

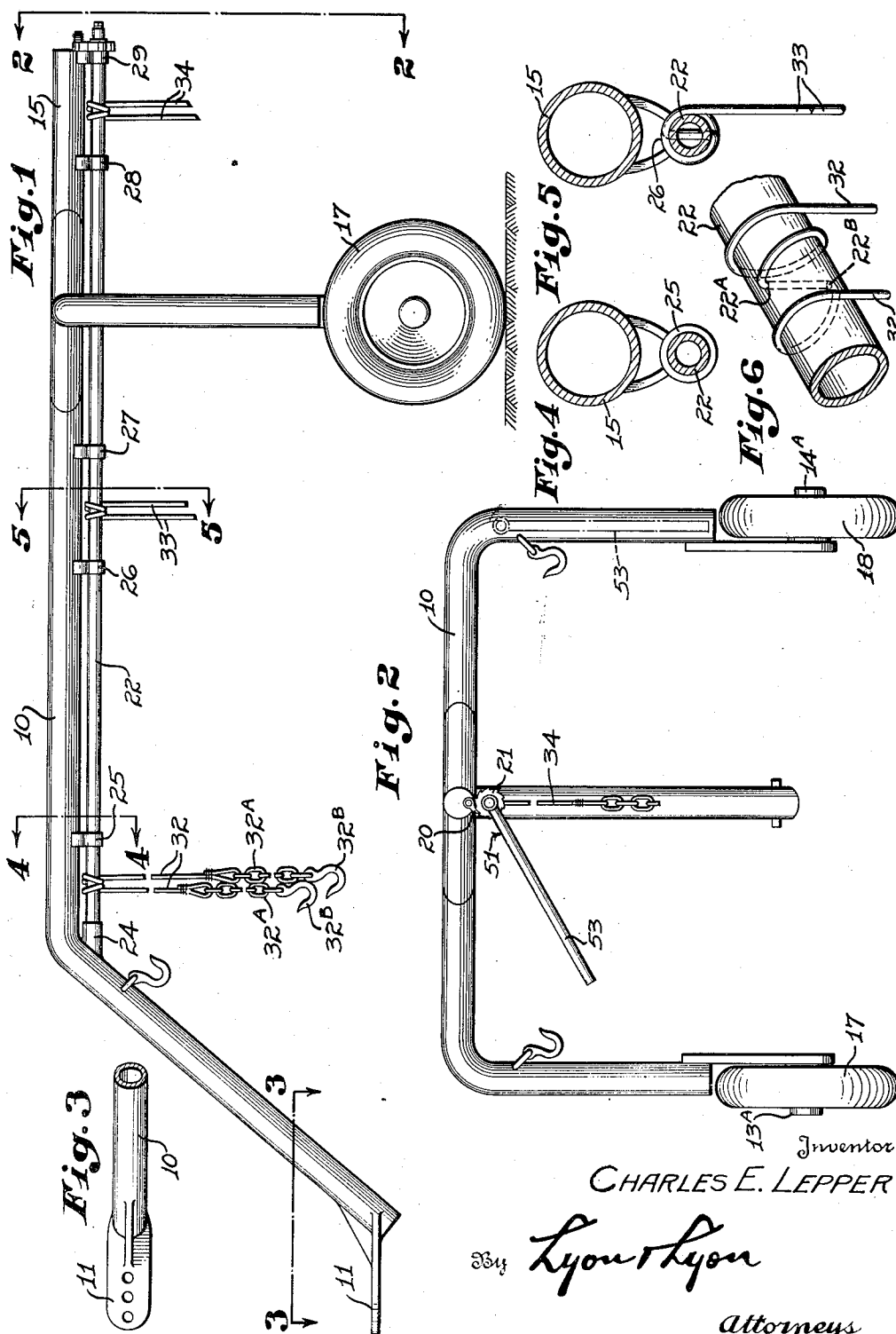
Aug. 5, 1952

C. E. LEPPER
TOOL TRANSPORTER

2,606,001

Filed May 3, 1948

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

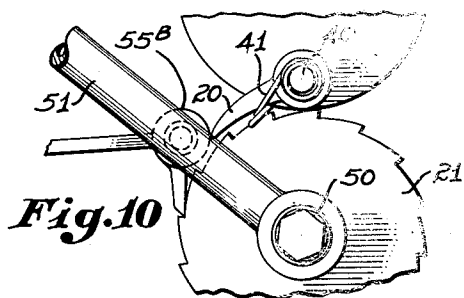


