

**Assembly for the collection and disposal of household  
waste**

The present invention relates to the field of the  
5 terrestrial transport of materials, in particular of  
waste.

More particularly, the invention relates to an  
assembly for the collection and disposal of waste, in  
particular household waste, in an urban or periurban area.

10 Currently, one of the problems in the field of the  
collection and disposal of waste is the possibility of  
easily reaching city centres in order to collect waste  
there and the possibility of disposing of it at the  
outskirts of the city, at unloading sites such as  
15 landfills, reprocessing centres, or selective sorting  
centres.

To this end, there currently exist conventional  
systems that employ waste trucks that carry out  
predetermined circuits and collect the waste. Such waste  
20 trucks are often large and fairly slow and comprise a  
container for collecting waste. The waste, accumulated in  
bins, is poured into the container of the truck by way of  
tipping means positioned at the rear of the truck, said  
tipping means tipping the bins. Once the circuit has been  
25 completed, the truck returns to the outskirts of the city  
and travels, for example, to an unloading site where it  
empties the container.

However, a drawback with such solutions is that the  
means employed, specifically the waste truck, prove to be  
30 relatively problematic for urban traffic. Specifically, on  
account of their relatively substantial size and their low  
speed, they cause significant blockages in the roads, this

being unsatisfactory. More particularly, when these waste trucks travel in city centres where the urban traffic is relatively heavy, they cause the traffic to slow down, this being detrimental to the life of the city.

5        Furthermore, such means prove to be harmful to the environment on account of the carbon impact they have and on account of their energy consumption, this also being unsatisfactory. In addition, these means are relatively noisy and give off a disagreeable smell, this being  
10        unacceptable for the residents.

      The objective of the invention is in particular to solve the drawbacks of the prior art.

      More particularly, one objective of the invention is to propose a technique for limiting the interference with  
15        urban traffic, which tends to be heavy in city centres (cars, trucks, two-wheeled vehicles, pedestrians, etc.).

      Another objective of the invention is to provide a technique for limiting the carbon impact associated with these collections and moving of waste, and for limiting  
20        the energy consumption while providing a relatively "clean" solution.

      Yet another objective of the invention is to provide a technique for optimizing the circulation of the flow of waste to be collected and disposed of.

25        Finally, one objective of the invention is to provide a technique which is inexpensive and easy to implement.

      These objectives, and others which will become apparent hereinbelow, are achieved with the aid of an assembly for the collection and disposal of waste, in  
30        particular household waste, in an urban or periurban area, the assembly comprising:

- at least one tank for storing the waste, the tank having at least one opening for receiving this waste;
- a container which is able to simultaneously receive a plurality of tanks to be emptied, the container comprising  
5 upright walls and a bottom;
- at least one first vehicle, on which the tank is mounted in a removable manner, in order to convey it to the container;
- transfer means for transferring the tank from the  
10 vehicle into the container and vice versa;
- locking means for reversibly locking the tank to the container; and
- first tipping means for tipping the tank, then locked to the container.

15        Thus, the invention proposes a novel and inventive approach for limiting the interference between the collecting assembly and urban traffic. Specifically, the fact of employing tanks, in which waste is collected, and then of transferring these tanks into containers which are  
20 located outside the city makes it possible to reduce the size of the means which pass into the interior of the city and thus to limit or even do away with the inconvenience caused.

25        Furthermore, this makes it possible to optimize the circulation of the flow of waste, since once the first vehicles have loaded their tanks onto the container, the container can be conveyed to the emptying area while the first vehicles return to the city with empty tanks, thereby optimizing the speed of collection and disposal of  
30 the waste.

      In one embodiment of the invention, the container comprises at least one passage, made in at least one of

its walls, for passing the tank into the container via the transfer means.

As a result, it is easier to transfer the tank from the first vehicle to the container on account of the  
5 passage which is made in one of its walls.

In one particular embodiment of the invention, the transfer means comprise:

- a support for the tank, said support being mounted so as to be able to move on the first vehicle, so as to  
10 transport the tank on the first vehicle; and
- second means for tipping the tank in order to tip the tank with respect to the support, between the first vehicle and the container, such that, when conveyed in a full state, the tank is stood up in the container before  
15 being emptied via the first tipping means over one of the upright walls in an unloading area.

