May 25, 1954 C. R. STOUT 2,679,329

LIFTING AND TRANSPORTING DEVICE

Filed June 16, 1952 3 Sheets-Sheet 1

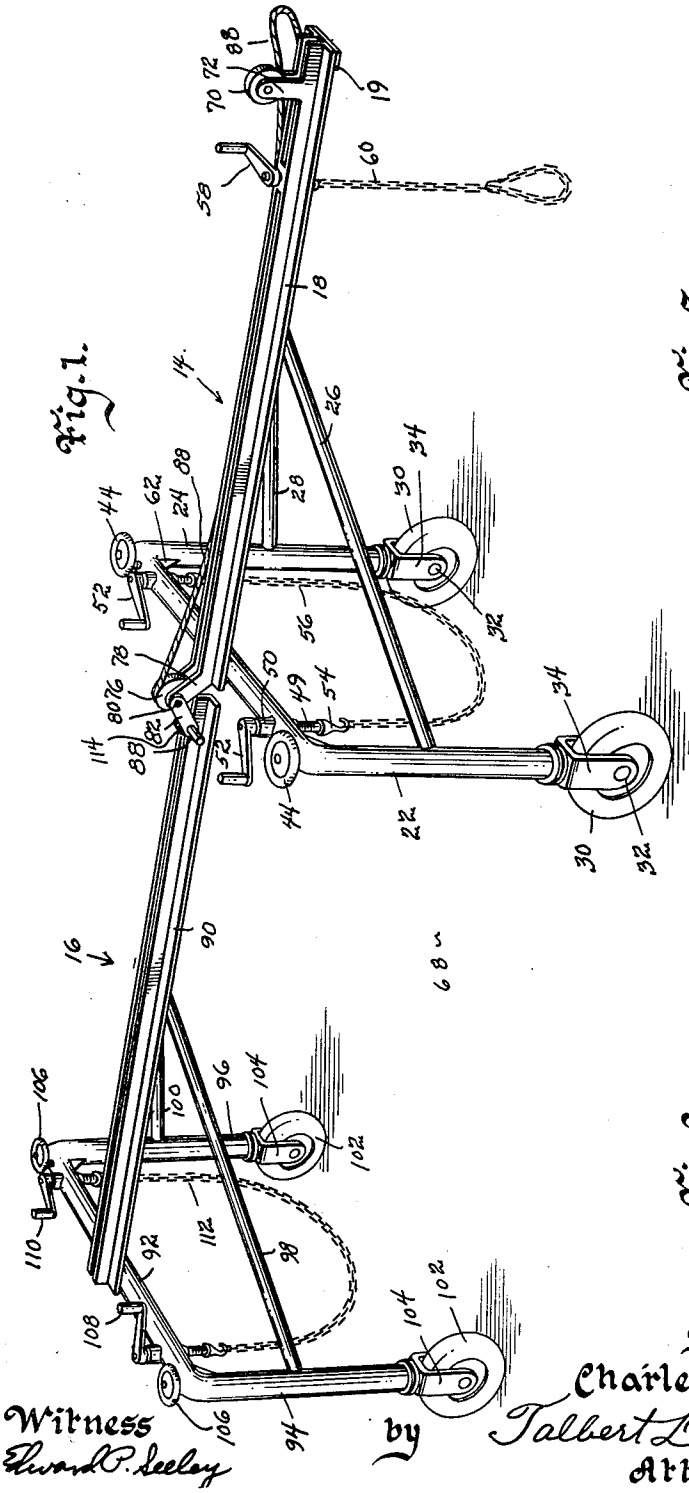


Fig. 1.

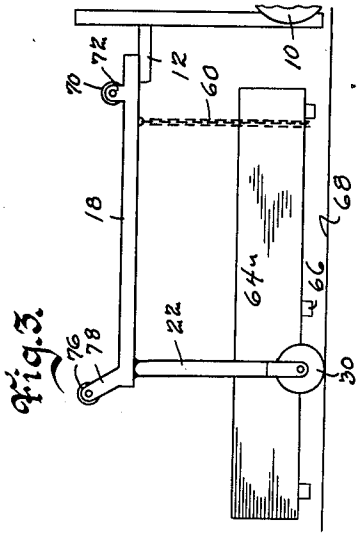


Fig. 3.

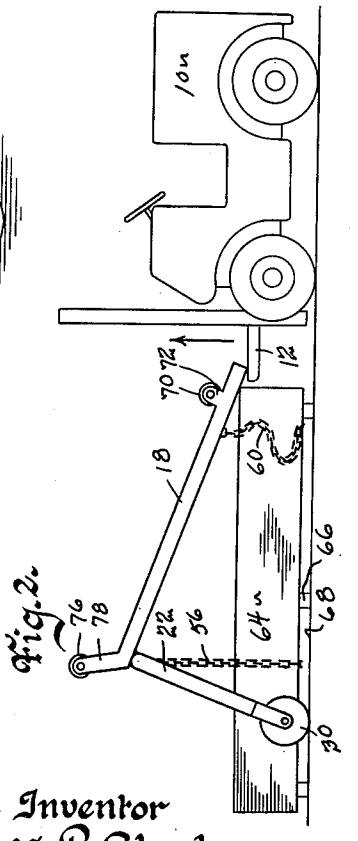


Fig. 2.

