July 24, 1962 E. H. FISHER 3,045,847

WHEELBARROW ATTACHMENT

Filed Nov. 12, 1959

3 Sheets-Sheet 1

FIG-2

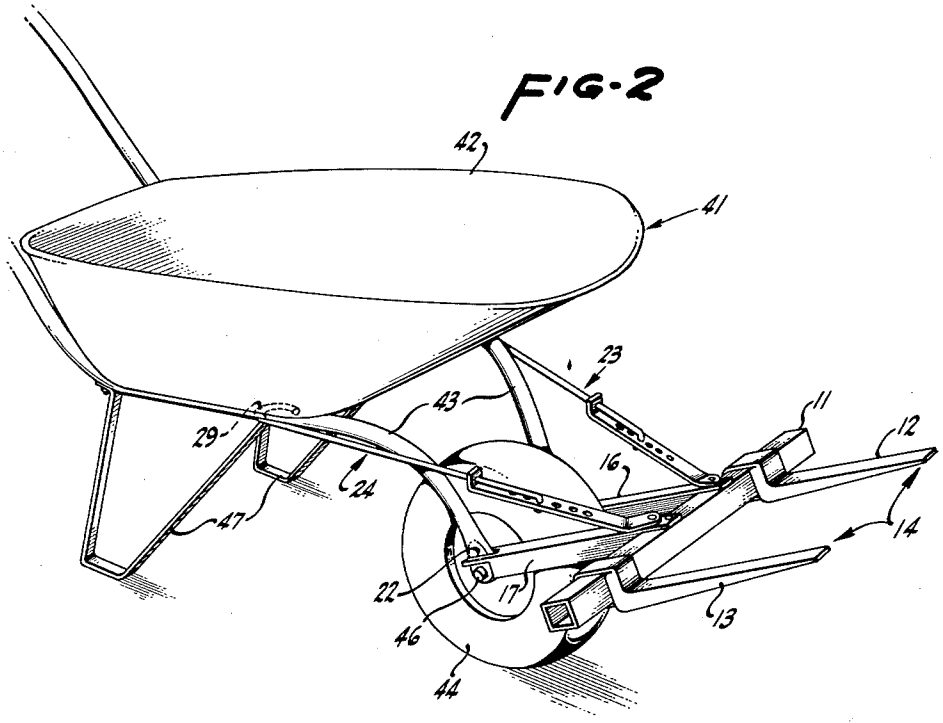
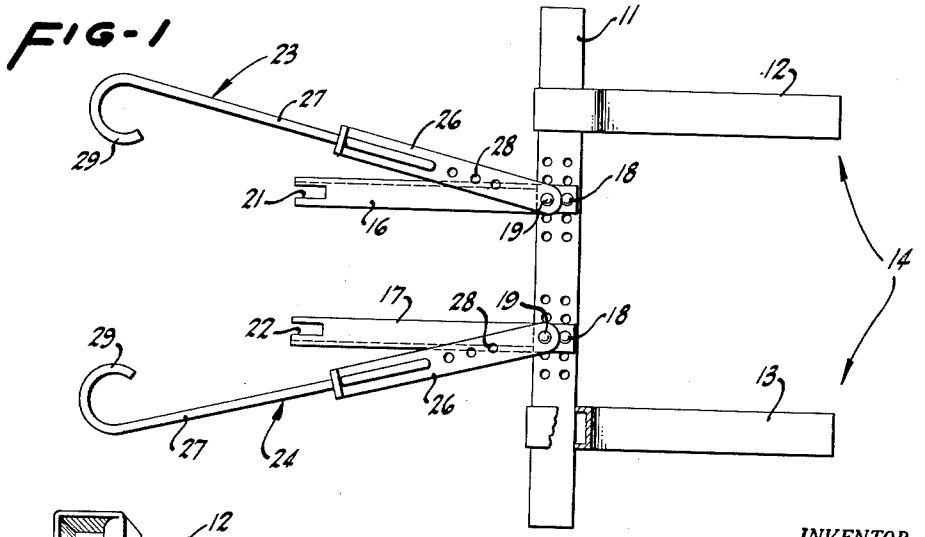


FIG-1



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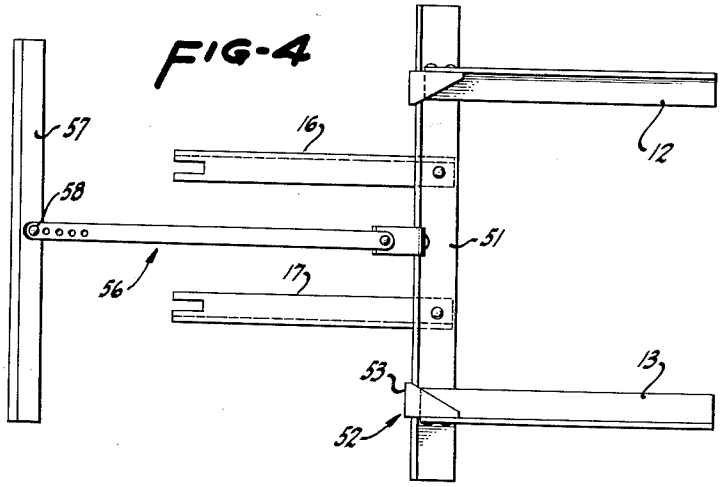
FIG-3