Thus, this makes it possible to transfer the tank from the first vehicle to the container by way of movements that are relatively simple to implement mechanically, and  
20 to limit the number of these movements.

According to one variant of the invention, the support and the second means for tipping the tank are mounted respectively on the first vehicle and partially on the first tipping means and the container. According to  
25 another variant of the invention, the support and the second means for tipping the tank are mounted respectively on the first vehicle and partially on the first vehicle and the tank.

As a result, the means for transferring the assembly  
30 are distributed between the various "active parts" of this assembly, thereby making it possible to optimize the size, in particular of the first vehicle, while making it easier

for these "active parts" to cooperate.

According to one embodiment of the invention, the first and second means for tipping the tank operate in a first and a second direction and take action towards two  
5 different walls.

In this way, the means employed and the activity are distributed in the region of the walls in order to optimize the efforts required at each of the walls.

In one particular embodiment of the invention, the  
10 assembly comprises means for moving the tank, so as to move the upright tank, in the container, between the support for the tank and a part, carried by the container, of the first tipping means.

As a result, the energy consumption of the assembly is  
15 limited by the employment of the moving means, thereby making it possible to avoid the exertion of forces on the tank in order to position it directly on the tipping means of the container.

According to a variant, the means for moving the tank  
20 may be mounted on the first vehicle and the tank.

Thus, and in the same way as before, the activity is distributed at each of the "entities" of the assembly, while making it easier for these entities to cooperate.

In another embodiment of the invention, the support  
25 for the tank is mounted so as to be able to move on the first vehicle between a first, rear moved-back position, for tipping the tank, and a second, advanced position for loading waste into the tank via a loading hopper with which the first vehicle is equipped.

30 In this way, the means employed in the invention are optimized, on account of the use of a single support for a number of phases of collection and disposal of waste,

while the transfer of the tank onto the container is simplified by this transfer being realized by means of simple mechanical movements.

5 In one particular embodiment, the assembly comprises a second vehicle, heavier and more voluminous than the first vehicle, on which the container, which then contains a number of full tanks, is mounted in a removable manner, in order to move said container to the unloading area.

10 Thus, this makes it possible to move the container from the area where it is stored to the unloading area in a simple manner without interfering with "sensitive" areas such as a city centre.

The invention also relates to a method for the collection and disposal of waste, in particular household waste, in an urban or periurban area, the method comprising steps in which:

- a first vehicle, carrying a tank full of said waste, is moved up to and immobilized in the vicinity of a container suitable for receiving a plurality of tanks;
- 20 - the tank is transferred from the first vehicle into the container by moving the tank back into an overhanging position with respect to a support which supports the tank in the first vehicle while it is being moved up, and by then letting the tank tip by gravity in a first direction
- 25 so as to stand it up in the container;
- the tank is reversibly locked to the container; and
- the locked tank is tipped in a second direction in order to empty it out of the container in an unloading area.

30 According to a variant of the method, the transfer of the tank from the first vehicle into the container comprises a step of moving the upright tank in the container by way of pushing means carried by the first

vehicle until the tank is positioned so as to be locked reversibly to an upright wall of the container, in order to tip the tank over this wall while it is being emptied.

In one particular embodiment of the method:

- 5 - the tank is moved back from the first vehicle into the container by way of a mechanical action which moves back side arms that are connected to the support and carry pivots on which the tank is mounted,
- and/or the final standing up of the tank is assisted by
- 10 the tank being connected to a pulling means which is moved by the first vehicle and which pulls the tank towards its base in the direction of its pivoting.

In another embodiment of the method, the transfer of the tank is finished and then it is moved in an upright

15 manner in the container:

- by putting the tank into the container on the moving means; and
- by moving the tank therein by way of a mechanical action output by the first vehicle and/or by the first vehicle
- 20 reversing.

Further features and advantages of the invention will become more clearly apparent from reading the following description of an embodiment, given simply by way of illustrative and non-limiting example, and from the

25 appended drawings, in which:

- Figure 1 is a perspective view of a first vehicle carrying a tank, according to a first embodiment of the invention;
- Figure 2 is a perspective view of the container
- 30 according to the first embodiment of the invention;
- Figures 3, 4, 5 and 6 are sectional side views illustrating four successive phases of the transfer

of a tank from a first vehicle to a container, according to the first embodiment of the invention;

- Figures 7 and 8 illustrate two successive phases of the transfer of two tanks from a first vehicle to a container, according to a second embodiment of the invention;

- Figure 9 is a perspective view of the phase of transferring a container onto a second vehicle, according to the first embodiment of the invention; and

- Figures 10, 11, 12 and 13 are perspective views illustrating different embodiments of the phase of emptying tanks in an unloading area.

