

June 11, 1957

F. J. SCHENKELBERGER

2,795,347

LOAD HANDLING ATTACHMENT FOR INDUSTRIAL TRUCKS

Filed March 25, 1953

6 Sheets-Sheet 1

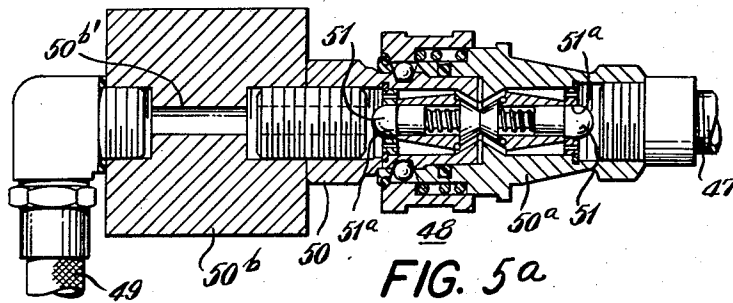


FIG. 5a

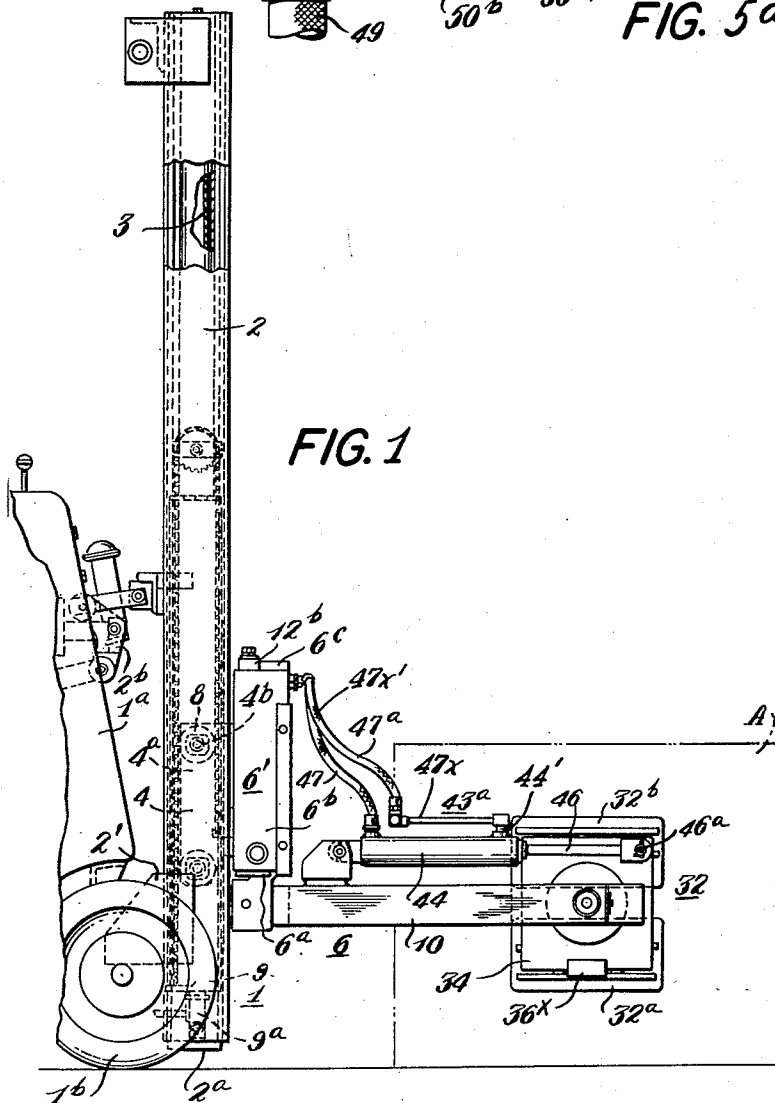


