Aug. 13, 1968 G. D. KENNEDY 3,396,816

APPARATUS FOR USE IN PICKING TREE-GROWN FRUIT

Filed Dec. 18, 1967 4 Sheets-Sheet 1

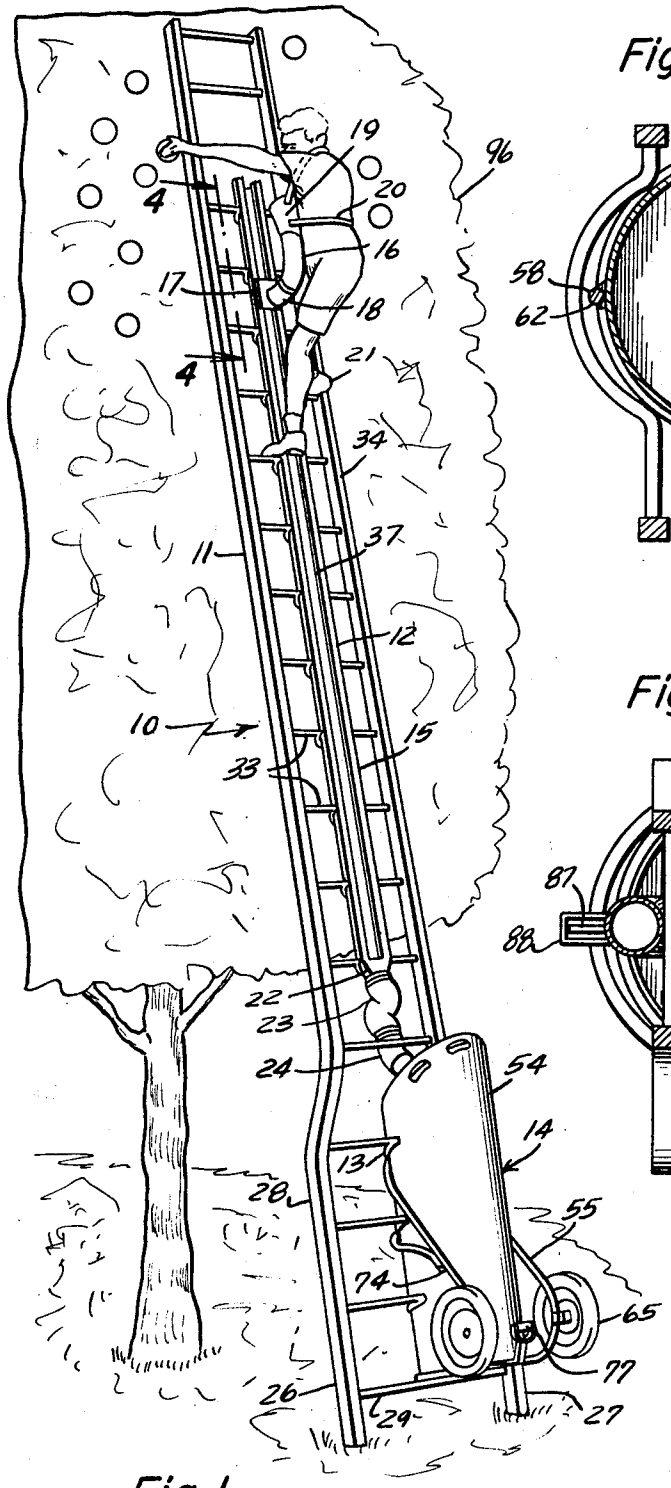


Fig. 1

Fig. 5

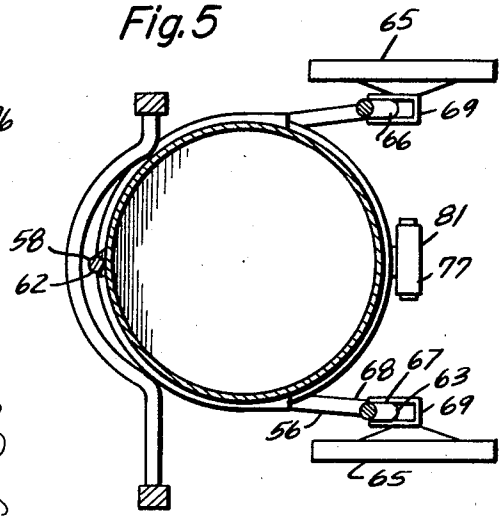
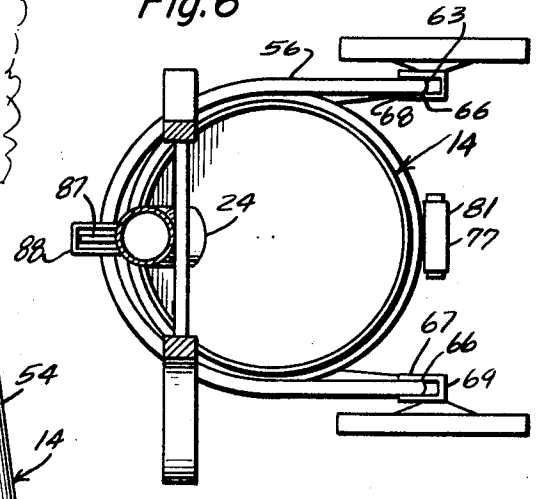