An assembly for the collection and disposal of household waste according to a first embodiment will now be presented with respect to **Figures 1 and 2**.

As illustrated in these two figures, the assembly comprises a first vehicle 3, on which a tank 1 for collecting waste, a priori household waste, is mounted. The first vehicle 3, also known as a collection vehicle, is a relatively lightweight and fairly compact vehicle that makes it possible to limit the inconvenience brought about by the movement of this first vehicle 3 in the centre of a city. In this example, this collection vehicle 3 is equipped with a clean-energy and low-consumption motor, such as an electric motor, a hybrid motor or a compressed-air motor, so as to limit the environmental impact and the energy costs. Thus, it is recommended that the drive motor 30 of the vehicle 3 is a clean-energy motor and thus not an internal combustion engine. The first vehicle 3 will furthermore preferably comprise a hopper 31 for loading waste and also means 32 (Figure 3)

for compressing this waste, said means compressing the waste fed by the hopper 31 before conveying said waste to the tank 1. A side passage 310 connects the hopper and the inside of the tank, on the side having the opening 10.

5        This embodiment illustrates a first vehicle which is designed such that only a single tank can be mounted thereon, this being preferred.

10        This tank 1 for storing waste has, in this embodiment, a cylindrical profile. It is mounted in a removable manner with respect to the collection vehicle 3 by way of a support 41. It comprises an opening 10 for receiving waste which can be introduced through the hopper 31. This opening may also serve, in this embodiment, to empty the tank 1. It is conceivable for the tank to have a number of  
15        openings, in particular one for filling it, one for emptying it, it being possible for this second opening 110 to be placed on the side of the tank (see Figure 11) or opposite. Favourably, the tank 1 will be mounted horizontally on the support or cradle 41, that is to say  
20        in a direction in which its longest side is approximately parallel to the ground and to the longitudinal axis 3a of the vehicle 3 and of its support 41. Its opening 10 is oriented towards the front (AV) of the vehicle, its fixed bottom 100 towards the rear (AR), through which the tank  
25        is loaded and unloaded, in this case longitudinally.

30        The assembly also comprises a container 2. This container 2 comprises (in this case four) upright walls 21, 22, 23, 24 (the wall 21 called the front wall not being shown in Figures 1 and 2 for the sake of clarity) and a horizontal bottom 25, the walls and the bottom delimiting the volume of the container. In this example, the volume of the container is around 40 m<sup>3</sup>. It comprises a

number of (in this case three) compartments that can each receive a tank 1. The container 2 also comprises passages 26 provided on the front wall 21 in order to transfer the tanks from the first vehicle into the container 2 via transfer means 4. These passages 26 may be closed, in a preferred embodiment, by doors 260 (see Figure 9), or hatches, which are closed in a selective manner in order to open and close the access to the passage. These doors may for example be mounted in a pivoting manner with respect to the bottom 25 or with respect to one of the side walls.

Preferably, this container will be positioned outside a large conurbation so as not to impede traffic in this area. For example, such a container 2 can be positioned at the periphery of the city centre, the collection vehicles 3 conveying full tanks to or from this container 2, by making return journeys.

The assembly for the collection and disposal of waste also comprises first means 4 for transferring the tank 1 onto the container 2, locking means 5 for reversibly locking the tank 1 to the container 2, and first means 6 for tipping the tank 1, then locked to the container 2, in order to empty the tank 1 outside the container 2. The locking means 5 are provided on a wall of the container and on the/each tank.

It is recommended that the/each first vehicle 3 is provided with a power source, such as the motor 30 or an ancillary source 300, which exclusively supplies energy to the first means 4 for transferring the tank.