FIG. 1

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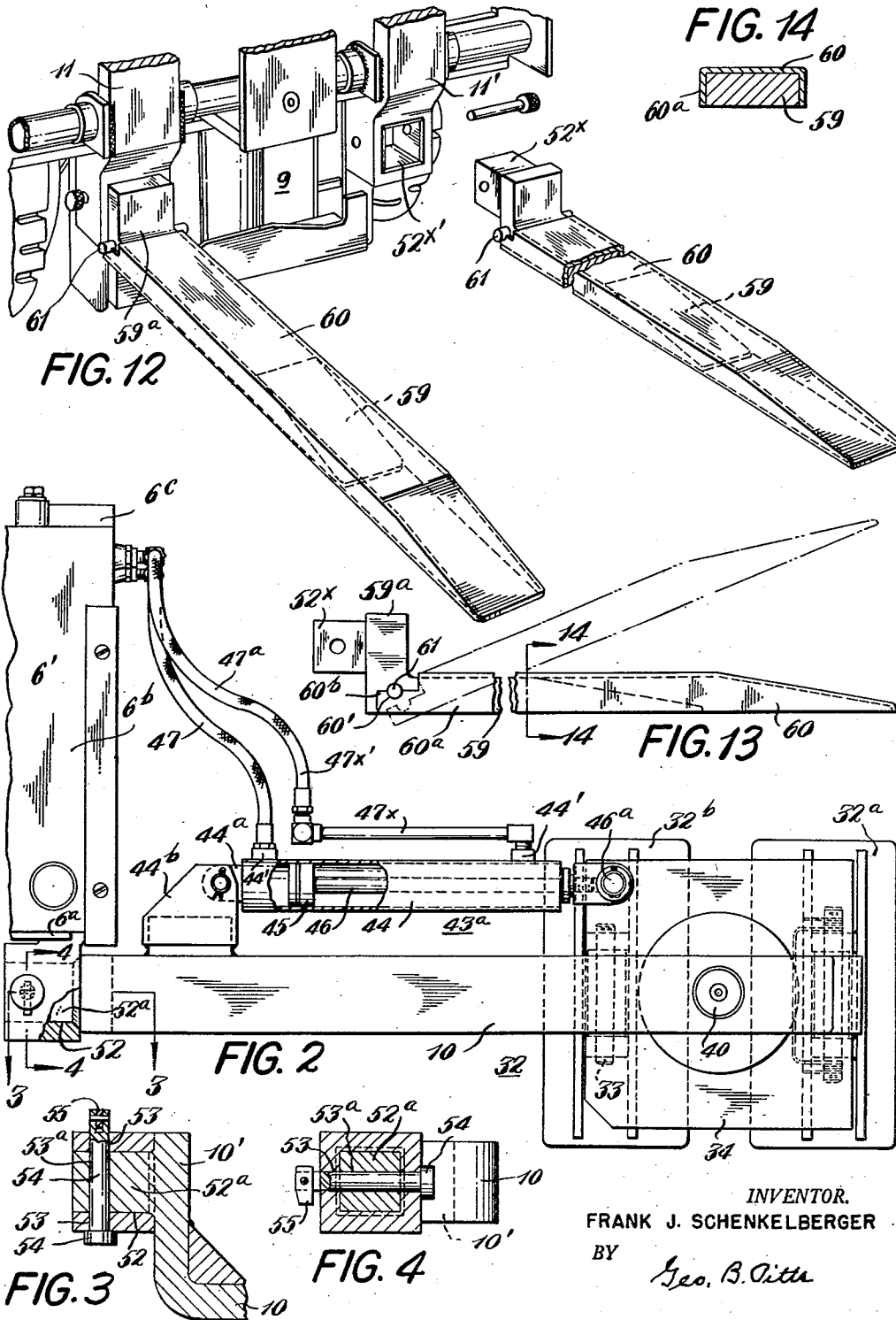
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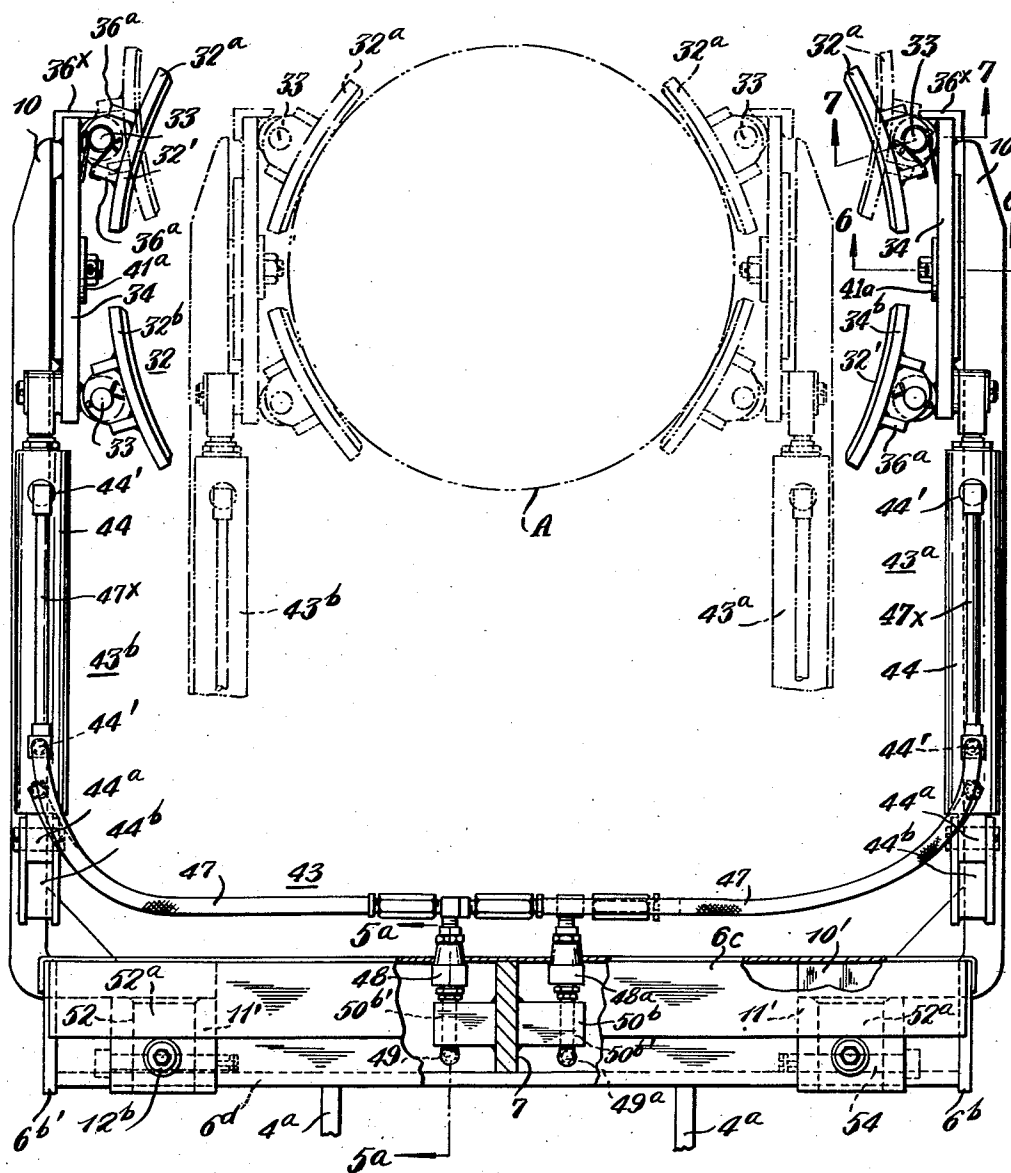