Witness
Edward P. Seeley

by

Inventor
Charles R. Stout
Talbert Dick & Adler
Attorneys

May 25, 1954 C. R. STOUT 2,679,329

LIFTING AND TRANSPORTING DEVICE

Filed June 16, 1952 3 Sheets-Sheet 2

Fig. 4.

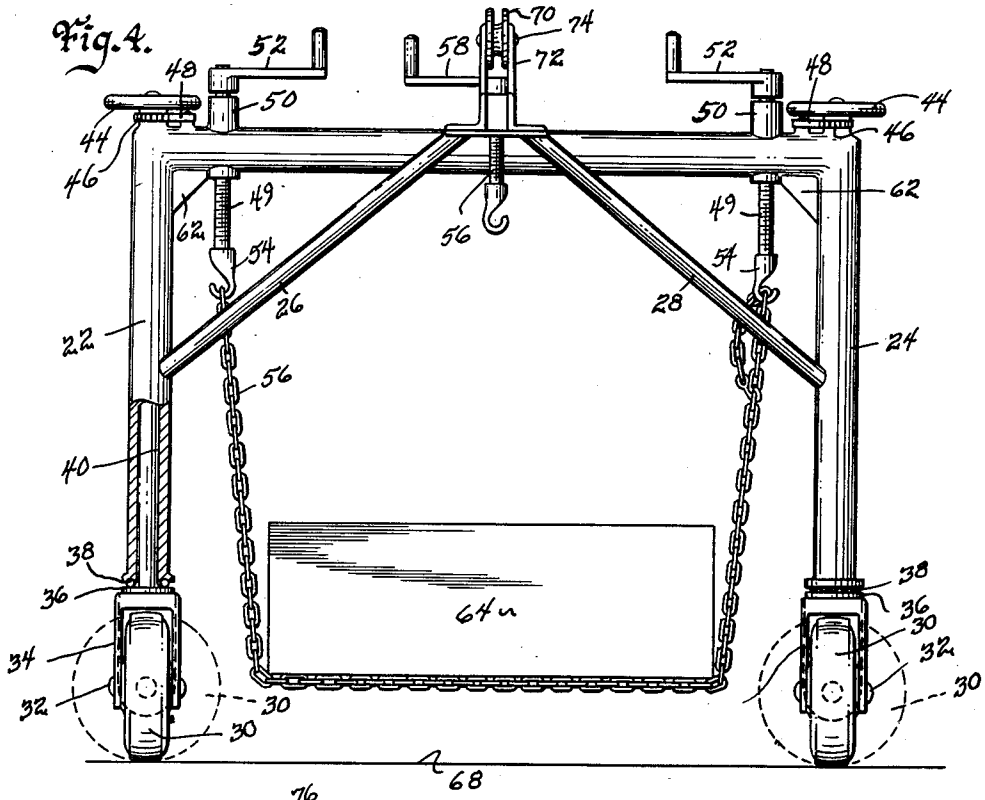
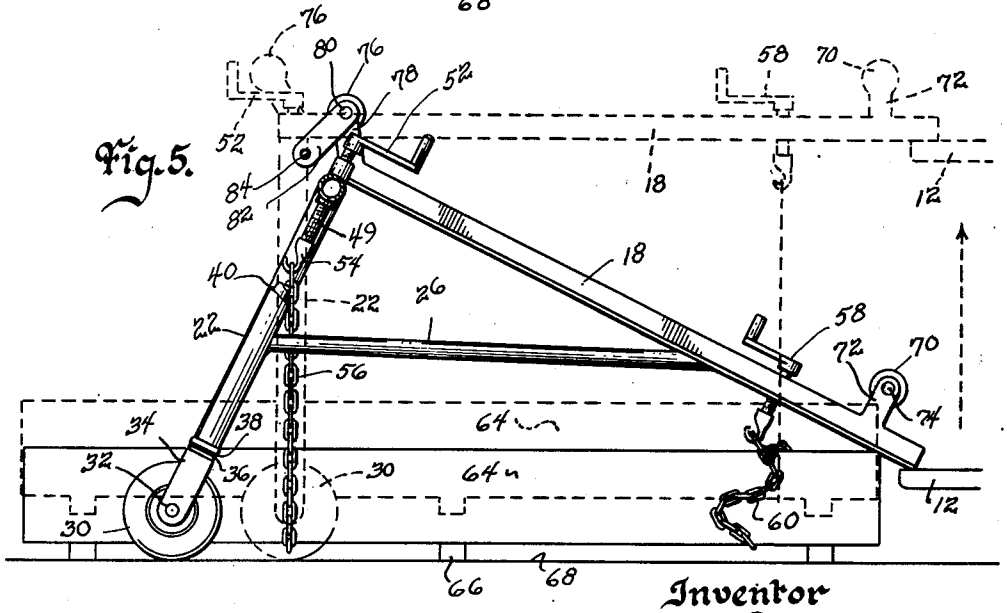


Fig. 5.