Fig. 6



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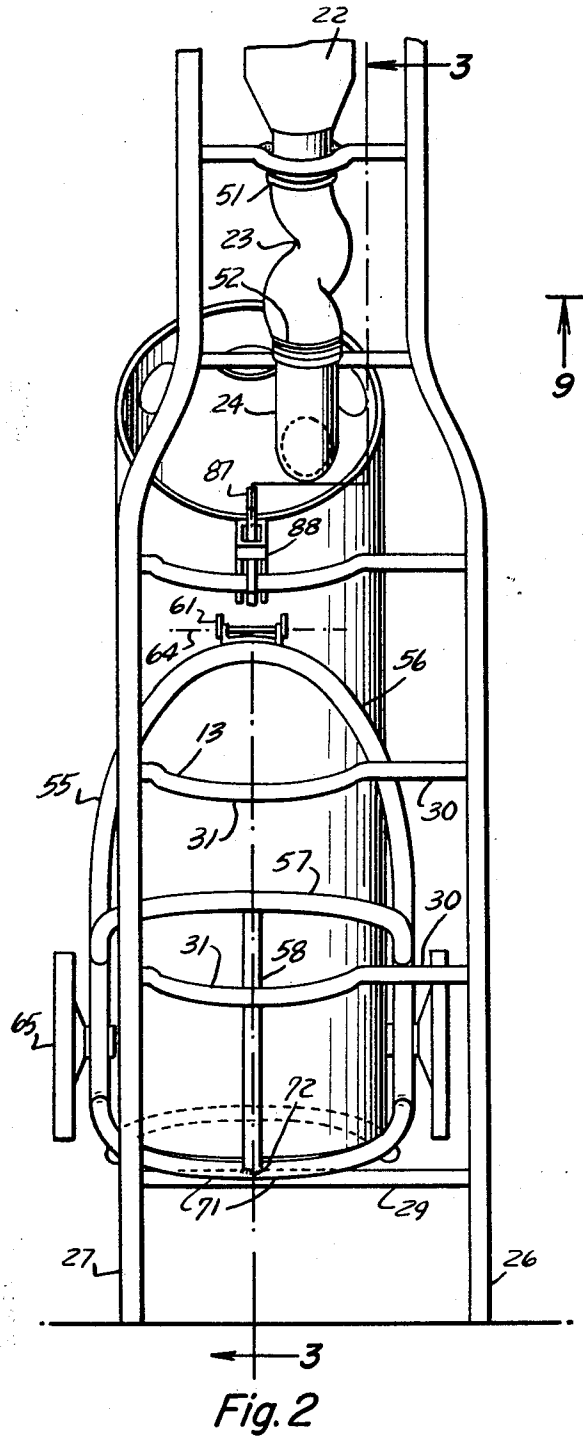