These transfer means 4 transfer the tank 1 transported by the first vehicle 3 onto the container 2. In this example, they comprise the support 41, which is mounted on

the first vehicle 1, and second means 42 for tipping the tank 1, said second means tipping the tank 1 with respect to the support 41 between the first vehicle 3 and the container 2. The support 41 for the tank 1 is mounted so  
5 as to be able to move on the first vehicle 3 between a rear moved-back position (AR), for tipping the tank 1, and an advanced second position for loading waste into the tank 1 via the hopper 31. The rear position (AR) is preferably a moved-back overhanging position with respect  
10 to the vehicle, for transferring the tank to the container. For their part, the second tipping means 42 are, in this embodiment, mounted partially on the tank 1, the container 2, the first vehicle 3, and the first tipping means 6. In this particular example, the second  
15 tipping means 42 are in the form of guide pins 421 (mounted on the first tipping means 6) that move in guide rails 422 (mounted on the container 2), and of a cable (mounted on the first vehicle 3, not shown in these two figures) connected to a fastener (mounted on the tank 1,  
20 not shown in these two figures).

Thus, these transfer means 4 move the tank 1 from a horizontal position, when it is on the support 41, to an upright position in the container, by way of the second tipping means 42.

25 For their part, the locking means 5 lock the tank to the container in a reversible manner. In this example, the locking means are in the form of vertical "hooks" 51 that are provided along an upright wall 23 of the container 2 and engage with a retaining bar 52 provided on the first  
30 tipping means 6.

Thus, it is preferred:

- that the first transfer means 1 are installed exclusively between the tank 1 and the first vehicle 3, and/or
- that the locking means 5 and the first tipping means 6 are exclusively installed between the/each tank 1 and the container.

The second tipping means 42 are mounted partially on the first tipping means and on the container 2, in order to tip the tank into the latter from the moved-back overhanging position on the support 41.

In this example, the first tipping means 6, also known as rockers, are individual. In other words, each tank 1 engages with different tipping means 6. Thus, in this example, the assembly comprises three "first tipping means 6", that is to say three rockers.

Four successive phases of transferring the tank 1 from the first vehicle 3 to the container 2, according to the first embodiment of the invention, will now be presented with reference to **Figures 3 to 6**.

Before the tank 1 full of waste is transferred from the first vehicle 3 to the container 2, the first vehicle 3 is moved up to and immobilized in the vicinity of the container 2. It is positioned opposite a passage 26, and thus a rocker 6. In this phase, the support 41 supports the tank 1 in the collection vehicle 3.

Once the collection vehicle 3 has been positioned in this way, the full tank 1 is transferred by moving it back, in a first phase, into an overhanging position with respect to the support 41. To this end, the tank 1 is moved in translation by a mechanical action which moves back side arms connected to the support 41, and thus this support, which is then in the rear moved-back position.

Figure 3 illustrates this first phase. During the, in this case substantially horizontal, movement in translation of the support 41, the first tipping means 6 engage with the tank, in this example by way of three bars 611 which are  
 5 accommodated in hollow lugs 11 provided on the tank 1. The side bars 611a, 611b slide horizontally in rails 422 fixed to the container.

In a second phase, and as illustrated in Figures 4 and 5, the tank 1 is tipped, still preferably in an  
 10 overhanging position with respect to the support 41, by gravity in a first direction  $\alpha$  which is, in this example and at this viewing angle, the anticlockwise direction, so as to stand it up. The tank is tipped and stood up likewise by the second tipping means 42 which guide the  
 15 descent/drop by gravity of the tank 1 and which then stand it up when it has arrived in contact with or in the vicinity of the bottom 25 of the container 2. In this example, the guide pins 421 move in the rails 422, which are divided into a horizontal portion followed by a  
 20 vertical portion, so as to guide the descent under gravity of the tank 1, then the cable 423 (manoeuvred by the power source 30 or 300) pulls the tank 1 at its base by way of the fastener 424 in order to stand it up. The tank 1 is then stood up vertically. This standing up by way of the  
 25 cable 423 may be carried out by the support 41 being returned into its advanced position, the cable being fixed to a pulling means connected in this example to the support 41. As a result, the cable pulls the base of the tank 1 in its pivoting direction and stands it up, thereby  
 30 positioning the tank 1 on moving means 8 (in this case wheels located under its fixed, solid bottom 100). It should be noted that this cable, also known as a rigid

rod, is mounted in a detachable manner with respect to the tank. In a variant of the invention, moving means mounted on the tank 1 and also on the first vehicle 3, in the form for example of an arm, are conceivable.