Witness
Edward P. Seeley

Inventor
Charles R. Stout
by Talbert Dick & Adler
Attorneys

May 25, 1954 C. R. STOUT 2,679,329

LIFTING AND TRANSPORTING DEVICE

Filed June 16, 1952 3 Sheets-Sheet 3

Fig. 6.

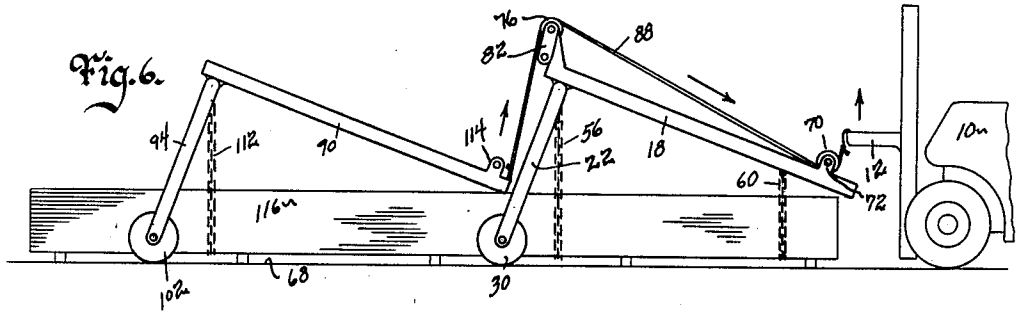


Fig. 7.

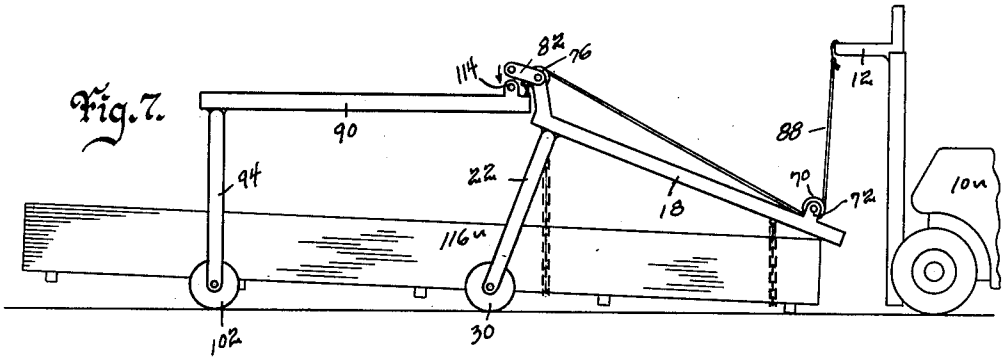


Fig. 8.

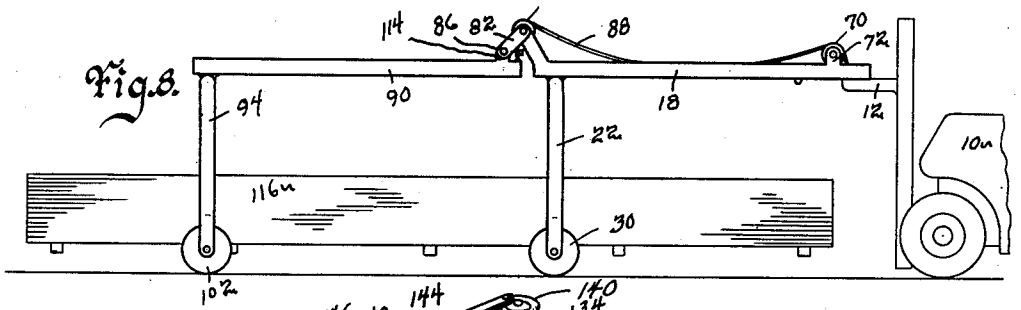
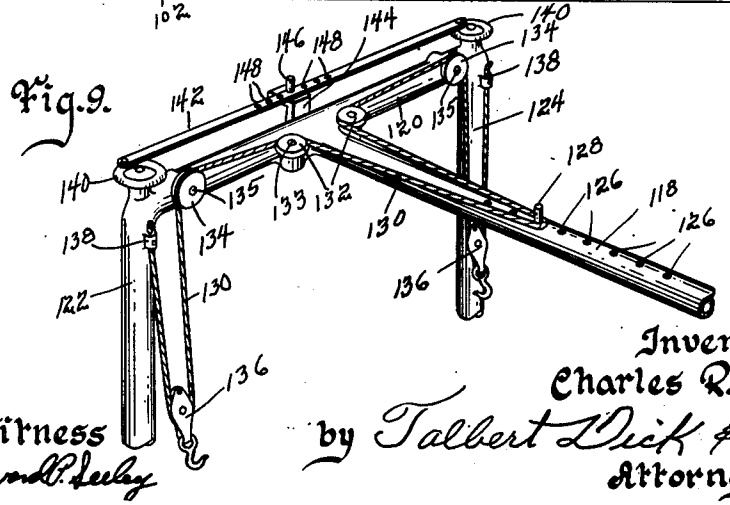


Fig. 9.