Fig. 2

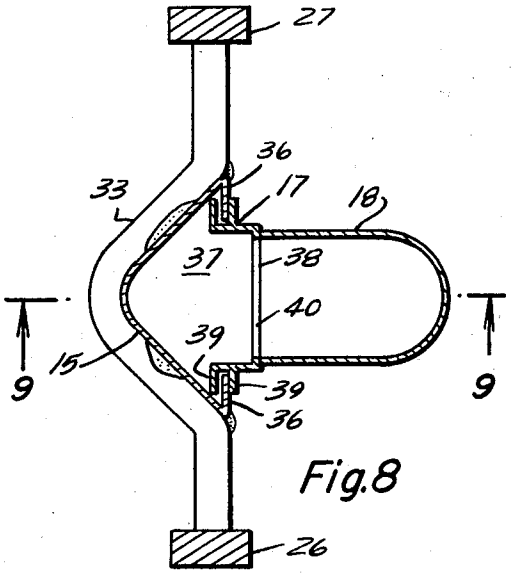


Fig. 8

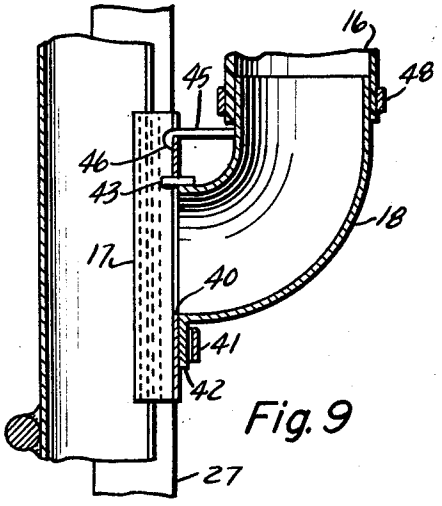


Fig. 9

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APPARATUS FOR USE IN PICKING TREE-GROWN FRUIT

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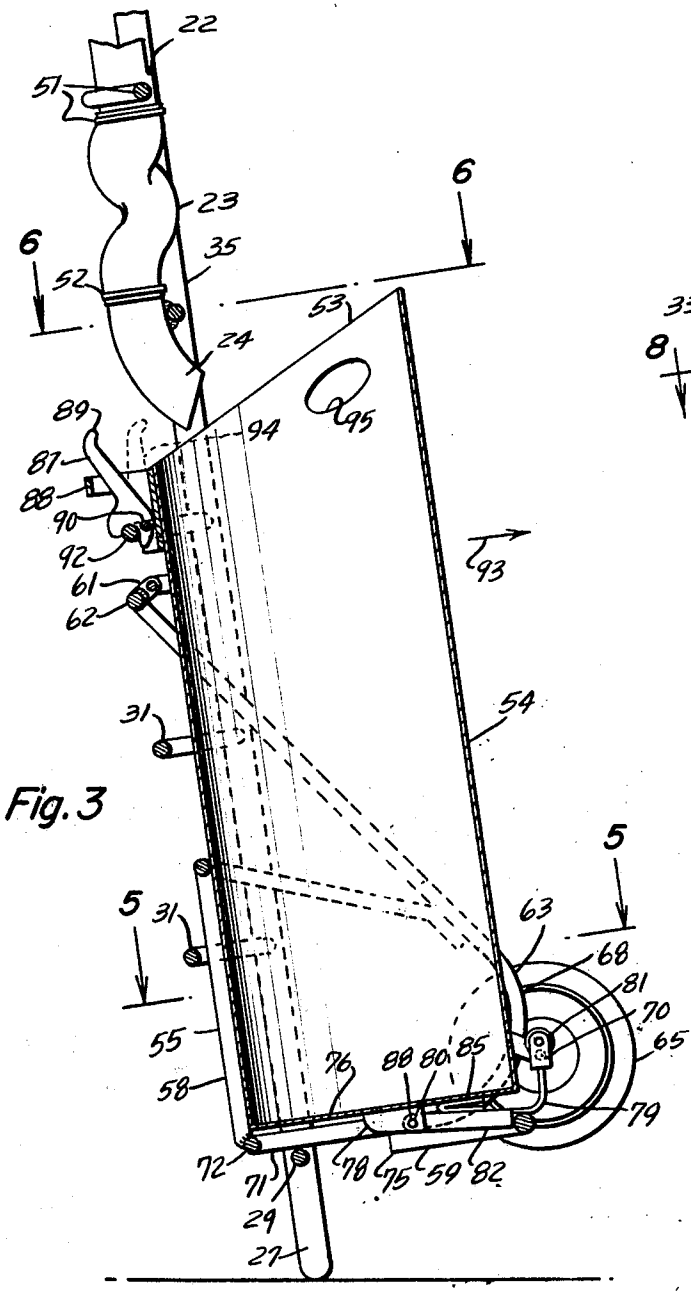