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WHEELBARROW ATTACHMENT

Filed Nov. 12, 1959 3 Sheets-Sheet 2

FIG-4



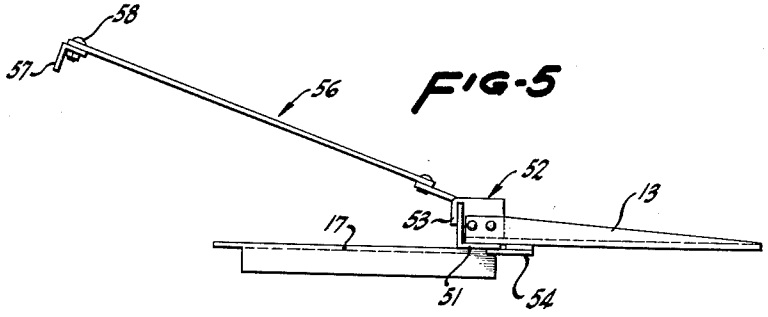


FIG-5

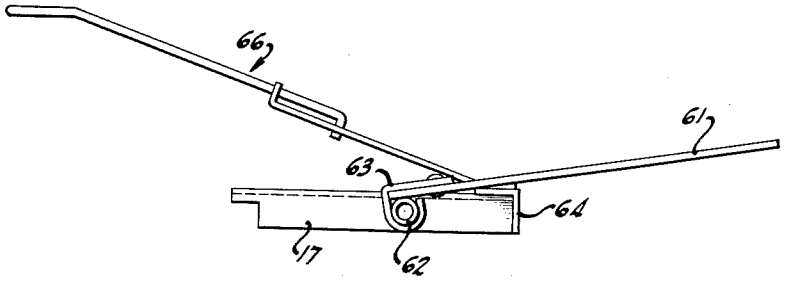


FIG-6

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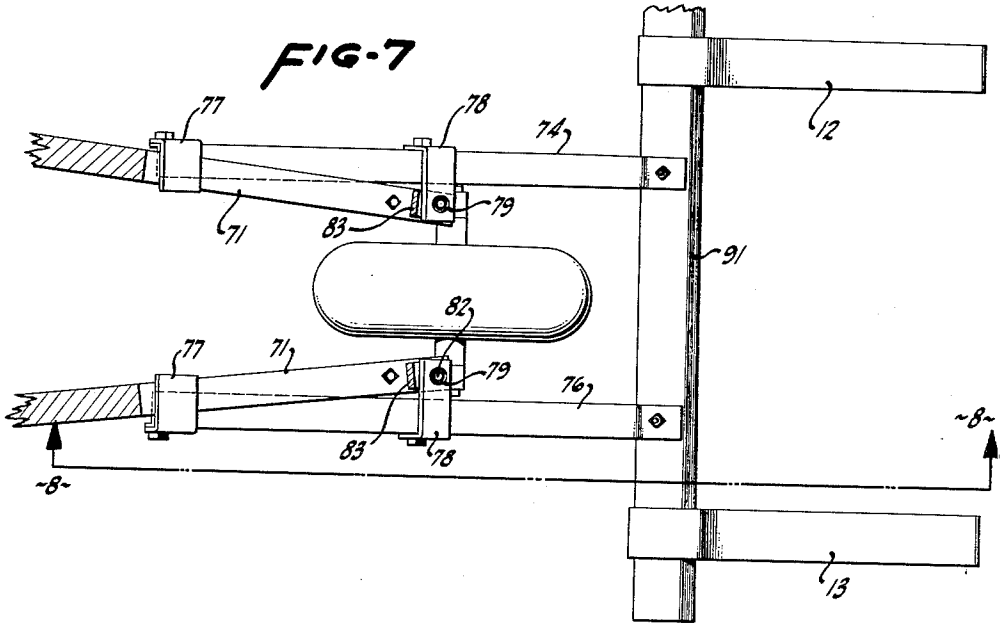
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July 24, 1962 E. H. FISHER 3,045,847

