the truck wheels.

Like reference characters denote like components throughout the several figures of drawing.

As conducive to a clearer understanding of certain features of the present invention, it may be helpful at this point to present briefly some of the many problems which have been encountered in the handling of objects of heavy or unwieldy type. There are industrial problems, for example, in factories and the like, and in way of illustration mention is made of work tables or benches which

have to be moved to a new location sometimes with tools or equipment still installed on the table. Frequently, the table-mounted apparatus is permanently situated near one end of the table so that a maximum, uninterrupted table surface will remain available to provide work space such as for the feeding of work pieces to the machine. The benches or tables, whether to be moved alone or along with the particular equipment, usually call for a considerable work effort. With the extra weight of machinery on the table this weight more often than not is so distributed as to cause the center of gravity to be shifted from the geometrical center of the table to a point approaching an end of the table, thus making the difficulty of lifting and carrying more acute. Normally the relocation of these tables, either with or without further weight, is accomplished by having several men share their efforts, since the tables often are either too unwieldy or are too heavy, or both, to be handled by one man. Even with several persons involved in the lifting, severe physical strain sometimes is suffered. Then, too, there is the loss which arises from interrupting other duties and reducing productivity of too many people in the factory, merely to have heavy or unwieldy objects transferred to a new location whenever the need arises.

An important object of this invention accordingly is the provision of a hand truck which is well suited for lifting and transporting heavy work tables having industrial machinery mounted thereon, such as industrial sewing machines, and which truck is thoroughly capable of being operated by one person who can perform alone the procedure of lifting, transporting, and resituating the work table without inordinate exertion.

There are of course other places besides factories where problems of this general sort might just as well be encountered, as for example in the home workshop with regard to the movement of benches and bench mounted power tools, in retail shops with respect to the movement of tables, cartons, crates, display cases or fixtures, on construction jobs, in warehouses, railway depots, loading docks, and in fact anywhere that certain objects need to be lifted and transferred with reduced physical effort by a person or persons confronted by the problem.

In the embodiment of the invention represented in the accompanying drawing a hand truck 10 (see Figure 1) includes a rigid frame having a substantially horizontal U-shaped frame component 11 and an inverted, substantially vertical or upright U-shaped frame component 12. The frame components advantageously are made of strong metal tube or bar stock. The substantially vertical frame component 12 has legs 13 which diverge downward from each other from an integral upwardly rounded cross member 25 remaining at the upper ends of the legs and interconnecting the legs, and the substantially horizontal frame component 11 has spaced parallel arms 14 which are bent outward from a transverse bar 30 between the arms. Another transverse bar, this being bar 17, extends across arms 14 and is in substantially parallel relation to bar 30 somewhat forward of the latter along the arms. Bar 17 conveniently is joined to the arms by welding and so are legs 13 of the substantially U-shaped frame component 12. Points of juncture, 15 and 16, of legs 13 with arms 14 illustratively are immediately annexed to the ends of transverse bar 17 so that the latter bar forms a direct tie across the ends of legs 13. Legs 13 preferably are inclined backward somewhat from arms 14 so as to form obtuse angles of approximately equal magnitude (say a magnitude of anywhere from about 100 degrees to about 130 degrees) with the arms measured toward the free ends of the arms.

The free ends of arms 14 are equipped with rolling contact means for contacting the floor or other surface

over which the hand truck is to be moved. Thus, for example, outwardly and upwardly inclined yokes 20 are welded at their backs to the free ends of arms 14, and the opposite spaced side members of each of the yokes support a transverse interconnected pin 20*a* on which a corresponding wheel 19 of the truck is axially rotatably mounted. Horizontal frame component 11 defines an article-receiving recess between arms 14, and the truck frame has means affixed thereto on which an end of the article to be transported can rest and be lifted. The rest means ultimately lends support to the article while the article is being carried over the floor on the truck. A very worthwhile embodiment of the rest means includes a plurality of spaced parallel projections or tines 18 secured to the underneath side of transverse bar 17 as by welding. These projections extend a substantial distance outward from the bar 17 toward the open side of the substantially horizontal U-shaped frame component 11 and advantageously lie in a plane in common with the lowermost points 22 on the peripheries of wheels 19, thus more easily to be inserted under an object which is resting flush on the floor.

