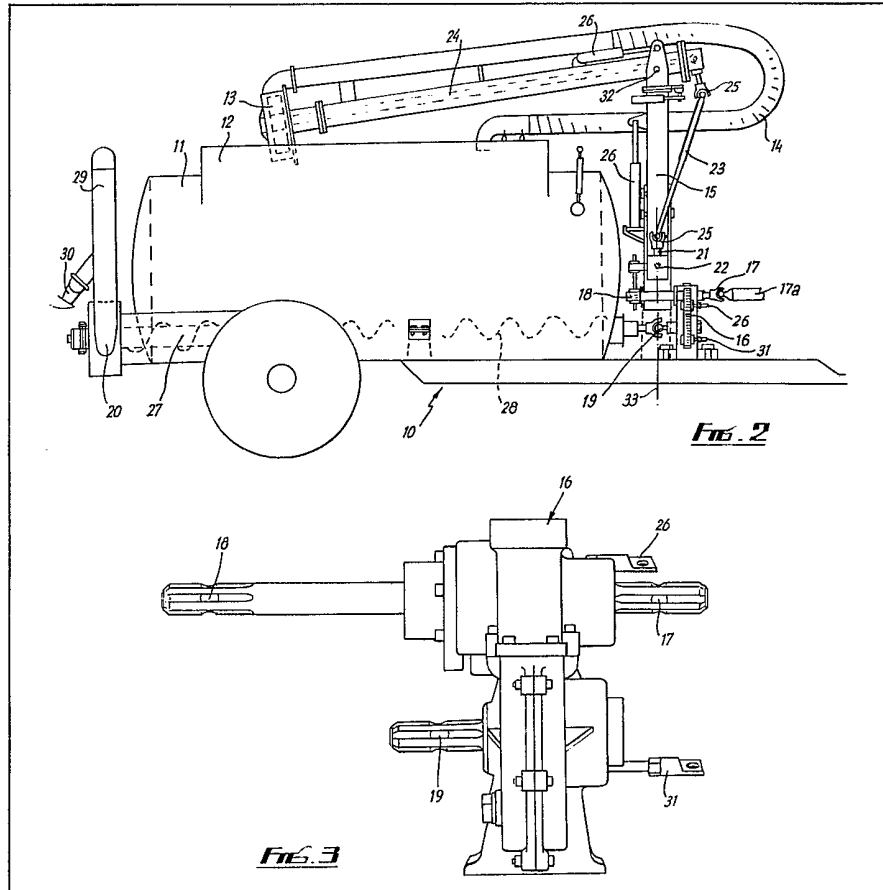


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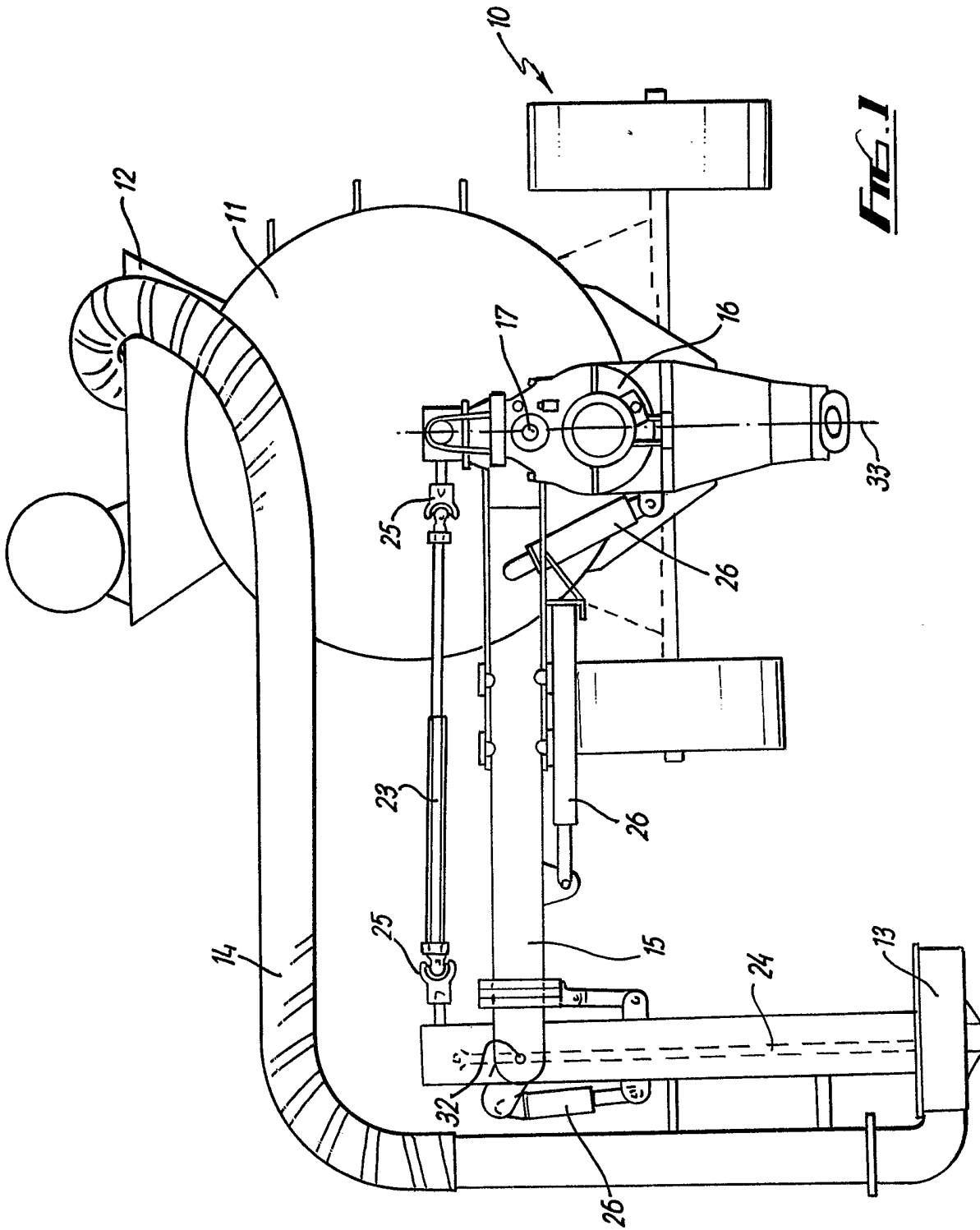
ing and pumping farmyard slurry comprises a trailer (10) adapted to be connected to a tractor. A first pump (13) is located at the free end of a jointed and telescoping boom (15) which is pivotally mounted on the trailer (10) so as to be movable between operating and stowed positions. In the stowed position the first pump (13) overlies an inlet hopper (12) of a container (11) for slurry mounted on the vehicle (10). Drive means (16) is mounted on the vehicle and operable selectively to drive the first pump (13) and a drive means power take-off shaft (19) to which a second pump (20) is connected. The second pump (20) serves to deliver slurry to an outlet (30) of the container (11). The drive means (16) is driven by the tractor power take-off shaft. The boom (15) may be moved so that the first pump (13) can be lowered into a slurry pit so as to pump slurry therefrom into the container (11).