FIG. 5

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LOAD HANDLING ATTACHMENT FOR INDUSTRIAL TRUCKS

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FIG. 8

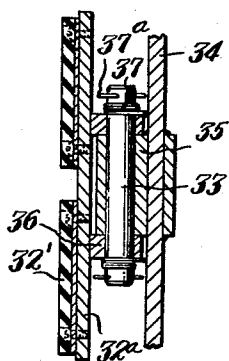
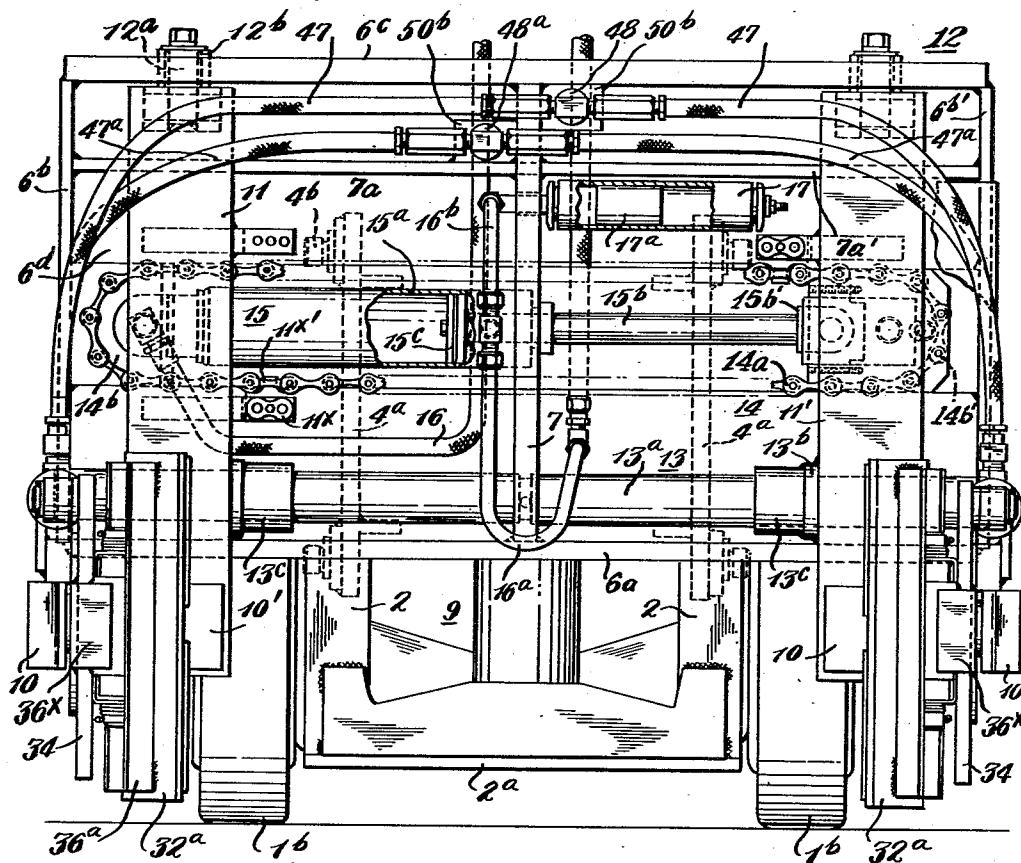


FIG. 7

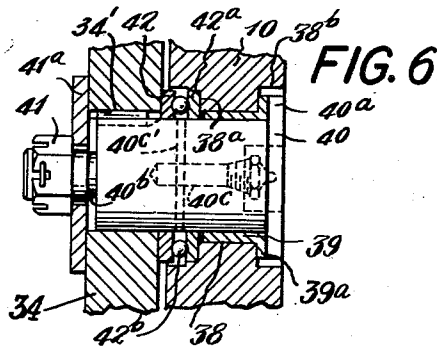


FIG. 6

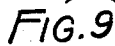
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**2,795,347**

6. Sheets-Sheet 5



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LOAD HANDLING ATTACHMENT FOR INDUSTRIAL TRUCKS

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FIG. 10

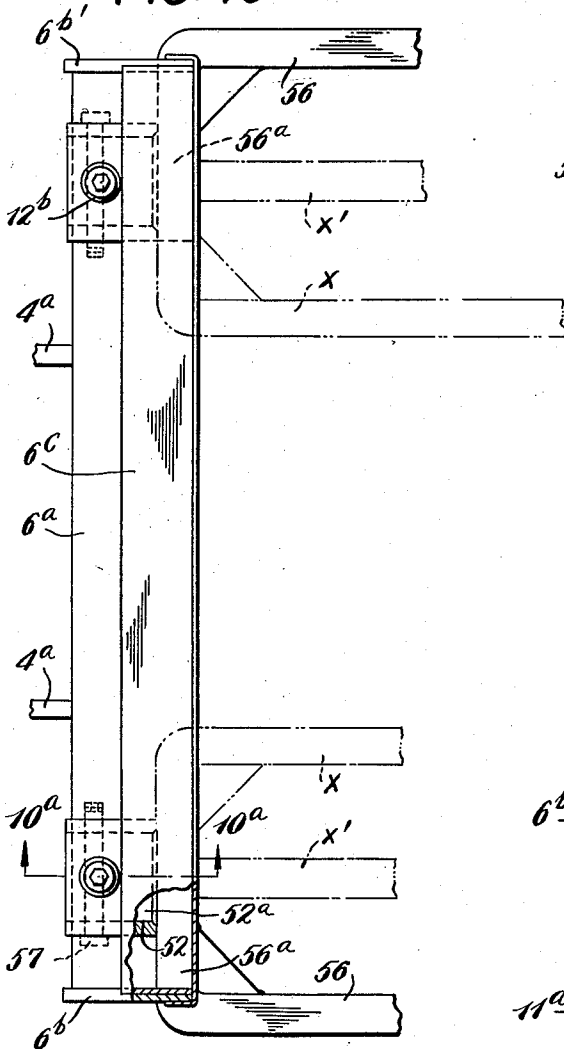


FIG. 10a

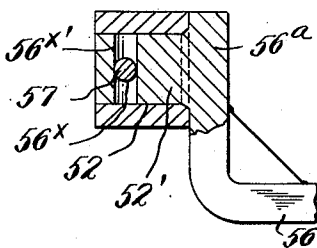


FIG. 11a

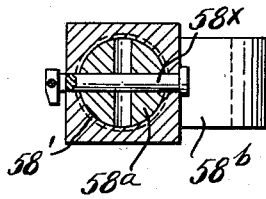
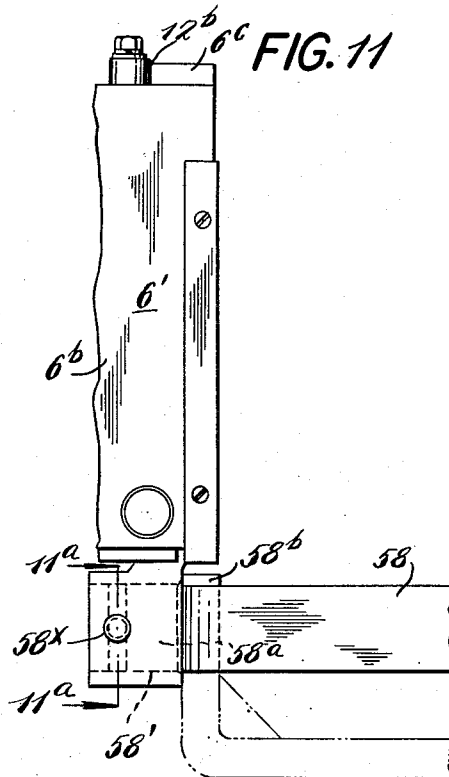


FIG. 11



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2,795,347

## LOAD HANDLING ATTACHMENT FOR INDUSTRIAL TRUCKS

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Application March 25, 1953, Serial No. 344,543

11 Claims. (Cl. 214—701)

This invention relates to an industrial truck, more particularly a truck having upright guide means on which a member is slidably supported and may be raised by a suitable power operated mechanism. In trucks of this type the raisable member is provided with a carrier for the loads to be picked up, transported and discharged. In some forms of construction, the load engaging or carrying devices are connected directly to the raisable member; in other forms of construction, these devices are movably mounted on a frame which in turn is connected to the raisable member. As hereinafter set forth, the invention herein is embodied in both forms of construction to (a) accommodate loads of different shapes or sizes, such as boxes, cartons, bales, tires and other bodies, or (b) accommodate and handle loads, which for various reasons, may be bodily moved by a power operated mechanism while supported on the carrier.

