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Jones, Jr. et al.

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[54] **APPARATUS FOR LIFTING AND MOVING CONTAINERS**

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[52] **U.S. Cl.** **214/750,** 294/87, 294/88

[51] **Int. Cl.** **B66f 9/14**

[58] **Field of Search** ..... 294/63, 65, 67 R, 294/67 BB, 86 R, 87, 87.26, 88; 214/145, 620, 650–655, 660, 750

[56] **References Cited**

UNITED STATES PATENTS

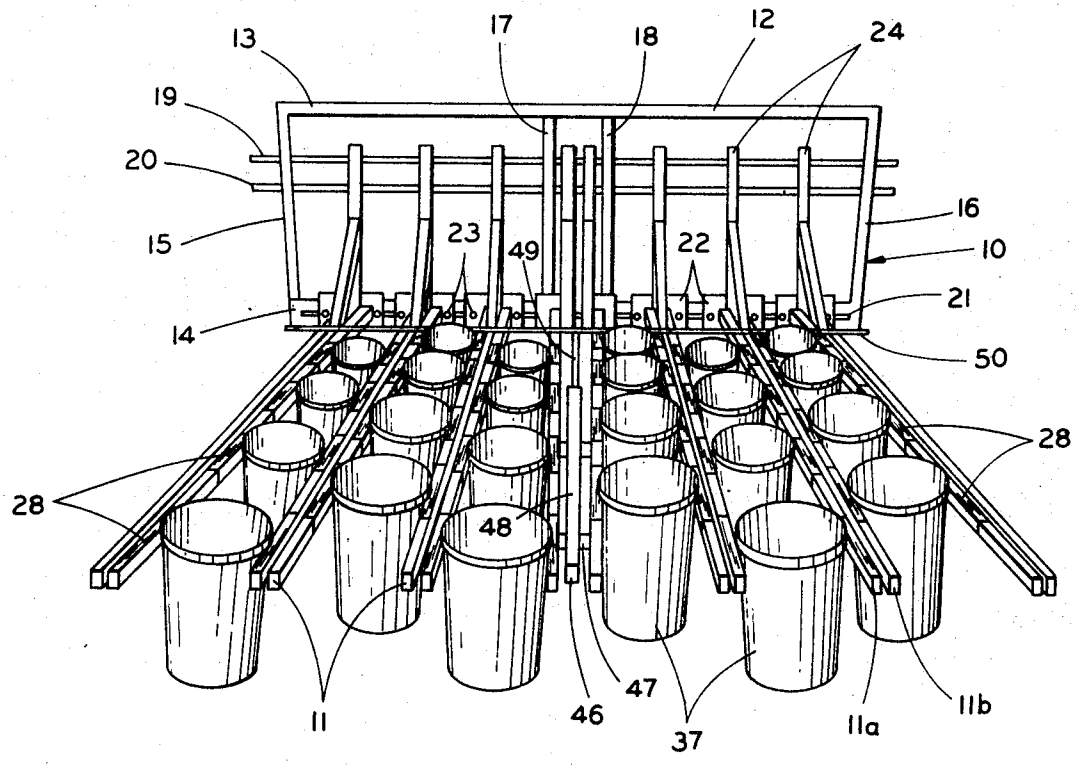
2,468,378	4/1949	Scofield	214/660
2,999,608	9/1961	Ganahl	214/654
3,194,422	7/1965	Shinn	214/653
3,262,595	7/1966	Seip et al.	214/653

Primary Examiner—Evon C. Blunk
Assistant Examiner—Johnny D. Cherry
Attorney—Dawson et al.

[57] **ABSTRACT**

An apparatus for lifting and moving containers includes a frame and a plurality of spaced-apart generally parallel rails which extend from the frame in a generally horizontal plane. A plurality of slide means are slidably mounted on each rail for longitudinal sliding movement on the rail, and connecting means extend between adjacent slide means for permitting limited longitudinal sliding movement of each pair of adjacent slide means between adjacent and separate positions. An extendable hydraulic motor extends parallel to the rails, and a connecting rod extends transversely from the motor and is connected to one of the slide means of the rail. Extension of the hydraulic motor will extend the first slide means of each rail, and, after limited sliding movement permitted by the connecting means, the succeeding slide means on each rail will also be moved longitudinally along the rail until all of the slide means are separated from each other. Retraction of the hydraulic motor will cause successive butting of each slide means against the forwardly adjacent slide means until all of the slide means on each rail are adjacent each other. The containers to be lifted are supported between a pair of slide means on adjacent rails and can be lifted by raising the frame. The separation between the containers can be varied as desired by extending or retracting the hydraulic motor.

