

In towns and agglomerations refuse is collected with refuse-collecting vehicles and transported to a disposal site or incineration plant. If the disposal site or incineration plant lies far from the collection area the collecting vehicles have to cover large transportation distances. This is uneconomical because the refuse-collecting vehicles with their special equipment for receiving the refuse are expensive and have only a small transportation capacity considering their price.

A loading plant with refuse silos as in the preamble of claims 1 and 5 is known from FR-A-2 074 727. In this plant the refuse silos have a slightly conical wall and on one of their ends have a lid tiltable on a vertical axis for filling and emptying the silo. The silos are placed horizontally with the lid open against the exit opening of a refuse collection shaft. The refuse is then conveyed from the shaft into the silo with a press which can be moved horizontally at the lower end of the shaft. This plant is relatively complicated in its construction. The open collecting shafts give rise to smells which create a nuisance and for this reason this plant can scarcely be built in the centres of agglomerations. It cannot be used therefore in the economically optimum way.

Further loading plants with refuse silos are known from DE-A 2 905 865, FR-A 2 118 397, US-A 3 753 506 and US-A 3 417 883.

The basic object of the invention is to provide a loading plant and a refuse silo which enables the rational disposal of refuse from agglomerations. This object is achieved by the characterising features of claims 1 and 5.

The plant according to the invention can be built in the centre of a collection area. The refuse-collecting vehicles then have minimal transportation routes and can be used very economically. The silos can have several times the storage capacity of refuse-collecting vehicles. In addition the refuse can be well sealed in the erected silos. The transport of the refuse to the disposal site or incineration plant is therefore considerably cheaper. In addition transportation can be carried out with relatively few transportation vehicles because the silos standing at the standing places constitute a buffer to balance out the irregular delivery of refuse which is determined by the refuse-collecting vehicles.

In the following an embodiment of the invention is explained with drawings. These show:

"fig. 1 a perspective view of a loading plant according to the invention,

Fig. 2 a side view of a silo on a transportation vehicle,

Fig. 3 the upper edge of a silo with the lid lifted.

The plant shown in Fig. 1 has a horizontal storage area 1 with several standing places 2 for several vertically erected refuse silos 3 with a cylindrical wall 4 and each with a tiltable lid 5, 6 on both axial ends. A horizontal loading area 7 for refuse-collecting vehicles to drive on to is arranged above the storage area 1 at the height of the axial length of the silo 3. An inclined ramp 9 leads from the storage area 1 to the loading area 7. The space beneath the loading area 7 can be used for example for garages, storage of materials or workshops.

The loading area 7 is rectangular and has straight edges 14. Along the edges 14 vertical supports 15 are arranged at regular intervals which are greater than the width of one silo 3. Attached to these supports above the loading area 7 are horizontal tilt axes 16 which stand perpendicular to the edge 14 and on which two funnel plates 17 can be tilted. When a silo 3 is removed or loaded on to a transportation vehicle 20 the funnel plates 17 are angled vertically and therefore at a slight distance to the side from silo 3 as shown in the example of standing place 2c. If the silo 3 is to be filled the funnel plates 17 are inclined (see e.g. standing place 2a) so that their lower edge slightly covers the edge of the fill opening of the silo 3 and thus prevents refuse from falling down over the edge of the silo opening.

Standing vertically above the standing places 2 there is a hydraulically or pneumatically telescoping press 21 with a round, horizontal base-plate 22 which can be moved transversely on tracks 23. The refuse can be compacted in the silo 3 using this press 21.

The refuse silos 3 are manufactured from steel. The cylindrical wall 4 is supported by a support frame 27 which consists of two supporting sections 28 lying next to each other, arranged parallel to the cylindrical axis, these have a U-shaped cross-section and each have a quadrilateral base frame 29 arranged on the axial ends of the wall 4 and connected to the supporting sections 28. The lid 5 which is at the top when the silo is standing can be tilted on an axis 30 adjacent to the two supporting sections 28, while the tilt axis 31 of the lower lid 6 is arranged on the diametrically opposite side. When open the upper lid 5 together with the funnel plates 17 forms a filling funnel. The lower lid 6 is used to empty the silo 3 at disposal sites or incineration plants. Both lids 5, 6 are sealed with an elastomeric sealing ring 32 against the wall 4.

