(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 544 133 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
07.03.2007 Bulletin 2007/10

(51) Int Cl.:
B65F 5/00 *(2006.01)*

(21) Application number: **03104796.2**

(22) Date of filing: **18.12.2003**

(54) **Method of collecting and managing waste**

Verfahren zur Sammlung und Verwaltung von Müll

Procédé de récupération et de gestion de déchets

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

(43) Date of publication of application:
22.06.2005 Bulletin 2005/25

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Printed by Jouve, 75001 PARIS (FR)

Description

TECHNICAL FIELD

[0001] The present invention relates to a method of to collecting and managing waste, specifically smaller amounts of waste normally referred to as litter that is introduced in waste or litter bin assemblies.

BACKGROUND OF THE INVENTION

[0002] Littering, that is the discarding of smaller amounts of loose waste/litter, in streets and public open places is not only an environmental problem but is in many countries even a criminal offence. In urban areas, litter should be dropped in litter bins that are frequently placed in public places. However, emptying of the traditional separate litter bins is a rather time consuming and expensive task.

[0003] Attempts have therefore been made to rationalize the collection and handling of waste or litter from such public litter bins. One such attempt has been to provide litter bins connected to a conventional, existing or newly installed refuse vacuum transport system of the kind used for collecting mainly domestic or household waste. In this case the bins have been provided immediately above a transport pipe of the system, have been in continuous open communication with the transport pipe that in turn is a branch of the transport system and may be separated therefrom by a branch valve. Waste or litter introduced into the bins falls by gravity directly down into the branch pipe and is intermittently sucked out from the branch pipe by opening the branch valve to apply the system vacuum to said branch pipe. This briefly described prior solution is fairly effective in collecting the waste, but suffers from serious drawbacks that make it less attractive. The open communication between the bin and the branch pipe vacuum results in an environmentally unacceptable high noise level in the vicinity of the bin, and furthermore increases the danger of injuries in case waste is being introduced into the bin during an emptying phase.

[0004] To adress the problems of noise and injury risk the document US-A-3,977,729 discloses a refuse receiving system that uses a method of collecting and managing waste according to the preamble of claim 1 that may serve to receive household waste and that may also be used as a waste-paper or litter bin system. The system uses sluice-like waste insertion elements that either alone or in combination with a bottom discharge valve form a space in which inserted waste may be received and from which the collected waste may be emptied into a system transport pipe at selected times and during optional operational phases of the system In other words the collecting space is connected to a system transport pipe but may be disconnected from the transport pipe to secure that system vacuum will not be communicated to waste inlets thereof during waste insertion phases, to thereby reduce noise and minimize injury risk.

SUMMARY OF THE INVENTION

[0005] The invention provides a solution overcoming the above discussed problems experienced with the prior known techniques.

[0006] It is a basic object of the invention to provide an improved method of collecting and managing waste in an efficient manner and with little environmental disturbance.

[0007] Briefly, the invention provides a method enabling the collecting and managing of smaller amounts of unpackaged waste in waste bin assemblies connected to a refuse vacuum transport system, wherein waste introduced into a waste bin assembly when the refuse vacuum system is active, is held back therein during such an active phase, is emptied therefrom when the system is in a deactivated state to be temporarily stored in a transport pipe of the system and is removed by the refuse vacuum system in connection with the next activation thereof. According to the invention the waste that has been temporarily stored in the transport pipe is removed therefrom in a separate pre-activation phase immediately preceding the next active phase of the entire system. By controlling emptying of the waste bin assemblies in this manner the added handling of the smaller amounts of waste from the waste bin assemblies will not interfere with the operation of the main refuse collection and will not significantly add to the noise level or the total active time of the system.

[0008] In an embodiment of the invention an interior of said litter bin assemblies is connected to the refuse vacuum transport system through a controlled discharge valve, whereby all assembly discharge valves are maintained in closed position during activation of the vacuum transport system, so that inserted waste is collected in the respective assembly. The discharge valves are then opened during a deactivated phase of the vacuum transport system, to empty the waste bin assemblies and temporarily store the waste in a transport pipe of the system. The stored waste is finally removed from the transport pipe in association with the next active phase of the system. By providing a discharge valve in each waste bin assembly and specifically by operating it in this way, a very practical solution is achieved for holding back the introduced waste and for emptying it into the system transport pipe.

[0009] Further embodiments of the invention are specified in the dependent patent claims.

[0010] The above stated and other objects of the invention are met by the invention as defined in the appended claims.

[0011] Advantages offered by the present invention, in addition to those described above, will be readily appreciated upon reading the below detailed description of embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention along with further objects, features and advantages thereof are described further in detail below in connection with the attached drawings, of which:

Fig. 1 is a schematic illustration of an exemplifying refuse vacuum transport system where the waste collecting and managing method according to the invention may be employed;

Fig. 2 illustrates an embodiment of a waste bin assembly of the general kind employed in association with the invention, during a collection phase of the inventive method;

Fig. 3 illustrates of a group of exemplifying waste bin assemblies according to fig. 2 during an emptying phase of the waste collecting and managing method of the invention;

Fig. 4A is an exemplifying illustration of the operational phases of a basic refuse system controlled in accordance with an embodiment of the method of the invention; and

Fig. 4B is an illustration corresponding to that of fig. 4A of the operational phases of an expanded refuse system controlled in accordance with an embodiment of the method of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0013] An exemplary illustrative embodiment of the method of the invention will be described below with reference to the illustrations of figs. 1-3 and 4A-B. The method of the invention primarily concerns the collecting and managing of smaller amounts of loose waste that is normally referred to as litter. Throughout this description the terms waste and litter refer specifically to such unpackaged waste in the form of paper, wrappings, fruit, fast food leftovers etc. that has traditionally been collected in so called litter bins provided in public places.