Witness
Edward P. Seeley

Inventor
Charles R. Stout
by Talbert Dick & Adler
Attorneys

Patented May 25, 1954

2,679,329

UNITED STATES PATENT OFFICE

2,679,329

LIFTING AND TRANSPORTING DEVICE

Charles R. Stout, Waterloo, Iowa

Application June 16, 1952, Serial No. 293,866

7 Claims. (Cl. 214—394)

1

My invention is a device for lifting and transporting heavy and awkward objects such as raw materials in metal fabrication plants and the like.

Until recently sheet, bar and rod steel could be purchased in a manner that caused it to be shipped to the user in units small enough to be handled by the lift fork truck that is so widely used in industrial plants to handle all types of lifting and transporting problems. It is now the policy of suppliers of raw materials for metal fabrication plants to ship materials in units, called lifts or bundles, that are beyond the capacity of the usual lift fork truck even when the truck is modified to increase its capacity for lifting to a maximum. Also, of course, many types of raw materials used in metal fabricating plants are of an awkward size and shape to handle. Almost all of the materials are in the form of sheets, rods, tubes, or bars. These raw material forms are frequently long or broad or both. It is not uncommon for them to be of such a shape that they cannot be handled well by a fork lift truck even if the truck had the actual capacity to lift the mass of the material. For example, very long rods or sheets of material even if well within the load capacity of the truck would have to be carried with their lengths extending laterally. A lift fork truck with a load so mounted on it could not proceed down narrow passageways as would be required in warehouses and the like. The problem of handling such materials in metal fabrication plants has been enormous. Furthermore, as mentioned earlier the usual shipping unit for raw materials now exceeds the lifting capacity of these trucks by several times. Consequently the metal fabrication plant is faced with a serious problem in lifting these units onto a transport truck or the like. The units could be broken into smaller weights for handling but such procedure is wasteful of time and effort.

In view of the foregoing therefore, it is the principal object of my invention to provide a lifting and transporting device that will accommodate loads of extreme length.

It is a further object of my invention to provide a lifting end transporting device that permits lifting and transporting loads of a weight far in excess of the lifting capacity of the lift truck that provides the lifting force.

It is a further object of my invention to provide a lifting and transporting device that will facilitate the removal and placement of objects in storage areas in a neat and orderly manner.

It is a further object of my invention to provide a lifting and transporting device that is

2

simple and relatively inexpensive to manufacture and maintain.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, and specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of my lifting and transporting device in the position it assumes when an object has been lifted and is ready for transport.

Fig. 2 is a reduced side elevation diagrammatic view of the primary unit and a lift fork truck and illustrates the first step in lifting an object with the primary unit and a lift fork truck.

Fig. 3 is a similar view to that shown in Fig. 2 except that the lifting is illustrated as completed and a majority of the lift fork truck is deleted to conserve space.

Fig. 4 is an enlarged rear elevation view of the primary unit supporting a load and shown as though a lifting force had been applied. Broken lines illustrate an adjusted position of the wheels, and portions of the device are broken away to illustrate more clearly its construction.

Fig. 5 is a side elevation view of the primary unit and a load to be lifted. The machine is shown secured to the load and ready to lift with broken lines illustrating the lifted position. Portions of the device are deleted to illustrate its construction more clearly.

Fig. 6 is a reduced diagrammatic side elevation view of the primary and secondary units and a fragment of a lift fork truck. The units are arranged over a load and prepared for the first lifting step.

Fig. 7 is the same view as Fig. 6 except that the first lifting step is shown completed, and

Fig. 8 is the same view as Figs. 6 and 7 except that the second lifting step is completed and the load is supported ready for transport.

Fig. 9 is a fragmentary, perspective view of a modified form of secondary unit.

Referring to the drawings I have used the numeral 10 to designate an ordinary fork lift truck having a powered vertically moveable fork 12 mounted on it. This unit is used as the source of both lifting and towing energy for use with my lifting and transporting device.

The entire mechanism that is my invention is divided for convenience in use into a primary

unit generally designated 14 and a secondary unit generally designated 16. As the primary unit is useful independently of the second unit, I will describe it and its separate use before entering into a discussion of the entire mechanism. The primary unit 14 has a frame or body portion 18 that comprises an elongated rigid element. A plate 19 is rigidly secured to the end of frame 18 to facilitate engaging the frame end with one of the tines of the lift fork 12. A U-shaped leg portion, comprising the cross member 20 and the legs 22 and 24 respectively, is rigidly secured to one end of the frame in any suitable manner as by welding or the like. The legs and frame are preferably secured together so that the legs extend at right angles to the frame.