Fig. 3

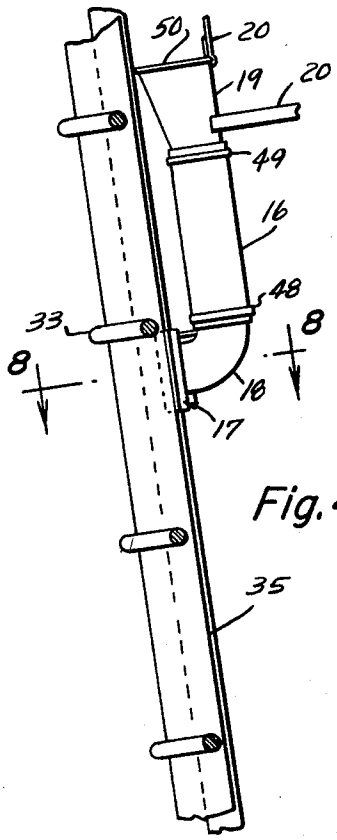


Fig. 4

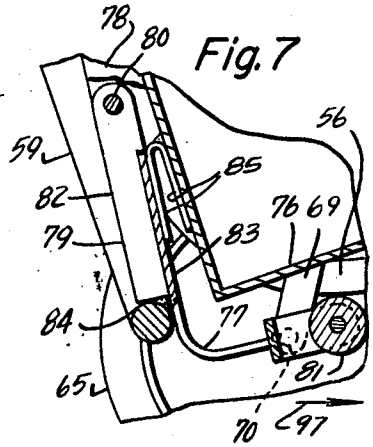


Fig. 7

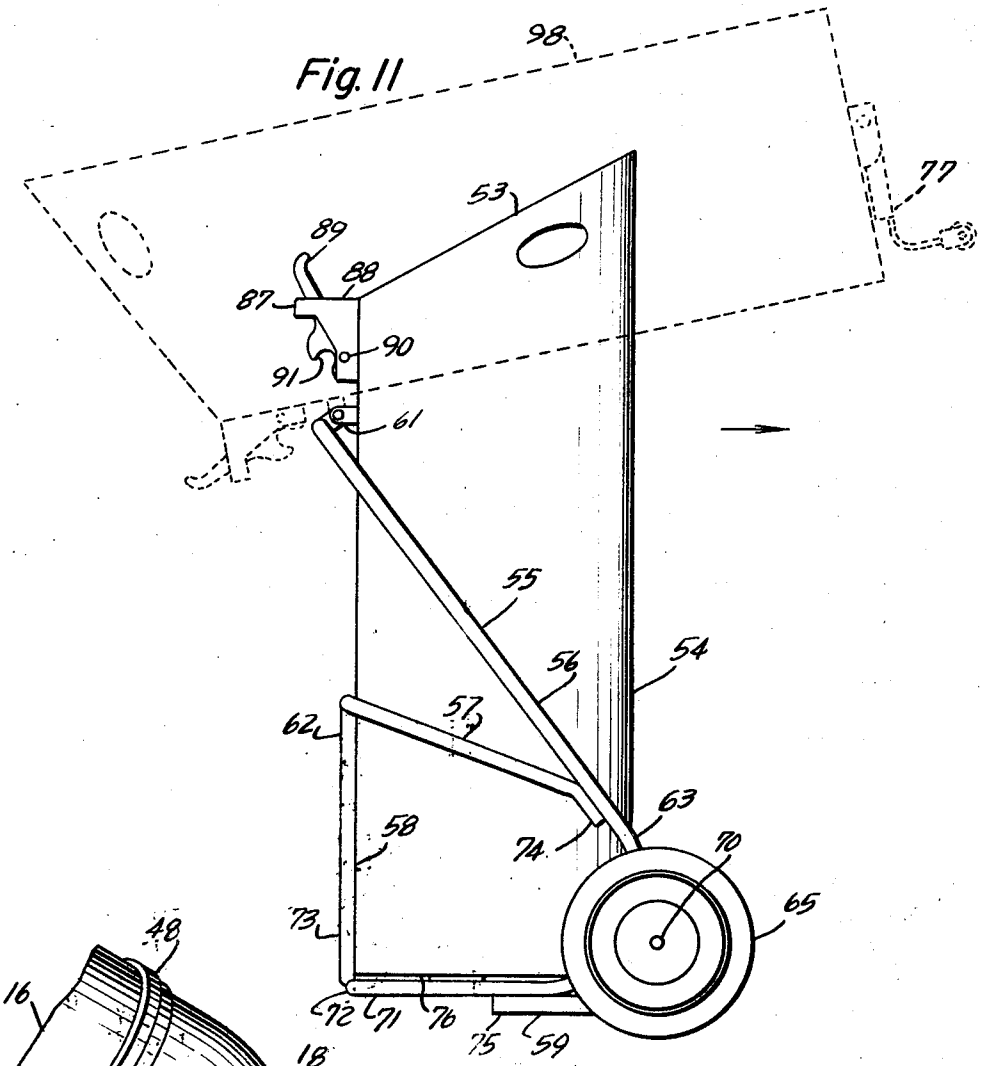
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APPARATUS FOR USE IN PICKING TREE-GROWN FRUIT

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Fig. 11



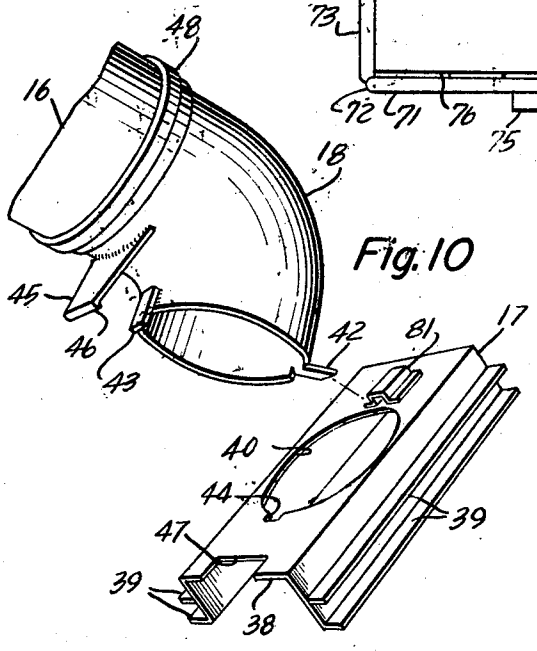


Fig. 10

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3,396,816

APPARATUS FOR USE IN PICKING TREE-GROWN FRUIT

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Continuation-in-part of application Ser. No. 576,269, Aug. 31, 1966. This application Dec. 18, 1967, Ser. No. 691,511