7 Claims, 5 Drawing Figures



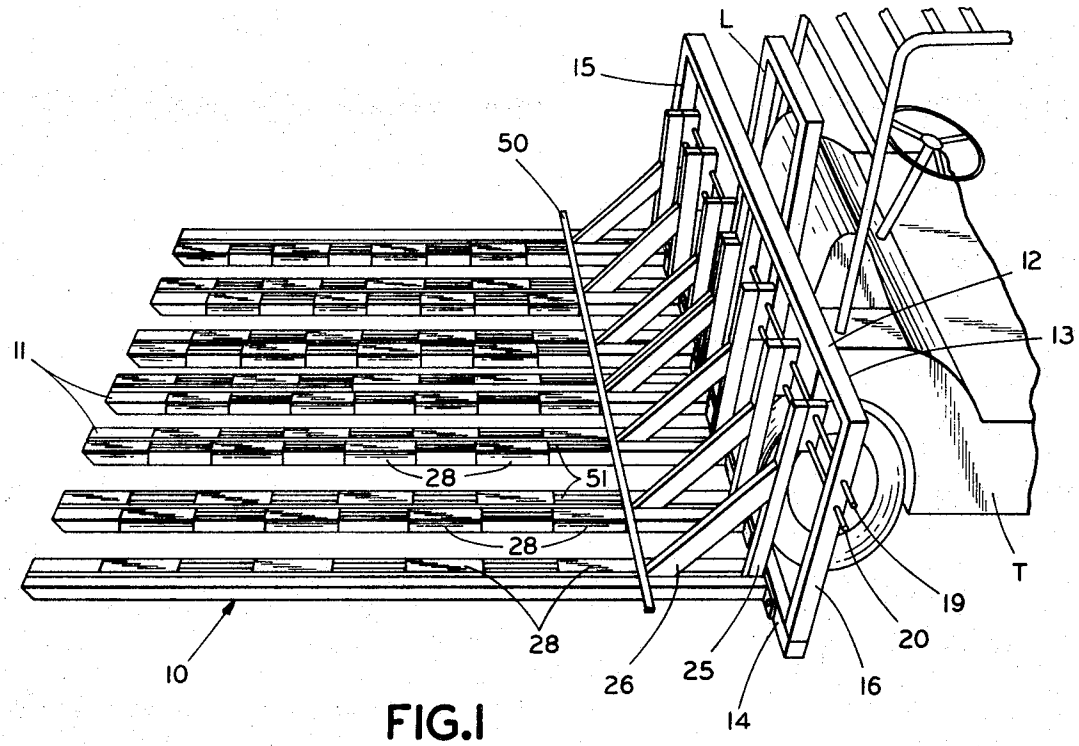

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FIG.1

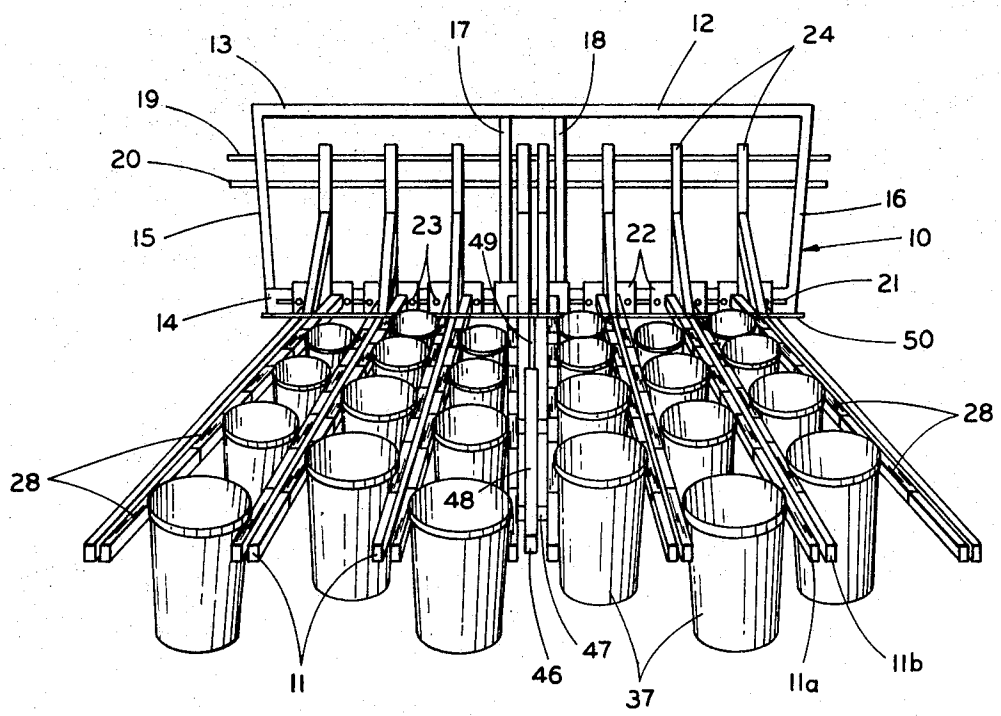