A pair of braces designated 26 and 28 respectively are rigidly secured to the legs and the frame to provide adequate rigidity between the legs and the frame. The particular form of bracing is not material to the invention, of course. Each leg is provided with a wheel designated 30 that is appropriately journalled in a suitable manner as by the axle 32 extending through the wheel bearing and the two legs of the bifurcated element or fork 34. The top of the wheel forks support the lower ball races 36 while the lower end of each leg provides the upper ball race. Balls 38 are captured between the races in a conventional manner to form a ballbearing. The shaft 40 is rigidly secured to the wheel fork and the wheel axle 32 is positioned directly below the shaft 40 and as a result the wheel will not caster. Shaft 40 extends beyond the top plane of cross member 20, however, and is provided with a hand wheel 44 which permits turning the wheels manually to any desired position. The portion of shaft 40 just below wheel 44 and above cross member 20 has a toothed wheel 46 secured to it that is engaged by a dog or pawl 48 which may be moved to engage the toothed wheel 46 to insure that the wheel 30 retains any position in which it is set manually. In the cross member 20 are provided some lifting means which may be screw threaded elements such as the ones 49 which threadably engage special nuts 50 that are rigidly secured to cross member 20 in any suitable manner as by welding or the like. A crank 52 may be secured to the screw threaded lifting means 49 to facilitate manipulating it. The other end of the screw threaded element is provided with a means such as hook 54 for attaching a flexible element such as chain 56 to it. A third lifting means is provided near the end of the frame opposite to that to which the cross member is secured. As this third lifting means may be identical to those described above it is merely designated generally by numeral 58. It serves the purpose of a hook on which to secure chain 60 when the primary unit is used alone, and also as a tightening means for anchoring the free end of frame 18 to a bundle when the cable is used for lifting as will be apparent from the discussion relating to operation of the entire device as set out below. The point of joiner of the legs and the cross member 20 may be further suitably braced as by the triangular elements 62 being suitably secured to the legs and cross member as by welding or the like.

The structure described thus far is all that is necessary when the primary unit is used independently and such use will, therefore, now be recited. In steel fabricating plants sheet steel or the like is acquired from the rolling mill in large bundles such as the one indicated by the

outline designated 64 in Figs. 2, 3, 4 and 5. These bundles have blocks such as those designated 66 secured to them to space the bundle itself above a supporting surface 68 to facilitate engaging the underside of the bundles with a lifting mechanism. To lift one of these bundles with my invention in cooperation with a fork lift truck, the following procedure is followed. The primary unit is manipulated over the bundle until it assumes a position such as that shown in Fig. 5. Chain 56 is then extended under the bundle and the chain secured to hooks 54. After the chain is secured, the slack is quickly and easily removed from the chain by rotating the threaded lifting means 49. The chain 60 is then secured around the bundle and to its lifting means 58. Not all of the slack is taken out of the chain 60 of course, but it is secured in a manner that causes that end of the bundle to be lifted when the fork 12 of a fork lift truck engages and raises the frame 18 to the position shown by the broken lines in Fig. 5 or as illustrated in the diagrammatic views Figs. 2 and 3. Wheels 30 roll toward the truck as the fork lift carries the frame end up. As the chain is drawn snug before this rolling action starts to take place, consequently as the leg assumes a vertical position and frame 18 a horizontal one, the chains lift the bundle of raw materials as shown in Fig. 3. The truck may then be used to tow the bundle to any desired location. The lifting and transporting device is disconnected from the load by reversing the procedure described for lifting. When very long pieces of material are to be handled, it is necessary to use the secondary unit also. I will now describe the secondary unit, therefore, together with those portions of the primary unit that are used only when the secondary unit is also used.

Near lifting means 58 on primary unit frame 18 is a pulley 70 that is rotatably supported on frame 18 by any suitable means such as the arms 72 and axle 74. A pulley 76 is similarly mounted near the cross-member 20 on arms 78 and axle 80. Axle 80 also supports the links 82. The links have holes 84 near their free ends and a pin 86 slidably extends therethrough. Any suitable flexible element such as cable 88 is reeved over pulley 76 and under pulley 70.

The secondary unit has a frame 90 that is very similar to frame 18 and at one end is secured a cross-member 92 that is like its counterpart 20. Legs 94 and 96 extend vertically down from each of cross-member 92 and are braced by the diagonals 98 and 100. Each leg is provided with a wheel 102 rotatably mounted in a fork 104. These forks are secured to shafts that extend through the hollow legs to the hand wheels 106 which permit adjusting the wheels to any direction as in the case of the primary unit. The secondary unit also has lifting elements 108 and 110 to tighten chain 112 as in the case of the primary unit. At the end of frame 90 that is farthest from cross-member 92 is a pierced ear 114 which cooperates with links 84 and pin 86 to secure the primary and secondary units together as shown in Fig. 1.