Fig. 10

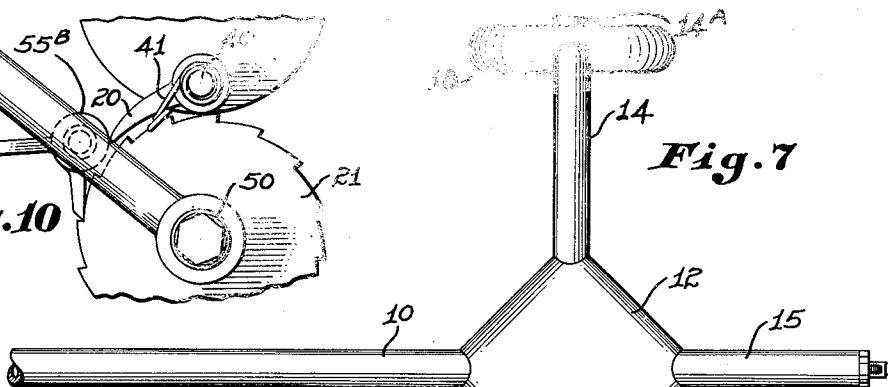


Fig. 7

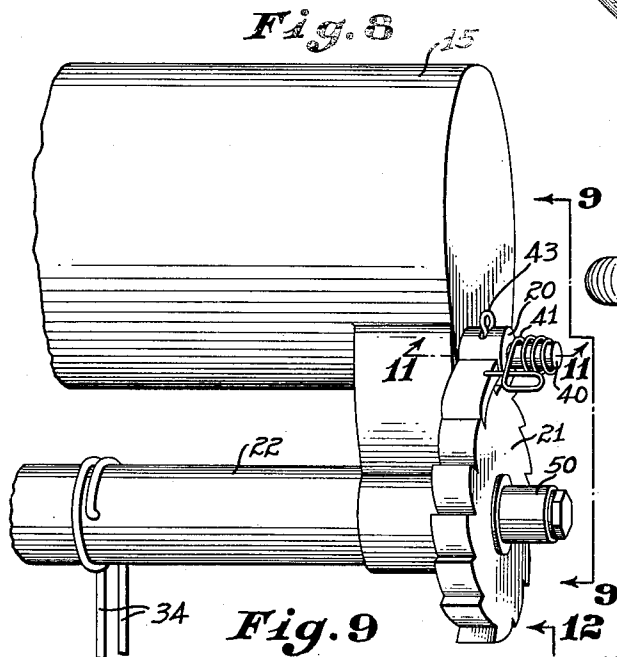


Fig. 9

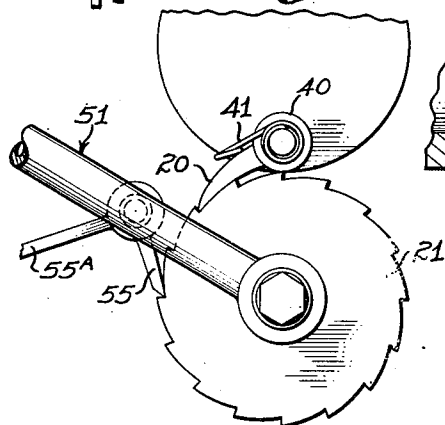
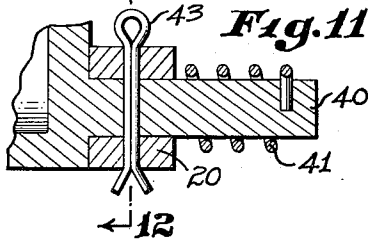