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11a
11b

FIG.2

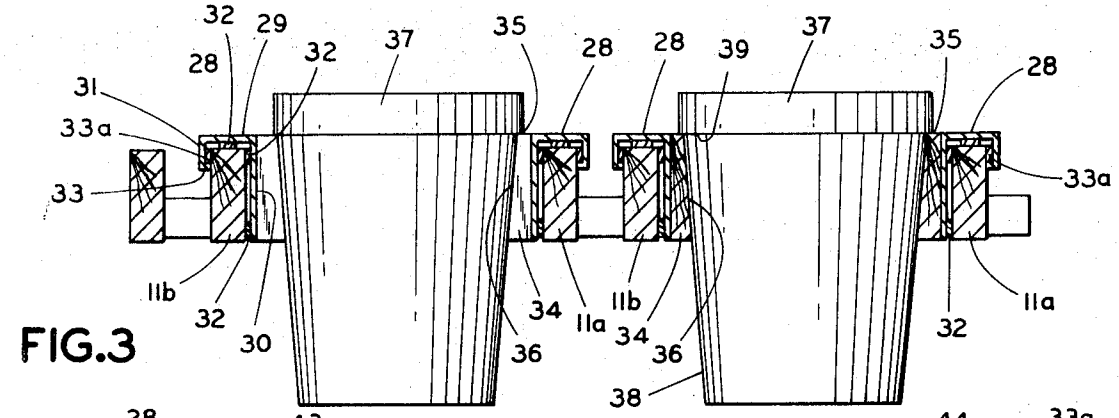


FIG.3

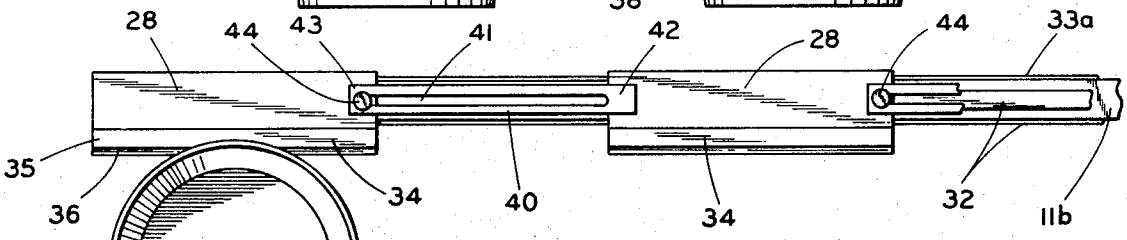
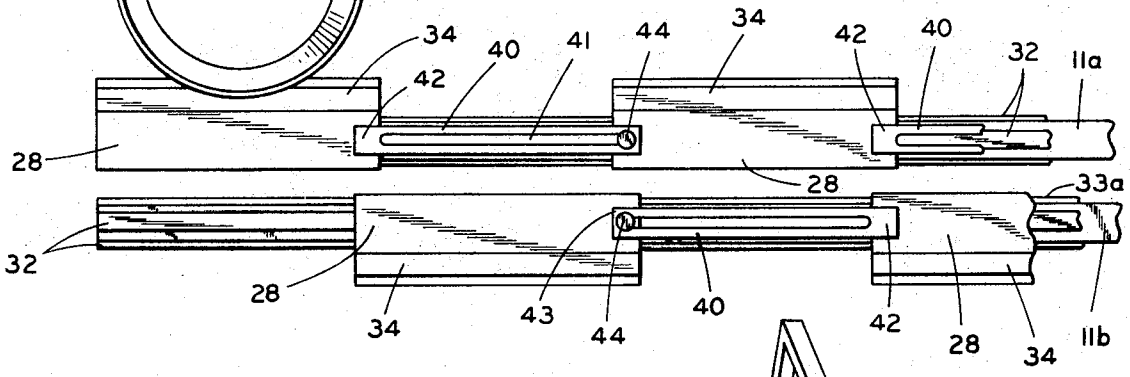