[0014] In Fig. 1 is illustrated a very schematic example of a refuse vacuum transport system 1 of the general type that is widely used for collecting larger amounts of primarily domestic/household waste or refuse that is ordinarily packaged in plastic refuse bags. Such a system 1 comprises a collection central 2 having vacuum generating equipment, such as one or several strong exhausters, filter equipment, silencers and a storage capacity for the collected refuse. The mentioned collection central equipment may be of any standard type used for such systems and will therefore not be specifically described or illustrated herein. In the basic conventional system 1 refuse is sucked in to the collection central 2 by strong vacuum that is applied to a transport pipe 3 and in the illustrated basic embodiment, drawn with full lines, to the branch or section pipes 13, 23 when the system is in an active phase. Said active phase is entered during daytime and early evening only, since this is the time that refuse is introduced into the system, and not least since nighttime operation would in many places cause unacceptable environmental disturbance, in the form of noise caused e.g. by operating exhausters or the application of a strong vacuum.

[0015] Specifically, in the presently used systems, refuse is introduced at insertion points, generally designated by the reference numeral 5, that may be in the form of refuse chutes extending through a multi-storage building and having an insertion opening associated with each story, or that may be so called "separate" insertion chutes normally being positioned outdoors and having one insertion opening. For further details of such insertion points, reference can be made to our earlier International Patent Application WO02102686. At the bottom of each chute there is provided a refuse discharge valve CDV-A and CDV-B, not specifically illustrated, that supports the inserted refuse until the respective chutes are emptied in a controlled or preset sequence during the active phase of the system 1. Thus, as the discharge valves are opened the refuse stored in the respective chute is sucked out therefrom and into the transport pipe by the powerful vacuum applied thereto, and then further on to the collection central.

[0016] Fig. 1 indicates that the refuse transport system 1 may contain further branch pipes, such as the additional branches/sections 33, 43 drawn with dash-dot lines therein. Said additional branch pipes 33, 43 communicate either directly with the main transport pipe 3 or with another branch pipe, and thereby with the collection central 2, or indirectly therewith through a sectioning valve 40.

[0017] In order to adapt such a standard refuse vacuum transport system 1 so that it may be operated in accordance with the invention, to effectively and safely handle also smaller amounts of waste or litter, waste/litter bin assemblies 4 are provided therein. Waste bin assemblies 4 are provided at appropriate positions directly above a transport pipe or branch of the vacuum transport system 1 to allow for a gravity feed of waste W (see figs. 2 and 3) from each waste/litter bin assembly 4 into the respective transport pipe or branch. In the embodiments schematically illustrated in fig. 1 waste bin assemblies 4 are provided in association with the branches 23, 33 and 43.

[0018] An exemplary embodiment of an appropriate waste bin assembly 4 associated with the branch 23, is illustrated in figs. 2 and 3. The assembly 4 has an upper insertion structure 9 that is normally positioned above ground G and that consists of an outer housing 11 having at least one insertion opening 10 and partially enclosing an internal collection chamber 12 (fig. 2). A lower portion of the waste bin assembly 4 is here received in a service chamber 6 positioned below ground G. In fig. 2 and in

the left assembly 4 of fig. 3, a front wall of the service chamber 6 has been removed so as to illustrate, at least partially, some of the vital elements received therein. This lower portion mainly consists of a discharge valve WDV and connecting members, not specifically designated, for connecting the upper structure 9, and specifically its collection chamber 12, to the inlet of the valve WDV and for connecting the valve outlet to a transport pipe branch 23 of the system 1 through a branching 7 attached thereto. In other words, the internal collection chamber 12 of each waste bin assembly 4 is connected to a transport pipe/branch.

[0019] The purpose of the waste discharge valve WDV is to close off the bottom of the internal collection chamber 12 when the valve WDV is in its closed position. In most cases it is also preferred that the valve completely seals off the internal collection chamber 12 from the transport pipe/branch pipe of the system, so that practically no vacuum may be applied to said collection chamber when the valve is closed. In the embodiment illustrated in figs. 2 and 3 the discharge valve WDV is a simple and inexpensive flap type valve where the flap 15 is controlled by a fluid cylinder to which fluid is supplied through supply lines 8A that outside the service chamber run in protective tubes 8 extending along the branch pipe 23. Said protective tubes 8 may furthermore or alternatively, depending upon the actual method used for controlling the valves, receive electric lines or fluid control lines. In the closed position (fig. 2), the flap 15 engages a lower end of the internal collection chamber 12 and in its open position (fig. 3) the flap 15 opens communication between the collection chamber 12 and the branch pipe 23. It should be emphasized though, that it would be obvious to the man skilled in the art to choose another suitable valve type for the discharge valve that does not need to carry any significant load in the closed position. Therefore, the invention is not restricted to the use of valves of the type illustrated herein.

[0020] The method of the invention will now be described with specific reference to figs. 4A and 4B and also to figs. 2 and 3. The method is integrated in the normal operation of an intermittently activated refuse vacuum transport system 1. Examples of the normal operation of such refuse vacuum transport systems 1 are schematically illustrated in figs. 4A and 4B and will now be briefly explained. In fig. 4A is illustrated the 24 hour operation of a relatively large system for which it-is justified to maintain the-system in an active phase, with its exhausters operating and applying vacuum to the transport pipes/branches, during the full day. The system is deactivated during late evening, night and early morning when practically no refuse is inserted into the chutes. It is also indicated that during the active phase of the system, the chutes are emptied in a specific sequence that may vary from system to system and that is only exemplified by the shown regular sequence. The different chutes 5, or branches 13, 23, 43, are emptied by opening the corresponding chute discharge valves CDV-A, CDV-B and CDV-C, respectively, and, where applicable, the corresponding sectioning valve 40.

[0021] In accordance with the method of the invention, the assembly discharge valves WDV of all waste bin assemblies are closed during the entire active phase of the system 1 as well as during a later described pre-active phase of the system. As indicated by the black (valve must open) and grey (valve optionally open) line in fig. 4A, the assembly discharge valves WDV may on the other hand be open during the entire non-active phase of the system 1 or during only a restricted time, shortly before the pre-active phase of the system 1. Loose waste/litter W (figs. 2 and 3) that is introduced into the waste bin assemblies 4 when the assembly discharge valves WDV are closed, is collected in the internal collection chambers 12 thereof, supported on the flap 15 of the assembly discharge valves WDV (fig. 4A-B). Thus, all inserted waste/litter is held back in the waste bin assemblies 4 at least during the full extent of said active phase.