Fig. 11

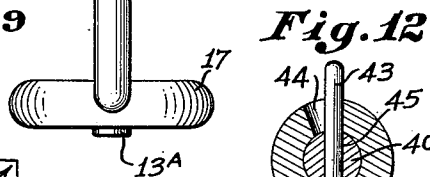


Fig. 13

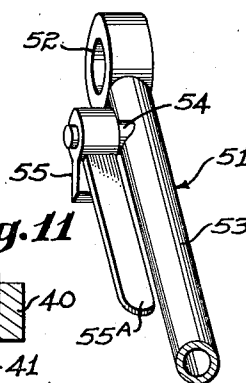


Fig. 12

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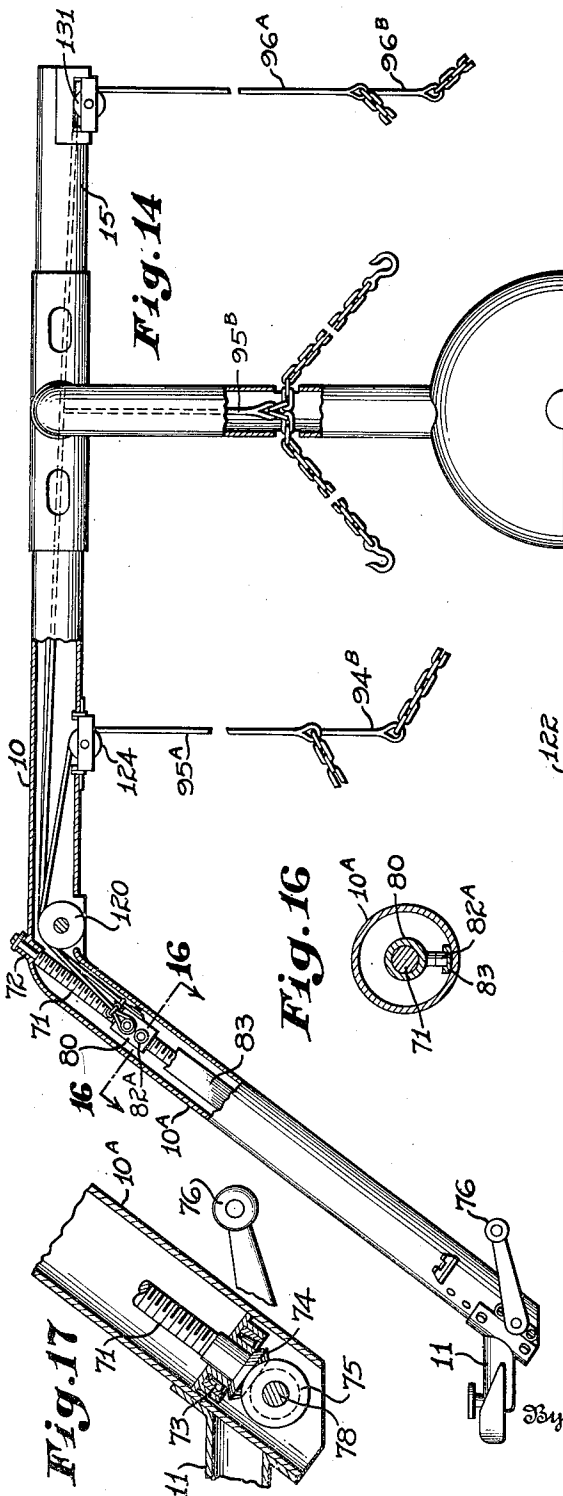
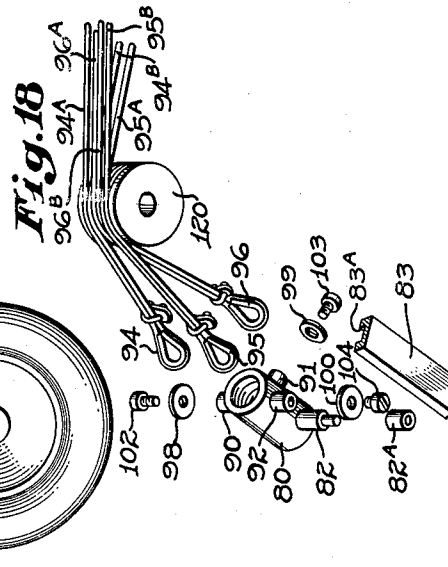
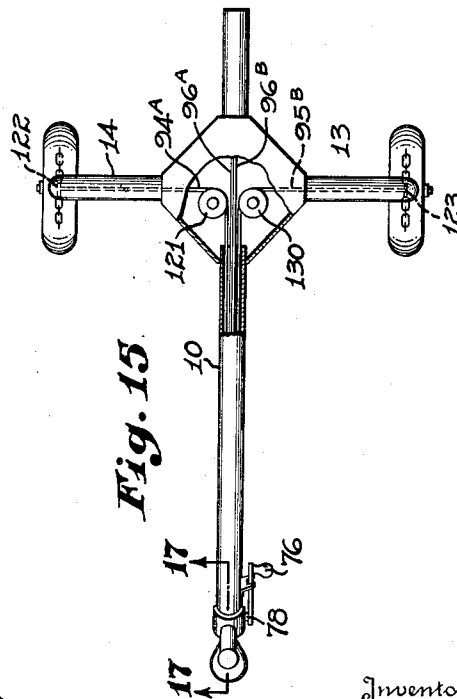
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TOOL TRANSPORTER