WHEELBARROW ATTACHMENT

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FIG-7



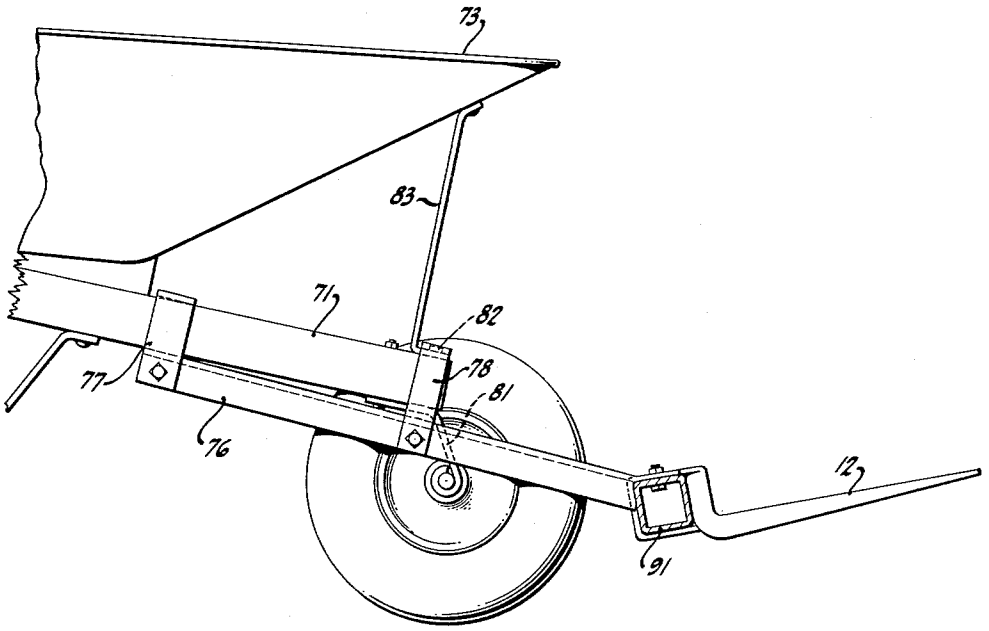


FIG-8

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United States Patent Office 3,045,847 Patented July 24, 1962

3,045,847

WHEELBARROW ATTACHMENT

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Filed Nov. 12, 1959, Ser. No. 852,285
7 Claims. (Cl. 214—370)

The present invention relates to an attachment for wheelbarrows and the like, and is particularly directed to the provision of a fork lift attachment which is quite readily engaged with and disengaged from wheelbarrows and the like for adding a lifting function to devices of this type.

There is afforded by the present invention a very substantial and advantageous extension of the utility of conventional wheelbarrows. This is herein accomplished by the provision of a fork lift attachment, which may be readily engaged with a wheelbarrow to provide for the lifting of heavy or bulky objects with the wheelbarrow. The present invention finds particular application in the lifting and moving of boxes or tubs, such as, for example, planter boxes, and provides for the engagement with such objects at a substantial distance from structural members which might otherwise encounter and damage overhanging portions of the elements being lifted, such as, for example, plants growing in planter boxes. A very substantial mechanical advantage is achieved in the lifting of objects with the present invention in detachable engagement with the wheelbarrow, so that only a minimum physical effort is required to lift and transport objects of a weight which would otherwise be relatively impossible to move by hand equipment. The present invention is further advantageous in maintaining the lifted load at all times in close proximity to the ground, so that a very steady balance is maintained and dangers of upsetting are minimized.

The present invention, in brief, includes a very simply constructed and readily demountable attachment for wheelbarrows. This attachment structure includes a protruding fork which may be employed either to laterally grip objects to be lifted or may be employed to slide under such objects to thereby raise same by pivoting the wheelbarrow itself into normal wheeling position. A minimum of structural elements are required for the present invention, so that a marked simplicity in structure is herein achieved. A very substantial strength and ruggedness of the attachment is attained by the utilization of a novel and advantageous mounting arrangement for engaging the invention with a wheelbarrow structure. Furthermore, the present invention is adapted for attachment to wheelbarrows of various structures, and this attachment is quite readily accomplished without the necessity of bolting or otherwise fastening the device to the wheelbarrow. As a result of the demountable feature of the present invention, the apparatus hereof is quite readily and rapidly attached to and removed from wheelbarrows, so as to thereby achieve maximum utility. The demountable feature of the present invention further provides for ready storage of the attachment when same is not in use upon a wheelbarrow. Additionally, the present invention is readily separable into a minimum number of individual components which readily fit together to form a compact package for shipping and/or storage,

In brief, the present invention provides an attachment including a pair of tines extending forwardly from a structural cross-member, that is, in turn, adapted for mounting upon a conventional wheelbarrow. The mounting means includes thrust members and tension members, which are preferably adjustable to accommodate attachment of the invention to wheelbarrows of varying sizes and configurations. As a further advantage and feature of the present invention, the forwardly extending tines thereof may be provided in relatively movable relationship, so as to thereby move upon the structural mounting member for affording desired spacing between such tines. This is advantageous in the utilization of the attachment hereof for lifting tapered objects, wherein it is desired to engage the sides of the object with the tines of the fork lift attachment. The particular mounting means herein employed, including both thrust members and tension members, further serves to materially simplify the structure of the present invention commensurate with the achievement of maximum structural strength.

It is an object of the present invention to provide an improved and readily demountable fork lift attachment for wheelbarrows.

It is another object of the present invention to provide an improved wheelbarrow attachment having a fork member demountably attached to a wheelbarrow by compression and tension members.

It is a further object of the present invention to provide a fork lift attachment for wheelbarrows which is adapted for detachable engagement therewith, and including no fastening means in such attachment.

Various other possible objects and advantages of the present invention will become apparent to those skilled in the art from the following description of particular preferred embodiments hereof, however, no limitation is intended by the terms of such description, and, instead, reference is made to the appended claims for a precise delineation of the true scope of the present invention.