FIG.4



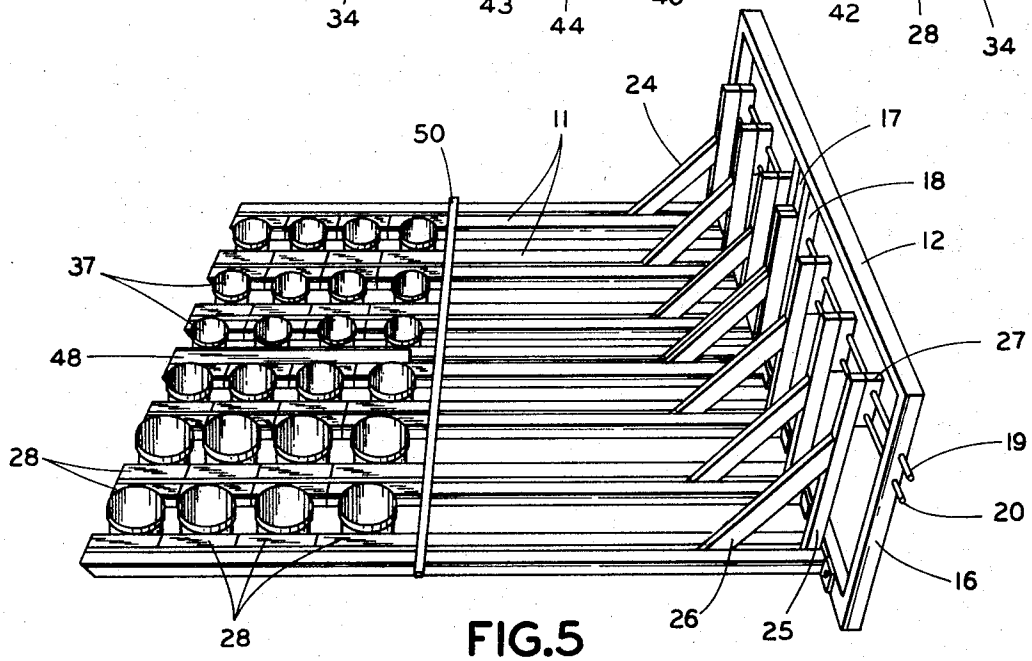


FIG.5

APPARATUS FOR LIFTING AND MOVING CONTAINERS

BACKGROUND

This invention relates to an apparatus for lifting and moving containers and, more particularly, to an apparatus which is particularly suitable for lifting and moving containers or pots for flowers and other plants.

In recent years there has been an increase in the use of containers for growing ornamental plants and other varieties. The resultant increase in the number of containers that must be moved has resulted in a labor problem. In accordance with conventional practice containers are moved from potting areas to growing beds and finally to transportion sites within a nursery by a combination of hand and trailer movement. Each individual container may therefore be handled several times before reaching its final destination.

The containers may also be moved several times even after they are positioned in the growing bed. When a plant is first placed in a container, spacing of the container from adjacent containers is generally not necessary for good plant growth. When containers are positioned adjacent each other, many more plants can be placed per acre of growing area than would be possible if the containers were separated. However, as the plants grow, additional space is required, thereby requiring another movement of the containers. Many growers position the containers in a spaced-apart manner when the containers are originally spaced in order to avoid the later necessity of spacing the container, but this results in inefficient use of costly plant bed space.

Many plants, such as herbaceous ornamentals, are not cold hearty and require protection from the cold. During cold weather such plants should be transported to protected areas.

The containers are relatively heavy, and one person can generally carry only two containers at a time, except for very small containers. A filled 20 gallon container, for example, can weigh as much as 100 pounds.

