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3,080,196

VEHICLE WITH RETRACTABLE WHEELS

Filed Nov. 12, 1957

Fig. 1

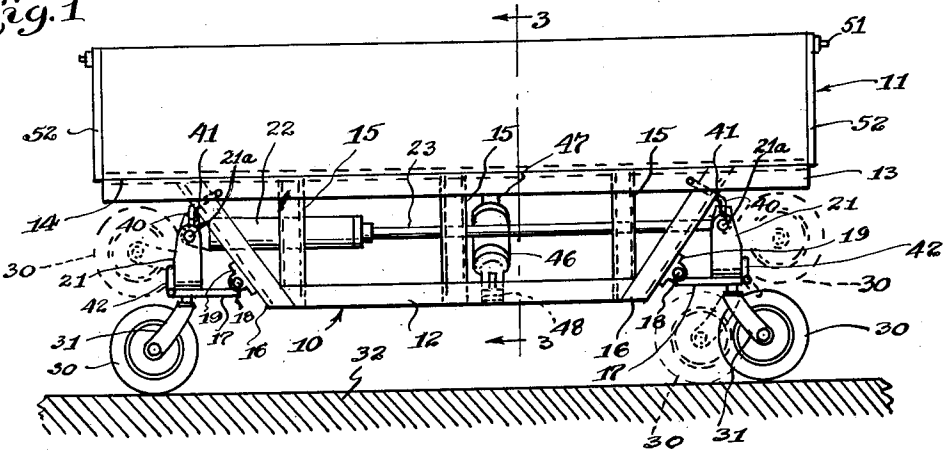


Fig. 3

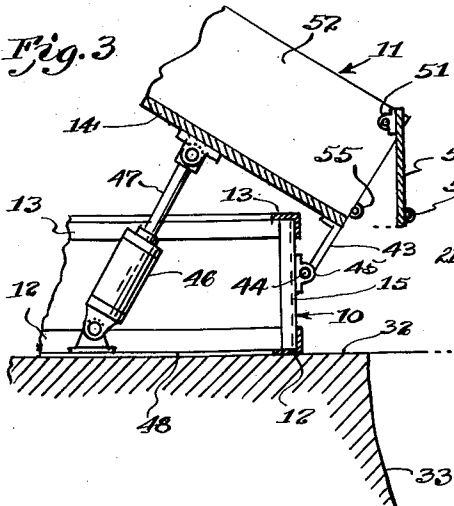


Fig. 2

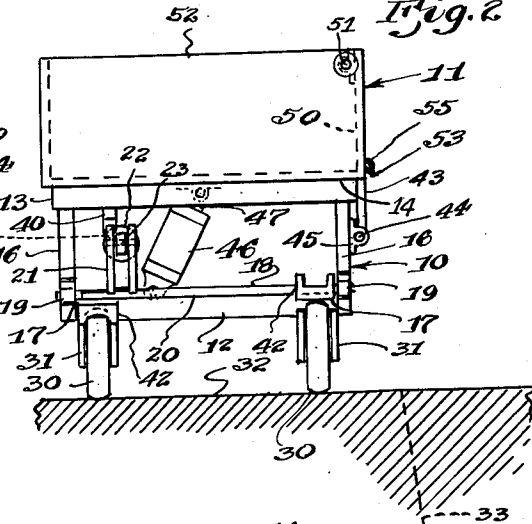


Fig. 4

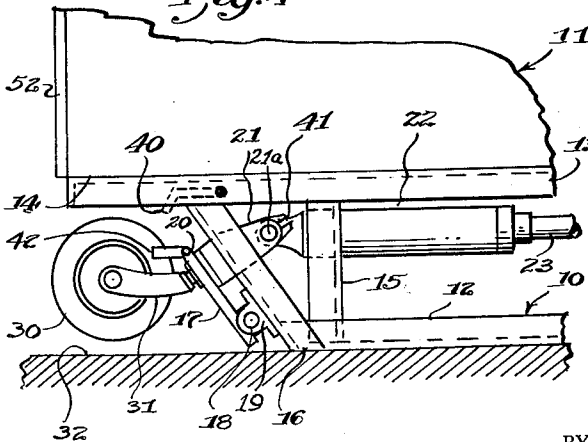
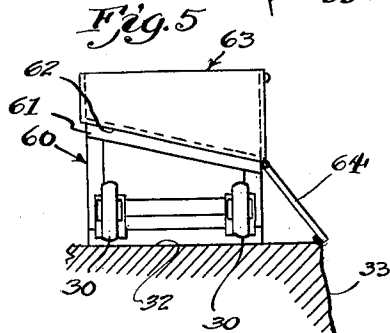


Fig. 5



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## VEHICLE WITH RETRACTABLE WHEELS

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12 Claims. (Cl. 293-1)

My invention relates to material handling apparatus and more particularly to an apparatus preferably adapted for containing earth dug from an excavation and operable to back-fill the excavation as desired.

The embodiment of the invention herein disclosed is particularly applicable to the back-filling of cemetery grave excavations, but it will be apparent that other excavating and/or material handling work will be similarly facilitated by the use of the present or similarly constructed equipment.

When excavations such as are made for graves or in utility company work and the like are to be dug, and the earth removed must be retained for subsequent back-filling, several problems arise. The earth tends to become scattered and to fall back into the excavation or, in cases of utility work, into the street or adjacent property. Rain will sometimes wash part of the pile away or at least create an extensive muddy area. In the case of cemetery graves, a pile of earth is unsightly and no kind of covering can disguise its identity. The cost and the time expended preclude such a solution as transporting the excavated earth away and returning it when back-filling is needed. In addition, the process of back-filling must be accomplished either by hand-shoveling, which is a slow process, or by utilizing a bulldozer or other earth-moving equipment, which is expensive and, in areas where space is limited, maneuvering of equipment may be difficult.

An object of the present invention is to facilitate the handling of excavated earth by providing an apparatus for containing the earth adjacent the excavation.