The invention includes means for removably supporting on the raisable member load supporting or engaging devices adapted for handling one kind or shape of load, whereby these devices may be removed and replaced by devices adapted for handling a different kind or shape of load. In this connection, it is to be observed that in some manufacturing plants, where different types of loads had to be handled, separate trucks were employed, for example, one having a carrier to accommodate and transport the materials and parts to be fabricated and another to handle the finished products made from such materials and parts. Due to the cost of these trucks and for other economical reasons, it has been found desirable to provide a truck having a raisable member wherein the carrier or parts thereof, may be removed and another carrier or parts substituted therefor. By such removable and replacement arrangement one carrier may be adapted to handle one type of load and the substituted carrier or parts thereof may be adapted for handling another type of load, whereby a substantial saving in the initial cost and operating expense results. Furthermore, so far as I have knowledge, in elevating trucks having a carrier that may be removed and another carrier substituted therefor, undue labor and time was required to make the change of carriers, especially where parts of the carrier and raisable member and the fluid connections had to be disassembled and re-assembled.

The invention includes removably related connections between the load engaging devices and the raisable support or between parts of the carrier, whereby the load engaging devices may be adjusted or repositioned to engage and support loads of different sizes.

The invention also includes a carrier consisting of forks and removable devices for increasing the length of the forks.

One object of this invention is to provide, in a truck having a raisable support, improved interrelated, separable elements and locking devices therefor of simplified form, whereby the load carrier may be readily positioned on the support or removed and replaced by another carrier.

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Another object of the invention is to provide an improved mechanism for removably mounting a load carrier on the raisable member of an elevating truck consisting of telescopically related parts.

Another object of the invention is to provide, in a truck having a raisable member, an improved mechanism mounted thereon for removably mounting load supporting or handling devices consisting of sets of telescopically related fixed and movable parts, wherein the movable part is operated in a direction endwise of the truck, whereby positioning or replacement of the carrier on the raisable member may be made in a relatively limited area.

Another object of the invention is to provide in an elevating type of truck, load supporting devices having offset inner ends capable of being adjustably mounted on the raisable support for the truck, whereby the supporting devices may be related in selected spaced relation.

Another object of the invention is to provide improved means for increasing the length of the forks to accommodate large loads.

A further object of the invention is to provide an improved mechanism mounted on the raisable support of a truck and having pairs of load engaging devices swingably mounted on relatively movable members and adapted to engage the opposite sides of a load to be picked up and transported and means operable to simultaneously swing the pairs of devices to a selected position, whereby the load may be bodily repositioned to facilitate transportation and/or the discharge thereof.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a fragmentary side elevation of an industrial truck embodying my invention, parts being broken away;

Fig. 2 is an elevation of parts shown in Fig. 1, enlarged, parts being broken away;

Figs. 3 and 4 are sections on the lines 3—3 and 4—4, respectively, of Fig. 2;

Fig. 5 is a plan view of parts shown in Figs. 1 and 2;

Fig. 5a is a section on the line 5a—5a of Fig. 5;

Figs. 6 and 7 are sections on the lines 6—6 and 7—7, respectively, of Fig. 5;

Fig. 8 is a fragmentary front elevation looking toward the left of Figs. 1 and 2;

Fig. 9 is an expanded view of parts shown in Figs. 1 and 2 showing the load engaging mechanism removed;

Fig. 10 is a fragmentary plan view showing the mounting of a modified form of load support;

Fig. 10a is a section on the line 10a—10a of Fig. 10;

Fig. 11 is a fragmentary side elevation of parts shown in Fig. 10, but showing a modified form of mounting;

Fig. 11a is a section on the line 11a—11a of Fig. 11;

Fig. 12 is a fragmentary perspective view showing a plurality of removable forks for supporting a load; also showing each fork provided with a supplemental member, whereby the length of the forks may be increased;

Fig. 13 is a side elevation of the fork and supplemental member; and

Fig. 14 is a section on the line 14—14 of Fig. 13.

In the drawings, referring particularly to Figs. 1 to 8, inclusive, 1 indicates as an entirety the front portion of an industrial elevating truck consisting of a frame 1a mounted on a pair of front wheels 1b and a pair of rear wheels (not shown). By preference, one of said pairs of wheels is driven by a suitable motive power and the wheels of the other pair are mounted to provide for steering of the truck. 2 indicates a pair of main guides connected together at their lower ends by a base 2a. The outer sides of the guides 2 are provided with rearwardly extending supports 2' (one only being shown) suitably

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pivotaly mounted on the housing of the axle for the wheels 1b, whereby, by means of a power operated mechanism (not shown) connected to linkage 2b the guides 2 and parts supported thereon may be tilted inwardly to facilitate transportation of the loads. Such mounting of the main guides 2 and the mechanism for tilting or swinging them inwardly and outwardly are well known in this art, for which reason such mechanism is not shown. The guides 2 slidably support a pair of secondary guides 3, for movement endwise thereon and the latter guides slidably support an elevating member, indicated as an entirety at 4. As shown in Fig. 1, the guides 2 and 3 are preferably of equal length and in the lowest position of the elevating member 4 the guides 3 may rest on the base 2a.