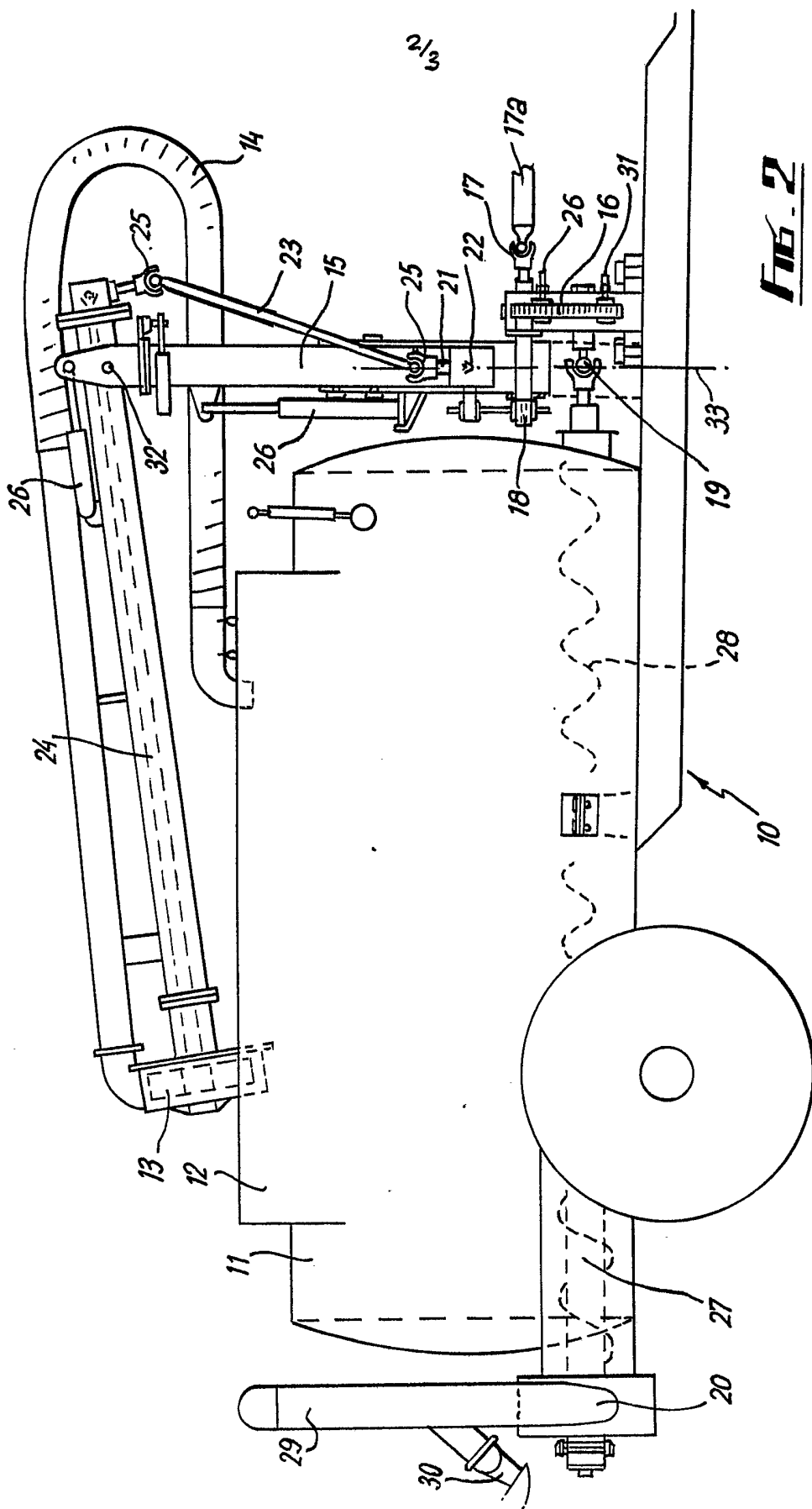
(54) **Slurry tanker and pump**

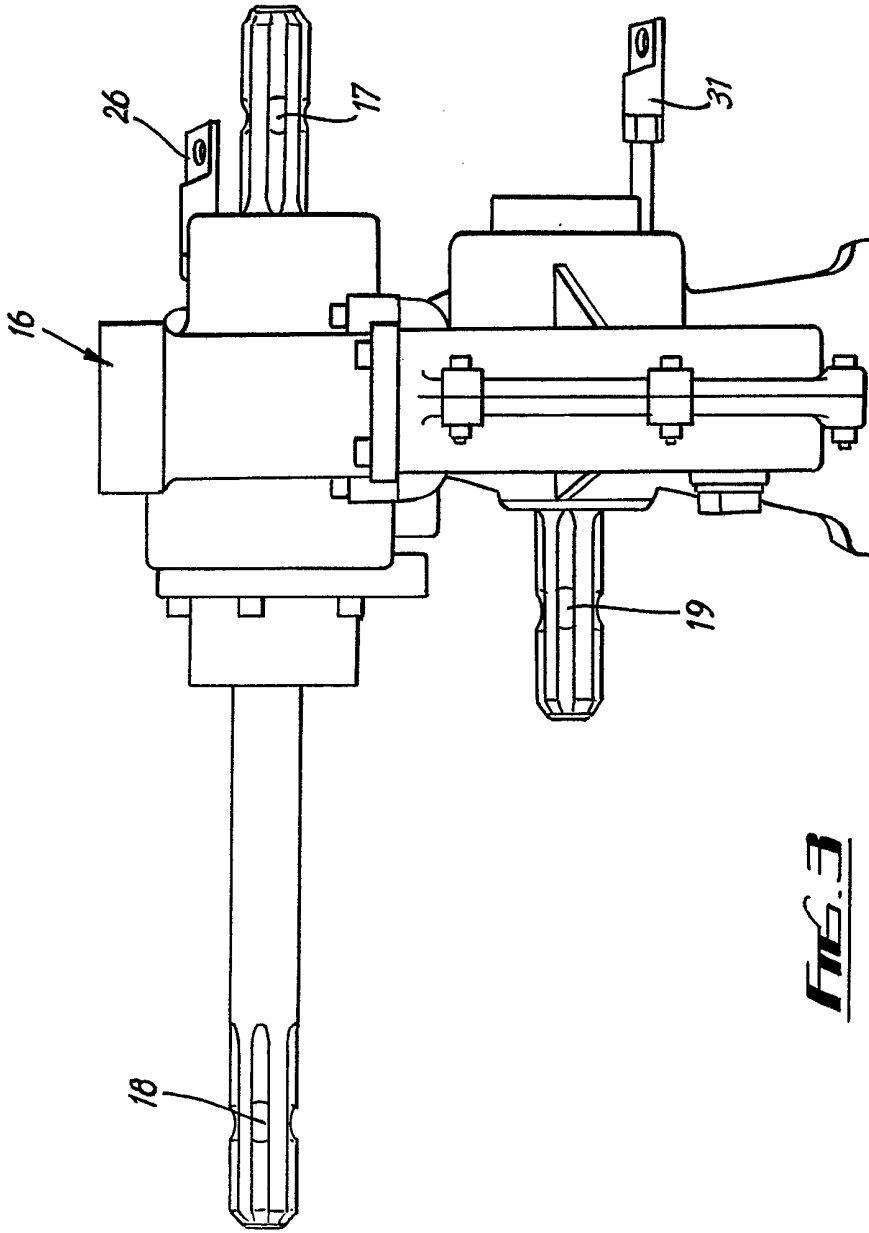
(57) A vehicle (10) for use in transport-



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**FIG. 3**

## SPECIFICATION

**Slurry tanker and pump**

5 This invention relates to apparatus for transporting farmyard slurry and for spraying the same onto farmland.

Slurry tankers are used to transport farmyard slurry and to spray the same from a rear outlet onto farmland. One type of tanker has a gate valve at the rear thereof and is pressurised by means of a pump to enable slurry to be forced out of the gate valve and thereby be sprayed onto the farmland. Another type of tanker has an outlet at the rear thereof which is in the form of an inverted U-shaped pipe, and a feed screw is used within the tanker to feed slurry to a pump located at the entrance to the U-shaped pipe. This latter type of tanker is not pressurised and is usually open topped. Both types of tanker may be drawn and powered by a tractor or alternatively may incorporate their own motive power and driving cab.

Slurry pumps, are used to pick up farmyard slurry from pits containing the same, and to deliver that slurry to a slurry tanker. Such pumps are connected to a tractor and are driven by the power take-off drive of the tractor. Various types of such pump are available for this purpose.

The operations, of pumping slurry from a pit into a tanker, transporting the slurry in the tanker and then spraying the slurry onto the farmland, consume many manhours, particularly in the case of the use of a tractor driven tanker. In such a case either two tractors are required or the slurry pump must be disconnected from the single tractor and the tanker connected therewith between the pumping and transporting operations. This contributes to the time consuming nature of the whole operation and/or more than one person is required to carry out these operations.

It is an object of the present invention to provide apparatus for use in such operations whereby one person can perform all of the operations in a simple and convenient manner and whereby the time taken to perform all of the aforementioned operations is reduced relative to that taken heretofore.

The invention provides apparatus comprising in combination a first pump mounted on a vehicle and drive means also mounted on said vehicle and operable selectively to drive said first pump and a drive means power take-off shaft for a second pump.