[0022] Then, as the system 1 enters its non-active phase, waste W from the collection chambers 12 of the waste bin assemblies 4 is emptied into a corresponding transport pipe/branch pipe 23, 33, 43, of the system 1, thereby allowing waste emptied from the assemblies to be temporarily stored in said pipe 23, 33, 43. Closing of the discharge valve WDV of each waste bin assembly 4 again is then performed prior to commencing the next pre-active and active phases of the vacuum transport system. The temporarily stored waste W is removed from the pipes 23, 33, 43 in association with said next active phase of the refuse vacuum transport system 1. Waste/litter W temporarily stored in transport pipes/branch pipes 23, 33, 43 of the refuse vacuum transport system 1 is removed therefrom in a separate pre-active phase immediately preceding the active phase of the system 1 and by the full system vacuum. This will secure a safe and effective transport of the loose waste/litter to the collection central 2 and will still only insignificantly add to the active phase of the system. In a preferred embodiment of the invention the temporarily stored waste/litter W is removed simultaneously from all pipes 23, 33 and 43, in order to keep the pre-active phase very short. Specifically, this means that to perform efficient removal of all said waste/litter W the exhausters will only have to be started shortly before the actual active phase, with the resulting saving in time and energy. Notwithstanding this, the invention also covers embodiments for very large systems, where stored waste/litter W from different groups of waste bin assemblies 4 is removed in separate consecutive steps, such as for one or more of the different groups of bin assemblies or for one or more branches/sections of the system.

[0023] Since the internal collection chambers 12 of all said waste bin assemblies 4 are closed and sealed with regard to the corresponding transport pipe/branch pipe 23, 33, 43 during the full active phase/phases of the system 1, the collection and handling of the loose waste/litter will cause no environmental disturbance in the form

of noise and no risk of injuries at the insertion openings 10. Opening of the discharge valves WDV of the waste bin assemblies 4, for allowing waste W from the assemblies 4 to be emptied into and temporarily stored in the transport pipes/branch pipes 23, 33, 43 of the system, is performed only during a non-active phase of the vacuum transport system 1 when no strong vacuum is applied and no disturbing noise is therefore generated.

[0024] In fig. 4B is illustrated the 24 hour operation of a smaller system for which it is not necessary to maintain the system in an active phase, with its exhausters operating and applying vacuum to the transport pipes/branches, during a full day. Therefore, in such a smaller system, several active phases, in the example two, are entered during the day, separated by a further non-active phase. The application of the method of the invention to this system is similar to that of the larger system, the assembly discharge valves WDV may be opened during each non-active phase and the pre-active phase is entered immediately before each active phase.

[0025] However, in case there are more than two active phases, it may optionally only be necessary to open the assembly discharge valves WDV during some of the non-active phases and to add a pre-active phase before some of the active phases.

[0026] Furthermore, fig. 4B also indicates that a weak suction may applied to some or all of the transport pipes/branches 23, 33, 43 before a pre-active phase to provide a forced emptying supporting the gravity feed to secure discharge of all waste W from the internal collection chambers 12 of the litter bin assemblies 4 to the transport pipes/branches 23, 33, 43. This forced emptying is preferably performed by means of a separate exhauster creating a relatively weak vacuum in the transport pipes/branches 23, 33, 43 before the pre-active phase. To save time and energy, said forced emptying is likewise preferably performed in one step for all waste bin assemblies 4 in all branches/sections, but it may likewise, depending upon the size of the system, be performed in separate consecutive steps, such as for one or more of the different groups of bin assemblies or for one or more branches/sections of the system. The application of such a weak vacuum will not cause any significant noise and will not involve any danger of injuries at the insertion openings.

[0027] In practicing the method of the invention, waste bin assemblies 4 may be arranged in specific waste bin branches 33 or may be positioned in branches 23, 43 that also contain refuse chutes 5 (see fig. 1). In the branches 23, 33, 43, the waste bin assemblies 4 may also be grouped in groups of different numbers or may be positioned individually. The invention therefore covers all such combinations.

[0028] The invention has been described above with specific reference to the illustrated embodiments thereof. However, it shall be understood that the invention is not restricted to these exemplifying embodiments or applications. The basic principles of the invention may likewise be applied to other embodiments for use in refuse transport systems of other configurations. Furthermore, the invention is not restricted to the use thereof on newly installed systems, but is also applicable to existing systems. Therefore, modifications and variations of the invention that may be required in such applications fall within the scope of the invention as defined in the appended claims.

Claims

1. A method of collecting and managing waste (W) that is introduced into waste bin assemblies (4), wherein an internal collection chamber (12) of each waste bin assembly is connected to a transport pipe (23, 33, 43) of an intermittently activated refuse vacuum transport system (1), waste (W) introduced into the internal collection chamber (12) of the waste bin assemblies (4) during an active phase of the refuse vacuum transport system (1) is held back therein at least during the full extent of said active phase, waste (W) from the collection chamber (12) of the waste bin assemblies (4) is emptied into the transport pipe (23, 33, 43) of the system during a non-active phase of the vacuum transport system (1), thereby allowing waste emptied from the assemblies to be temporarily stored in said transport pipe (23, 33, 43); and the temporarily stored waste (W) is removed from the transport pipes (23, 33, 43) in association with the next active phase of the refuse vacuum transport system (1), **characterized in that** waste (W) temporarily stored in the transport pipe (23, 33, 43) of the refuse vacuum transport system (1) is removed therefrom in a separate first pre-active phase preceding the next active phase of the system (1).

2. A method according to claim 1, **characterized in that** waste (W) temporarily stored in all transport pipes (23, 33, 43) of the refuse vacuum transport system (1) is simultaneously removed therefrom in a a single step of the pre-active phase.

3. A method according to claim 1, **characterized in that** waste (W) temporarily stored in different transport pipes (23, 33, 43) of the refuse vacuum transport system (1) is removed therefrom in a number of consecutive steps of the pre-active phase.

4. A method according to any of claims 1-3, **characterized in that** the internal collection chamber (12) of said waste bin assemblies (4) is closed and sealed with regard to the transport pipe (23, 33, 43) during the full active phase of the system (1).