The invention is illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of a preferred embodiment of the fork lift attachment of the present invention;

FIG. 2 is a perspective view of the fork lift attachment of FIG. 1 in engagement with the conventional wheelbarrow;

FIG. 3 is a perspective view of a single tine of the fork lift attachment, illustrating structural details thereof;

FIG. 4 is a plan view of an alternate embodiment of the fork lift attachment of the present invention;

FIG. 5 is an elevational view of the embodiment of FIG. 4;

FIG. 6 is an elevational view of a further embodiment of the present invention, and illustrating alternate tine attachment details;

FIG. 7 is a plan view of a further embodiment of the present invention, particularly adapted to certain wheelbarrow structures; and

FIG. 8 is an elevational view of the embodiment of FIG. 7 taken in the plane 8—8 of FIG. 7.

Considering now the present invention in some detail, and referring first to FIGS. 1 and 2 of the drawing, there will be seen to be provided as a part of the fork lift attachment of the present invention, a transverse structural member **11** forming the back of a fork. This member **11** may be formed as a rectangular tube and there is mounted upon this structural member a pair of tines **12** and **13** forming the fork **14** of the invention. The tines **12** and **13** extend forwardly of the fork lift attachment, and thus transversely of the structural member **11**. In accordance with one embodiment of the present invention, these tines **12** and **13** may be mounted upon the structural member **11** to slide therealong, so as to thereby afford control over the lateral displacement of the tines. As illustrated in FIG. 3, an individual tine **12** may be formed of a channel iron having the side webs thereof cut off or removed at the back portion of the tine, this back portion then being folded about a rectangle, as illustrated. By the appropriate dimensioning of the rectangular opening formed laterally through the tine by folding the rear portion thereof, it will be seen that the tine will fit about the

structural member 11 so as to thereby be slidable along the length of this member. Furthermore, by the provision of a rectangular cross-section to the structural member 11 and a like configuration to the openings at the rear of the tines, it will be seen that these tines are restrained from rotating about the structural member. Preferably, the rear end of the tine 12, which is folded forward to complete the square or rectangular opening at the rear of the tine, is firmly secured to the forward portion of the tine, so as to thereby provide maximum structural rigidity to the tine structure. The formation of the tine from a channel so as to thereby leave the side channel portions on the forward portion of the tine will be seen to afford a material strengthening of this member, and, preferably, this side portion of the tine is tapered toward the front of the tine so as to thereby provide a wedge-shape to the tine in cross-section, again as illustrated.

Attachment of the fork lift of the present invention to wheelbarrows or the like, is herein accomplished by the provision of both compression and tension members extending rearwardly from the structural member 11. Thus, as shown in FIG. 1, there will be seen to be provided a pair of compression or thrust members 16 and 17, which are preferably formed of angle iron or the like, and which are separately secured to the structural member 11, as by means of bolts 18. These thrust members 16 and 17 extend perpendicularly from the structural member 11 in the opposite direction from the tines and are each provided at the rear ends thereof with slots 21 and 22, respectively. These slots 21 and 22 are formed in the upper surface of the thrust members at the rear thereof, and extend generally longitudinally of the thrust members toward the structural member 11. Preferably, the side web of the thrust angle members is partially cut away at the rear end of these members, for reasons set forth in more detail below.

Also attached to the transverse structural member 11 are a pair of tension elements 23 and 24. These tension elements may be advantageously formed in two parts to afford adjustment in the length thereof, so that the fork lift attachment of the present invention may be readily engaged with wheelbarrow structures of varying sizes and configurations. Although a multitude of ways are possible to provide the desired adjustment in the length of the tension elements, a material simplicity of design and low cost of construction is herein achieved by the formation of each of such elements from a forward strap 26 and an engaging bar 27. The strap 26 is disposed with the forward portion thereof resting upon the structural member 11 atop the thrust member 16 and is bent to extend upwardly from this member. The strap is affixed in pivotal mounting upon the structural member 11 by means of a bolt 19, which may extend through both the structural member and thrust member so as to thereby afford greater structural rigidity to the attachment of the thrust member and structural member while at the same time providing for mounting of the tension element. The strap 26 extends rearwardly and upwardly from the structural member, while at the same time slanting outwardly from an axis transversely through the structural member and fork. The rear end of the strap 26 is bent upwardly and has an opening formed therein, through which the bar 27 extends. A plurality of spaced apertures 28 are formed in the strap 26, along the length thereof and the forward end of the bar 27 is bent downwardly so as to fit into any one of these apertures. By providing the opening in the rear upturned lip of the strap 26 of sufficient size, it will be seen to be possible to pivot the bar 27 so as to slip the front end thereof out of an aperture 28 in the strap 26, and to then slide the bar 27 along the strap until a desired overall length of strap and bar are attained. In this position, the bar is then pivoted to move the front end downwardly into one of the apertures in the strap, and to thereby prevent further longitudinal motion of the bar with respect to the strap. The rear end of the bar 27 is curved to form a hook 29 extending inwardly toward a central axis of the fork lift attachment, as illustrated. This hook 29 has a substantial radius of curvature, so as to readily fit about structural members of the wheelbarrow, as set forth below.