5        In a third step, and as illustrated in Figure 6, the upright tank 1 is moved in the container 1 by the moving means 8 associated with a mechanical action output by the collection vehicle 3 (in this case a reverse movement of the first vehicle and more particularly of the support 41  
10        mounted on the first vehicle 3), until the tank 1 is positioned so as to be locked in a reversible manner to the locking means 5 carried by the "back" wall 23. Locked in this way to the container 2, the tank 1 is in position to be tipped and emptied, in a second direction  $\beta$ , out of  
15        the container. The second direction is, in this case and preferably, also the anticlockwise direction, the first direction  $\alpha$  and the second direction  $\beta$  thus being identical. In a variant of the invention, the first vehicle may be positioned at a distance from the  
20        container, this distance being relatively small, so as to "participate" in the forces exerted on the container in order to move it back into the first tipping means and/or the locking means. For example, the first vehicle may be positioned at a distance of less than two metres from the  
25        container, so as also not to be too far away for the deposition of the tank in the container.

During a reverse process, that is to say when there is a desire to transfer a tank from the container to the collection vehicle, the operation is reversed compared  
30        with the transfer of a tank from the collection vehicle to the container. In other words, the steps are carried out in the reverse order when there is a desire to transfer a

tank from the container to the collection vehicle.

Thus:

- the means for transferring the tank have positioned the tank, preferably on its fixed bottom 100, in the container
- 5 2,
- and moving means 8, at least in part carried by the tank and/or the first vehicle (pushing means such as the cable or rod 423 or the support 41), have moved the tank, positioned in the container, between the first vehicle 3
- 10 and a part (611a, 611b), carried by the container, of the first tipping means 6.

A second embodiment of the assembly for the collection and disposal of waste will now be presented with reference to **Figures 7 and 8**.

- 15 In this embodiment, the assembly comprises a storage tank 1' which has a parallelepipedal profile and is mounted on a support 41' of a first collection vehicle 3'. The assembly also comprises a container 2' which has three upright walls 21', 22', 23', and a front passage or front
- 20 opening 26' provided to make it easier to transfer the tanks 1' from the first collection vehicle 3' to the container 2'. One upright face of the container 2' is thus open. The container is likewise open at its top here.

- 25 Located on the first vehicle 3' is a hopper 31 for loading waste, or means 32' for compressing this waste through the side passage 310'.

- 30 Similarly to the assembly of the first embodiment, the assembly in question here also comprises transfer means 4' in the form of the support 41' mounted so as to be able to move in translation and rotation on the first vehicle 3', and second tipping means 42'. In this example, the second tipping means 42' are mounted partially on the tank 1' (by

way of guide pins 421'), on the container 2' (guide rails 422' in which the guide pins 421' can move) and on the support 41' (retaining hook 423').

Furthermore, this assembly also comprises means 5' for reversibly locking the tank 1' in the container 2', these locking means being provided partially on the container 2' and on the tank 1'.

Finally, the assembly comprises first means (not shown in these figures) for tipping the tank 1', these means being positioned partially on the container 2' and partially at a distance from this container.

As illustrated in these Figures 7 and 8, the container is provided to receive a number of full tanks 1', preferably by these tanks being stacked. In order to transfer the bottom tank, the front part of the support 41', that is to say the part closest to the front of the first vehicle 3', is tipped in a first direction  $\alpha'$  which is directed towards the rear so as to slide the full tank by gravity. This descent of the tank is controlled by the second tipping means 42', which may also serve as a brake to slow down the drop and thus to prevent the tank or the support from being damaged. In parallel with this tipping of the support towards the rear, the second tipping means 42', and more particularly the means provided on the tank and on the container 2', guide the tank into its position in the container. When the tank is partially, or completely, in contact with the container, the locking means 51' are brought into engagement with the tank and the container by way of a mechanical action output by the first vehicle 3'. This may be a reverse movement of this first vehicle so as to push the tank 1' towards the upright wall 22' of the container opposite the opening

26'.