6 indicates as an entirety a carrier comprising a frame 6' mounted on the member 4 and a load support, which is later referred to. The frame 6' consists of a bottom wall 6a, side walls 6b, 6b', a top wall 6c and spaced upper and lower panels forming a rear wall 6d. The frame 6' is reinforced vertically by a bar 7 welded to the top and bottom walls thereof and horizontally disposed bars 7a, 7a', each welded at its opposite ends to the vertical bar 7 and one of the side walls 6b, 6b'. The frame 6' may be of any desired width. In the illustrated form of construction, the elevating member 4 consists of the following: 4a indicates spaced, parallelly related brackets mounted on and extending rearwardly from the wall 6d, each bracket being provided with upper and lower laterally extending stud shafts 4b loosely rotatably supporting rollers 8, which roll on the secondary guides 3, to support the elevating member 4 and carrier 6 thereon, whereby these parts may be raised and lowered, by a suitable mechanism indicated as an entirety at 9. The raising mechanism 9 herein illustrated is of the fluid operated type and preferably similar in construction and operation to the mechanism shown in Letters Patent No. 2,598,566 to Max Lehmann, dated May 27, 1952 (to which reference may be made) wherein the source of fluid under pressure is supplied to the lower end of a member 9a, mounted on the base 2a.

The load support consists of a pair of arms or members 10 extending outwardly of the frame 6' and removably mounted on the lower ends of vertically disposed supporting elements 11, 11', as later set forth. In the form of construction referred to, the supporting elements 11, 11', are movably supported on the frame 6' by means of upper and lower guide devices 12, 13, respectively, whereby the members 10, dependent on the equipment associated therewith or lack of equipment thereon, may be moved toward or from each other or both moved simultaneously in the same direction. It will be observed that where the supporting elements 11, 11', are not to be moved laterally in either direction they may be fixed to cross members, which in turn are removably supported on the raisable support 4, as shown in Letters Patent No. 2,522,128, dated September 12, 1950. The devices 13 consist of the following: 13a indicates a guide member disposed adjacent the lower wall 6a of the frame 6' and suitably mounted at its opposite ends in the side walls 6b, 6b', thereof. Each of the upstanding supporting elements 11, 11', is provided at its opposite sides with rearwardly extending plates 13b connected to a sleeve 13c which slidably fits the guide 13a. The guide devices 12 consist of pins or bolts 12a mounted in and extending upwardly beyond the upper ends of the supporting elements 11, 11', each pin supporting a bushing on which a roller 12b is mounted, the rollers having engagement with the rear edge of the top wall 6c and co-operating with the guide member 13a to slidably support the supporting elements 11, 11', and parts supported thereon on the frame 6'.

14 indicates as an entirety power means for moving the supporting elements 11, 11', on the guide devices 12, 13, disposed intermediate the latter. The power means comprise the following: 14a indicates an endless

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chain engaging reeving elements 14b, 14b', suitably mounted on the side walls 6b, 6b', respectively. In the arrangement shown in Fig. 8, the supporting element 11 is detachably connected to the lower run of the chain 14a and the supporting element 11' is detachably connected to the upper run of the chain; accordingly, with the supporting elements 11, 11', in the position shown in Fig. 8, driving of the chain 14a in a counter-clockwise direction will move the supporting elements 11, 11', toward each other, whereas, driving of the chain 14a in a clockwise direction will move the supporting elements 11, 11', in the opposite direction. The detachable connections between each supporting element 11, 11', and the chain 14a consists of a key 11x removably mounted in an extension on the rear side of the adjacent supporting element and provided with a lug 11x' which projects into one of the links of the chain 14a. It will be observed that these connections provide for the initial setting of the supporting elements 11, 11', at any desired spaced relation. The chain 14a is preferably driven by a fluid operated mechanism consisting of a cylinder-piston unit 15 preferably disposed between the chain runs. The outer end of the cylinder 15a is mounted on the support for the reeving element 14b, whereas the outer end of the piston rod 15b, which is connected to the reciprocable piston 15c, is pivotally connected to a block 15b' suitably mounted on the rear side of the supporting element 11'; as the supporting element 11' is, as already set forth, connected to the upper run of the chain 14a, the operation of the piston 15c toward the left, as viewed in Fig. 8, will effect movement of the supporting element 11', which will drive the chain 14a and the latter in turn will move the supporting element 11 toward the right. As later set forth, the operation of the supporting elements 11, 11', toward each other serves to effect pressure or clamping engagement with a body A, which as shown in dotted lines for purposes of illustration in Fig. 5, consists of a roll of paper. As shown in Fig. 8, the opposite ends of the cylinder 15a are connected with fluid connections 16, 16a, for the supply and discharge of the fluid (preferably oil), the source of fluid pressure supply being mounted on the frame 1a and controlled by a valve (not shown) arranged to supply fluid pressure to either end of the cylinder 15a and the discharge of the fluid from the opposite end of the latter in a well known manner. The fluid connection 16a is provided with a branch pipe 16b connected to one end of a separate cylinder 17 having a piston 17a which is subjected on its inner side to the fluid pressure established in the fluid supply system, the cylinder 17 on the outer side of the piston being filled with a suitable gas—such as nitrogen under pressure equal to that for operating the piston 15c when the latter is operated to move the members 11, 11', into engagement with the body A, whereby the latter may be raised or otherwise bodily moved. The pressure of the gas in the cylinder 17 is effective to compensate for reduced pressure in the connection 16a and the fittings therefor, due to leakage of the fluid therefrom, when a body A is clamped, as later set forth. The piston 17a is elongated and slidably fits the inner wall of the cylinder 17 for endwise movement therein.

The mounting of the supporting elements 11, 11', and power means for operating the latter are similar to the mounting of and power means for operating the upstanding legs in my co-pending application Ser. No. 221,638, filed Apr. 18, 1951, now Letters Patent No. 2,663,443, dated Dec. 22, 1953, for which reason no claim is made herein thereto.

In the form of construction being described, the members 10 are provided with pairs of load engaging members 32 in opposed relation and adapted to engage the opposite sides of the load or body A, as shown in dotted lines in Fig. 5. Where the side wall of the load or body A is round, the members 32a, 32b, are of arcuate shape to insure maximum surface engagement with the body A