Engagement of the fork lift attachment of the present invention with a wheelbarrow structure is quite readily and rapidly accomplished, without the necessity of employing fastening devices. There is illustrated in FIG. 2 a preferred embodiment of the present invention in engagement with a wheelbarrow 41, including a bucket 42 mounted atop a pair of longitudinal frame members 43, which, in turn, are carried upon a wheel 44 rotatably mounted upon an axle 46 extending between the forward extremities of the frame. Generally U-shaped legs 47 are conventionally provided beneath the rear portion of the wheelbarrow bucket in connection to the frame 43 to support the bucket upon three points when same is at rest. Attachment of the fork lift arrangement hereof to the wheelbarrow structure is readily accomplished by fitting the thrust members 16 and 17 onto the frame 43 of the wheelbarrow immediately above the axle thereof and on opposite sides of the wheel 44. The thrust members are engaged with the wheelbarrow frame at the slots 21 and 22 provided in the thrust members, so that the thrust members then slide onto the wheelbarrow frame immediately above the wheelbarrow axle. By pivoting the fork lift attachment upwardly at the front thereof, it is then possible to place the tension member hooks 29 immediately behind the forward portion of the wheelbarrow legs, so as to extend about same. Pivoting of the fork lift attachment downward then engages the tension members with the wheelbarrow structure at the hooks 29, so as to prevent further downward pivoting of the fork lift attachment. This is the position in which the present invention is illustrated in FIG. 2 of the drawings.

With the fork lift attachment of the present invention engaged with a wheelbarrow, as illustrated, the wheelbarrow is then adapted for the ready lifting and moving of heavy or bulky objects through the use of the fork 14 extending forwardly of the wheelbarrow structure. In use, the wheelbarrow is lifted at the rear end thereof by grasping the handles formed at the rear terminals of the frame 43, so as to be movable upon the wheelbarrow wheel 44. This will be seen to pivot the fork lift attachment of the present invention downwardly, so that the tines thereof are in position to slide under objects to be lifted, or, alternatively are in position to laterally engage a tapered object to be lifted. In the lifting of bulky or heavy objects wherein the tines of the present invention are adapted to be moved under the object, it is only necessary for the operator to pivot the wheelbarrow upwardly at the rear end thereof about the wheel 44, so as to position the tines of the present invention upon the ground and then to roll the wheelbarrow forward to slide the tines under the object. Correct lateral placement of the tines 12 and 13 may be accomplished by physically grasping same at the rear ends thereof, and sliding them along the structural member 11. With the tines of the fork lift attachment hereof disposed beneath a heavy or bulky object to be moved, it is only necessary for the operator to then manually depress the wheelbarrow handles, so as to pivot the fork lift attachment and wheelbarrow for raising the object.

It will be appreciated that a very substantial leverage is afforded by virtue of the substantial extension of the wheelbarrow frame 43 rearwardly of the wheelbarrow axle, which forms the pivot point about which the object is raised. It has been found that objects of great weight may be raised with very little effort in this manner. Inasmuch as the fork lift attachment is at all times close to the ground, it will be appreciated that the balancing of an object upon the fork 14 poses almost no problem. Only a relatively slight raising of the object is necessary for same to be moved by walking with the wheelbarrow

to move same upon the wheelbarrow wheel 44. By maintaining the object close to the ground, no danger of unbalancing occurs. It is to be further noted that the object to be lifted is at all times maintained at a substantial distance from any wheelbarrow elements which might otherwise interfere with overhanging portions of such object. This is of particular advantage wherein the wheelbarrow and attachment may be utilized to move elements or objects, such as planter boxes, having shrubbery or the like growing therein.

Particular types of planter boxes, for example, are formed with tapered sides, and in this instance it is not necessary for the fork of the present invention to be placed beneath the box in order to raise and move same. It is only necessary for the tines 12 and 13 to be properly adjusted as to spacing upon the transverse structural member 11, and for the wheelbarrow and attachment to then be moved toward the tapered box, so that the tines slide along opposite sides thereof, substantially below the top of the box. By depressing the wheelbarrow handles, it will then be seen that the tines engage the sides of the tapered box, or object, so that same is lifted as the wheelbarrow is pivoted about the wheel thereof. This particular application of the present invention is highly advantageous in gardening and nursery work. In this respect, it is noted that although the tines 12 and 13 may be readily moved longitudinally of the transverse structural member 11 by physically grasping the tines at the rear end thereof and sliding same along the member, the application of an outward force to the tines adjacent the center or front portions thereof will not slide the tines outwardly upon the structural member. Rather, there will be applied a pivoting force to the tines, which will then tend to bind same upon the transverse member 11, so that they will be fixed in position and will firmly grasp the tapered member disposed therebetween.

In order that the fork lift attachment of the present invention may be adapted to fit a wide variety of wheelbarrow structures, there may be provided a plurality of apertures vertically through the transverse structural member 11 of the fork lift attachment, so that the thrust members 16 and 17 may be affixed to different points thereof. While a majority of conventional wheelbarrow structures of the single-wheel variety will be fitted by a single positioning of the thrust members 16 and 17, lateral displacement of the thrust members may be desirable to properly engage wheelbarrows of the type having two wheels. Also, the cut-out portion upon the side web of the angle forming the thrust members is provided to accommodate those wheelbarrow structures wherein the axle extends substantially laterally outward of the wheelbarrow members 43.