5. A method according to claim 4, wherein the internal collection chamber (12) of said litter bin assemblies (4) is connected to the transport pipe (23, 33, 43) of the refuse vacuum transport (1) system through a

discharge valve (WDV) operated between open and closed positions,
characterized by:

- placing and maintaining the discharge valve (WDV) of each litter bin assembly (4) in a closed position during the full extent of each active phase of the vacuum transport system (1);
- opening the discharge valve (WDV) of each of the waste bin assemblies (4) during a non-active phase of the vacuum transport system (1), for allowing waste (W) from the assemblies to be emptied into and temporarily stored in the transport pipe (23, 33, 43) of the system (1); and
- closing the discharge valve (WDV) of each waste bin assembly (4) again prior to commencing the next active phase of the refuse vacuum transport system (1).

6. A method according to claim 5, **characterized in that** closing of the discharge valve (WDV) of each waste bin assembly (4) is performed prior to commencing the pre-active phase of the system (1).

7. A method according to claims 5 or 6, **characterized by** placing and maintaining the discharge valve (WDV) of each litter bin assembly (4) in a sealing position with regard to the transport pipe (23, 33, 43) during each full active phase and pre-active phase of the refuse vacuum transport system (1).

8. A method according to any of claims 5-7 , **characterized by** forced emptying of some or all of the waste bin assemblies (4) of the system (1) during a non-active phase of the system, when the discharge valve (WDV) of the corresponding waste bin assemblies (4) are opened and before a pre-active phase of the system, to support secure discharge of all waste (W) from the litter bin assemblies (4) into the corresponding transport pipe or pipes (23, 33, 43).

9. A method according to claim 8, **characterized by** simultaneous forced emptying of all waste bin assemblies (4) in one step.

10. A method according to claim 8, **characterized by** forced emptying of the waste bin assemblies (4) of different groups of bin assemblies (4) or of one or more branches (23, 33, 43) of the system (1), in separate consecutive steps.

11. A method according to any of claims 8-10, **characterized by** performing the forced emptying by applying a weak suction to the transport pipe or each transport pipe (23, 33, 43) of the system (1) by means of a separate exhauster.

12. A method according to any of claims 1-11, **characterized by** arranging the waste bin assemblies (4) in groups of different numbers or by alternatively individually positioning waste bin assemblies (4) in the refuse vacuum transport system (1).

13. A method according to any of claims 1-12, **characterized by** arranging the waste bin assemblies (4) in separate branches (33) of the refuse vacuum transport system (1).

14. A method according to any of claims 1-13, **characterized by** arranging the waste bin assemblies (4) in branches (23, 43) of the system (1) that also contain refuse chutes (5).

Patentansprüche

1. Verfahren zur Sammlung und Entsorgung von Abfall (W), der in Abfallbehälteranordnungen (4) eingebracht wurde, wobei eine innere Sammelkammer (12) jeder Abfallbehälteranordnung verbunden ist mit einem Beförderungsrohr (23, 33, 43) eines intermittierend aktivierten Müllunterdrucktransportsystems (1), während einer Aktivphase des Müllunterdrucktransportsystems (1) in die innere Sammelkammer (12) eingebrachter Abfall (W) wird darin zumindest während des gesamten Umfangs der Aktivphase zurückgehalten, während einer Ruhephase des Müllunterdrucktransportsystems (1) wird Abfall (W) von der Sammelkammer (12) der Abfallbehälteranordnungen (4) in das Beförderungsrohr (23, 33, 43) des Systems geleert, wodurch aus den Anordnungen geleerter Abfall (W) vorübergehend in dem Beförderungsrohr (23, 33, 43) gelagert werden kann, und der vorübergehend gelagerte Abfall (W) aus den Beförderungsrohren (23, 33, 43) in Verbindung mit der nächsten Aktivphase des Müllunterdrucktransportsystems (1) entfernt wird,
dadurch gekennzeichnet,
dass vorübergehend in dem Beförderungsrohr (23, 33, 43) des Müllunterdrucktransportsystems (1) gelagerter Abfall (W) aus diesem entfernt wird in einer separaten ersten der nächsten Aktivphase des Systems (1) vorausgehenden Vor-Aktivphase.

2. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass der vorübergehend in allen Beförderungsrohren (23, 33, 43) des Müllunterdrucktransportsystems (1) gelagerte Abfall (W) aus diesen gleichzeitig in einem einzigen Ablaufschritt der Vor-Aktivphase entfernt wird.

3. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass vorübergehend in verschiedenen Beförderungsrohren (23, 33, 43) des Müllunterdrucktrans-

portsystems (1) gelagerter Abfall (W) aus diesen in etlichen aufeinander folgenden Ablaufschritten der Vor-Aktivphase entfernt wird.

4. Verfahren nach einem der Ansprüche 1 - 3, **dadurch gekennzeichnet, dass** die innere Sammelkammer (12) der Abfallbehälteranordnungen (4) mit Bezug auf das Beförderungsrohr (23, 33, 43) während der ganzen Aktivphase des Systems (1) geschlossen und abgedichtet ist.

5. Verfahren nach Anspruch 4, wobei die innere Sammelkammer (12) der Abfallbehälteranordnungen (4) mit dem Beförderungsrohr (23, 33, 43) des Müllunterdrucktransportsystems (1) verbunden ist durch ein Auslassventil (WDV), das zwischen offenen und geschlossenen Positionen betätigt wird, **gekennzeichnet durch**

- Einstellen des Auslassventils (WDV) jeder Abfallbehälteranordnung (4) in eine geschlossene Position und Beibehalten dieser während des ganzen Umfangs der Aktivphase des Unterdrucktransportsystems (1);
- Öffnen des Auslassventils (WDV) jeder der Abfallbehälteranordnungen (4) während einer Ruhephase des Unterdrucktransportsystems (1), um zu ermöglichen, dass Abfall (W) aus den Anordnungen in das Beförderungsrohr (23, 33, 43) des Systems (1) entleert und in diesem vorübergehend gelagert wird; und
- erneutes Schließen des Auslassventils (WDV) jeder Abfallbehälteranordnung (4) bevor die nächste Aktivphase des Abfallunterdrucktransportsystems (1) eingeleitet wird.