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2 Claims. (Cl. 254—139.1)

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The present invention relates to a mobile carrying or transporting structure arranged to lift and transport, for example, heavy agricultural tools, such as heavy disk harrows and the like.

In transporting heavy equipment or tools in the field, it is desirable that they be transported easily and safely with equipment which is expensive, easily maintained and operated without requirement of much skill by a limited number of persons. In particular, it is desirable that the carrying device be so constructed that tipping of the carried tools is eliminated while being transported.

It is therefore an object of the present invention to provide an improved mobile carrying device for achieving the above-mentioned desideratum.

A specific object of the present invention is to provide an improved tool transporter which is readily and easily balanced when carrying intended loads.

Another specific object of the present invention is to provide an improved tool transporter employing supporting chains or cables which are adapted to be connected at suitable points to the tool to, at all times, maintain such tool level either while being lifted or while being carried.

Another specific object of the present invention is to provide improved mechanisms in tool transporters of the character described in which supporting cables or chains are simultaneously moved in equal amounts by a simple manually operable mechanism assuring leveling of the tool in its suspended position.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

Figure 1 is a view in side elevation of a mobile lifting and carrying device embodying the present invention.

Figure 2 is an end view of the same taken in the direction indicated by the lines 2—2 in Figure 1 and includes in addition the novel wrench for rotating the tube upon which the cables are affixed.

Figure 3 is a view taken in the direction indicated by the line 3—3 in Figure 1.

Figures 4 and 5 are sectional views taken respectively on the lines 4—4 and 5—5 of Figure 1.

Figure 6 is a perspective view of a portion of

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the apparatus shown in Figure 1 and discloses the manner in which the cable is attached to the removable tube shown therein.

Figure 7 is a top plan view of the device shown in Figure 1.

Figure 8 is an enlarged perspective view of a portion of the device shown in Figure 1.

Figure 9 is a view taken in the direction indicated by the line 9—9 and shows in addition the crank member mounted in operative position for rotating the tube upon which the cables are mounted.