In the modified form of the secondary unit shown in Fig. 9, the frame 118 is shown as a tubular member similar to cross member 120 and legs 122 and 124. It is obvious that the frame need not be such a tubular member, but it is considered preferable to the frames used in the major showing for this particular form since it provides a frame readily adapted to the holes 126 and pin 128 which are used to secure the cable

130 or like flexible element in any desired position along the frame. Flexible element 130 is reeved over a pair of horizontally rotating direction changing pulleys designated 132 and mounted on vertical axles 132 and a pair of vertically rotating pulleys 134 journalled on horizontal axles 135 that permit the cable to be directed downward. The ends of the cable extend through the blocks 136 and are secured to the legs by a suitable means such as the clamps 138. By pulling the center of the cable 130 along the frame the blocks 136 are raised. This cable 130 is pulled by use of cable 88 in a manner similar to the way the latter is normally used to raise the rear end of the secondary unit. In the modified form also I have shown the wheels 140 secured together by a tie rod 142, to coordinate their turning positions. A bracket 144 is provided near the center of the cross bar, and it carries a removable pin 146. A series of holes 148 in tie rod 142 may be used in conjunction with the pin and bracket to lock the wheels in any desired position. It is understood that similar structure could be applied to all the units shown, and it has proved itself very valuable in steering loads around corners that cannot be managed when the unit is merely towed. The lift advantage gained by using the pulleys, block and cable make it possible to raise a portion of a bundle directly rather than by tipping the frame. In some cases this type of lifting is preferable. Trucks for example are often provided with low canopies which make it difficult to use the type of tightening means shown in the major disclosures. The modified form of secondary unit is preferable for removing lifts from such trucks since the workman is required only to place the hooks of blocks 136 and all of the tightening and lifting is performed with the fork lift truck.

The use of the secondary unit with a primary unit and fork lift truck is clearly illustrated in Figs. 6, 7 and 8. As is shown in Fig. 6 the two units are arranged over the load to be lifted, budle 116. This positioning of the trucks is accomplished by manual manipulation of the units. Chain 112 is then placed around the end of the load and slack removed with tighteners 108 and 110. Cable 88 is then secured to the end of frame 90 that is nearest ear 114 and to the fork 12 of fork lift truck 10. Chain 60 is also placed around the bundle and drawn tight by means of tightener 58. As the lift truck pulls on cable 88, therefore, the end of the frame 18 carrying pulley 70 is held down by chain 60 and the weight of bundle 116. As the cable is pulled by the truck a lifting force is applied to the end of the secondary unit that brings it up into the position shown in Fig. 7. The end of bundle 116 under which the chain 112 is placed also is raised, of course, while the fork lift truck supports the secondary unit as shown, the links 82 are aligned manually with ear 114 so that the hole in the ear and the ones designated 84 align. The pin 86 is then slipped into place and pressure on cable 88 relieved which causes the weight supported by the secondary unit bearing on the pin 86 to secure it in place frictionally. Fork 12 is then relieved of the cable and placed under the free end of frame 18. Chain 60 is loosened to provide the correct lifting length and the end of frame 18 is raised as shown in Fig. 8 by means of the fork lift truck. The load is released by reversing the procedure for lifting the load. The fork lift is manipulated to lower the end of frame 18 and chain 60.

If one or both of the units are used as shown and recited a 3000 lb. capacity truck can handle a load of 10,000 lbs. easily. The truck also furnishes the motive power to propel the supported bundle from one place to another. When both units are used, towing is the most practical method of moving. It is practical to push as well as tow when only the primary unit is employed, however. In many cases stacking of the material in piles as high as the units will permit saves much storage space. The units also permit stacking the materials in piles that are near to each other. The major saving in using my device comes from the fact that the bundles or lifts may be handled without taking them apart. The time and effort lost when it is necessary to disassemble the lifts in order to reduce them to a weight which the usual lift fork truck can handle, is enormous. Furthermore, once the bundle is broken, the individual pieces are almost impossible to keep together. Also, of course, very long material cannot be handled well by a fork lift truck alone. There is simply no reasonable way for the fork lift to engage long elements except in the longitudinal center and such a position for the lift causes the burden to be impossibly wide as far as transporting it in a factory building is concerned and it is even awkward out-of-doors. Consequently my device not only increases the load capacity of the usual fork lift truck, but also makes it possible to handle deftly loads that would be exceedingly awkward to transport without it. Furthermore, the structure of my unit is such that all of the lifting is accomplished by the power of the fork lift truck. In its simplest form the raising of the bundle is accomplished by raising the unit frames into a horizontal position.