6. Verfahren nach Anspruch 5, **dadurch gekennzeichnet, dass** Schließen des Auslassventils (WDV) jeder Abfallbehälteranordnung (4) ausgeführt wird, bevor die Vor-Aktivphase des Systems (1) eingeleitet wird.

7. Verfahren nach einem der Ansprüche 5 oder 6, **gekennzeichnet durch** Einstellen des Auslassventils (WDV) jeder Abfallbehälteranordnung (4) in eine abgedichtete Position mit Bezug auf das Beförderungsrohr (23, 33, 43) und Beibehalten dieser während jeder ganzen Aktivphase und Vor-Aktivphase des Unterdrucktransportsystems (1).

8. Verfahren nach einem der Ansprüche 5 - 7, **gekennzeichnet durch** Zwangsentleerung einiger oder aller Abfallbehälteranordnungen (4) des Systems (1) während einer Ruhephase des Systems, wenn das Auslassventil (WDV) der entsprechenden Abfallbehälteranordnungen (4) geöffnet ist und vor einer Vor-Aktivphase des Systems, um sicheres Entleeren des ganzen Abfalls (W) aus den Abfallbehälteranordnungen (4) in das entsprechende Transportrohr bzw. die entsprechenden Transportrohre (23, 33, 43) zu unterstützen.

9. Verfahren nach Anspruch 8, **gekennzeichnet durch** gleichzeitige Zwangsentleerung aller Abfallbehälteranordnungen (4) in einem Ablaufschritt.

10. Verfahren nach Anspruch 8, **gekennzeichnet durch** Zwangsentleerung der Abfallbehälteranordnungen (4) verschiedener Gruppen von Behälteranordnungen (4) oder einer oder mehrerer Abzweigung(en) (23, 33, 43) des Systems (1) in separaten aufeinander folgenden Ablaufschritten.

11. Verfahren nach einem der Ansprüche 8 - 10, **gekennzeichnet durch** Ausführen der Zwangsentleerung **durch** Anwenden eines schwachen Sogs auf das Beförderungsrohr oder jedes Beförderungsrohr (23, 33, 43) des Systems (1) mittels eines separaten Saugers.

12. Verfahren nach einem der Ansprüche 1 - 11, **gekennzeichnet durch** Anordnen der Abfallbehälteranordnungen (4) in Gruppen verschiedener Anzahl oder **durch** alternatives individuelles Positionieren von Abfallbehälteranordnungen (4) in dem Abfallunterdrucktransportsystem (1).

13. Verfahren nach einem der Ansprüche 1 - 12, **gekennzeichnet durch** Anordnen der Abfallbehälteranordnungen (4) in separaten Abzweigungen (33) des Abfallunterdrucktransportsystems (1).

14. Verfahren nach einem der Ansprüche 1 - 13, **gekennzeichnet durch** Anordnen der Abfallbehälteranordnungen (4) in Abzweigungen (23, 43) des Systems (1), das ebenfalls Müllschlucker (5) beinhaltet.

Revendications

1. Procédé de récupération et de gestion des déchets (W) qui sont introduits dans des ensembles de poubelles (4), dans lequel une chambre de collecte interne (12) de chaque ensemble de poubelles est reliée à une conduite de transport (23, 33, 43) d'un système de transport des ordures activé de façon intermittente par dépression (1), les déchets (W) introduits dans la chambre de collecte interne (12) des

ensembles de poubelles (4) durant une phase active du système de transport des ordures par dépression (1) sont retenus ici au moins pendant toute la durée de ladite phase active, les déchets (W) de la chambre de collecte (12) des ensembles de poubelles (4) sont vidés dans la conduite de transport (23, 33, 43) du système au cours d'une phase non active du système de transport par dépression (1), permettant de cette façon aux déchets vidés en provenance des ensembles d'être stockés de façon temporaire dans ladite conduite de transport (23, 33, 43), et les déchets (W) stockés temporairement sont rejetés des conduites de transport (23, 33, 43) en association avec la phase active suivante du système de transport des ordures par dépression (1), **caractérisé en ce que** les déchets (W) stockés temporairement dans la conduite de transport (23, 33, 43) du système de transport des ordures par dépression (1) sont rejetés de celle-ci durant une première phase pré-active séparée précédant la phase active suivante du système (1).

2. Procédé selon la revendication 1, **caractérisé en ce que** les déchets (W) temporairement stockés dans toutes les conduites de transport (23, 33, 43) du système de transport des ordures par dépression (1) sont rejetés simultanément de celles-ci au cours d'une unique étape de la phase pré-active.

3. Procédé selon la revendication 1, **caractérisé en ce que** les déchets (W) temporairement stockés dans différentes conduites de transport (23, 33, 43) du système de transport des ordures par dépression (1) sont rejetés de celles-ci durant un nombre d'étapes consécutives de la phase pré-active.

4. Procédé selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** la chambre de collecte interne (12) desdits ensembles de poubelles (4) est fermée et hermétique par rapport à la conduite de transport (23, 33, 43) au cours de toute la phase active du système (1).

5. Procédé selon la revendication 4, dans lequel la chambre de collecte interne (12) desdits ensembles de poubelles (4) est reliée à la conduite de transport (23, 33, 43) du système de transport des ordures par dépression (1) par une soupape d'évacuation (WDV) qui fonctionne selon des positions ouverte et fermée, **caractérisé par** :

- le placement et le maintien de la soupape d'évacuation (WDV) de chaque ensemble de poubelles (4) dans une position fermée pendant toute la durée de chaque phase active du système de transport des ordures par dépression (1) ;
- l'ouverture de la soupape d'évacuation (WDV) de chacun des ensembles de poubelles (4) durant une phase inactive du système de transport des ordures par dépression (1), pour permettre aux déchets (W) en provenance des ensembles d'être vidés et temporairement stockés à l'intérieur de la conduite de transport (23, 33, 43) du système (1) ; et
- à nouveau la fermeture de la soupape d'évacuation (WDV) de chaque ensemble de poubelles (4) avant de commencer la phase active suivante du système de transport des ordures par dépression (1).