Another object of the invention is to remedy problems in handling excavated earth by providing an apparatus capable of both storing excavated earth and back-filling the excavation when required.

A further object of the invention is to facilitate material handling by providing an apparatus comprising a wheeled undercarriage and a hopper carried thereby, said undercarriage being selectively lowered to a ground-support position.

Yet another object of the invention is to improve earth-handling equipment by constructing a light-weight, readily transported, portable apparatus for containing excavated earth in readiness for back-filling.

Still another object of the invention is to facilitate material-handling by providing a light-weight apparatus having wheels that may be retracted to lower the apparatus into ground-support position whereby relatively heavy loads may be held ready for various purposes while permitting the unloaded vehicle to be readily transported.

A still further object of the invention is to facilitate earth-handling by constructing a portable hopper apparatus adapted to contain excavated earth and operable selectively to dump the load of earth back into the excavation.

For a more complete understanding of the invention, reference may be had to the accompanying drawing illustrating a preferred embodiment of the invention in which like reference characters refer to like parts throughout the several views and in which

FIG. 1 is an elevational side view of the preferred apparatus embodying the present invention.

FIG. 2 is an elevational end view of the apparatus of FIG. 1.

FIG. 3 is a fragmentary cross-sectional view taken substantially on the line 3-3 of FIG. 1, the wheels of the apparatus having been retracted.

FIG. 4 is a fragmentary side view of one end of the apparatus of FIG. 1 illustrating the wheels in the retracted position, and

FIG. 5 is a diagrammatic end view of a modified construction of the apparatus.

The material apparatus comprises a frame assembly 10 and a preferred container 11 carried thereon substantially as shown. The frame assembly 10 includes a base or lower frame 12 and an upper frame 13 on which the bottom 14 of the container 11 normally rests. The upper and lower frames are spaced apart preferably by substantially upstanding members 15 and inclined end members 16.