Some changes may be made in the construction and arrangement of my lifting and transporting device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a lifting and transporting device comprising a primary unit and a secondary unit; said primary unit comprising, an elongated frame, a cross member secured to one end of said frame, a pair of spaced apart legs secured to and extending down from said cross member at substantially right angles to said frame, a wheel rotatably journalled on the bottom of each leg, a flexible element secured to said cross member, means for selectively increasing and decreasing the effective length of said flexible element, a flexible element secured to said frame at a point spaced from said cross member, a means for selectively increasing and decreasing the effective length of said frame secured flexible element, a plate secured to the bottom of the other end of said frame, a pulley rotatably secured to the top of said frame near said plate, a second pulley rotatably secured to said frame near said cross member, a flexible element reeved under said pulley and over said second pulley, a pair of outwardly extending links secured to said one end of said frame; said links having holes near their outer ends, a pin selectively slidable into and out of said link holes; said secondary unit comprising, an elongated frame, a pair of spaced apart legs secured to said cross member and extending down at substantially right angles to said frame, a wheel journalled on the end of

each of said secondary unit legs, a flexible element secured to said secondary unit cross member, means for selectively increasing and decreasing the effective length of said flexible element, and a pierced ear secured to the other end of said secondary unit frame; said pierced ear constructed and arranged to slidably fit between and align with said links; whereby said pin is insertable through said links and said pin to secure said ear to said links, and removable therefrom to detach said ear and links selectively.

2. In a lifting and transporting device comprising a primary unit and a secondary unit; said primary unit comprising, an elongated frame, a cross member secured to one end of said frame, a pair of spaced apart legs secured to and extending down from said cross member at substantially right angles to said frame, a fork pivotally secured in the lower end of each of said legs, a wheel journalled in said fork, means secured to said forks pivoting said forks through an arc of substantially ninety degrees, means secured to said fork and said legs for selectively locking and releasing said forks against and for pivotal movement, a flexible element secured to said cross member, means for selectively increasing and decreasing the effective length of said flexible element, a flexible element secured to said frame at a point spaced from said cross member, a means for selectively increasing and decreasing the effective length of said frame secured flexible element, a plate secured to the bottom of the other end of said frame, a pulley rotatably secured to the top of said frame near said plate, a second pulley rotatably secured to said frame near said cross member, a flexible element reeved under said pulley and over said second pulley, a pair of outwardly extending links secured to said one end of said frame; said links having holes near their outer ends, a pin selectively slidable into and out of said link holes; said secondary unit comprising, an elongated frame, a pair of spaced apart legs secured to said cross member and extending down at substantially right angles to said frame, a wheel journalled on the end of each of said secondary unit legs, a flexible element secured to said secondary unit cross member, means for selectively increasing and decreasing the effective length of said flexible element, and a pierced ear secured to the other end of said secondary unit frame; said pierced ear constructed and arranged to slidably fit between and align with said links; whereby said pin is insertable through said links and said pin to secure said ear to said links, and removable therefrom to detach said ear and links selectively.

3. In a lifting and transporting device comprising a primary unit and a secondary unit; said primary unit comprising, an elongated frame, a cross member secured to one end of said frame, a pair of spaced apart legs secured to and extending down from said cross member at substantially right angles to said frame, a fork pivotally secured in the lower end of each of said legs, a wheel journalled in said fork, means secured to said forks for pivoting said forks through an arc of substantially ninety degrees, means secured to said fork and said legs for selectively locking and releasing said forks against and for pivotal movement, a flexible element secured to said cross member, means for selectively increasing and decreasing the effective length of said flexible element, a flexible element secured to said frame at a point spaced from said cross member, a means for selectively increasing and decreasing the effective length of said frame secured flexible element, a plate secured to the bottom of the other end of said frame, a pulley rotatably secured to the top of said frame near said plate, a second pulley rotatably secured to said frame near said cross member, a flexible element reeved under said pulley and over said second pulley, a pair of outwardly extending links secured to said one end of said frame; said links having holes near their outer ends, a pin selectively slidable into and out of said link holes; said secondary unit comprising, an elongated frame, a pair of spaced apart legs secured to said cross member and extending down at substantially right angles to said frame, a fork pivotally secured in the lower end of each of said secondary unit legs, means secured to said secondary unit forks for pivoting said secondary forks through an arc of substantially ninety degrees, a wheel journalled in each of said unit forks, a means secured to said secondary unit forks and legs for selectively locking and releasing said secondary unit forks against and for pivotal movement, a flexible element secured to said secondary unit cross member, a means for selectively increasing and decreasing the effective length of said flexible element, and a pierced ear secured to the other end of said secondary unit frame; said pierced ear constructed and arranged to slidably fit between and align with said links; whereby said pin is insertable through said links and said pin to secure said ear to said links, and removable therefrom to detach said ear and links selectively.

4. In a lifting and transporting device comprising a primary unit and a secondary unit; said primary unit comprising, an elongated frame, a cross member secured to one end of said frame, a pair of spaced apart legs secured to and extending down from said cross member at substantially right angles to said frame, a straight fork pivotally secured in the lower end of each of said legs, an axle in said fork, a wheel journalled on said axle; said axles being directly below said legs, means secured to each of said forks for pivoting said forks through an arc of substantially ninety degrees, a flexible element secured to said cross member, means for selectively increasing and decreasing the effective length of said flexible element, a flexible element secured to said frame at a point spaced from said cross member, a means for selectively increasing and decreasing the effective length of said frame secured flexible element, a plate secured to the bottom of the other end of said frame, a pulley rotatably secured to the top of said frame near said plate, a second pulley rotatably secured to said frame near said cross member, a flexible element reeved under said pulley and over said second pulley, a pair of outwardly extending links secured to said one end of said frame; said links having holes near their outer ends, a pin selectively slidable into and out of said link holes; said secondary unit comprising, an elongated frame, a pair of spaced apart legs secured to said cross member and extending down at substantially right angles to said frame, a wheel journalled on the end of each of said secondary unit legs, a flexible element secured to said secondary unit cross member, means for selectively increasing and decreasing the effective length of said flexible element, and a pierced ear secured to the other end of said secondary unit frame;

said pierced ear constructed and arranged to slidably fit between and align with said links; whereby said pin is insertable through said links and said pin to secure said ear to said links, and removable therefrom to detach said ear and links selectively.