A coupling device 38 for a pulling cable 41 on the transportation

vehicle 20 is arranged on each of the supporting sections 28. This takes the form of a coupling element 40 which can be moved along a longitudinal track 39 fixed to the section 28. The movement path of the coupling element 40 is restricted near the upper end of the section 28 by a stop 42 and by a further stop at the bottom at about shoulder height.

To load the silo 3 the transportation vehicle 20 drives backwards until it is close to the silo 3 and by means of two telescopic cylinders 47 tilts its loading bridge 46 into an almost vertical position. The cables 41 are wound down sufficiently far for their end loops to be coupled to the coupling elements 40 on their lower stops. The cables 41 are then partly wound up and the coupling elements 40 slide upwards along their tracks 39. The vehicle 20 is brought back somewhat until it almost touches the silo 3. The cables 41 are drawn in further until the coupling elements 40 lie on their upper stops 42. When the loading bridge 46 is lowered the silo 3 is tipped by the cable 41 and then loaded onto the loading bridge 46 so that it rests on its supporting sections 28. Unloading is carried out in the reverse manner.

In Fig. 2 the silo 3 is shown on the transportation vehicle 20 in the position during emptying where the lower lid 6 is de-coupled and tilted on its axis 31. The silo 3 is sealed during loading and transportation by the sealing ring 32. To simplify the opening of the upper lid 5 a lever 50 cranked downwards is attached near its tilt axis 30. A pre-tensioned spring 51, the other end of which is supported on the frame 29, engages with its free end.

Claims

1. A loading plant with refuse-silos (3), which have tiltable lids on one of their ends for charging the refuse-silos, whereby the plant has a storage area (1) with several standing places (2) for the refuse-silos (3) and a loading area (7) arranged parallel above the storage area (1) for refuse-collecting vehicles (8) to drive on to, characterised in that the refuse-silos (3) are formed to be stored vertically on the standing places (2) and on the other end have a second tiltable cover (6) for emptying the refuse-silos (3) and that the vertical distance between the storage area (1) and loading area (7) approximately corresponds to the axial length of the refuse-silos (3).
2. A plant according to claim 1, characterised in that, a press (21) is arranged vertically above the standing places (2) for the compression of the refuse.
3. A plant according to claim 2, characterised in that the press (21) can be moved across over the standing places (2).
4. A plant according to any one of claims 1 to 3, characterised in that vertically above each standing place (2) two tiltable funnel plates (17) are arranged which project over the loading area (7), whereby the reciprocal distance between the tilt axes (16) of the funnel plates (17) is greater than the width of the refuse-silos (3).
5. A refuse-silo for use in a loading plant according to any one of claims 1 to 4 with a wall (4) and a tiltable lid (5) on its axial end as well as a supporting frame (27) containing two supporting sections (28), characterised in that the wall (4) is cylindrical and has a second tiltable cover (9) on its other axial end, that the supporting sections (28) are arranged parallel to the cylinder axis and that the refuse-silo (3) has a coupling device (38) for coupling with a pulling cable (41) on a transport vehicle (20).
6. A refuse-silo according to claim 5, characterised in that a sealing ring (32) is arranged between both ends of the wall (4) and each of the covers (5, 6).
7. A refuse-silo according to claim 5 or 6, characterised in that the supporting frame (27) on both ends of the wall (4) has a quadrilateral base frame (29) connected with the supporting sections (28) and arranged vertical to the cylinder axis.
8. A refuse-silo according to any one of claims 5 to 7, characterised in that the wall (4) is a circular cylinder.



9. A refuse-silo according to any one of claims 5 to 8, characterised in that the coupling device (38) comprises coupling elements which can be shifted along the supporting sections (28) between the stops (42).

10. A refuse-silo according to any one of claims 5 to 9, characterised in that the upper lid (5), when the refuse silo (3) is erect, is tiltable around an axis (30) adjacent to both supporting sections (28) and the lower cover (6) is tiltable about a diametrically opposed axis (31).