Figure 10 is a view similar to the view shown in Figure 9 but with the mechanism adjusted to lower the loads carried on the cables attached to the removable tube.

Figure 11 is a sectional view taken substantially on the line 11—11 of Figure 8.

Figure 12 is a sectional view taken substantially on the line 12—12 of Figure 11.

Figure 13 is a view in perspective of the novel wrench which is likewise shown in Figures 2, 9, and 10 for rotating the tube upon which the cables are attached in opposite directions to thereby either raise or lower the cables with respect to the ground.

Figure 14 is a view in side elevation, partly in section, of a modified device embodying the present invention.

Figure 15 is a top plan view of the same, with some of the parts in section and broken away to show internal construction.

Figure 16 is a sectional view taken on the line 16—16 of Figure 14.

Figure 17 is a sectional view taken substantially on the line 17—17 of Figure 15.

Figure 18 is a perspective view of the cable attaching means with elements in disassociated and exploded form.

Referring to the preferred device embodying the present invention in Figures 1 through 15, inclusive, the transporter is formed of a pipe frame constituting a longitudinally extending pipe 10 bent forwardly and downwardly with the forward end having welded thereto a trailer hitch 11 for conventional fastening to a vehicle, such as a tractor or automobile, the other end of the pipe 10 being welded to one apex of the square coupling plate or box 12. The other three apexes are welded respectively to the tubular pipes 13, 14, and 15, the pipes 13 and 14 having an L-bend in them and each one of their lower ends being adapted to support a corresponding axle 13A, 14A upon which the ground-engaging wheels 17, 18 are mounted.

The other pipe 15 welded to the square coupling plate or box 12 has bonded at its rearmost end, as shown in Figures 7, 8, and 11, a spring-biased pawl member 20 adapted to releasably engage a co-operating ratchet member 21 on the longitudinally extending tube 22, which tube is rotatably supported in the spaced bearing members 24, 25, 26, 27, 28, 29, the bearing members 24, 25, 26, and 27 being welded to the tube 10 while the bearing members 28, 29 are welded to the tube 15.

The tube 22 has mounted thereon three double-ended cables 32, 33, 34, each of which are adjustably mounted on the tube 22 in the manner indicated in Figure 6. In Figure 6, one end of the cable 32 makes one complete turn on the tube 22 before passing downwardly through the diametrically opposite apertures 22A, 22B in the tube after which the cable 32 makes one complete turn around the tube 22. Each one of the ends of the cable 32 has attached thereto chains 32A, the free ends of which have mounted thereon, the hooks 32B, 32B.

It is apparent that the height of one of the hooks 32B may be conveniently adjusted with respect to the height of the other one of the hooks by pulling more or less of the cable 32, as the case may be, through the apertures 22A, 22B in the pipe 22. This adjustability is made when no weight is applied to the hooks 32B and after the cables 32 are moved so as to produce no binding action on the tube 22 which binding action otherwise exists due to the individual turns taken around the tube.

The other double-ended cables 33, 34 each have chains or hooks attached to their free ends as shown in connection with the cables 32.

Referring again to Figure 5, it is apparent that when the tube 22 is rotated about its axis, the free ends of the cables 32 are raised or lowered with respect to the ground, depending upon the direction of rotation of the tube 22. The tube 22 is normally prevented from rotating in accordance with the weight of the cables or weights attached to the cables by the pawl and ratchet mechanism 20, 21 at the rear end of tube 22, best shown in Figure 8.

In Figure 8, the pawl member 20, which has limited pivotal movement on the shaft 40 welded to the supporting tube 15, is spring biased into engagement with the ratchet 21 by the torque spring 41, having one of its ends anchored in the shaft 40 and the other one of its ends, in Figure 8, engaging the pawl 20 to press it into engagement with the ratchet 21. As shown in Figures 8, 11 and 12, a cotter pin 43 passes through an enlarged motion limiting slot 44 in the pawl 20 and the hole 45 through shaft 40 and cooperates with such slot 44 to allow only limited movement of the pawl member.