6 Claims. (Cl. 182—49)

ABSTRACT OF THE DISCLOSURE

A wheeled fruit hauling device is used in conjunction with a ladder that is equipped with a chute for conveying tree-grown fruit picked from the ladder to a container component of the device. The ladder is equipped with a cradle section for supporting the device as the container is being filled and the chute has a section which is suspended from the worker and slidable on a trough component of the chute. Means for reducing the speed of descent of the fruit is provided in the chute and the container component is suspended for pivotal movement from the frame component device to facilitate dumping its contents.

This application is a continuation-in-part of copending application entitled "Apparatus for Use in Picking Fruit," filed Aug. 31, 1966, and assigned Ser. No. 576,269, and now abandoned.

The invention relates to an apparatus which is useful in the hand picking and handling of tree-grown fruit.

The current practice in picking citrus fruits such as oranges is to provide the worker with a sack or flexible bag-like container and which is suspended from the worker's shoulders while he picks the tree-grown fruits from the ladder. The sack or bag serves as a receptacle for the fruit which is picked by the worker and becomes a bulky item to carry on the ladder as it becomes filled with the picked fruit. The filled bag not only makes it awkward for the worker to maneuver on the ladder but creates a top heavy situation on the ladder which is unsafe and that the ladder frequently becomes unbalanced so that the worker falls to the ground. In addition to this the use of bags that are carried by the worker causes the frequent need for descent from the ladder in order to empty the contents of the bag into a suitable collection receptacle. This of course is time consuming to the worker and especially so when several bags of fruit may be picked at one placement of the ladder.

A general object of the invention is to provide an apparatus which eliminates the need for the worker to carry the fruit which is picked by him and which enables the worker to pick more fruit in less time and with less labor than can now be done.

Yet another object is to provide a hauling device for use by fruit pickers and which can be used to receive the fruit picked by the worker and then readily moved by the worker to a fruit collection location in the grove for dumping its contents.

Yet another object of the invention is to provide an apparatus for use by grove workers in picking tree-grown fruit and which eliminates the hazardous top heavy ladder conditions which result when the picked fruit is carried by the worker in a container which is suspended from his body.

In accord with one aspect of the invention a ladder which is equipped with a chute for conveying the picked fruit to a suitable receptacle at the base of the ladder is provided the worker and the chute includes an open trough and a flexible conduit which is suspended at one end for the worker and slidably connected to the trough

at the other end to enable the worker to ascend and descend the ladder in the fruit picking area. The chute is equipped with a speed reducing section at the base of the trough to reduce the speed of descent of the fruit which is received in the trough and in accord with one aspect of the invention the receptacle is supported in a cradle section that is provided at the base of the ladder. By virtue of this arrangement the ladder becomes more stable as the container is filled.

Yet another aspect of the invention relates to a fruit hauling device which includes the container and is used in conjunction with the chute equipped ladder. The device includes a wheeled frame and a container which is suspended from the frame for pivotal movement about a pivot axis that enables the container to be readily dumped by a grove worker.

Other aspects of the invention relate to means for securing the container against pivotal movement in relation to the frame.

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

FIG. 1 is a diagrammatic perspective view of a preferred apparatus embodying the concepts of the invention and shows the hauling device in a supported position in the cradle of the ladder and in an arrangement for receiving the picked fruit from the chute.

FIG. 2 is an enlarged view at the lower end of the ladder seen in FIG. 1 and is taken from the rear side of the ladder to show the cradle.

FIG. 3 is an elevational sectional view at the lower end of the ladder shown in FIG. 2 and as seen generally along the lines 3—3 therein.

FIG. 4 is a side elevational view of the trough and of the flexible conduit section of the chute as generally seen along the lines 4—4 of FIG. 1, with parts broken away.

FIG. 5 is a transverse section taken generally along the lines 5—5 of FIG. 3.

FIG. 6 is another section taken generally along the lines 6—6 of FIG. 3.

FIG. 7 shows the handle arrangement at the bottom of the container with certain parts broken away and illustrates the mechanism for securing the container against pivotal movement in the frame of the hauling device as seen when the device is in a mobilized position.

FIG. 8 is a transverse section taken generally along the lines 8—8 of FIG. 4 and illustrates the means used for slidably connecting the flexible conduit section to the trough component of the chute.

FIG. 9 is a longitudinal section taken generally along the lines 9—9 in FIG. 8.

FIG. 10 is a perspective view of the slide component of the chute and of a fragment of the connecting flexible conduit section when detached from the slide and illustrates the means for connecting the flexible conduit section to the slide.