6. Procédé selon la revendication 5, **caractérisé en ce que** la fermeture de la soupape d'évacuation (WDV) de chaque ensemble de poubelles (4) est effectuée avant de commencer la phase pré-active du système (1).

7. Procédé selon les revendications 5 ou 6, **caractérisé par** le placement et le maintien de la soupape d'évacuation (WDV) de chaque ensemble de poubelles (4) dans une position hermétique par rapport à la conduite de transport (23, 33, 43) pendant toute la durée de chaque phase active et pré-active du système de transport des ordures par dépression (1).

8. Procédé selon l'une quelconque des revendications 5 à 7, **caractérisé par** le vidage forcé de certains ou de tous les ensembles de poubelles (4) du système (1) durant une phase inactive du système, lorsque la soupape d'évacuation (WDV) des ensembles de poubelles correspondants (4) est ouverte et avant une phase pré-active du système, afin d'assurer l'évacuation de tous les déchets (W) des ensembles de poubelles (4) dans la ou les conduites de transport correspondantes (23, 33, 43).

9. Procédé selon la revendication 8, **caractérisé par** un vidage forcé simultané de tous les ensembles de poubelles (4) au cours d'une étape.

10. Procédé selon la revendication 8, **caractérisé par** un vidage forcé des ensembles de poubelles (4) de différents groupes d'ensembles de poubelles (4) ou de l'une ou de plusieurs conduites (23, 33, 43) du système (1), au cours d'étapes consécutives séparées.

11. Procédé selon l'une quelconque des revendications 8 à 10, **caractérisé par** la réalisation du vidage forcé en appliquant une faible aspiration sur la conduite de transport ou chaque conduite de transport (23, 33, 43) du système (1) au moyen d'un extracteur séparé.

12. Procédé selon l'une quelconque des revendications

1 à 11, **caractérisé par** l'agencement des ensembles de poubelles (4) en groupes de nombres différents ou, en variante, par l'agencement individuel des ensembles de poubelles (4) dans le système de transport des ordures par dépression (1).

13. Procédé selon l'une quelconque des revendications 1 à 12, **caractérisé par** l'agencement des ensembles de poubelles (4) dans des conduites séparées (33) du système de transport des ordures par dépression (1).

14. Procédé selon l'une quelconque des revendications 1 à 13, **caractérisé par** l'agencement des ensembles de poubelles (4) dans les conduites (23, 43) du système (1) qui contient également des vide-ordures (5).