The shaft 22 is rotated in the counterclockwise direction in Figure 9 to raise the attached cables 32, 33 and 34 simultaneously by applying the wrench to the round extension 50 on the end of shaft 22 and by operating such wrench 51 in the manner indicated hereinafter.

In Figure 13, the wrench 51 has a circular opening 52 at one end thereof of diameter slightly larger than the diameter of extension 50 so that it may freely rotate thereon. The handle portion 53 has a shaft 54 extending transversely perpendicular to its apex on which is pivotally mounted a pawl member 55 adapted to cooperate with the teeth on the ratchet wheel 21. Preferably, this pawl member 55 has extending there-

from a weighted handle member 55A to facilitate operation.

When it is desired to raise the cables 32, 33, 34 and the load fastened thereto, the wrench 51 is applied as indicated in Figure 9 with the pawl 55 pressed in engagement with the ratchet wheel 21 due to the gravity forces acting on the weighted extension 55A. Counterclockwise rotation of the wrench 51 produces corresponding counterclockwise movement of the ratchet wheel 21, the spring biased pawl 20 preventing clockwise movement thereof and serving to relieve some of the torque which would otherwise be exerted on the wrench 51.

In operation, the wrench 51 is rotated an angular distance slightly greater than the pitch on the teeth of the reel 21 to thereby step the ratchet wheel and attached shaft 22 around in a series of short strokes. When it is desired to lower the cables 32, 33, 34 with the load suspended thereby, the torque spring 41 has its free end transposed from the top side of the pawl 20 in Figure 9 to the underside of the same pawl 20 in Figure 10 in which latter case, the spring 41 biases the pawl member 20 out of engagement with the ratchet wheel teeth. In such case, the clockwise movement of the ratchet wheel 21 is arrested by the pawl member 55. The operator allows the wrench 51 to pivot under the influence of the torque present at the ratchet wheel 21 until the back side 55B of the pawl 55 engages the pawl member 20 to press it downwardly against the ratchet teeth of wheel 21. In this latter position of pawl 20, it is effective to arrest further clockwise movement of the ratchet wheel 21, it then being necessary that the pawl 20 be allowed to move outwardly again under the influence of spring 41 before the wheel 21 may continue to rotate. Such outward movement of the pawl member 20 results as the wrench 51 is rotated about the extension 50 in a counterclockwise direction. Such counterclockwise rotation of the wrench 51 causes the pawl 55 to engage the necessary succeeding tooth, to release the pressure between pawl 20 and wheel 21 whereupon the pawl 20 is free to move out of engagement under the influence of the torque spring 41. The wrench 51 is then allowed to move in the counterclockwise direction until it again cams down the pawl member 20 to repeat the sequence of events. It is thus apparent that the motion of the wrench 51 in the lowering operation is confined to a relatively small angular distance somewhat greater than the angular distance corresponding to the pitch between the adjacent teeth on the wheel 21.

In the modified arrangement shown in Figures 16 through 18, inclusive, the tool transporter has a frame substantially the same as the frame shown in the preferred embodiment, but cables extend through the whole framework and are movable in unison by a different type of mechanism.

Corresponding parts of the frame in the two modifications shown therein have identical reference numerals.

In Figure 16, the forward end 10A of the pipe 10 has mounted therein along its axis a jack shaft 71 whose ends are journaled for rotation in the bearings 72, 73. As shown in Figure 17, the lower end of the jack shaft 71 has mounted thereon a bevel gear 74 which cooperates with the gear 75, the gear 75 being rotatable upon rotating the handle 76.