For its part, the upper tank (Figure 8) is transferred from the first vehicle 3' to the container 2' by a vertical upward movement in translation of the support 41', or by a lift plate 410', such that the tank is positioned opposite its position in the container 2'. Next, the top tank is pushed by a part of the second tipping means 42', in this case the hook 423', in order to position it at the end of the container and to lock it reversibly to the container 2' by way of the locking means 5'. It should be noted that this phase of pushing the tank into the container may be guided by guide pins 421' of the tank, which slide in second guide rails of the container.

Thus:

- 15 - the second tipping means 42':
  - \* mounted partially (reference 420') on the first vehicle (3') tip the tank,
  - \* and/or, in part (references 421', 422') between the tank 1' and the container 2', then guide the tank along the container,
- the lift plate 41', mounted so as to be able to tip on the first vehicle, tips the tank via these second tipping means (420'), and
- the container and the tank are designed such that the container receives a number of full tanks which are stacked in the container via the lift plate.

The means 420' may be jacks.

It is furthermore recommended that the first tipping means 6' are disposed between the container 2' and the second vehicle 9' and are moved by an autonomous energy source 300' of the second vehicle.

An embodiment of the phase of transferring a container

onto a second vehicle, according to a first embodiment of the invention, will now be presented with reference to **Figure 9**.

As illustrated in this Figure 9, the assembly  
5 comprises a second vehicle 9, which is heavier and more voluminous than the first vehicle 3. This second vehicle moves the container, then containing one or more full tanks, to an unloading area 50 (Figure 10). Since this second vehicle does not travel or only travels a little in  
10 urban areas having a high concentration of vehicles and pedestrians, its relatively large size compared with that of the first vehicle is not problematic. In order to mount the container 2 on the second vehicle 9, the latter comprises third tipping means 91 in the form, in this  
15 example, of a crane, which is provided on the rear part of the second vehicle and which pulls the container by way of a hook 911 of the crane connected to a lug 912 on the container. Once this transfer has been carried out, the container can for example be reversibly secured to the  
20 second vehicle by second locking means 500 (Figure 10), this making it possible to move it to the unloading area without there being a risk of it overturning.

Various embodiments of the phase for emptying full tanks from a container, preferably through the openings  
25 10, in an unloading area will next be presented with reference to **Figures 10 to 13**.

Once the container has been brought into the unloading area 50, the full tanks are emptied.

For this purpose, the following procedure has thus  
30 been carried out:

a) waste has been collected in a tank mounted in a removable manner on a first type of vehicle 3 or 3';

- b) this first type of vehicle has moved the full tank to a "multi-tank" container 2, 2';
- c) it has then been possible to transfer the tank from the first type of vehicle into the container;
- 5 d) it has been possible to repeat steps a) to c) at least once;
- e) with the container full, it has been loaded onto a second type of vehicle 9, 9', which is heavier and more voluminous than the first;
- 10 f) this second type of vehicle 9, 9' carrying the container has been moved up to and immobilized in the vicinity of an unloading area 50; and
- g) the tanks have been tipped out of the container in order to empty them in the unloading area.

15 The transfer of the/each tank from the first type of vehicle 3, 3' to the container will thus favourably include a step of lifting and/or tipping at least one of the tanks.

20 In this regard, the first means 6, 6' for tipping the/each tank 1, 1', then locked to the container 2, 2', will make it possible to empty it, outside this container, in the area 50, which is thus located at the outskirts of an urban area, by:

- 25 \* tipping the tank with respect to the container (Figures 10-12),
- \* and/or tipping the container (Figure 13), it being possible for the/each tank in question to be fixed to the container.

30 In addition, in the embodiment in Figures 10-12, these first means 6 for tipping the tank will favourably be mounted so as to be rotatable towards the top of one of said side walls (in this case the one 23 opposite the

openings) carrying the first locking means, in order to tip the tank over this wall while it is being emptied, the first locking means then preventing the tank from falling out of the container.

5       As already noted, this emptying will be carried out either through the receiving opening 10, or through some other opening in the tank that is intended for this purpose.

10       In Figures 10 to 13, the tanks are emptied by these tanks 1 being tipped in the second direction  $\beta$  in order to empty them out of the container. In the embodiments in Figures 10 to 12, it may be noted that, from the point of view of the tanks, the second direction  $\beta$  is the same as the first direction  $\alpha$ , whereas in Figure 13, it may be  
15       noted that, from the point of view of the tanks, the second tipping direction is in the opposite direction to the first direction. However, in the figures shown, the first and second directions are identical.