It will be appreciated that various alternative structures are possible in connection with the fork lift attachment of the present invention, and certain of these structures are hereinafter described, however, in this connection it is noted that the tines of the fork hereof are in each instance fixed against rotational motion. In this respect, a plurality of different configurations are possible, and there is illustrated in FIGS. 1 to 3 a single, preferred manner of providing this relationship with adequate structural rigidity. There could, alternatively, be provided a plurality of other structures such as, for example, a slotted pipe in place of the square tube of the structural member 11, or an angle iron in place of such element. With regard to the movement of the tines of the fork upon this structural member, there is above described and illustrated a free sliding arrangement with a friction grip; however, it is possible in this connection to use a positive grip, such as a toothed engagement between the tines and the transverse structural member.

In FIGS. 4 and 5 there is illustrated a further embodiment of the present invention employing a modified transverse structural member and tine engagement therewith. There is also provided as a part of this illustrated embodiment a somewhat different means for attaching the tension member of the invention to a wheelbarrow structure. Referring to the embodiment of FIGS. 4 and 5, there will be seen to be provided a pair of tines 12 and 13 which are slidably mounted upon a transverse member 51. This latter member is formed of a piece of angle iron, and attachment of the tines thereto is accomplished by a bracket 52 upon each of the tines. Each bracket has a rearwardly extending lip 53 which depends downwardly so as to form a slot which is adapted to accommodate the upwardly extending portion of the angle iron of the member 51. The bracket 52 may be attached as by bolts, or the like, to an upstanding web upon the tine and will be seen to slidably engage the tine with the transverse member 51, by means of the bracket lip 53. In this instance the tines may be formed of an angle iron with an upstanding wall thereof tapered toward the front of the tine, so as to provide a minimum cross-section of the tine at the front thereof, as best seen in FIG. 5. In order to prevent the tines from being lifted from the transverse member 51, there may be provided upon each of the tines a lower plate 54, secured to the under surface of the tine and extending rearwardly for engagement of the under surface of the member 51. This is best seen in FIG. 5 wherein it will be noted that the combination of the bracket 52 and under plate 54 serves to firmly secure the tine to the angle iron of the member 51, so that the tine is movable longitudinally of this member 51, but is firmly secured to the member in connection with movement in any other direction. Engagement of the tines with the transverse member 51 is accomplished by sliding the tines onto the ends of this member.

In this embodiment of the invention, the thrust members 16 and 17 may be the same as those illustrated and described above; however, an alternative tension member may be herein provided. Thus, there is shown in FIGS. 4 and 5 tension means 56 including a forward depending portion, which may be either integral with or attached to the main body of the tension means, and which is adapted for attachment to the upstanding rear portion of the angle of the transverse member 51. In this instance, but a single tension means is employed, and same is directed upwardly and rearwardly from the transverse member 51, and is further provided with a cross-piece 57 which is removably attached to an elongated bar of the tension means 56, as by means of a bolt 58. This cross-piece 57 is adapted to fit behind the legs 47 of a wheelbarrow 41, and is thus provided with a sufficient length to extend transversely across the wheelbarrow and to fit behind the legs. A plurality of apertures may be provided in the elongated bar of the tension means 56, in order that the cross-member 57 thereof may be attached at various points therealong, to accommodate attachment of the fork lift arrangement hereof with wheelbarrows of varying sizes and configurations.

The engagement of the above-described embodiment of the present invention with wheelbarrows of conventional or unconventional structure is quite similar to that described above, with the exception of the engagement of the tension means 56. Insofar as the thrust members 16 and 17 are concerned, same are adapted to fit upon the longitudinal wheelbarrow frame 43 immediately above the wheelbarrow axle 46 in the same manner as previously described. The tension means is adapted to have the cross-piece 57 thereof wedged behind the legs 47 of the wheelbarrow and, as above noted, provision is made for adjusting the spacing of this cross-member longitudinally of the tension means in order to provide for proper positioning of the cross-member so as to thereby orient the fork lift attachment in proper or desired position in front of the wheelbarrow when attached thereto. Use of the fork lift attachment illustrated in FIGS. 4 and 5 is identical to that described above.

As above noted, various alternatives are possible in

the mounting of the tines of the fork lift attachment hereof, and in this respect attention is invited to FIG. 6, wherein the tine 61 is illustrated as being slidably mounted upon a transverse shaft 62 by means of a wrap around bracket 63, secured to the tine and folded about the shaft. In order to prevent pivoting of the tine 61, the transverse structural member of the fork lift attachment is disposed in front of this shaft 62, and the tine extends over the top of the structural member. As herein illustrated, such member may be provided as an angle iron 64 oriented with the open side thereof to the rear and downwardly of the attachment. The thrust members 16 and 17 are secured directly to the transverse angle iron 64 in any suitable manner, such as that described above, and, likewise, the tension member or members 66 are also secured to this angle iron, as at the upper surface thereof. By the provision of the shaft 62 behind the transverse structural angle 64 and by extending the tines 61 over the top of the latter, it will be seen that the tine 61 is prevented from rotating downwardly or clockwise in the illustration of FIG. 6. This alternative structure is also suitable for use with a wheelbarrow wherein the shaft 62 also forms the wheelbarrow axle. It will, of course, be appreciated that in such instances the thrust member 17 will terminate in the vicinity of such axle, so as to thereby engage longitudinal frame members of the wheelbarrow in order to transmit thrust thereto from the fork of the attachment.

