

[54] REFUSE CONTAINER HANDLING DEVICE

3,294,266 12/1966 Snow ..... 248/133

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[57] ABSTRACT

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248/139

[51] Int. Cl. .... B65g 65/30

[58] Field of Search ..... 214/1 Q, 130 A, 302,  
214/314; 248/133, 139, 140; 269/17, 20

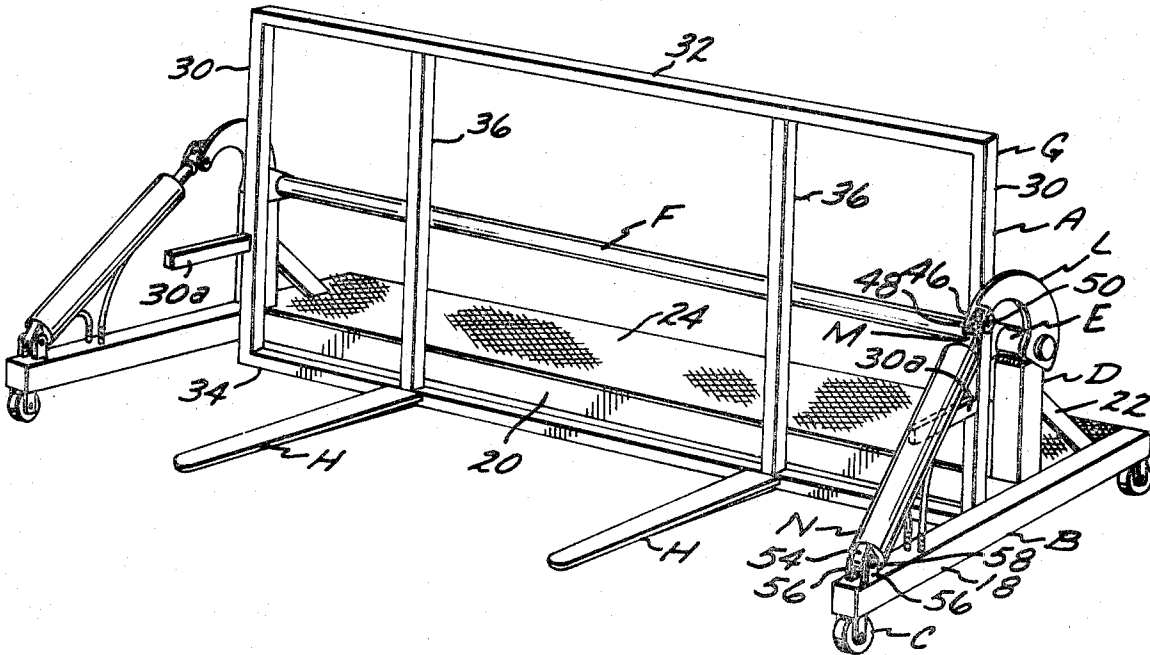
A movable, power operated, sanitation container handling device that includes pair of forks that may removably engage the container, and pivot the engaged container to any one of a number of elevated positions where the container may be steam cleaned, painted or other maintenance work performed thereon. The handling device is also capable of pivoting the container to a position where water or steam condensate that may have accumulated therein may drain from the container due to gravity.