Portion 25 of the inverted, substantially vertical U-shaped frame component 12 on its top side supports a clamp 26 which includes spaced perforated ears 26*a* welded to portion 25. The top surface of portion 25 between these ears conveniently is made flat to afford a fixed jaw of the clamp. The apertures of the ears are aligned and receive pins 26*b* extending from the corresponding adjacent ends of a cylindrical rotary clamp jaw 26*c* situated between the ears 26*a* and parallel to the fixed clamp jaw. The pins are aligned with each other on a line parallel to the axis of the cylindrical jaw, but are removed from the axis of the cylinder, and thus the cylinder will rotate eccentrically to close and open the space between it and the fixed jaw. An upstanding lever 26*d* extends radially outward from the cylinder so that the clamp may be controlled by the operator of the hand truck 10. A flexible strap 23 made of belting or other suitable material extends between the eccentric rotor of clamp 26 and the fixed jaw and has a riveted loop end 23*a* hitched to an anchor element 24 on the underneath side of frame portion 25. The free end of the strap 23 is attached to a rigid hook 27. In the present embodiment the hook is provided having a channel shape in which one of the channel legs is longer than the other channel leg. The longer leg of the channel, as it projects outward, is in longitudinal alignment with the length of strap 23 and in this relation is riveted to the strap. By extending the strap over the inside faces of the hook and by discreet riveting, or other fastening practice, a good padding against scratching portions of objects such as table edges is achieved especially when the strap is made of belting or other suitable material for protecting the objects being hauled. The hook may of course take any of a number of forms and in certain instances may even be an object-piercing hook.

The operation of truck 10 will be explained in conjunction with lifting and moving a work table 35 on which an industrial sewing machine 36 is situated, although it will be distinctly understood that trucks provided in accordance with this invention may readily lend themselves to the handling of any of a number of different types and classes of objects such as crates, cartons, pieces of furniture, work benches, or other objects which are in harmony with the mechanical capabilities of the truck. Since the sewing machine 36, as shown, is nearer one end of the table than the other, it is advantageous to approach the end of the table nearest the machine with the truck and to lift that end first. Thus, the truck is brought to the table as represented in Figure 2, and in this position arms 14 and their corresponding wheels 19 are on opposite sides of the table and projections 18 are situated underneath transverse table member 35*a* which interconnects the adjacent table legs 35*b* near the lower ends of these legs. At this point, the U-shaped frame component 11 of the truck is in its down position. Strap 23 then is laid out down the length of table 35 and hook 27 is engaged on the far edge of the table top. With clamp 26 loosened by rotation of lever 26*d*, it is possible then for the operator of the truck to pull a length of the strap 23 backward through the clamp, thus reducing the length of strap remaining between the clamps and hook 27. The substantially vertical U-shaped frame component 12 meanwhile serves as a lever when pushed forward by the operator and the upper end of component 12 accordingly has a longer moment arm about wheels 19 than do the projections 18. Thus projections 18 are rotated powerfully upward with arms 14 and transverse bar 17 about wheels 19, and the projections transmit lifting thrust to the corresponding table end. This thrust is applied underneath member 35*a* interconnecting the adjacent table legs. Table 35 accordingly begins to tilt about the other pair of its legs which are remote from the truck. As the operator further diminishes the length of strap 23 remaining between hook 27 and clamp 26, projections 18 further rotate upward and further tilt the table. By having the legs 13 of the substantially vertical frame component 12 in obtuse angle relation backward from wheels 19, there is adequate clearance for the frame component 12 to approach the table end during the lifting action. When tilting of the corresponding end of the table has been completed, the operator sets clamp 26 by rotating the lever 26*d*. Eccentric clamp jaw 26*c* thus is rotated to close the space between itself and the fixed clamp jaw on frame portion 25 and this compresses and fastens the strap 23 so firmly that it cannot slip. The length of strap 23 then remaining between clamp 26 and hook 27 is in tension and, with the aid of the hook and clamp, the truck frame and projections 18 are held in their upwardly rotated positions with respect to the wheels 19. Then the operator simply walks to the end of table 35 which is remote from the truck 10 and lifts that end by manual force represented by arrow A in Figure 3. Table 35 thus rotates about wheels 19 and may readily be held with all of its legs clear of the floor and pushed or pulled with the truck as a unit by the operator. It will be noted that wheels 19 are disposed along the length of table 35 and that at least a portion of the weight of the table and machine 36 is balanced out across these wheels. On reaching intended destination, the operator sets down the end of the table which he has been manually supporting, walks back to the truck end of the table and releases clamp 26, thus freeing the frame of the truck to rotate downward as a unit with projections 18 to the floor, the rotation again being about wheels 19. Hook 27 is disengaged by the operator and the truck is pulled away from the table.