SUMMARY

The invention reduces the cost and time required to transport and properly position containers. The apparatus includes a plurality of horizontally extending rails which can be inserted between rows of containers. When the rails are lifted, the top rim of each container is supported by a pair of slide means on adjacent rails. The frame which supports the rails can be mounted on a conventional lift truck or the like which can then transport the containers to another site. When the containers are lifted from the ground, the spacing between the containers can be varied as desired by extending or retracting the hydraulic motor to change the spacing between adjacent slide means. The rails are adjustably mounted on a frame, and the spacing between adjacent rails can be readily adjusted to permit the apparatus to be used with different sizes of containers.

DESCRIPTION OF THE DRAWING

The invention will be explained in conjunction with an illustrative embodiment shown in the accompanying drawing, in which

FIG. 1 is a perspective view of an apparatus formed in accordance with the invention mounted on a conventional lift truck;

FIG. 2 is a front perspective view showing the apparatus lifting containers, the lift truck being omitted for clarity;

FIG. 3 is a transverse fragmentary sectional view showing two containers engaged by lift rails;

FIG. 4 is a fragmentary top plan view of the apparatus and one container; and

FIG. 5 is a side perspective view of the apparatus showing the containers moved into adjacent positions.

DESCRIPTION OF SPECIFIC EMBODIMENT

Referring now to the drawings, the numeral **10** designates generally a lifting apparatus which includes a plurality of elongated parallel rails **11** supported by a frame **12.** The frame **12** is mounted on a fork lift L of a conventional fork lift truck T to permit the frame and the rails to be raised and lowered by the fork lift.

The frame is generally rectangularly shaped and includes upper and lower bars **13** and **14** and side bars **15** and **16** which are secured together. Intermediate bars **17** and **18** extend between the upper and lower bars near the middle of the frame, and a pair of elongated rods **19** and **20** extend through the vertically extending rods **15–18.**

The bottom bar **14** of the frame is provided with an elongated slot **21** which extends transversely to the rails, and the back end of each rail is attached to a mounting plate **22** which is adjustably secured to the bar **14** by a bolt **23** which passes through the slot **21.** A plurality of braces **24** are secured to the rails and to the frame for providing additional support for the rails. Each brace includes a vertically extending brace member **25** which is attached to a pair of closely spaced rails, as by welding, and extends upwardly adjacent the rods **19** and **20** of the frame, and an inclined brace member **26** which is secured between the closely adjacent rails and to the vertically extending brace member **25.** A connecting member **27** extends rearwardly from the upper end of the vertical brace member **25** and is provided with a pair of openings through which the rods **19** and **20** extend.

Referring now to FIGS. **3** and **4**, a plurality of generally U-shaped slides or sleeves **28** are slidably carried by each rail **11.** In the embodiment illustrated each of the slides includes a top wall **29,** a downwardly extending side wall **30** which extends for substantially the entire height of the rail along the inside surface of the rail, i.e., the left side of the rails **11*a*** and the right side of the rails **11*b***, and a shorter side wall **31** which extends downwardly on the outside of the rail. Suitable bearing means may be provided between the slides and the rails to facilitate the sliding movement of the slides relative to the rails, and in the particular embodiment illustrated, the bearing means comprise elongated oil-impregnated wooden strips **32** which extend along the rail and are secured thereto. Two strips are located along the inside surface of each rail and one strip is located along the top of the rail. The outer side wall **31** of each slide includes an inwardly extending flange **33** which extends below an elongated metal guide strip **33*a*** which is secured to the rail. The strip **33*a*** guides the slide and prevents the slide from being removed upwardly from the rail.

In the particular embodiment illustrated the slides are also equipped with wood blocks **34** which are secured to the elongated inner side wall **30.** Each block has a flat upper surface **35** and an inclined outer sur-

face **36** to provide bearing contact over a greater surface area with the inclined side wall of a conventional plant container **37**. As illustrated in FIG. **3**, plant containers conventionally include a generally frusto-conical side wall **38** and an outwardly extending upper rim or flange **39**.

The rails are arranged in closely adjacent pairs of rails **11***a* and **11***b*, and the spacing between the rail **11***a* of one pair and the rail **11***b* of an adjacent pair is such that when the rails are raised the flat top surfaces **35** of the wooden block will engage the outwardly extending rim **39** of the container and the inclined surfaces **36** of the blocks will extend adjacent the frusto-conical side wall of the container. If desired, however, the blocks could be eliminated, and the spacing between the rails adjusted so that the container rims would be engaged by the slides **28**.