[56] References Cited

UNITED STATES PATENTS

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4 Claims, 6 Drawing Figures



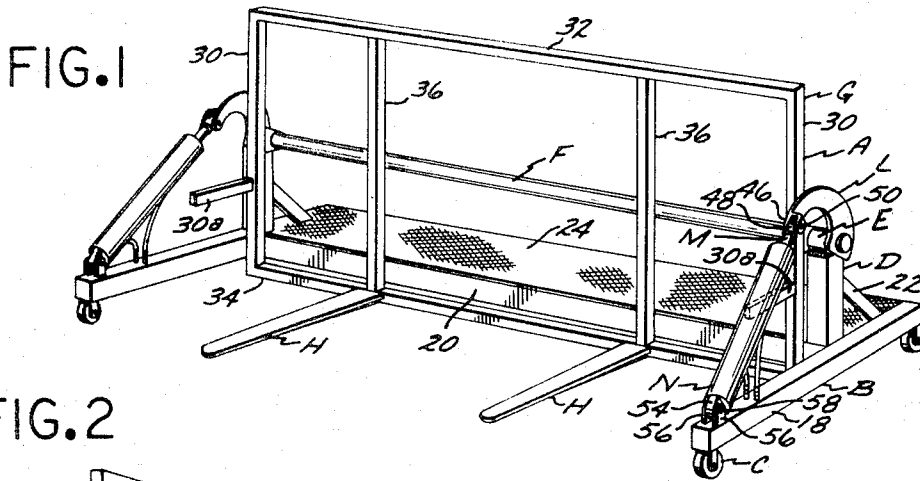


FIG. 2

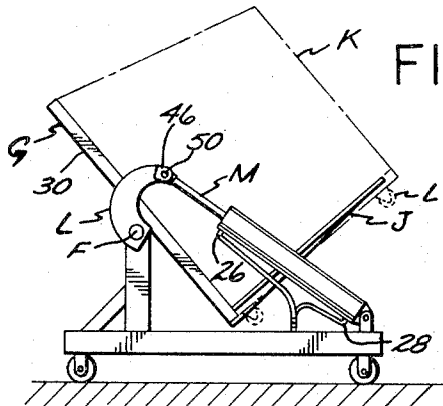
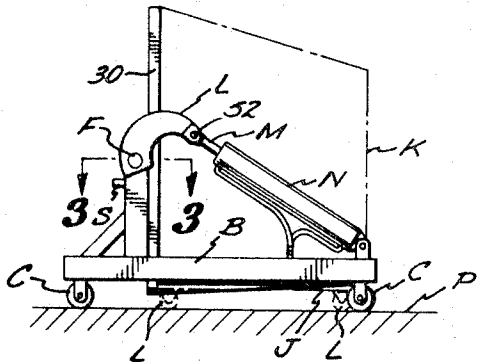


FIG. 4

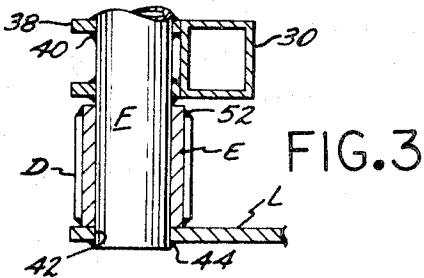


FIG. 3

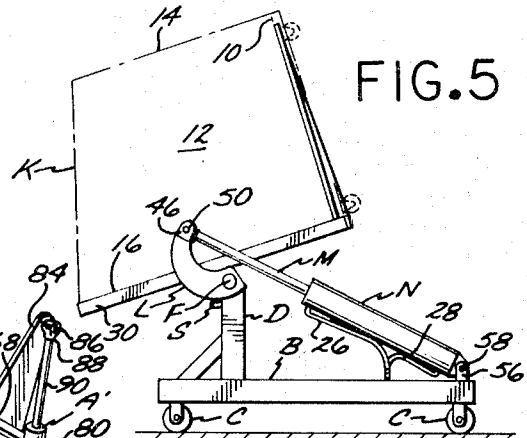


FIG. 5

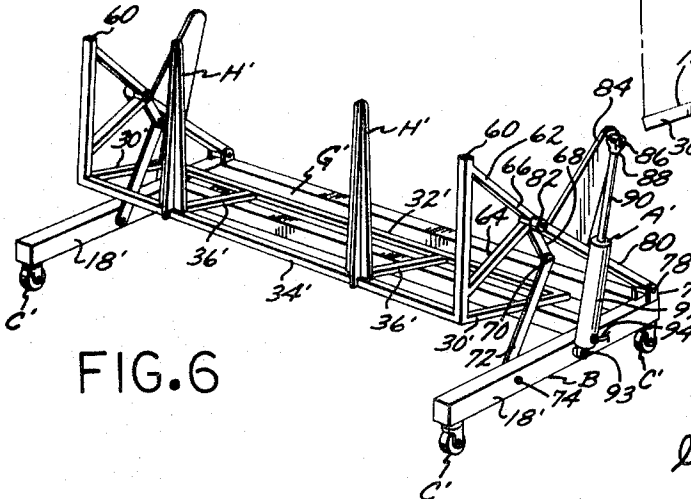


FIG. 6

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## REFUSE CONTAINER HANDLING DEVICE

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

A refuse container handling device.