Shaft 78 extending perpendicular to the axis

of the pipe 10A and journaled for rotation therein in a suitable bearing member has mounted thereon a gear 75 and handle member 76 so that rotation of the handle member 76 produces a corresponding rotation of the jack shaft 71. Such rotative movement imparted to shaft 71 results in longitudinal movement of the sleeve member 80 which is threaded on the shaft 71. In order to assure only rectilinear movement of the sleeve 80 without a rotational component, the sleeve has extending radially therefrom a guide projection 82 arranged to slide in the grooved guide member 83, the guide member 83 extending longitudinally to and within the pipe end 10A and being secured to the inner wall thereof. If desired, the projection 82 may have a roller 82A mounted thereon engageable in the groove 83A to minimize frictional forces.

Sleeve 80 also has depending radially therefrom the three integrally threaded lugs 90, 91, 92 which serve respectively as a fastening element for the eyelets in the double ended cables 94, 95, 96. These cables are maintained in position by suitable washers 98, 99 and 100 which are held in place by the corresponding bolts 102, 103, 104 entering the tapped holes in abutments 90, 91, 92 respectively to thereby maintain the eyelets of cable 94, 95, 96 in position. It is thus apparent that when the sleeve member 80 is moved, the double ended cables 94, 95, 96 are moved in unison.

One end 94A of the double ended cable 94 passes over the guide roller 120, over the guide roll 121, through the horizontal portion of tube 14 to the L-bend therein at which point it passes over a third roller 122, and then passes downwardly through the vertical portion of tube 14. As indicated in Figure 14, a pair of chains are attached to the end of the cable, with the chains extending through diametrically opposite apertures in the tube 14. The rollers 120, 121, 122 and the corresponding roller 123 are each journaled for rotation within and on the composite frame. The other end 94B of the cable 94 extends over the guide roller 92, over the guide roller 124 and then downwardly and has a chain with a hook attached thereto. The second cable 95 has one of its ends 95A extending over the roller 120 and over the roller 124 where it extends downwardly and has attached thereto a chain with a hook. The other end 95B of the cable pair 95 extends over the roller 120, over the roller 130 through the horizontal portion of tube 13, over the roller 123 in the bend of tube 13, down through the vertical portion of tube 13 and at its lower end is attached to a pair of chains having hooks attached to the ends thereof.

Both ends 96A and 96B of the double ended cable 96 pass in turn over the rollers 120 and 131 mounted at the rear of tube 15, then passes downwardly, and each has a chain with a hook attached thereto. Both ends 96A and 96B of the double ended cable 96 pass in turn over the rollers 120 and 131 mounted at the rear of tube 15, then passes downwardly and each has a chain with a hook attached thereto.

Each one of the guide rollers for the various rollers described above may be journaled for rotation on their respective tube.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. In a device of the character described, a longitudinally extending centrally disposed frame member, a pair of L-shaped frame members each having one of their ends attached to the first frame member and each having their downwardly extending ends adapted to mount a ground engaging wheel, a plurality of spaced cables depending downwardly from the first frame member and supported thereby, and a mechanism mounted within said frame member including a rotatable screw element cooperating with a sleeve threaded thereon and attached to said cables, arranged to move all of said cables in unison upon rotation of said rotatable screw element, said screw element and said sleeve being disposed within said frame member and extending in the longitudinal direction of said frame member with an end of said screw element projecting therethrough for rotation.

2. An equipment carrier, comprising: a rigid tubular frame including a single longitudinal member having a horizontal portion and a downwardly inclined forward end, and a single pair of aligned cross members rigidly attached to said longitudinal member and terminating at their extremities in vertical legs, and a reinforcing structure of diamond form enveloping the junctures of said longitudinal and cross members to unite them in rigid relation; carrier wheels journaled directly under and substantially within the planes of the vertical legs of said cross members; a mechanism carried by said frame including a plurality of flexible tension elements for attachment to a load disposed between said wheels and common means for operating said elements to lift and suspend said load.

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