5. In a lifting and transporting device comprising a primary unit and a secondary unit; said primary unit comprising, an elongated frame, a cross member secured to one end of said frame, a pair of spaced apart legs secured to and extending down from said cross member at substantially right angles to said frame, a straight fork pivotally secured in the lower end of each of said legs, an axle in said fork, a wheel journalled on said axle; said axles being directly below said legs, means secured to each of said forks for pivoting said forks through an arc of substantially ninety degrees, a flexible element secured to said cross member, means for selectively increasing and decreasing the effective length of said flexible element, a flexible element secured to said frame at a point spaced from said cross member, a means for selectively increasing and decreasing the effective length of said frame secured flexible element, a plate secured to the bottom of the other end of said frame, a pulley rotatably secured to the top of said frame near said plate, a second pulley rotatably secured to said frame near said cross member, a flexible element reeved under said pulley and over said second pulley, a pair of outwardly extending links secured to said one end of said frame; said links having holes near their outer ends, a pin selectively slidable into and out of said link holes; said secondary unit comprising, an elongated frame, a cross member secured to one end of said elongated frame, a pair of spaced apart legs secured to said cross member and extending down at substantially right angles to said frame, a straight fork pivotally secured in the bottom of each leg of said secondary unit, an axle secured in each of said secondary unit forks, a wheel journalled on each of said secondary unit axles, means secured to said secondary unit forks for pivoting each of said secondary unit forks through an arc of substantially ninety degrees, a flexible element secured to said secondary unit cross member, means for selectively increasing and decreasing the effective length of said flexible element, and a pierced ear secured to the other end of said secondary unit frame; said pierce dear constructed and arranged to slidably fit between and align with said links; whereby said pin is insertable through said links and said pin to secure said ear to said links, and removable therefrom to detach said ear and links selectively.

6. In a lifting and transporting device, an elongated frame, a cross member rigidly secured to said frame, a pair of spaced apart legs secured to and extending down from said member; said legs being parallel to each other, wheels journalled on the lower end of each leg, a flexible element having its end immovably secured to the device at an elevation substantially that of said cross member, a pair of pulleys journalled on horizontal axle one secured adjacent each leg on said cross member, a pair of pulleys journalled on vertical axles one secured to said cross member on each side of and adjacent to said frame; said flexible element extending down from each end, then up and reeved over said pulleys journalled on horizontal axles, then extending across to and reeved around said pulleys journalled on vertical axles and extending back along said frame to form a loop above said frame, a pair of blocks one on each of the portions of said flexible element between the secured ends and said pulleys journalled on horizontal axles; said frame having a plurality of spaced apart holes in its top, land a pin selectively engaging and disengaging the holes of said frame; whereby a longitudinally movable means of securing said flexible element loop against movement along said frame is provided.

7. In a lifting and transporting device, an elongated frame, a cross member rigidly secured to said frame, a pair of spaced apart legs secured to and extending down from said member; said legs being parallel to each other, wheels journalled on the lower end of each leg, a flexible element having its end immovably secured to the device at an elevation substantially that of said cross member, a pair of pulleys journalled on horizontal axles one secured adjacent each leg on said cross member, a pair of pulleys journalled on vertical axles one secured to said cross member on each side of and adjacent to said frame; said flexible element extending down from each end, then up and reeved over said pulleys journalled on horizontal axles, then extending across to and reeved around said pulleys journalled on vertical axles and extending back along said frame to form a loop above said frame, a pair of blocks one on each of the portions of said flexible element between the secured ends and said pulleys journalled on horizontal axles; and means on said frame along its top for securing said flexible element loop against movement relative to said frame in one direction at least.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,348,039	Niceley	July 27, 1920
1,457,025	Gerlinger	May 29, 1923
1,501,996	Grooms	July 22, 1924
1,590,308	Merrill	June 29, 1926
1,870,689	Remde	Aug. 9, 1932
2,260,676	Lafaye, Sr.	Oct. 28, 1941
2,317,784	Lewis	Apr. 27, 1943
2,376,296	Walter	May 15, 1945
2,377,201	Baird	May 29, 1945
2,438,534	Bowers	Mar. 30, 1948
2,452,338	Thompson	Oct. 26, 1948
2,517,160	Alphin, Jr.	Aug. 1, 1950