## 2. Description of the Prior Art

Refuse containers of the type that are mounted on rollers, and include fork engageable means as a part thereof, are used in the collection of refuse and trash. Such containers may be transported to a desired location to have trash deposited therein, or may be removably supported on a movable vehicle for such purposes, such as disclosed and claimed in U.S. Pat. No. 3,550,802 that issued to Charles J. Ellerd on Dec. 29, 1970 entitled Power Driven Container Transporting Device. Such containers after they have been used for a period of time must be cleansed for sanitation purposes, and also periodically maintenance work must be performed thereon. The handling of these containers has in the past presented a serious problem, in that, the containers in the larger size are relatively heavy, and it has been difficult to dispose them in positions where all sides of the containers are available for cleansing purposes or maintenance work to be performed thereon.

The primary purpose in devising the present invention is to provide a movable, power operated, handling device that permits a trash collecting container to be easily engaged and disposed in any desired elevated position for cleansing purposes or for maintenance work to be performed thereon.

## SUMMARY OF THE INVENTION

A container handling device that has a roller supported base that includes two laterally spaced end pieces, and the end pieces in turn having uprights mounted thereon that pivotally support a cradle-like structure. A portion of the cradle is defined by a pair of outwardly extending forks that may removably engage one of the containers, to hold the container firmly in position relative to the cradle as the cradle and container are concurrently pivoted. Pivotal movement of the cradle and the container in removably engagement therewith is accomplished by one or more hydraulic cylinders, which cylinders are actuated by air or liquid under pressure.

Each of the hydraulic cylinders is pivotally mounted on one of the end pieces, and has the piston rod associated therewith pivotally connected to an arm that forms a part of the cradle assembly. The cradle assembly is pivotally supported on bearings that are mounted at desired positions on the uprights.

Each of the containers is of rectangular shape and includes a bottom and end walls. The end walls are connected by a back wall and front wall. During a cleansing operation, water or steam condensate will normally accumulate in the container, but such water or condensate is easily discharged therefrom by pivoting the container to an elevated position where the back wall extends downwardly and rearwardly relative to the device. The container may be placed on the device in reverse if desired. When the container is so positioned water or condensate in the container will drain therefrom by gravity.

A major object of the present invention is to provide a movable, power operated device that can pivot a fork engageable refuse receiving container to any one of a number of elevated positions, where maintenance work

may be performed on the container, or the container may be cleansed by the use of water or steam, and the water or steam condensate collecting in the container draining therefrom by gravity.

Another object of the invention is to supply a handling device for fork engageable containers that may be fabricated from standard commercially available materials, has an extremely simple mechanical structure, is simple and easy to use, and one that will materially reduce the time involved in cleaning containers as well as performing maintenance work thereon safely.

Yet another object of the invention is to provide a container handling device that is operated by hydraulic means, and one wherein the operator of the device is put to little or no physical strain or effort in pivoting the engaged container to a desired elevated position.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the fork engageable container handling device;

FIG. 2 is an end elevational view of the device, and with a container shown in phantom line removably mounted thereon;

FIG. 3 is a fragmentary horizontal cross sectional view of the first form of the device taken on the line 3—3 of FIG. 2;

FIG. 4 is a second end elevational view of the device, but with the device having been actuated to move the engaged container to an elevated angularly disposed position;

FIG. 5 is the same end elevational view as shown in FIG. 2, but with the device having pivoted the container to an elevated position where water or steam condensate will flow therefrom by gravity; and

FIG. 6 is a perspective view of a second form of a power operated, container handling device.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

The first form A of the container handling device as may best be seen in FIG. 1 includes a base B that is movably supported on rollers C. The base B has two laterally spaced uprights D mounted thereon with each of the uprights supporting a bearing E. The pair of bearings E rotatably support an elongate shaft F. Shaft F has a cradle G secured thereto, with the cradle including a pair of forks H. The pair of forks H are adapted to removably engage a pair of guides J provided on the bottom portion of a conventional trash receiving container K, which container is movably mounted on rollers L.