Yet another alternative embodiment of the present invention is illustrated in FIGS. 7 and 8, and this embodiment is particularly adapted for attachment to wheelbarrows of the construction type, wherein rather large, straight, side frame members 71 are provided to support the wheelbarrow bucket 73. Although it is believed evident that the above-described embodiments of the present invention are readily adapted for attachment to a wheelbarrow of this structure, a certain simplification of the overall structure may be afforded by the utilization of the embodiment of FIGS. 7 and 8 in connection with wheelbarrows of this type. As shown in these figures, there are provided a pair of longitudinal bars 74 and 76 formed, for example, of angle iron. Each of these bars is provided with a rear mounting bracket 77 and a central mounting bracket 78 for clamping onto the wheelbarrow frame 71. The brackets are removably secured to the bars as by bolts and elongated slots may be provided to adjust the brackets to removably engage these bars with wheelbarrow structures of varying sizes. In order to prevent slipping of the attachment, there is preferably provided an opening 79 through the upper end of the central bracket 78. This type of wheelbarrow structure normally includes on each side thereof a depending arm 81 attached to the frame by a bolt 82 and adapted to mount the wheelbarrow axle. Vertical brackets or braces 83 may also be secured by these same bolts to support the forward end of the wheelbarrow bucket 73. This then provides bolt heads atop the wheelbarrow frame 71 at the forward end thereof, and by the provision of apertures 79 in the central attachment brackets it is possible to fit the brackets over these bolts so as to prevent the bars 74 and 76 from slipping of shifting on the frame.

This particular embodiment may be formed with the forward portions of the bars 74 and 76 defining tines of an attachment fork or fork lift arrangement, or alternatively, there may be provided a transverse member 91, as illustrated, to slidably carry separate tines 12 and 13 thereon. It will be appreciated that material simplification is achieved by the utilization of the bars 74 and 76 directly as tines of the fork lift arrangement, however, it is also to be appreciated that in this instance no lateral adjustment of the tine positions is possible. The embodiment illustrated in FIGS. 7 and 8 includes a similar tine and transverse member relationship to that illustrated and described in connection with FIGS. 1 to 3, and thus same is not herein further described. It is noted, however, that the transverse member 91 may be directly bolted to the forward ends of the bars 74 and 76.

Attachment of the device illustrated in FIGS. 7 and 8 to a wheelbarrow of the type illustrated in FIG. 8 is quite readily accomplished by slipping the brackets 77 and 78 onto the wheelbarrow members 71 and 72 from opposite sides thereof. It will be seen that the brackets or clamps 77 and 78 serve to hold the attachment bars 74 and 76 firmly in engagement with the wheelbarrow structure. Furthermore, the engagement of the wheelbarrow bolts 82 with the central brackets 78 through the apertures 79 therein, serves to prevent slipping of the brackets at this point. The fork lift attachment will thus be seen to be firmly anchored to the wheelbarrow in removable attachment therewith, and thus to be in position for use in the manner described at some length above in connection with other embodiments of the present invention.

The fork lift attachment of the present invention is readily adapted for removable engagement with wheelbarrows of any and all construction. The embodiment of the present invention illustrated in FIG. 1, for example, will be seen to be admirably suited to attachment to any type of wheel barrow, whether of the single or double-wheel type. The adjustments in the length of the tension means provide for accommodating wheelbarrows of varying sizes and configurations, and also the provision for varying the spacing between the thrust members of the fork lift attachment will be seen to provide for accommodating various lateral dimensions, as may be encountered in wheelbarrows of different types. Not only is the fork lift attachment of the present invention adapted for engagement with any type of conventional wheelbarrow, but, furthermore, it will be seen that such attachment is quite readily and rapidly accomplished. It is not necessary to operate fastening means in order to engage the fork lift attachment with the wheelbarrow but, instead, it is only necessary to slip the attachment onto a conventional wheelbarrow in order to provide the attachment in position for immediate use. The fork lift attachment hereof will be seen to afford a substantial extension to the utility of conventional carriers and wheelbarrows. By the utilization of this invention, it is possible for conventional wheelbarrows to be employed to lift and transport vary bulky and heavy objects with a minimum of physical effort. Furthermore, the positioning of the fork of the attachment hereof will be seen to afford a substantial advantage in the balancing of heavy and bulky objects, inasmuch as such objects are at all times maintained in close proximity to the ground. Through the utilization of both thrust and tension members, the fork lift attachment of the present invention provides for maximum structural strength with minimum structural complexity and size. Furthermore, this particular type of dual arrangement, wherein both compression and tension members are employed, serves to materially simplify the manner in which the attachment hereof is engaged with and removed from a wheelbarrow. Almost no bending stresses are encountered by the individual elements of the present invention, aside from the times thereof, and by the formation of such tines from channel iron or the like, sufficient structural rigidity is afforded thereby, so that no structural failure of the fork lift attachment hereof is encountered, even though extremely heavy weights be lifted thereby. The very material mechanical advantage afforded the operator of a wheelbarrow with this attachment thereon will be seen to provide a great advantage, for a very long lever arm is available to the operator so that it is quite easy to lift the heaviest of objects. By the elimination of transverse or bending forces on the compression and tension members of the present invention, it is possible then to provide for maximum strength of the device without the utilization of weighty and bulky structural elements. Forces are herein divided between compression and tension, so that the

weight of the object lifted is thus preferentially and advantageously dispersed for maximum lifting efficiency.