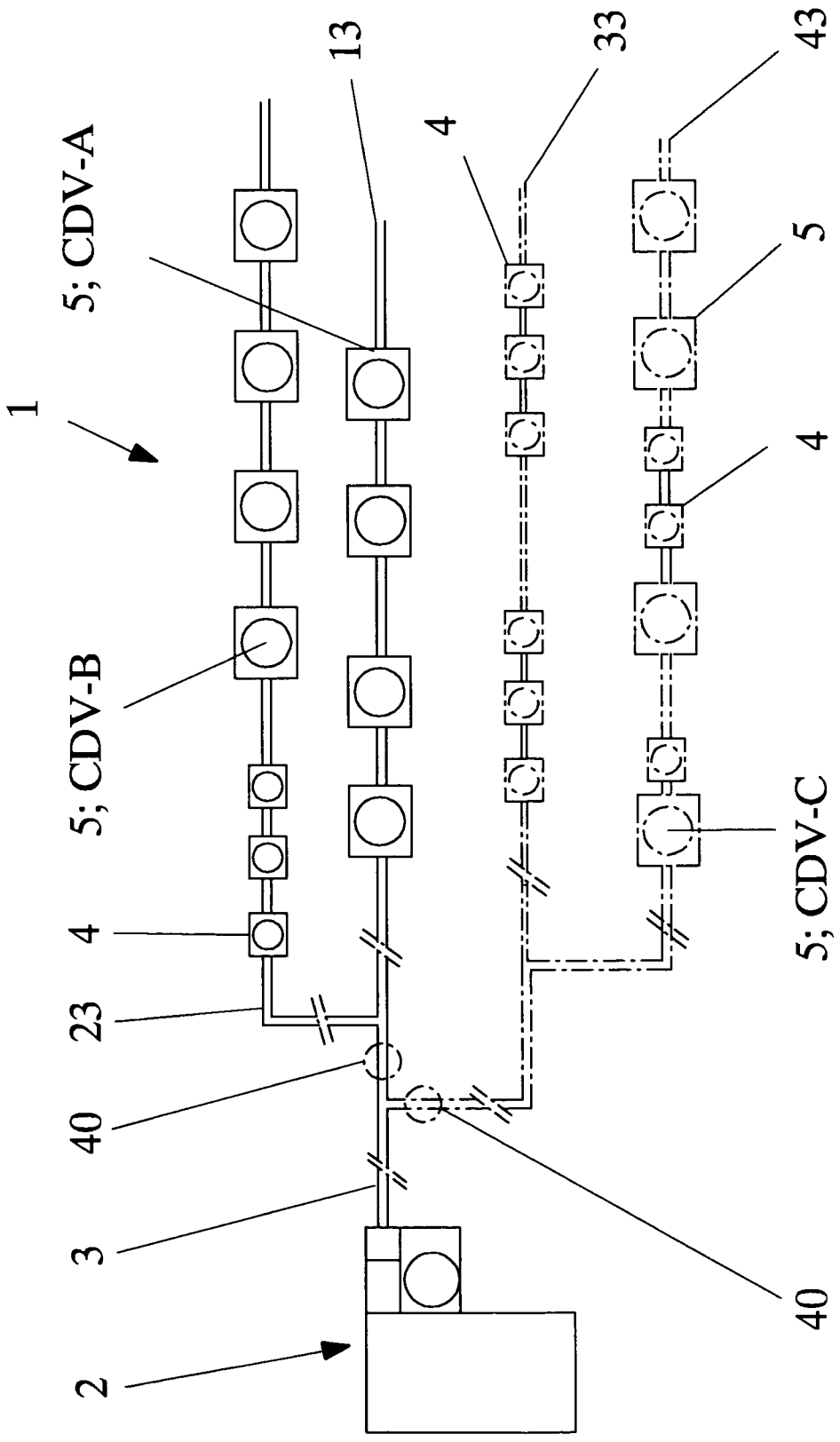


FIG. 1

FIG. 2

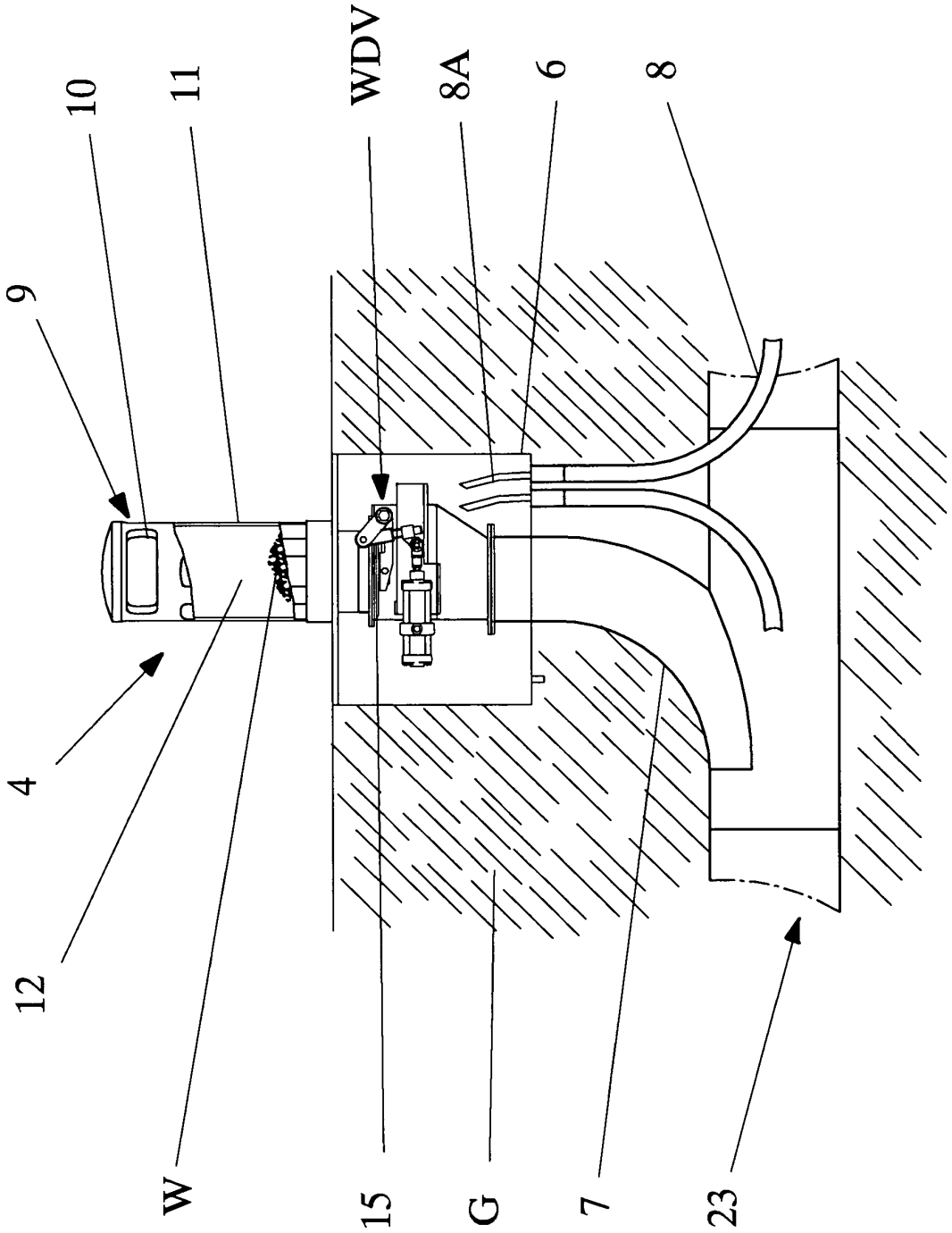


FIG. 3

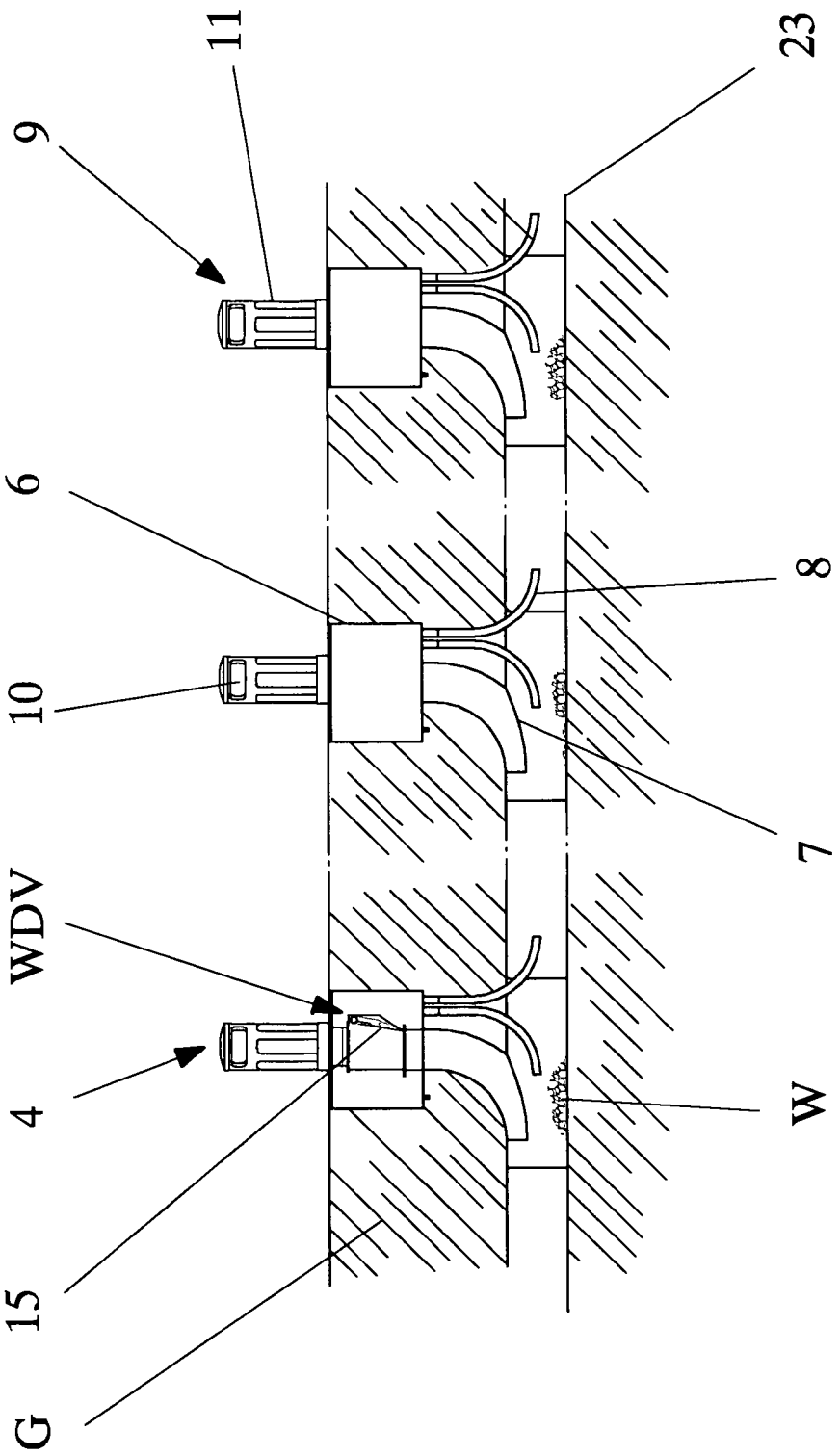
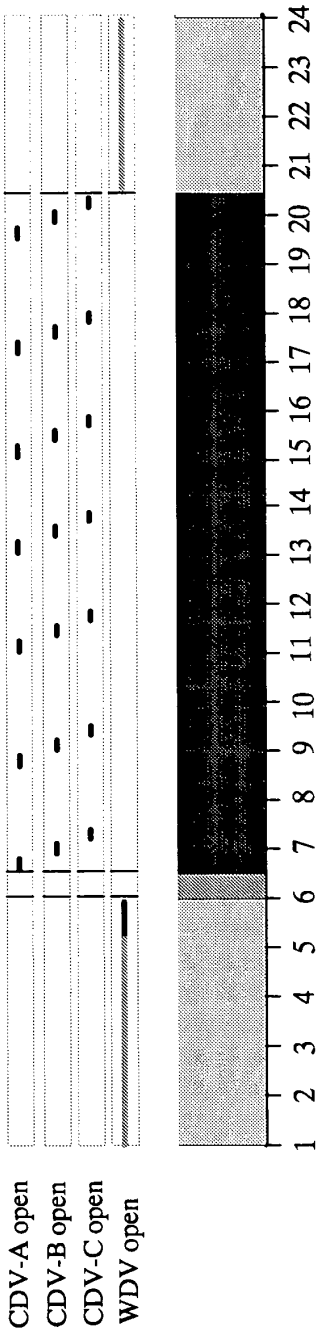


FIG. 4A


CDV-A open
CDV-B open
CDV-C open
WDV open