20       As illustrated in Figures 10 to 12, the first means 6 for tipping the tanks 1 tip over the upright wall 23 of the container 2 which partially carries the locking means 5. This tipping takes place about a substantially longitudinal axis with respect to this wall, that is to say about an axis extending in the same direction as the  
25       wall 23. In a variant of the invention, it is also possible to employ means for retaining the tank, these being for example fixed to the base of this tank, so as to further prevent it from tipping over the wall 23.

30       In the embodiment in Figure 10, these tipping means are rotated by way of pulling means 61, which are provided on the body of the second vehicle 9 and are connected to the tipping means by way of connecting means such as

straps 612. It should be noted that each rocker 6 has its own respective pulling means, these pulling means in addition being able to function independently or not to function independently of one another, thereby making it possible for all of the tanks to be emptied at the same time or for them to be emptied one by one. Emptying them one by one may have the advantage of avoiding tipping of an excessively large mass in one go and thus possible tipping of the vehicle, but has the drawback of being slower. According to the variants of the invention, the pulling means 61 may be moved by an energy source of the second vehicle 9.

In the embodiment in Figure 11, the pulling means of the embodiment in Figure 10 have been replaced by lifting means 62 such as a crane which can lift full tanks, these tanks still being connected to the tipping means 6 and locked to the container 2 by the locking means 5. In this example, the crane lifts the full tanks one by one at their base by way of connecting means 601 which connect the arm of the crane to the tanks.

In the embodiment in Figure 12, the tipping means furthermore comprise means 63 for selecting a tank 1 to be emptied from the plurality of tanks disposed in the container 2. In this example, these selection means 63 are in the form of hydraulic jacks 631 which move selection carriages 632 vertically in translation, these carriages 632 then moving in a selective manner in the vicinity of the first tipping means of a tank, the tank tipping when the jack descends again, carrying with it the carriage and thus the tank. It should be noted that the movement of the carriages may be controlled manually, in particular by a user who selects one of the carriages which is intended to

move by means of a control panel, or automatically. According to variants, the selection carriages may operate simultaneously or successively, making it possible to empty a number of tanks simultaneously or to empty them  
5 successively.

Figure 13 shows the emptying phase of the tank in an unloading area according to the second embodiment of the assembly. As illustrated in this figure, it is not the tanks 1' which are tipped directly by the tipping means  
10 6', but the container 2' which is tipped, indirectly causing the tanks to tip. Embodiments in which the container is partially tipped and the tanks are also partially tipped, so as to share the tipping movement between these two elements, may also be conceivable. In  
15 this example, the two stacked tanks 1' are emptied simultaneously outside the container 2' by way of an opening provided on one side of these tanks. It should be noted that, in contrast to the first embodiment, in which the tanks are transferred and emptied at two opposite  
20 walls of the container, the tanks of the second embodiment are transferred and emptied at the same wall of the container. Of course, it may also be possible to provide embodiments in which the tanks are transferred and emptied towards two different walls which are not opposite one  
25 another.

It may also be possible to provide an embodiment in which the third tipping means and the first tipping means are coincident. It may also be possible to provide embodiments in which the container is originally  
30 positioned on the second vehicle, so as to remove the step of transferring the container onto this second vehicle.

**CLAIMS**

1. Assembly for the collection and disposal of waste, in particular household waste, in an urban or periurban area,  
5 the assembly comprising:
- at least one tank (1) for storing the waste, the tank (1) having at least one opening (10) for receiving this waste;
- the assembly also comprising:
- 10 - a container (2) which is able to simultaneously receive a plurality of tanks (1) to be emptied, the container (2) comprising side walls (21, 22, 23, 24) and a bottom wall (25);
- at least one first vehicle (3), on which the tank (1) is  
15 mounted in a removable manner, in order to convey it to the container (2);
  - transfer means (4) for transferring the tank from the vehicle (3) into the container (2) and vice versa;
  - locking means (5) for reversibly locking the tank (1) to  
20 the container (2); and
  - first tipping means (6) for tipping the tank (1), then locked to the container (2), in order to empty the tank (1) outside the container (2), either through the receiving opening (10) or through another opening (110) in  
25 the tank (1), the emptying taking place by tipping,  
**characterized in that** the transfer means (4) comprise:
- a support (41) for the tank (1), said support (41) being mounted so as to be able to move on the first vehicle (3), so as to transport the tank (1) on the first vehicle (3);  
30 and
  - second means (42) for tipping the tank (1) in order to tip the tank (1) with respect to the support (41), between

the first vehicle (3) and the container (2), such that, when conveyed in a full state, the tank (1) is stood up in the container (2) before being emptied via the first tipping means (6) over one of the upright walls (21, 22, 23, 24) in an unloading area.