The container K is shown in phantom line in FIGS. 2, 4 and 5. The container includes a bottom 10, two end walls 12, a forward wall 14, and a back wall 16. After the container K has the guides J thereof removably engaged by the forks H as shown in FIG. 2, the container may be pivoted on the device A to the position illustrated in FIG. 5. The container K when so positioned has the back wall 16 sloping downwardly and rearwardly relative to the device A to permit water or steam condensate used in cleaning the container to drain therefrom by gravity. The shaft F has at least one lever L secured to an end thereof as shown in FIG. 1, and the lever being pivotally connected to a piston rod M that is slidably mounted in a hydraulic cylinder N. The cylinder N is pivotally secured to one of the end pieces 18 that forms a part of the base B. The base B

as may be seen in FIG. 1 has the two laterally spaced end pieces 18 rigidly connected to one another by a heavy cross piece 20 that serves as a support for the uprights D. Each of the uprights D has a reinforcing member 22 secured thereto that extends downwardly and rearwardly and is affixed to one of the end pieces 18. The rearward portion of the base B preferably includes a horizontal plate 24 that extends between the end pieces 18, and on its forward edge terminates at the forward extremity of the cross piece 20.

Each of the hydraulic cylinders N has conduits 26 and 28 connected to the interior end portions thereof, and the conduits serving to permit fluid under pressure to be discharged into and out of the cylinder to actuate the piston rod M. The source of hydraulic fluid that is supplied to the conduits 26 and 28 may be from any convenient source, and is not shown in the drawings. The words "hydraulic", "hydraulic fluid", and "hydraulic cylinder" are used herein to include any fluid under pressure and a cylinder actuated by such fluid. The fluid may be either air, a gas, or a liquid that is under pressure.

The cradle G as may be seen in FIG. 1 includes a rectangular frame that has two laterally spaced end members 30 that are connected by an upper cross member 32 and lower cross member 34. The upper and lower cross members 32 and 34 preferably have two reinforcing members 36 extending therebetween, and the reinforcing members being vertically aligned with the two forks H which are welded or otherwise secured to the lower cross member 34. The end members 30 and reinforcing members 36 preferably have lugs 38 extending rearwardly therefrom that engage the shaft B as may be seen in FIG. 3 and are secured thereto by welding beads 40 or other fastening means.

The upper and lower cross members 32 and 34, end members 30 and reinforcing members 36 are preferably of heavy tubular structure, and are illustrated in FIG. 3 as being of square transverse cross section. However, if desired, the upper and lower cross members 32 and 34, end members 30 and reinforcing members 36 may be formed from a heavy tubular member of circular transverse cross section.

Each of the levers L as may best be seen in FIGS. 1, 2, 4 and 5 is of arcuate shape and has an opening 42 therein through which an end portion of the shaft F extends. Each lever L is secured to an end portion of the shaft F by welding beads 44 or other conventional fastening means. The free end portion 46 of the lever L is of a bifurcated structure into which a head portion 48 of one of the piston rods M extends. The bifurcated end 46 and head 48 are pivotally connected by a pin 50 as shown in FIG. 1.

Each of the bearings E as may best be seen in FIG. 3 is rigidly secured to an upper end portion of one of the uprights D by a welding bead 52. Due to the arcuate shape of the lever L, and the space of the hydraulic cylinders N, but a short length of the piston rod M extends from the cylinder when the forks H are horizontally disposed and initially placed in engagement with the guides J of a container K. Each of the hydraulic cylinders N has a lug 54 projecting from the forward end thereof as shown in FIG. 1, and this lug being disposed between two laterally spaced members 56 that extend upwardly from the forward end portion of one of the end pieces 18. A pin 58 engages transversely aligned openings (not shown) formed in each pair of members

56 and lug 54 to pivotally support one of the hydraulic cylinders N from one of the end pieces 18.

The use and operation of the first form A of the invention is extremely simple. The device A is moved on the rollers C to a convenient location, and the receptacle K that is to be cleaned or have maintenance work performed thereon is rolled towards the device A when the cradle G is positioned as shown in FIG. 1 to cause the forks H to engage the guides J. Hydraulic fluid, which may be either air or liquid, is discharged through the conduits 28 into the lower portions of the cylinders N to cause the levers L to pivot in a counterclockwise direction as viewed in FIG. 4. The fluid is continued to be discharged into the lower portions of the cylinders N until the cradle G and container K have reached a position where cleaning or maintenance work can be performed thereon.

The maximum pivotal movement of the cradle G and the container K is reached when the container is disposed in a second position as shown in FIG. 5, with the back wall 16 sloping downwardly and rearwardly from the device A, to permit either water or steam condensate that accumulates in the container during the cleansing operation to drain therefrom by gravity. Pivotal movement of the container K in a counterclockwise direction beyond the second position is prevented by stops S that are secured to the uprights D, and are contacted by the levers L.