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and eliminate damage to the latter. As shown, members 32a, 32b, of each pair are mounted on parallel related shafts 33, which, as viewed in Fig. 5, are disposed parallel to the axis of the body A and carried by a plate 34, which in turn is rotatably mounted on the adjacent member 10. As shown in Figs. 5 and 9, each of the members 32a, 32b, is provided with upper and lower facing pads 32' formed of suitable compressible friction increasing material, such as rubber or rubber compound. Each pad 32' is cemented to a plate 32x which is secured to the adjacent load engaging member by screws 32x'. The pivotal mountings between the members 32a, 32b, and the adjacent plate 34 are preferably similar in construction, each mounting consisting of the following—see Fig. 7: 35 indicates a hollow support welded on the inner face of the adjacent plate 34, the adjacent shaft 33 extending through the opening in the support 35 as shown in Fig. 7. The shaft 33 extends beyond the opposite ends of the support 35 and through openings formed in spaced plates 36 which and inwardly extending lugs 36a are suitably welded on the inner side of the adjacent member. The shaft 33 for each member 32a preferably extends beyond the opposite ends of the adjacent support 35 and each of said ends supports a coiled spring 37 one end of which engages the adjacent plate 34, whereas its other end engages the adjacent member 32a to normally swing the latter to the position shown in dotted lines in Fig. 5. Cotter pins 37a serve to prevent displacement of the shaft 33. With the load engaging members 32a in the position shown in dotted lines and the members 10 properly spaced, the truck may be operated to position the load engaging members 32a—32b, 32a—32b, at opposite sides of the body A (as shown in Fig. 5), whereupon the members 10 may be operated to move the members 32a—32b, 32a—32b, into pressure or clamping engagement with the body A, as shown in dotted lines. In this latter operation, the engagement of the inner side edges of the members 32a with the body A serves to swing the members 32a into face-to-face relation with the body A. By preference, that end of each plate 34, which supports one of the body engaging members 32a, is provided with an angle 36x the outer wall of which provides a stop to limit the swinging movement of the adjacent member 32a under the influence of the springs 37.

The pivotal connection between each member 10 and the adjacent plate 34 is preferably disposed axially of the latter and consists of the following: 38 indicates a through opening formed in the member 10 (see Fig. 6), and aligned with the through opening 38 in the other member 10. The inner and outer ends of the opening 38 are enlarged to provide annular recesses 38a, 38b. 39 indicates a bushing mounted in and having a pressed-in fit with the walls of the opening 38. The outer end of the bushing 39 is provided with a flange 39a seated in the recess 38b. 40 indicates a shaft having a flange 40a engaging the flange 39a. The shaft 40 is rotatably mounted in the bushing 39 and extends therethrough and an opening 34' formed in the plate 34, the shaft 40 terminating at its inner end in a stud 40b, which is provided with screw threads to take a nut 41. The nut 41, when tightened, engages a washer 41a, which has bearing on the adjacent face of the plate 34; in this arrangement of parts the shaft 40 is held against endwise movement in either direction. As shown, the inner end portion of the shaft 40 is suitably keyed to the plate 34. 42, 42a, indicate annular rings disposed in engagement with the inner face of the plate 34 and bottom wall of the recess 38a, the rings providing races for the anti-friction elements (balls) 42b, forming a thrust bearing for a well known purpose. The shaft 40 is formed with a chamber 40c extending inwardly from its outer end and adapted to hold a supply of lubricant for the thrust bearing. The chamber 40c is provided with a suitable normally closed inlet, whereas its inner portion communicates with ducts 40c' leading to the space between the races 42, 42a.

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Mechanism, indicated as an entirety at 43, is provided for simultaneously rotating the plates 34 ninety degrees; that is, from the position shown in Figs. 2 and 5 to and from the position shown in Fig. 1. In Figs. 2 and 5, the load engaging members 32 are positioned to engage a body A when supported on one end and raise it to a suitable level for transportation; when in the raised position the body A may be swung to a horizontal position for transportation at the option of the truck driver or where the load, when lowered, is to be discharged on its side, as shown in Fig. 1. Likewise, the load A may be picked up when positioned as shown in Fig. 1 and raised and thereafter bodily rotated and discharged on a surface in an upright position. The construction lends itself to other application: for example, a container containing a material, which container may be engaged and raised and then transported to a discharge station where the container may then be bodily rotated to discharge the material therefrom. The mechanism 43 comprises fluid operated cylinder-piston units 43a, 43b, each mounted on one of the members 10. These units are similar in construction and operation, so that one only will be referred to, but like parts will be identified by similar reference characters. Referring to Figs. 1, 2 and 5, the unit 43a consists of the cylinder 44 the inner end wall of which is provided with an extension 44a pivotally connected to a standard 44b, which is mounted on the adjacent member 10. The cylinder 44 contains a reciprocable piston 45 connected to a rod 46 which extends through the outer end wall of the cylinder 44, the outer end of the rod being pivotally connected to the adjacent plate 34 at one side of the shaft 40 by a wrist pin 46a. The opposite ends of the cylinder 44 are provided with fluid inlet and outlet fittings 44' to which the outer ends of fluid conduits 47, 47a, are respectively connected. As shown, the fluid conduit 47a is preferably formed of outer and inner connected together sections 47x, 47x', the outer section 47x consisting of a metal pipe and the inner section 47x' and conduit 47 consisting of flexible hose to compensate for (a) swinging movement of the cylinder 44, due to the arcuate path traversed by the wrist pin 46a in rotating the adjacent plate 34 from the position shown in Fig. 2 to the position shown in Fig. 1 and in the reverse direction and (b) movement of the members toward and from each other. As will be observed in Figs. 2, 5 and 8, the inner ends of the conduits 47, 47a, are connected through a T-element to the outer end of a fitting 48, whereas the inner ends of the conduits 47a are connected through a T-element to the outer end of a fitting 48a. The outer ends of the fittings 48, 48a, are connected to main conduits 49, 49a, respectively, and the latter are connected to a valve (not shown) forming part of a system for supplying fluid (such as oil) under pressure to the cylinders 44, 44. As is well known, in the fluid system referred to, operation of the valve serves to supply fluid under pressure to and through either main conduit 49, 49a, and permit discharge of the fluid through the other main conduit; accordingly, when fluid pressure is supplied to the conduit 49, the fluid flows to and through the fitting 48 and conduits 47 to the inner ends of both cylinders 44 and is applied to the outer sides of the pistons 45 therein to move the latter outwardly (as viewed in Fig. 2) and simultaneously the fluid in the cylinders 44 on the inner sides of the pistons 45 is discharged through conduits 47a to the fitting 48a for flow to the valve and from the latter to a sump. Where the fluid pressure is supplied to the main conduit 49a, to move the pistons 45 inwardly, the fluid flow in conduits 47 and 47a is reversed.

As the frame 6' is mounted on the support 4 which moves vertically, the main conduits 49, 49a, consist of hose.