FIG. 11 is a side elevational view of the hauling apparatus as seen in a ground supported position with a dumping position for the container being also shown in broken lines.

The apparatus embodying the concepts of the invention is generally designated at 10 in FIG. 1. It includes a ladder 11 which is equipped with a chute 12 for guiding the picked fruit into a container. The ladder 11 has a cradle 13 at its lower end and a wheeled vehicle which serves as a mobile fruit hauling device 14 which is supported in

the ladder cradle to receive the picked fruit at the discharge end of the chute 12.

The chute 12 has an open trough 15 which extends over a major portion of the ladder length and it also has a flexible conduit section 16 which is slidably connected to the trough section 15 by means of a slide member 17. The flexible section 16 is equipped with an elbow 18 at its lower end and here the section is releasably connected to the slide member 17. At the upper end of section 16 the section is equipped with a funnel component 19 that is provided with suitable straps 20 so that during use the flexible section 16 is suspended from the worker 21 as seen in FIG. 1.

The lower end of the trough 15 is provided with an adapter 22 and here the trough section is connected to a coiled flexible conduit section 23 which connects with an elbow 24 at the discharge end of the chute.

The ladder includes elongated side pieces 26 and 27 at the opposite sides of the ladder and these pieces are bent as seen in the figures to provide a wider section 28 at the lower end of the ladder. Except for the bottom rung 29, the rungs 30 which interconnect the side pieces 26 and 27 in the lower section 28 are provided with arcuate bends 31 that are located adjacent the right side piece 27. This arrangement provides a cradle structure 13 at the right side of the lower section 28 and in which the hauling device 14 is seated and arranged to receive the discharge at the lower end of the chute when the apparatus is in use. The offset arrangement of the cradle in the lower section is such as to provide foot room on the rungs 29 and 30 adjacent side piece 26 to permit the worker to ascend and descend the ladder even though the hauling device 14 is supported in the ladder cradle 13 as will be evident from FIG. 1.

The trough section 15 as seen in FIG. 8 is V-shaped in cross section and here the rungs 33 in the upper section 34 of the ladder are bent to conform to the contour of the trough 15. This provides a recessed trough arrangement at the front side 35 of the ladder and avoids forwardly projecting structure which could interfere with the worker. The opposite side edges 36 of the trough are bent inwardly along the funnel opening 37 in the trough and these edges 36 serve as guide rails for the slide member 17.

The structure of the slide member 17 is best seen in FIGS. 8 and 10 and comprises a channel-like member 38 which is equipped at its opposite sides with a pair of spaced laterally extending flanges 39 which are arranged with the adjacent side edges 36 therebetween in the assembled chute 12. The channel-like member 38 has a circular opening 40 in its face and which is adapted to accommodate the delivery of the fruit from the elbow 18 to the trough section 15. As seen in FIG. 10 the flexible conduit section 16 is releasably connected to the slide member and to facilitate the connection the face of channel 38 is provided with an eyelet 41 at one side of opening 40. Eyelet 41 is adapted to receive a laterally extending lug forming protuberance 42 in the elbow section 18. Opposite the protuberance 42, the elbow section 18 is provided with a depending lug 43, and this lug 43 fits in a slot 44 in member 38 when the upper section is attached to the slide plate 17. Lug 43 serves as a stop that prevents the protuberance from being withdrawn from eyelet 41 and the lug 43 is maintained in slot 44 by means of a dog 45 that is fixed to the elbow and provided with a hooked end 46 that engages the channel-like member 38 in an appropriate positioned slot, designated at 47. Dog 45 is sufficiently resilient to be bent out of engagement with the channel-like member 38 so that the flexible conduit section 16 can be detached from the slide member 17.

The lower ends of the flexible conduit section 16 is secured to the elbow 18 by means of a collar 48 and the other end of the flexible section 16 is secured to the funnel 19 by means of another collar designated at 49. It is believed apparent that the flexible conduit section 16 by virtue of its attachment to the worker is capable of slidably moving up and down the face of the trough as the worker ascends and descends the ladder during the process of picking the fruit. The fruit of course is picked from the tree and passed into the mouth 50 of the funnel member 19 from whence it falls through the flexible conduit section 16 and discharges from elbow 18 to pass through the opening 40 in the slide and thus into the trough section of the chute.

The arrangement at the discharge end of the chute is best seen in FIG. 2 and wherein the flexible coiled section 23 is fixed at one end to the adapter 22 by a collar 51 and at the lower end to the elbow by another collar 52. Elbow 24 is suitably secured to one of the rungs above the cradle and is arranged to discharge the fruit forwardly in the opening 53 of the container 54. The coiled section 23 serves to reduce the speed of descent of the fruit by causing the fruit to traverse a spiral path in the section 23 and this materially reduces the delivery speed to container 54.