Referring now particularly to FIG. **4**, each adjacent pair of slides **28** on each rail is joined by a connecting bar or slide strap **40** which permits limited separation between adjacent slides. Each connecting bar is provided with a longitudinally extending slot **41** and has one end **42** secured to one of the slides, as by welding, and another end **43** which extends slidably over the adjacent slide. A stop pin **44** extends upwardly from the adjacent slide through the slot **41** and permits separation of the slide until the pin engages the end of the slot.

Referring now to FIG. **2**, a hydraulic motor designated generally by the numeral **46** extends longitudinally between the middle pair of rails and is supported there-between by brackets **47** which are secured to these middle rails. The hydraulic motor is conventional and includes a double-acting cylinder **48** and a piston **49** which can extend and retract relative to the cylinder under the influence of hydraulic pressure supplied by a suitable source (not shown). The rear end of the piston is attached to an elongated connecting rod **50** which extends transversely across the top of the rails **11** and which is connected to the rearmost slide on each of the rails. Referring to FIG. **1**, the rearmost slides on some of the rails are positioned adjacent the connecting rod **50**, and these slides can be connected directly to the rod by suitable detachable connecting means such as a nut and bolt. The rearmost slides on the other rails are spaced forwardly of the connecting rod, and these slides are connected to the rod by a slide strap **51** similar to the slide strap **40** which permits limited movement of the slides away from the connecting rod. These slide straps are also detachably connected to the connecting rod.

When the piston is fully extended as in FIGS. **1** and **2**, the slides **28** on each rail are separated from adjacent slides, this separation being permitted by the sliding movement of the pins **44** within the slots **41** of the slide straps until each pin reaches the end of its associated slot. It is seen that slides on the rails **11***a* and **11***b* of each closely spaced pair of rails are staggered, i.e., each slide on one of the rails is positioned generally opposite the spacing between a pair of slides on the other rail.

When the piston is retracted, the connecting rod **50** begins to move those slides which are connected directly to it forwardly. Forward movement of these slides does not cause forward movement of the next slide on the associated rail until the slide abuts the next slide because the connecting slide straps **40** may slide freely relative to the pins **44**. Similarly, those slides which are connected to the connecting rod **50** by slide straps will not be moved forwardly by the connecting bar until the connecting rod contacts the slide.

It will be understood that continued retraction of the connecting bar will cause the slides on each rail to close the spacing between adjacent slides successively from the rearmost slide to the forwardmost slide until each slide is abutting the adjacent slides as shown in FIG. **5**. When the piston is extended from its retracted position shown in FIG. **5**, those slides which are directly connected to the connecting rod will immediately begin to be pulled rearwardly. The next slide on the associated rail will not begin to move until the associated stop pin **44** reaches the end of the slot of the associated slide strap. Thereafter, the second slide will be pulled rearwardly by the first slide. Similarly, those slides which are connected to the connecting rod by slide straps will not begin to move rearwardly until the associated pin reaches the end of the slot in the slide strap. Continued extension of the piston will similarly cause successive movement of each of the slides as the various slide straps reach the limit of their extension relative to the slides.

When a number of containers have been filled with soil and plants and are to be transported to a growing site or other area, the containers can be arranged in parallel rows in which adjacent containers are relatively closely spaced. The piston **49** can then be retracted to close the spacing between the slides, and the apparatus can be advanced by the lift truck to permit the pairs of closely spaced rails **11**a and **11**b to be inserted between adjacent rows of containers below the upper rims of the containers. The spacing between adjacent rows of containers should be such that the upper rims **39** thereof can be engaged by the blocks **34** on the slides when the frame is lifted. The containers can be lifted for transportation to another area merely by raising the lift L and the frame **12**.

Before the containers are returned to the ground, the piston can be extended if desired to increase the spacing between adjacent containers in each row. This would be desirable, for example, if the plants have reached a stage of growth which would require more growing area. Thereafter, the containers can be returned to the ground or other supporting surface by lowering the frame until the containers are supported by the ground and the rails are lowered below the upper rims **39** of the containers. The lift truck can then be backed up to withdraw the rails from between the rows of containers.