2. Assembly according to Claim 1, wherein the container (2) comprises at least one passage (26), made in at least one of its walls (21, 22, 23, 24), for passing the tank (1) into the container (2) via the transfer means (4).

3. Assembly according to Claim 1, wherein the support (41) and the second means (42) for tipping the tank (1) are mounted respectively on the first vehicle (3) and partially on the first tipping means (6) and the container (2).

4. Assembly according to Claim 1, wherein the support (41) and the second means (42) for tipping the tank (1) are mounted respectively on the first vehicle (3) and partially on the first vehicle (3) and the tank (1).

5. Assembly according to one of the preceding claims, wherein the first (6) and second (42) means for tipping the tank (1) take action towards two different walls (21, 22, 23, 24).

6. Assembly according to one of Claims 1 to 5, which comprises means (8) for moving the tank (1), so as to move the upright tank, in the container (2), between the support (41) for the tank (1) and a part, carried by the container (2), of the first tipping means (6).

7. Assembly according to Claim 6, wherein the means (8) for moving the tank (1) are mounted on the first vehicle (3) and the tank (1).

5

8. Assembly according to Claim 1 or Claim 1 and one of Claims 4 to 7, wherein the support (41) for the tank (1) is mounted so as to be able to move on the first vehicle (3) between a first, rear moved-back position, for tipping  
10 the tank, and a second, advanced position for loading waste into the tank (1) via a loading hopper (31) with which the first vehicle (3) is equipped.

9. Assembly according to one of Claims 1 to 8, which  
15 comprises a second vehicle (9), heavier and more voluminous than the first vehicle (3), on which the container (2), which then contains a number of full tanks (1), is mounted in a removable manner, in order to move said container (2) to the unloading area.

20

10. Method for the collection and disposal of waste, in particular household waste, in an urban or periurban area, the method comprising steps in which:

- a first vehicle (3), carrying a tank (1) full of said  
25 waste, is moved up to and immobilized in the vicinity of a container (2) suitable for receiving a plurality of tanks (1);

- the tank (1) is transferred from the first vehicle (3) into the container (2) by moving the tank (1) back into an  
30 overhanging position with respect to a support (41) which supports the tank (1) in the first vehicle (3) while it is being moved up, and by then letting the tank (1) tip by

gravity in a first direction so as to stand it up in the container (2);

- the tank (1) is reversibly locked to the container (2);  
and

- 5 - the locked tank (1) is tipped in a second direction in order to empty it out of the container (2) in an unloading area.

11. Method for the collection and disposal of waste  
10 according to Claim 10, wherein the transfer of the tank (1) from the first vehicle (3) into the container (2) comprises a step of moving the upright tank in the container (2) by way of moving means (8) carried by the first vehicle (3) and the tank (1) until the tank is  
15 positioned so as to be locked reversibly to an upright wall (21, 22, 23, 24) of the container (2), in order to tip the tank (1) over this wall while it is being emptied.

12. Method for the collection and disposal of waste  
20 according to Claim 10 or 11, wherein:

- the tank (1) is moved back from the first vehicle (3) into the container (2) by way of a mechanical action which moves back side arms that are connected to the support and carry pivots on which the tank (1) is mounted,  
25 - and/or the final standing up of the tank (1) is assisted by the tank (1) being connected to a pulling means which is moved by the first vehicle (3) and which pulls the tank (1) towards its base in the direction of its pivoting.

30 13. Method for the collection and disposal of waste according to Claim 11 or Claims 11 and 12, wherein the

transfer of the tank (1) is finished and then it is moved in an upright manner in the container (2):

- by putting the tank (1) into the container (2) on the moving means (8); and
- 5 - by moving the tank (1) therein by way of a mechanical action output by the first vehicle (3) and/or by the first vehicle (3) reversing.