The structure of the hauling device is best seen in FIGS. 2, 3, 5 and 6. It includes a wheeled frame 55 which is formed from tubular elements designated at 56, 57, 58 and 59. The container 54 is a cylindrical receptacle in the illustrated embodiment and which is provided with an inclined opening 53 for better orientation to receive the fruit at the discharge end of the chute when the device is supported in the ladder cradle.

The container 54 is suspended from the upper end of frame 55 by means of a hinge 61. Hinge 61 is located at one side 62 of the frame and the opposite side 63 of the frame is open to permit the bottom or lower end of the container to be withdrawn from the frame when the container is pivotally moved about the pivot axis 64 established by hinge 61.

The frame 55 is provided with a pair of wheels 65 and these wheels are mounted on the frame tube element 56 at the opposite sides 66 of the frame opening 67. Frame tube element 56 has a pair of bends 68 which are located at the base of the frame structure and spaced apart at the opposite sides of the opening 67 used for withdrawal of the container from the frame during pivotal movement thereof. Here the wheels 65 are mounted on the frame by means of suitable brackets 69 that are fixed to the bends 68 and which are provided with aligned pins 70 that establish a horizontal axis at the lower end of the frame for rotational movement of the wheels carried on the pins.

The opposite ends 71 of tube element 56 are bent at the bottom of the frame and join at the hinge side 62 to provide an arcuate ground contacting foot 72 when the hauling device is in a ground supported upright position 73 such as shown in FIG. 11.

Member 57 is fixed at its opposite end 74 to tube element 56 as seen in FIG. 11 and therebetween is bent to the general contour of the container and supported spacedly above the foot 72 by interconnecting vertical tube component 58 of the frame. Tube component 59 forms a rigidifying cross piece at the bottom of the frame and defines the side opening 67 in the frame thereabove. Component 59 is arcuately bent and fixed at its opposite ends 75 to the foot forming end section 74 of tube component 57 as seen in the drawings.

This arcuate component 59 of the frame is offset below the bottom wall 76 from container 54 so as to permit the bottom portion of the container to be withdrawn through the opening 67 when the container is being dumped and here the container is provided with a handle assembly 77 which is adapted and arranged to secure the container against pivotal movement with respect to the frame. The assembly includes a U-shaped bracket 78 which is fixed to the bottom wall 76 of the container and an arm 79 which is pivotally connected to the bracket by a pin 80 which establishes an axis for pivotal movement of the arm relative to the container

and which is parallel to the pivot axis 64 of hinge 61. The arm 79 as seen in FIGS. 3 and 7 is bent at its outer ends to provide a container side location for a handle grip 81 which is pinned to a U-shaped component at the end of the arm 79.

The arm 79 comprises a pair of elongated metal elements 82 which are fixed to and spaced apart by another elongated metal element 83, and the arrangement of elements 82 and 83 is such as to provide a notch 84 in which the tube section 59 is engaged when the bottom portion of the container is seated in the frame. The bottom wall 76 of the container has a V-shaped spring element 85 which is arranged to bear against arm component 83 and this element 85 serves to urge the arm into engagement with the cross piece 59. The element 85 is resilient and yields to upward pressure exerted on the handle and permits the handle to become disengaged from the cross piece 59 to permit the lower end of the container to be withdrawn from the frame.

The hauling device is adapted to rest in the cradle when the fruit is being picked from the ladder and in this respect the device is provided with a latch mechanism 87 to secure the device in position during use. Mechanism 87 includes a bracket 88 that is mounted at the hinge side 62 of the container. The bracket supports a lever element 89 of the mechanism 87 and which is mounted for pivotal movement by a pivot element 90 about a pivot axis which is parallel to that for pivotal movement of the container. Lever 89 has a notch in which the top rung 92 of the cradle is engaged when the device is locked to the ladder. Pivot 90 is located slightly above the center of the rung 92 so that when the device tends to move in the direction of arrow 93, the rung 92 remains engaged in notch 91. On the other hand by pulling the lever to the position indicated in 94 the device can be removed from the ladder for hauling the fruit to a central collection area.

The container 54 of the hauling device 14 is provided with openings 95 at its upper end. These openings provide a place for the worker to grip the device and thus manipulate the device into and out of its cradle position as well as to haul the device and its contents over the ground to a central location for dumping its contents.

In using the apparatus 10, the ladder 11 is first appropriately positioned in the tree 96 and the hauling device is then placed in the cradle 13 of the ladder. This is done by simply rolling the hauling device 14 up to the front of the ladder and in a manner such that the foot of the frame overlies the bottom rung 29 of the cradle section. The device is then pivoted by the worker on the rung and into the cradle position shown in FIG. 3 and whereat the hauling device becomes locked in position by the latch mechanism 87. Thereafter the worker ascends the ladder and by means of the straps 20 fastens the flexible conduit section 23 to his body. The worker can then move about in the upper section on the ladder and as he picks the fruit and places it in the funnel section it is guided into the trough and ultimately into the container therebelow. It is believed obvious that by virtue of the slide arrangement the worker is capable of ascending and descending the ladder in the area above the container to gather the fruit and that during such ascends and descends the upper section slides along the mouth of the trough and adjusts to the worker's location on the ladder.