Alternatively, the containers could be picked up when they are positioned in the spaced-apart arrangement shown in FIG. **2** by extending the piston to move the slides into the spaced-apart positions. If desired, the spacings between adjacent containers of each row can be reduced before the containers are replaced on the ground by retracting the piston.

If larger or smaller containers are to be lifted with the apparatus, the spacing between the rails **11***a* and **11***b* of adjacent pairs of rails can be adjusted as desired by loosening the bolts **23** which secure the mounting plates **22** to the bottom bar **14** of the frame and sliding the connected pairs of rails toward or away from each other. This movement of the rails is guided by the bolts which remain within the slot **21** of the bar **14** and by the support members **27** of the braces **24** which ride on the rods **19** and **20**. If extremely large containers are to be lifted, the end pair of rails on either or both ends of the

frame can be removed by removing the attaching bolts **23** and by sliding the rods **19** and **20** out of the support member **27** for those rails. The middle pair of rails which are positioned between the bars **17** and **18** of the frame need not be adjustable.

The number and size of slides **28** can also be varied depending upon the size of the containers. In the embodiment illustrated, four slides are carried by each rail, each slide being about **11** inches long. If smaller containers are to be lifted, these slides can be slidably removed from the forward end of the rails and replaced with shorter slides which will permit a greater number of containers to be lifted by each associated pair of rails. The change-over of the slides can be accomplished quickly merely by disconnecting the slides and the slide straps **40** from the connecting rod **50**, and sliding the slides forwardly off the rails. Thereafter, different slides can be slidably mounted on the rails and connected to the connecting rod.

Although the apparatus has been described in conjunction with frusto-conical or tapered plant containers, it will be understood that the apparatus can be used with containers of other shapes and sizes.

From the foregoing it is seen that the apparatus can lift and transport a large number of containers and readjust the relative spacing between the containers before the containers are replaced on a supporting surface. The maintenance of the apparatus is minimal since the only power-operated device is the hydraulic motor **46**. The oil-impregnated wood bearing strips **32** do not require lubrication and are more tolerant to sand and moisture which may be encountered in nurseries than a steel ball-bearing system in which steel rubs against steel.

While in the foregoing specification a detailed description of a specific embodiment of the invention was set forth for the purpose of illustration, it will be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. An apparatus for lifting and moving containers comprising a plurality of elongated spaced-apart generally parallel rails extending in a generally horizontal plane and adapted to be raised and lowered, a plurality of slide means slidably mounted on each rail for longitudinal sliding movement therealong, connecting means between adjacent slide means on each rail for permitting limited longitudinal sliding movement of adjacent slide means between adjacent and separated positions, and power means connected to at least one slide means on each rail for sliding each of said one slide means longitudinally on the associated rail whereby containers may be supported between slide means on adjacent rails and movement of the power means in one direction will move the slide means on each rail together into the adjacent position and movement of the power means in the other direction will move the slide means on each rail into the separated position.

2. The apparatus of claim **1** in which each connecting means includes a connecting member secured to one slide means and extending along an adjacent slide means for sliding movement relative thereto and stop means on the connecting member and the adjacent slide means for preventing further sliding movement when said one slide means and the adjacent slide means reach the separated positions whereby further movement of said one slide means pulls the adjacent slide means.

3. The apparatus of claim **2** in which each connecting member comprises a bar having an elongated slot therein extending parallel to the rails and having at least one end, the stop means comprising said one end of the slot and a pin on the adjacent sliding member, the pin being slidable within the slots and engageable with said one end of the slot.

4. The apparatus of claim **1** in which each slide means includes a generally U-shaped sleeve slidably carried by one of the rails.

5. The apparatus of claim **1** in which each slide means includes a side wall extending laterally of the associated rail and inclined toward an adjacent rail to permit engagement of the side wall with the wall of a tapered container.

6. The apparatus of claim **1** including a frame supporting the rails, at least some of the rails being adjustably secured to the frame whereby the horizontal spacing between at least some adjacent rails can be varied.

7. The apparatus of claim **1** in which the power means includes an extendable hydraulic motor extending parallel to the rails and a connecting rod extending transversely to the rails, the connecting rod being attached to the hydraulic motor and to one of the slide means on each rail whereby extension and retraction of the hydraulic motor moves the slide means between the separated and the adjacent positions.

* * * * *