A suspension assembly 17 is hinged approximately at each corner of the undercarriage 10 by any suitable means such as rods 18 each connecting an end pair of suspension assemblies 17 and pivotally carried by pillow blocks 19 or other means mounted preferably on the end members 16. The end pairs of suspension assemblies 17 are each also preferably connected together by means of a cross bar 20 on which an upstanding trunnion arm 21 is mounted as shown. The two arms 21 are preferably pivotally connected as at 21a respectively to the ends of a hydraulic cylinder 22 and piston 23 or other actuating means. Retraction of the piston 23 into the cylinder 22 will pivot the suspension assemblies 17 upward and outward as illustrated in FIGS. 3 and 4, and extension of the piston 23 will pivot the suspension assemblies downward and inward as illustrated in FIGS. 1 and 2. It is noted that any other means may be used to accomplish this operation, and the hydraulic means shown is merely preferred.

A wheel 30 is carried by a conventional swivel mount 31 which is pivotally secured to each suspension assembly 17 substantially as shown, the wheels 30 thus being retracted or extended vertically with respect to the undercarriage 10 upon corresponding operation of the suspension assemblies 17. When extended, the wheels 30 support the undercarriage above the ground surface 32, as illustrated in FIGS. 1 and 2, so that the entire apparatus may be readily wheeled into any desired position. An excavation is indicated by the dotted line 33 in FIG. 2 and by the solid line 33 in FIGS. 3 and 5. The suspension assemblies 17 are locked in the downward position by any preferred means such as by latches 40 pivotally secured to the frame 13 and operable to engage with a slot 41 provided in each arm 21. The wheels 30 are preferably prevented from swiveling during retraction by any means such as with a locking plate 42 hinged to the support structures 17 to be selectively pivoted downward, into engagement with the wheel 30 and illustrated in FIGS. 2 and 4.

When retracted, the wheels 30 are disposed between the ends of the container bottom 14, which preferably overhang the ends of the undercarriage 10, and the ground 32, the undercarriage 10 thus being lowered so that the lower frame 12 rests upon the ground 32. This places the container 11 in a convenient position to receive material such as earth which is removed from the ground adjacent the apparatus during an excavation.

The undercarriage 10 and the wheels 30 are preferably constructed of relatively light weight material which, if in the extended raised position of FIGS. 1 and 2, would be unable to support the load of material in the container 11. In the lowered position of FIGS. 3 and 4, however, the load stress is completely removed from the wheels 30 and instead is substantially transmitted to the ground on which the lower frame 12 rests, through the members 15 and 16. Such light weight portable construction is much less expensive and facilitates easier handling and transportation when empty than would be the case if the apparatus were constructed to otherwise carry a heavy load of material.

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The container 11 is provided with one or more hinge arms 43 secured at one side of the container 11 and pivotally secured by any means such as hinge pins 44 to pillow blocks 45 secured to the upright members 15 as illustrated in FIGS. 2 and 3. The hinge line is preferably disposed intermediate the bottom 14 of the container 11 and the ground 32 such that when tilted off of the undercarriage as shown in FIG. 3, the container will project laterally outward to dump back-fill earth into the excavation 33 spaced laterally from the apparatus. Thus the possibility of cave-in of the edge of the excavation 33 due to the weight of the loaded apparatus is materially reduced.

The container 11 may be tilted by any means such as hydraulically by a piston 47 and cylinder 46 respectively pivotally connected to the container bottom 14 and a cross member 48 secured to the lower frame 12. The container 11 has a side gate 50 preferably constructed as illustrated in FIG. 3 to swing outward by its own weight due to being hinged near the top edge on a hinge rod 51 secured to the ends 52 of the container 11. A latch rod 53 may be inserted through matching fixtures 54 and 55 respectively mounted on the gate 50 and the container ends 52, or any other suitable means may be so employed to lock the gate 50 in the closed position.