When the container 54 is full the worker simply releases the latch mechanism by drawing the lever to the position 94 and this causes the device to take on a ground supported position by pulling the upper end of the device in the direction of arrow 93. Thereafter the worker can wheel the loaded container to a central collection area for dumping its contents. As the device is being wheeled to the central collection area, spring 85 maintains the arm 79 in engagement with the arcuate section 59 and thus prevents the container from pivoting with respect to the frame about the pivot axis 64 of hinge 61. At the central collection area the worker merely lifts the handle as in the direction of arrow 97 to release the handle from engagement with the arcuate section 59 and with the handle pivots the container about the pivot axis 64 to a position such as indicated at 98 in FIG. 11 to permit the contents to fall through the opening in the container.

While only a certain preferred embodiment of this invention has been shown and described by way of illustration, many modifications will occur to those skilled in the art and it is, therefore, desired that it be understood that it is intended in the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. An apparatus for use by a worker in hand picking and handling tree-grown fruit comprising a ladder having a front side, an elongated substantially rigid trough which is fixed to and extends over a major portion of the length of said ladder, said trough being open at said front side substantially throughout its entire length and adapted and arranged during use of the ladder to guide the descent of picked fruit received in the trough toward one end of the trough, a flexible conduit having opposite ends and being adapted at one of said ends to receive fruit picked by the worker, means at said one of said opposite ends for suspending the flexible conduit from the worker, slide means connected to said flexible conduit at the other of said opposite ends and slidably connecting the flexible conduit to the trough, said flexible conduit being arranged at the trough opening to discharge the received fruit into said trough as thus connected thereto, conduit means connected to the trough and arranged to receive the picked fruit guided to said one end of the trough, said conduit means being adapted and arranged to reduce the speed of descent of the picked fruit received thereby, and a container arranged to receive the picked fruit discharged from said conduit means.

2. An apparatus in accord with claim 1 wherein said slide means is releasably connected to said flexible conduit.

3. An apparatus in accord with claim 1 further comprising a hauling device which includes said container, a frame having opposite sides, means at one of said opposite sides suspending the container from the frame and establishing an axis for pivotal movement of the container with respect to the frame, and a pair of wheels for supporting the frame and container during movement of the device over the ground; wherein said ladder has rungs adapted and arranged to provide a supporting cradle for the hauling device including a bottom rung, said device being supported on said bottom rung in said cradle and being removable from the cradle, said device having a releasable latch mechanism securing the device to the ladder, and a handle assembly manipulatable by a worker when the device is ground supported to pivotally move the container with respect to the frame and thereby to dump the contents of the container.

4. An apparatus in accord with claim 1 further comprising a hauling device which includes said container, a frame having opposite sides, means at one of said opposite sides suspending the container from the frame and establishing an axis for pivotal movement of the container with respect to the frame, a frame component at the other of said opposite sides and which defines a frame opening thereabove for the withdrawal of the bottom of the container from the frame during pivotal movement of the container with respect to the frame, a handle assembly pivotally connected to the bottom of the container having means releasably engaging the frame component and securing the container against pivotal movement with respect to the frame, and a pair of wheels lo-

cated at said other side for supporting the frame and container during movement of the device over the ground; and wherein said ladder has rungs adapted and arranged to provide a supporting cradle for the hauling device including a bottom rung, said device being supported in said cradle on said bottom rung and being removable from the cradle, and said device having a releasable latch mechanism securing the device to the ladder.

5. An apparatus for use by a worker in hand picking and handling tree-grown fruit comprising a hand manipulatable hauling device that includes a wheeled frame having opposite sides and a frame component at one of said sides defining a frame opening thereabove, a container located in the frame and having a bottom wall at its lower end, said bottom wall being located spacedly above said frame component, means at the other of said opposite sides suspending the container from the frame and establishing a horizontal axis above the bottom wall for pivotal movement of the container with respect to the frame, a handle assembly pivotally secured to said bottom wall and manipulatable by the worker to withdraw the lower end of the container through the frame opening to pivotally move the container with respect to the frame, and said handle assembly being adapted and arranged to releasably engage said bottom component and thereby to releasably secure said container against pivotal movement relative to said frame; and a ladder having a chute adapted and arranged to receive fruit picked from the ladder and to discharge the picked fruit into said container.

6. An apparatus in accord with claim 5 wherein said ladder has opposite side members, a lower section, and rungs in said lower section adapted and arranged to provide a supporting cradle for said hauling device adjacent one of said opposite side members, and releasable means securing said device to one of said rungs.

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