After the maintenance work has been performed on the container K, fluid is discharged into the upper end of the cylinders N through the conduits 26. Fluid in the lower portions of cylinders N is allowed to discharge at a desired rate therefrom through the conduits 28. The throttling of the fluid discharge through the conduits 28 by valve means (now shown) permits the container K to be returned from the position shown in FIG. 5 to that shown in FIG. 2 at a desired rate. After the container K has been returned to the first position shown in FIG. 2, it may be separated from the device A, by moving the container along the supporting surface P on the rollers L. The forks H for purposes of strength and to minimize deformation when supporting a heavy container K, are preferably formed with a transverse cross section that is of T-shaped configuration.

An alternate form A' of a container handling device is shown in FIG. 6. The device A' includes a base B' that is mounted on rollers C'. The base B' includes two end pieces 18' on which the rollers C' are mounted. The end pieces 18' are preferably connected by a cross piece 20'. A cradle G' is provided that includes two laterally spaced parallel forks H' and a frame that is defined by end members 30', an upper cross member 32', and lower cross member 34'. The frame G' includes reinforcing members 36' and 34' respectively.

Two legs 60 extend outwardly from the lower cross member 34' as may best be seen in FIG. 6 and are parallel and laterally spaced relative to the forks H'. Each of the legs 60 has two angularly disposed members 62 and 64 that extend outwardly therefrom and intersect at an apex portion 66. Each apex portion 66 has an arm 68 extending outwardly therefrom, and by a pin 70 is pivotally connected to a link 72. Each link 72 is pivotally connected on its lower end by a pin 74 to one of the end pieces 18. Each of the end pieces 18 has two laterally spaced members 76 that extend upwardly from a rearward end portion thereof. A pin 78 extends between members 76 and pivotally supports the lower

rearward portion of a lever 80 therebetween. The forward portion of each lever 80 is by a pin 82 pivotally connected to one of the apex portions 66. Each arm 80 has a triangular shaped web 84 extending upwardly therefrom. The upper extremity of each web 84 is by a pin 86 pivotally connected to a head 88 of a piston rod 90.

Each piston rod 90 is slidably mounted in a hydraulic cylinder 92 that has the lower end portion thereof pivotally connected to one of the end pieces 88 by a conventional pin assembly 93. Fluid may be discharged into the lower portion of each of the cylinders 92 through a conduit 94. Each conduit 94 is connected to a source of fluid under pressure (not shown) in the drawing. When the second form A' of the device is not energized by fluid being discharged into the hydraulic cylinders 92, the cradle G' rotates to a first position where the forks H are substantially horizontal; and may engage the guides J on one of the containers K. When the second form A' of the device has the forks H' horizontally disposed, the arms 68 extend upwardly and rearwardly, and are disposed above the levers 80.

After one of the containers K has been moved to engage the forks H', and fluid is discharged into the cylinders through the conduits 94, the levers 80 are pivoted upwardly and rearwardly as viewed in FIG. 6. The cradle G' is caused to pivot clockwise as viewed in FIG. 6 until the forks H' are substantially vertically disposed. A container K (not shown) mounted on cradle G' is now so situated that work may be performed on any desired surface portion thereof, and also so positioned that the container may be washed or steam cleaned.

After the maintenance or cleansing operation has been carried out as above described, valve (not shown) that controls the flow of fluid from the conduits 94 is opened slightly, and fluid allowed to bleed from the cylinders. As fluid discharges from the cylinders 92, the weight of the cradle G' and the container K mounted thereon, causes the levers 80 to pivot in a counterclockwise direction as viewed in FIG. 6. As the levers 80 pivot downwardly, the links 72 and arms 68 cooperate to pivot the cradle G' and container K supported thereon to a first position where the forks H' are horizontally disposed and the container K may be manually separated from the device A'.

In some instances it will be found that the containers J mounted on the end walls 12 thereof rather than on the bottom as shown in FIGS. two to 5 inclusive. Containers K with such end wall mounted guides (not shown) may be easily handled and manipulated by the first form of the invention shown in FIG. 1. When such containers are to be engaged, two short stub forks 30a are provided that extend outwardly from the end members 30, and slidably and removably engage the end wall mounted guides J. The forks H serve to support the weight of the container K so engaged by being in abutting contact with the bottom thereof, and the stub forks 30a preventing the container K being inadvertently displaced from the device when the container K is pivoted to the position shown in FIG. 5.