The apparatus may also comprise a second vehicle having mounted thereon a container for fluid material, a second pump adapted to provide delivery of fluid material from said container through an outlet of said chamber, said second pump being connected to said drive means power take-off shaft. Said vehicle may comprise a tractor and the second vehicle may comprise a trailer adapted to connect with said tractor.

Alternatively the apparatus may also comprise a container for fluid material mounted on said vehicle and a second pump connected with said drive means power take-off shaft and adapted to provide delivery of fluid material from an outlet of said container.

The vehicle may comprise a trailer adapted to connect with a tractor. The drive means may be adapted to be driven by the power take-off shaft of the tractor.

70 The first pump may be attached to a boom which is pivotally mounted on said vehicle so as to pivot between an operational position and a stowed position. The boom may be provided with sufficient, for example three, pivot points so as to be capable of being lowered into the operational position or raised and the first pump swivelled over the container and then lowered relative thereto into the stowed position. The boom may be telescopic so that the first pump may be displaced from the vehicle when the boom and first pump are in their operational positions.

The words "fluid material" herein referred to are intended to include liquids and also liquids having solid material in suspension therein, for example slurry.

One embodiment of apparatus according to the present invention will now be described with reference to the accompanying drawings in which:-

*Figure 1* is a front end elevation of a tanker vehicle, with the boom and slurry pump in the operative position;

*Figure 2* is a side elevation of the vehicle of *Figure 1*, with the boom and slurry pump in the stowed position;

*Figure 3* is an elevation of the drive unit of the vehicle of *Figures 1* and *2*.

Referring particularly to *Figures 1* and *2* there is shown a wheeled trailer vehicle which is adapted to be towed behind a farm tractor. The vehicle, denoted generally by the numeral 10, has mounted thereon a container 11 in the form of a slurry tank. On the top of the tank 11 is a hopper 12 serving as an inlet to the tank 11 for slurry fed thereto by means of a first pump, in this case a slurry pump 13 via a feed pipe 14. The slurry pump 13 is attached to a boom 15 which is pivotally mounted on the vehicle 10 as is described below.

When the boom 15 is moved into the operative position, as shown in *Figure 1*, the slurry pump 13 is lowered into a pit containing slurry so as to pump the slurry from the pit and into the container 11.

The drive means 16 is mounted on the vehicle 10 and is adapted to be coupled to the power take-off shaft of the towing tractor (not shown), and is shown in greater detail in *Figure 3*. Splined shaft 17 engages the power take-off shaft 17a of the tractor and splined shafts 18 and 19 provide drive to the slurry pump 13 and to a second pump, in this case a delivery pump 20, respectively. The drive transmission from the shaft 18 to the slurry pump 13 comprises a shaft 21, which passes through a lower pivot point 22 of the boom 15, a telescopic shaft 23 and a third shaft 24. At each end of the telescopic shaft 23 is a universal coupling 25 which in combination with the telescoping of shaft 23 allows the boom 15 to be moved between the operational and stowed positions shown in *Figures 1* and *2* respectively. This movement is performed by means of hydraulic actuators 26 which are themselves powered by means of the hydraulic system of the tractor. The

drive transmission 18, 21, 23, 24 is engaged by, or disengaged from, the drive shaft 17 by means of lever 26 which is coupled to an operating handle in the cab of the towing tractor (not shown). The drive transmission from the drive means power take-off shaft 19 to the delivery pump 20 comprises a shaft 27 on which is a helical screw flight 28 forming an auger feed for fluid material in the container. This screw 28 feeds fluid material to the delivery pump 20 which in turn feeds the material through the inverted U-shaped pipe 29 and out of the outlet 30. Lever 31, which is also coupled to an operating handle in the cab of the towing tractor, provides for the engagement or disengagement of shaft 19 and shaft 17. In consequence drive means 16 is operative to selectively drive the slurry pump 13 and the delivery pump 20.