Thus it will be seen that in this invention there is provided a hand truck by which the various objects noted herein together with many thoroughly practical advantages are successfully achieved. In view of the principles of construction and operation involved it will be appreciated that the apparatus can be built in compact form as compared with the size of the articles which it is expected to accommodate, and that nevertheless the apparatus stands as a very capable handling aid.

As many possible embodiments of the invention may be made, and as many possible changes may be made in the embodiment hereinbefore set forth, it will be distinctly understood that all matter described herein is to be interpreted as illustrative and not as a limitation.

I claim:

1. A hand truck comprising a frame having a substantially horizontal U-shaped component affording spaced arms to accommodate between said arms an object which is to be transported, a transverse portion of said component supporting spaced projections extending toward the open side of said component between said arms for

insertion under the corresponding end of said object, said arms having free ends and each of said ends independently of the other having a wheel for rolling contact with a surface over which the object is to be moved, an inverted substantially vertical U-shaped component of said frame extending upward from said arms of the substantially horizontal U-shaped component behind said projections and forming obtuse angles with said arms toward the wheel ends of said arms, said projections and frame being rotatable upward as a unit about said wheels thus for the corresponding end of the object to be lifted upward on said projections and tilted about the far end of said object, a clamp on the upper end of said substantially vertical frame component having an eccentric rotor adjacent to said frame and an operating lever for said rotor, and a flexible strap having a hook for engaging said far end of the object, said flexible strap being adjustable as to length past the eccentric rotor of said clamp for putting tension on said hook in the upwardly rotated position of said frame and for connection to said frame by said eccentric rotor to prevent downward rotation of said frame relative to said object, the end of said object remote from said frame accordingly being available for lifting so that said frame, projections and object may be pushed as a unit on said wheels.

2. A hand truck comprising a frame having a substantially horizontal U-shaped component affording spaced arms to accommodate between said arms an object which is to be transported, a transverse portion of said component supporting spaced projections extending toward the open side of said component between said arms for insertion under the corresponding end of said object, said

arms having free ends and each of said ends independently of the other having a wheel for rolling contact with a surface over which the object is to be moved, an inverted substantially vertical U-shaped component of said frame extending upward from said arms of the substantially horizontal U-shaped component behind said projections and forming obtuse angles with said arms toward the wheel ends of said arms, said projections and frame being rotatable upward as a unit about said wheels thus for the corresponding end of the object to be lifted upward on said projections and tilted about the far end of said object, clamp means on the upper end of said substantially vertical frame component, and a flexible member having a hook for engaging said far end of the object, said flexible member being adjustable as to length through said clamp means for putting tension on said hook in the upwardly rotated position of said frame and for connection to said frame by said clamp means to prevent downward rotation of said frame relative to said object, the end of said object remote from said frame accordingly being available for lifting so that said frame, projections and object may be pushed as a unit on said wheels.

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