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hours of the day

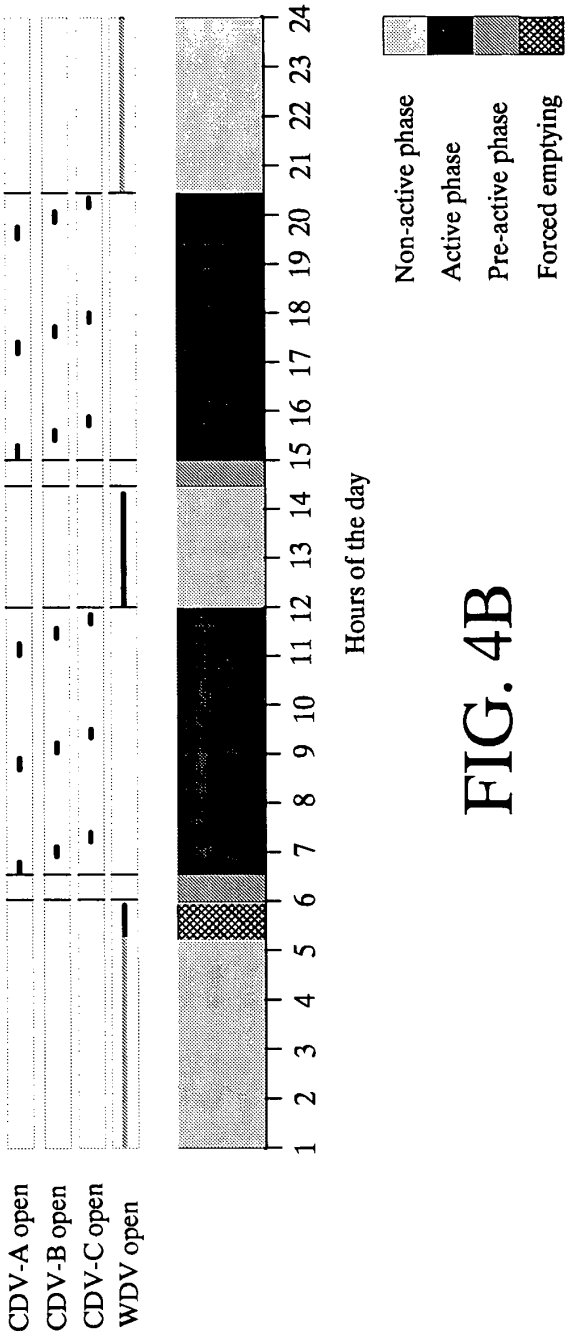

CDV-A open
CDV-B open
CDV-C open
WDV open
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hours of the day
Non-active phase
Active phase
Pre-active phase
Forced emptying

FIG. 4B