As mentioned above the boom 15 is pivotally mounted on the vehicle 10 so as to be pivotal between the operational and stowed positions. The boom 15 is provided with three pivot points, points 22 and 32 each providing for pivoting movement about an horizontal axis and the boom 15 being mounted on the vehicle 10 so as to be pivotal about a vertical axis 33. By this means after the slurry pump 13 has pumped sufficient slurry from a pit into the container 11 whilst in the operative position shown in Figure 1, the boom 15 may be lifted, by being pivoted at 22 about an horizontal axis, and then rotated about vertical axis 33 so that the slurry pump 13 is above the hopper 12. The slurry pump 13 may then be lowered into the hopper 12 by pivoting the boom 15 at 32 about an horizontal axis so that the boom 15 and slurry pump 13 are then in the stowed position as shown in Figure 2. This procedure is followed in reverse when it is desired to fill an empty container from a pit containing slurry.

In an alternative embodiment the pump 13, boom 15 and drive means may be adapted to be mounted in the manner described above on the tractor vehicle itself. In this case the trailer on which the container 11 and delivery pump 20 are mounted may be un-coupled from the tractor and replaced by another trailer if required.

In another embodiment of the invention the container 11 may be of the sealed type and the delivery pump 20 is then adapted to pressurise the container 11 in order that slurry is delivered through outlet 30. In this case the slurry pump 13 will rest on the top of the container 11 when in the stowed position instead of in the hopper 12 shown in the drawings.

In another embodiment the drive means may itself be driven by a motor instead of by the tractor power take-off shaft, or may comprise a separate motor driving each pump. In these cases the or each motor is preferably controllable from the driving cab of the tractor.

In yet a further embodiment of the invention the first and second pumps, the container and the drive means may be mounted on a single vehicle which has its own motor and driving cab.

By means of the apparatus of the invention, residual slurry in the slurry pump 13 does not fall onto roadways or the like whilst the slurry is being

transported, but is returned to the container or a collecting device provided on top of the container for this purpose.

The end of the boom 15 to which the slurry pump 13 is attached may be provided with rollers which can run on rails adjacent the hopper 12 edges so as to accommodate movement of the slurry pump 13.

Instead of the shaft connection 17, 17a, shown in Figure 2 the drive means 16 may be driven by means of a chain drive from the tractor, or hydraulically from the hydraulic system of the tractor.

#### CLAIMS

1. Apparatus for transporting and pumping farmyard slurry comprising a vehicle having mounted thereon a first pump, drive means and a drive means power take-off shaft for a second pump, wherein said drive means is operable selectively to drive said first pump and said drive means power take-off shaft.

2. Apparatus according to claim 1 comprising a container for fluid material.

3. Apparatus according to claim 2 wherein said container has an outlet therein.

4. Apparatus according to claim 3 comprising a second pump adapted in use to deliver fluid material from said outlet.

5. Apparatus according to claim 4 wherein said second pump is connected to said drive means power take-off shaft.

6. Apparatus according to any one of claims 1 to 5, wherein said first pump is mounted on a boom which is pivotally mounted on said vehicle so as to be movable between an operative position and a stowed position.

7. Apparatus according to claim 6 wherein said first pump is pivotally mounted at one end thereof on said vehicle.

8. Apparatus according to claim 7 wherein said first pump is mounted on said boom at an end thereof remote from said one end.

9. Apparatus according to any one of claims 6 to 8 wherein said boom is provided with at least one pivot joint therein.

10. Apparatus according to any one of claims 6 to 9 wherein said boom is provided with at least two parts which may telescope relative to each other.

11. Apparatus according to any one of claims 2 to 10 wherein said container is mounted on said vehicle and said vehicle is self powered.

12. Apparatus according to any one of claims 1 to 10 wherein said vehicle comprises a trailer adapted to be connected with a tractor.

13. Apparatus according to claim 12 wherein said drive means is adapted to be connected to a tractor power take-off shaft.

14. Apparatus according to any one of claims 2 to 4 and comprising a second vehicle on which said container is mounted.

15. Apparatus according to claim 14 wherein said vehicle is a tractor and said second vehicle is a trailer adapted to be connected to said tractor.

16. Apparatus according to claim 15 wherein said drive means is connected to a tractor power

take-off shaft.

17. Apparatus for transporting and pumping farm-yard slurry substantially as hereinbefore described with reference to and as illustrated in the accom-

5 panying drawings.

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