What is claimed is:

1. A fork lift attachment for wheelbarrows and the like comprising a fork having a transverse structural member with at least two tines extending therefrom in relatively movable relation on said member, a pair of thrust members affixed to said transverse member and extending from the opposite side thereof from said tines for slidably engaging a wheelbarrow frame in compression thereagainst, and at least one tension member secured to said transverse member and extending therefrom at a greater angle to horizontal than said thrust members, said tension member having protruding portions for hooking onto a wheelbarrow structure above the engagement of thrust members and wheelbarrow, whereby said fork is removably engageable with the wheelbarrow in extension in front of same and is maintained in engagement therewith by the weight of said attachment.

2. An improved fork lift attachment for wheelbarrows comprising a fork including a pair of rigid tines slidably mounted upon a transverse member and extending forwardly therefrom, a pair of thrust members secured to the transverse member of said fork in extension rearwardly thereof and slotted to engage a wheelbarrow frame adjacent the wheelbarrow axle in compression thereagainst, and a pair of controllably extensible tension elements secured to the transverse member of said fork in extension rearwardly and upwardly therefrom above said thrust members with hook means thereon for hooking onto wheelbarrow structure to removably affix the attachment to a wheelbarrow.

3. An improved fork lift attachment for wheelbarrows comprising a rectangular tube, a pair of rigid tines having rectangular openings at the rear end thereof for slidably engaging said tube in parallel extension therefrom, a pair of thrust members each having a slotted end for engaging a wheelbarrow frame immediately above the wheelbarrow axle and removably affixed to said tube in extension from the opposite side thereof from said tines, and a pair of tension elements mounted upon said tube to pivot in horizontal plane and extending upwardly from said tube above said thrust members, said tension bars having hooks formed at the outer ends thereof for hooking about wheelbarrow legs at the tops thereof, whereby the attachment is removably engageable with wheelbarrows to extend in front of same for the lifting of objects.

4. An improved wheelbarrow attachment comprising a rigid transverse member, a pair of forwardly extending rigid tines slidably mounted upon said member and restrained from rotating thereabout, tension means secured to said member and extending upwardly therefrom and away from same oppositely to said tines, said tension means having hook means at the free ends thereof for hooking onto wheelbarrow structure, and compression means removably secured to said transverse member in extension from the opposite side thereof from said tines below said tension means, said compression means having slotted portions for engaging a wheelbarrow frame, whereby said attachment is adapted to removably engage a wheelbarrow in extension forwardly therefrom to provide a fork lift operable with a wheelbarrow.

5. An improved wheelbarrow attachment comprising a rigid transverse structural member, a pair of rigid tines mounted upon said structural member in extension forwardly thereof, compression means secured to said transverse member in extension rearwardly thereof substantially oppositely of said tines, said compression means having openings at the free ends thereof adapted to engage wheelbarrow structure in compression thereagainst, and at least one tension member secured to said transverse member in extension upwardly therefrom above said compression members and having hook means thereon for slidably engaging wheelbarrow structure above said compression members, whereby the weight of the wheelbarrow attachment and any load carried thereby presses said compression members against engaging wheelbarrow structure and holds said tension member against wheelbarrow structure to firmly engage the attachment upon a wheelbarrow.

6. An attachment for wheelbarrows, as set forth in claim 5, further defined by said transverse structural member comprising an angle iron at the back of said tines, and means secured to said tines and extending over straight portions of said angle iron to provide a slidable tine engagement therewith while preventing pivotal motion of the tines thereon.

7. An improved fork lift attachment for a wheelbarrow comprising a fork having a pair of tines with rectangular openings laterally through the rear ends thereof and slidably mounted thereby about a cross-member of rectangular cross-section in extension transversely therefrom, a pair of rigid thrust members removably secured to said cross-member in abutting relation to a back side thereof and extending oppositely to said tines therefrom, said thrust members having the free ends thereof slotted to fit about the portions of a wheelbarrow frame above a wheelbarrow axle, and a pair of tension elements having adjustable lengths and connected at one end of each to said cross-member in pivotal engagement therewith, said tension elements having the upper ends curved to form hooks and extending upwardly from said cross-member away from said tines for hooking about wheelbarrow legs, whereby the fork lift attachment is removably engageable with a wheelbarrow to extend the tines forwardly thereof for the lifting of objects by the wheelbarrow and attachment.

References Cited in the file of this patent

UNITED STATES PATENTS

2,347,314	Droll	Apr. 25, 1944
2,593,796	Riewerts	Apr. 22, 1952
2,966,275	Brookins	Dec. 27, 1960

FOREIGN PATENTS

1,184,871	France	Feb. 9, 1959