The couplings or fittings 48, 48a, are of similar construction, each consisting of detachably related male and female parts 50, 50a (see Fig. 5a) arranged to disconnect

the adjacent main conduit from the conduits leading to the cylinders 44 when the members 10 are to be removed and other members (for example, forks 56 shown in Figs. 10 and 10a or forks 5a shown in Fig. 12) substituted as later set forth. Each part 50, 50a, is provided interiorly with a spring biased valve 51 which is automatically unseated when the parts 50, 50a, are in assembled relation (see Fig. 5a) to provide a fluid connection between the adjacent conduits, but when the parts 50, 50a, are uncoupled, the valve 51 in each part automatically engages its seat 51a to close the adjacent conduit. The couplings are of standard construction for which reason they are not described in detail. As shown in Fig. 5a, the outer end portion of each male part 50 is mounted in a support 50b, which is fixed to the vertical wall 7, the support 50b having a through opening 50b' to provide fluid communication between the adjacent conduits.

As shown in Figs. 1 to 5, inclusive, the inner ends of the members 10 are removably mounted on the supporting elements 11, 11', respectively. The mounting for each member 10 consists of the following: 52 indicates a recess or opening formed in each supporting element 11, 11', adjacent its lower end. In the form of construction referred to, each recess or opening is of non-circular shape in cross section. 52a indicates an extension on the inner end of each member 10. By preference, each member 10 is offset inwardly at its inner end, as shown at 10' and the extension 52a is provided on and projects rearwardly therefrom. The offsets 10' increase the spacing of the members 10 when the latter are moved to their extreme outward positions by the mechanism 14; hence, as compared to members 10 wherein the extensions are disposed endwise of the recesses 52, bodies A having a greater diameter or width can be engaged. Each extension 52a is complementary in shape in cross section to the adjacent recess or opening 52 and removably slidably fits the latter. By preference, the opening 52 extends through the adjacent supporting member and the extension 52a is co-extensive in length to that of the opening to insure an adequate and stabilized support for the adjacent member. The side walls of each recess are formed with aligned through openings 53, whereas the adjacent extension 52a is formed with a through opening 53a, which registers with the openings 53 when, in positioning the extension, the offset 10' engages the outer wall of the adjacent supporting element, as shown in Figs. 2, 3 and 5. The openings 53, 53a, are adapted to receive a removable pin 54 to lock the extension in position. The outer end of each pin 54 is bifurcated, the side walls of which support a shaft for a rocker 55 which may be disposed at right angles to the pin 54 (see Fig. 4) to prevent removal or displacement thereof or rocked into endwise relation to the pin when the latter is being inserted in position or removed. As shown in Fig. 9, the members 10 and the equipment thereon can be readily removed or disassembled from the supporting elements 11, 11', (a) when other load engaging members are to be substituted therefor or (b) parts of the truck or load engaging members are to be repaired.

Operation: Where the body A to be engaged and transported is standing on end, the pairs of load engaging members 32 are disposed as shown in Figs. 2, 5 and 8. Initially the members 10 are moved toward the side walls 6b, 6b', of the frame 6', by operation of the mechanism 14 to position the pairs of load engaging members 32 beyond the opposite sides of the body A, whereupon the truck is driven forwardly to locate the pairs of members 32a—32b at diametrically opposite sides of the body A and in symmetrical relation to the diameter of the body disposed at right angles to the members 10; next, the members 10 are then moved toward each other to effect pressure engagement of the pairs of engaging members 32a—32b with the opposite sides of the body A; finally, the support 4 may be raised to any desired level for

transportation and at the option of the truck driver the mechanism may be operated to swing the body A to a horizontal position. Fig. 1 shows the position of the load engaging members 32a—32b when the body A is in a horizontal position and is to be picked up or discharged.

56 indicates a pair of forks removably mounted on the supporting elements 11, 11', as already set forth; as shown, the supporting elements 11, 11', are relatively movable on the frame 6', but as already set forth they may be fixedly mounted on the raisable support 4. In this form of construction, each fork 56 is offset at its inner end as shown at 56a and the latter is provided on its outer side with an extension 52' telescopically and removably seated in an opening 52 in the adjacent supporting element. Fig. 10 shows the forks 56 in that position providing a maximum spacing thereof for large size bodies. By disassembly of the forks 56 from the supporting elements 11, 11', and bodily turning them (a) 180 degrees to the position shown in dotted lines at x or (b) 90 degrees to the position shown in dotted lines at x', and reseating the extensions 52' in the openings 52, the forks 56 will be in a reduced spaced relation and thus support bodies of a smaller size. To provide for the three positions referred to each of the extensions 52' is formed with through openings 56x, 56x', disposed at right angles (see Fig. 10a) to receive the locking pin 57 in either selected position of the forks.

Figs. 11 and 11a show a fork 58 which is similar in construction to the forks 56 but the mounting therefor is modified in that the wall of the through opening 58' in the adjacent supporting element is round and the extension 58a on the offset 58b is of similar shape in cross section and rotatably and removably fits the opening 58'. The form of mounting for the forks 58 permits the latter, upon removal of the locking pin 58x, to be rotated to either selected position (as set forth with respect to the forks 56) without removing the extension 58a from the adjacent opening 58'.

Figs. 12, 13 and 14 illustrate a modified form of construction wherein are shown forks 59 for engaging and raising and lowering loads, removably mounted on the supporting elements 11, 11', the forks being provided with offsets 59a having extensions 52x removably fitting into openings 52x'. In Fig. 12 the forks are shown in that position indicated at x' in Fig. 10; it will be observed that the forks 59 may be repositioned, as herein set forth in connection with the forks or members 56 and 58, to meet different types, shapes or sizes of loads. These views also illustrate means wherein provision is made to increase the length of the forks to accommodate large size loads. In these views, 60 indicates supplemental forks each removably mounted on one of the forks 59. Each supplemental member 60 is formed of sheet metal of U-shape in cross section, the top and side walls of which closely fit the corresponding walls of the adjacent fork 59. The supplemental forks 60 are preferably of a length to extend from the offsets 59a outwardly beyond the outer ends of the forks 59, the length of the supplemental forks 60 being dependent on specific conditions to be met when the truck is in use. The outer end portions of the top walls of the supplemental forks 60 are preferably inclined downwardly and outwardly. Each supplemental fork 60 is connected to the adjacent fork 59 by the following devices: 61 indicates pins extending laterally from the opposite sides of the fork 59, preferably adjacent its inner end. As shown in Fig. 13, the inner end portions of the side walls 60a for the supplemental fork are cut away to provide rearwardly extending wings 60b the upper edges of which are recessed to form seats 60' for the pins 61; each supplemental fork 60 is assembled on one of the forks 59 by initially positioning it as shown in dotted lines in Fig. 13 and then swinging the supplemental fork downwardly to the position shown in full lines, in which position the engagement of the pins 61 with the walls of the recesses 60' serves to lock the

supplemental fork against endwise movement outwardly. The removal of each supplemental fork 60 is effected by initially swinging it to the dotted line position, whereupon it may be bodily moved outwardly.