When the guides J are mounted on the bottom of the container K and are engaged by the forks H, the stub shafts 30a are disposed adjacent the end walls 12 thereof, but in this instance serve no particular purpose. The stub shafts 30a are only of use when the containers K being engaged have the guides J on the end walls 10 thereof.

I claim:

1. A power operated device for removably engaging an open topped refuse container when said container is in a first position at which fork engageable guides that form a part thereof are horizontally positioned, said device after said engagement capable of pivoting said container to an elevated second position at which substantially all surfaces of said container are accessible for cleansing and maintenance work thereon, with said container when in said second position so disposed that liquid will drain from said open top thereof by gravity, said device comprising:

- a. a base that includes two laterally spaced, substantially parallel end pieces and a cross piece extending therebetween and secured thereto;
- b. two laterally spaced uprights supported from said base;
- c. a horizontal shaft rotatably supported on said uprights and extending therebetween;
- d. a container receiving cradle assembly that includes a frame having upper and lower horizontal cross members that are joined by a pair of end members, said end members rigidly secured to said shaft, and a plurality of spaced parallel forks that project outwardly from said lower cross member and capable of engaging said guides; and
- e. power operated means mounted on said base and operatively associated with said shaft for pivoting said cradle assembly between said first and second positions, said power operated means including:
  1. a lever secured to a first end of said shaft and extending outwardly therefrom;
  2. A hydraulic cylinder;
  3. a piston rod slidably mounted in said cylinder;
  4. first means for pivoting a first end of said hydraulic cylinder to said first end piece;
  5. second means pivoting a free end extremity of said piston rod to said lever; and
  6. third means for discharging hydraulic fluid under pressure into at least one interior end portion of said hydraulic cylinder to move said cradle assembly and container supported thereon between said first and second positions.

2. A power operated device as defined in claim 1 in which said uprights are secured to said cross piece and extend upwardly therefrom, and said device in addition including:

- g. two axially aligned bearings supported from said uprights and rotatably supporting said shaft; and
- h. roller means disposed under said end pieces to permit said device to be rolled on a flat surface to a desired location.

3. A power operated device for removably engaging an open topped refuse container when said container is in a first position at which fork engageable guides that form a part thereof are horizontally positioned, said device capable of thereafter pivoting said container to an elevated second position at which substantially all surfaces of said container are accessible for cleaning and maintenance work to be performed thereon, with said container when in said second position so disposed that liquid therein will drain from said open top by gravity, said device comprising:

- a. a base that includes first and second parallel laterally spaced end pieces that are connected by a cross piece, with said cross piece of such length that one of said containers can be at least partially

- disposed between said end pieces when said container is in said first position;
- b. a lever pivotally connected to a rearward end portion of said first end piece;
- c. an elongate link pivotally connected to said first end piece;
- d. an upwardly extending hydraulic cylinder pivotally connected to said first end piece and extending upwardly therefrom;
- e. an upwardly extending piston rod slidably mounted in said hydraulic cylinder;
- f. first means for pivotally connecting a free end portion of said piston rod to said lever;
- g. a container receiving cradle assembly that includes a frame having upper and lower horizontal cross members that are joined by a pair of end members, said end members and a plurality of parallel spaced forks that project outwardly from said lower cross member and capable of engaging said guides;
- h. first and second legs that extend outwardly from said lower member and are adjacently disposed to said first and second end pieces;
- i. two angularly disposed members that extend outwardly from said first leg and intersect at an apex structure;

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- j. a rigid arm that extends outwardly from said apex structure;
  - k. second means for pivotally connecting said arm to said link;
  - l. third means for pivotally connecting said apex structure to a free end portion of said lever; and
  - m. fourth means for discharging hydraulic fluid under pressure into the lower interior portion of said hydraulic cylinder to move said piston rod and lever upwardly relative to said first end piece, and said arm and link cooperating as said lever is pivoted upwardly, to pivot said cradle assembly to said second position, with fluid when allowed to escape from said fourth means, permitting said lever to pivot downwardly due to the weight of said cradle assembly and container supported thereon, and as said downward pivotal movement takes place said link and arm cooperating to return said cradle assembly to said first position.
4. A power operated device as defined in claim 3 in which said first and second end pieces further include roller means depending downwardly therefrom to permit said device to be moved to a desired location on a smooth surface.

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