FIG. 5 illustrates diagrammatically a modification of the invention having an undercarriage structure 60 provided with a slanted upper frame 61 on which is secured the slanted bottom 62 of a container 63. The container 63 does not tilt at all, but is provided with a gate 64 hinged to the bottom 62 of the container 63, such that earth in the container 63 will readily pour from the container into the excavation 33. The wheels 30 are arranged for retraction as in the modification of FIGS. 1-4.

It is also noted that the gate 64, swinging downward as in FIG. 5, may be used if possible with the container 11 of FIGS. 1-4 instead of the gate 50 illustrated.

Although I have described only one preferred embodiment of the invention, it will be apparent to one skilled in the art to which the invention pertains that various changes and modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A dumping vehicle comprising
  - (a) an elongated frame assembly,
  - (b) a container mounted on top of said frame assembly,
  - (c) spaced suspension assemblies pivotally mounted on said frame assembly,
  - (d) means pivoting said suspension assemblies on an axis parallel to the transverse axis of said frame assembly to raise and lower said frame assembly from and to the ground,
  - (e) said means operably connecting and being positioned between said spaced suspension assemblies.
2. The apparatus as defined in claim 1 and in which said container comprises a box having a bottom slanting downwardly to one side thereof and a gate at said side, said gate being hingedly connected at the bottom of said box whereby to provide a slideway for material being dumped from said container.
3. The apparatus as defined in claim 2 and in which said frame assembly comprises a lower frame structure and support members spacing said lower frame structure from the bottom of said container, said lower frame structure being raised and lowered from and to the ground when said suspension assemblies are pivoted.
4. The apparatus as defined in claim 3 and in which said wheel assemblies on being pivoted upwardly are disposed substantially beneath the bottom of said container in the space between the ground and the container provided by said frame assembly support members.
5. The apparatus as defined in claim 1 and in which said suspension assemblies comprise a pair of wheel carry-

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ing support structures disposed one at each end of said frame assembly and pivotally connected thereto on substantially parallel horizontal axes, said wheels being rotatably carried on said support structures on axes separate from the pivot axes of said support structure.

6. The apparatus as defined in claim 5 and in which said actuating means comprises an extendable and retractable cylinder and piston carried by said frame assembly and connected to said support structures at pivot points spaced from the pivot axes of said support structures.

7. The apparatus as defined in claim 5 and in which a pair of spaced wheels are swivably carried by each of said support structures.

8. The apparatus as defined in claim 1 and in which said suspension assemblies include support members pivotally mounted on said frame assembly, wheel carrying members swivably carried by said support members on swivel axes disposed respectively at right angles to the pivot axes of said support members, and said wheels being rotatably carried by said support members on axes disposed respectively at right angles to the swivel axes, and means selectively locking said wheel carrying members against swiveling thereof.

9. The apparatus as defined in claim 3 and in which said container comprises an elongated box having the ends thereof overhanging said frame assembly, and in which said suspension assemblies on being pivoted upwardly are disposed substantially in the spaces between the overhanging ends of the box and the ground.

10. The apparatus as defined in claim 3 and in which said container comprises a box carried by said frame assembly and hinged at one side thereto, means tilting said box relative to said frame assembly, and the hinged side of said box being selectively opened for dumping the load from said box when same is tilted.

11. The apparatus as defined in claim 10 and in which said hinged side comprises a gate panel hinged at the upper edge thereof to the ends of said box and operable to swing outward under its own weight when said box is tilted.

12. The apparatus as defined in claim 10 and in which said box is hinged to said frame assembly on a longitudinal hinge line spaced from the box and disposed intermediate the bottom thereof and said lower frame structure such that tilting of said box effects lateral projection thereof beyond the side of said frame assembly whereby to facilitate dumping the load in a location laterally spaced from said apparatus.

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