To those skilled in the art to which my invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. My disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In a truck having upright guide means, a support movably mounted on said guide means and mechanism for raising the said support, the combination of supporting elements on said support, each of said elements being formed at its lower end with an inwardly extending recess, a plurality of horizontally disposed outwardly extending load supporting members, each member being provided at its inner end with a rearward extension removably fitting into one of said recesses and each of said supporting members being provided at its inner end with an offset and the extension for each member being mounted on the outer side of the offset of the corresponding member adjacent to the outer end of the offset, whereby by moving said members outwardly to remove said extensions from the adjacent respective recesses and replacing the extensions in a different angular position, the load supporting members may be selectively spaced.

2. In a truck having upright guide means, a support movably mounted on said guide means and mechanism for raising the said support, the combination of supporting elements on said support, each of said elements being formed at its lower end with an inwardly extending recess, a plurality of horizontally disposed outwardly extending load supporting members, each member being provided at its inner end with a rearward extension removably fitting into one of said recesses, and each load supporting member being provided at its inner end with an offset, the extensions of said members being mounted on the outer side of the offsets thereof adjacent to the outer end of the offset, whereby rotation of said extensions in their respective recesses serves to position said members in selectively spaced relationship.

3. In a truck having upright guide means, a support movably mounted on said guide means and mechanism for raising said support, of a load carrier on said support, said carrier comprising a transverse frame, a pair of vertically disposed, parallel related supporting elements, horizontally disposed guide means between said frame and said supporting elements, means for moving said elements toward or from each other, a pair of horizontally disposed, outwardly extending supporting devices each removably mounted at its inner end on the lower end of one of said supporting elements, plates mounted on the inner sides of said supporting devices adjacent their outer ends in aligned opposed relation and a pair of load engaging members mounted on said plates and disposed in opposed relation and adapted to engage the opposite sides of a load upon movement of said supporting elements toward each other.

4. In a truck having a frame, upright guide means mounted on said frame, a support movably mounted on said guide means and mechanism for raising said support, of a load carrier on said support and consisting of a transverse frame, a pair of vertically disposed supporting elements, horizontally disposed guide means on said frame for movably supporting said elements, means on said transverse frame and operatively connected to said supporting elements for moving them relative to said transverse frame, the lower ends of said supporting elements being formed with inwardly extending horizontally disposed recesses, a pair of horizontally disposed load supporting devices each having on its inner end a horizontally disposed rear extension fitting into one of said recesses and adapted to be removed therefrom endwise, and means

for removably securing each said extension in the adjacent recess.

5. A truck as claimed in claim 3 wherein each of said plates is rotatably mounted on the adjacent supporting device, a fluid operated mechanism is mounted on each of said supporting devices and operatively connected to the adjacent plate to rotate it in either direction, said mechanism including a motor and separate fluid conduits for said motor, each conduit consisting of an inner section connected at its outer end to said motor and an outer section the outer end of which is adapted to be connected to a fluid under pressure supply and discharge system mounted on the truck, a valve for controlling the flow of fluid through either of said conduits and discharge of the fluid through the other conduit, and detachable fittings between the adjacent ends of the conduit sections for each conduit adapted to be separated when said supporting devices are to be removed from said supporting elements, the fitting for the inner end of each outer conduit section being mounted on said support.

6. A truck having, in combination, a frame provided with upright guide means, a support movably mounted on said guide means, mechanism between said frame and said support for moving the latter vertically on said guide means, a plurality of horizontally disposed load engaging members mounted at their inner ends on said support and extending outwardly therefrom, an elongated supplemental load engaging member removably mounted on each of said first mentioned members, said supplemental member, when positioned on the latter, being arranged to extend beyond the outer end of the adjacent first mentioned member to increase the length of the latter, and detachable connections between each first mentioned load engaging members and the adjacent supplemental load engaging member.

7. A truck as claimed in claim 6 wherein each of said first mentioned load engaging members is shaped to provide a top wall and side walls and each of said supplemental members, throughout its inner portion, having an inverted U-shape in cross section and arranged to fit the top and side walls of the adjacent first mentioned load engaging member.

8. A truck as claimed in claim 7 wherein each of said first mentioned members is provided with a pin extending laterally from one side thereof and one side wall of the adjacent supplemental member is cut away to form a recess adapted to receive said pin and secure said supplemental member to the adjacent first mentioned member.

9. In a truck having a chassis, upright guide means mounted on said chassis, a support member movably mounted on said guide means and mechanism for raising said support member, the combination of a load carrier on said support member comprising a frame, a pair of supporting elements, horizontally disposed guide means on said frame for movably supporting said elements, means on said frame and operatively connected to said elements for moving the latter relative to said frame, said supporting elements each being formed with a recess, a pair of horizontally disposed load supporting devices each having on its inner end an extension fitting into one of said recesses and adapted to be removed therefrom, and means for detachably securing said extensions in said recesses.

10. In a truck having upright guide means, a support movably mounted on said guide means and mechanism for raising said support, the combination of a load carrier on said support and comprising a transverse frame, a pair of vertically disposed parallel supporting elements, horizontally disposed guide means supporting said supporting elements for movement on said frame, power actuated means for moving said elements toward or away from each other, a pair of horizontally disposed and outwardly extending supporting devices each removably mounted at its inner end on the lower end of said supporting elements, and load engaging members mounted on

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said supporting devices and disposed in opposed relationship and adapted to engage the opposite sides of a load upon movement of said load supporting devices toward each other.

11. In a truck having a chassis, upright guide means 5 mounted on said chassis, a support member removably mounted on said guide means and mechanism for raising said support member, the combination of a load carrier on said support member comprising a frame, a pair of supporting elements, horizontally disposed guide means 10 on said frame for movably supporting said elements, power actuated means on said frame and operatively connected to said elements for moving the elements laterally with respect to said frame, said supporting elements each being formed with an upwardly extending 15 recess adjacent its lower end, a pair of horizontally disposed load supporting devices each having on its inner end an extension fitting into one of said recesses and adapted to be removed therefrom, said recesses having 20 walls causing said load supporting devices to move horizontally with said elements, said elements including means

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adjacent said recesses for holding said extensions in said recesses but permitting selective removal of the extensions from the recesses.

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