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(54) **Method and apparatus for compacting waste.**

(57) The invention relates to an improved method of compacting waste for the purpose of allowing this process to be implemented continuously. To this end, the waste to be compacted is supplied alternately on the one side and on the other side of a displacement member (4) which is reciprocating underneath the supply opening (13) of the compacting space, so that the displacement member (4) compresses the waste towards both sides in the compacting space.

The invention furthermore relates to an apparatus for implementing the method, which apparatus consists of a box-like housing (1) which encloses a compacting space which houses in a close fit a reciprocating displacement member (4) and which comprises a supply opening (13) in a wall of the housing for supplying the waste to be compacted to the compacting space, the displacement member (4) being located in the central area of the compacting space, in such a way as allow compression of the waste to be compacted to take place on both sides of the displacement member.

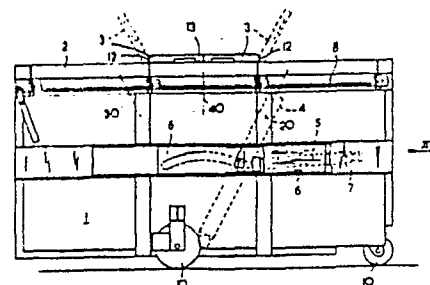


FIG. 1

OCAM 296-1

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METHOD AND APPARATUS FOR COMPACTING WASTE

The invention relates to a method of compacting waste, such as loose or bulk domestic refuse, waste matter from nursing homes, hospitals, offices, industry, etc., the waste to be compacted being supplied through an opening into the confined space designed
5 for the compacting process, which compacting space houses a reciprocating, close-fitting displacement member, under the action of which displacement member the refuse supplied is forced further into the compacting space during each cycle, as a result of which the refuse is compressed.

10 According to prior-art methods, the motion of a displacement member for compacting waste is used in only one direction. This entails the drawback of a relatively low efficiency of the travelling cycle of the displacement member.

The systems allowing prior-art methods to be applied can be
15 divided into two types: one type where the compacting space, on the one hand, and the displacement member with the driving means thereof, on the other hand, constitute system components which must be fastened together, and the other type where the displacement member with the driving means thereof are integrally incorporated into the compacting space.
20

Drawbacks inherent in the first type are, first, that valuable and often scarcely available space is taken up not only by the compacting space but by the other components as well, and, secondly, that a coupling mechanism is required for fastening
25 these system components to the compacting space. A third drawback is that liquids contained in the waste are forced out of this waste as a result of the compaction, causing leakage to develop especially at the junction of the aforementioned system components

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and the compacting space. Packings provided on such waste-processing installations have been found to be overly vulnerable and thus to necessitate a great deal of maintenance, while leakage in fact continues to take place. When the compacting space is full, i.e., when the displacement member is no longer capable of forcing additional waste inwardly, as determined by the available capacity and power, the aforementioned system components must be disconnected from the compacting space. After this uncoupling operation, the junction opening of the compacting space is exposed, and the waste which has last been pressed inwardly is forced outwardly again by the other waste which is under pressure, thus bringing about undesired pollution of the environment. Satisfactory sealing constructions are not yet available.

A drawback inherent in the aforementioned second type, the integrated system, is that the compacting space is emptied through one of the sides, which for this purpose, must be equipped with a door or flap, but in this case, too, the packing or seal is so vulnerable as to make it necessary at all times to allow for the possibility of leakage.

Another drawback which the two aforementioned types have in common is that the continuous dumping of waste is only possible when the filling opening of the system is **screened during the** cycle of motion, either by the displacement member itself or by an added mechanism, so as to prevent waste from accumulating on the side where the displacement member is driven. It has been found in practice, however, that it is never possible to screen the filling opening and to seal the space around the displacement member in an optimal manner, so that waste accumulation takes place at all times on the driven side of the displacement member. This results in added maintenance and trouble.

The invention aims at providing a solution with the use of which the aforementioned drawbacks are obviated.

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To this end, the invention proposes a method according to which the waste to be compacted is introduced alternately on the one side and on the other side of the displacement member, in such a way as to allow the waste to be compacted on both sides of the displacement member in the compacting space.

The invention furthermore relates to an apparatus for implementing the method. Such an apparatus consists of a box-like housing which encloses a compacting space which houses in a close fit a reciprocating displacement member and comprises a supply opening in a wall of the housing for supplying the waste to be compacted to the compacting space, which apparatus is characterized by a displacement member in the central area of the compacting space, in such a way as to allow the displacement of the waste to be compacted to take place on both sides of the displacement member.

The reciprocating motion of the displacement member is preferably a swivel motion.

It should be noted in this connection that maximum compacting efficiency is attained when the ratio of the distance between the middle position of the reciprocating motion and the one end wall to the distance between the middle position and the other end wall is proportional to the resultant of forces in the one and in the other direction of travel, respectively. In the case of equal resultants of forces in the two directions of travel, the ideal position for the pivot of the reciprocal motion evidently is the centre of the compacting space. For practical reasons, the centre of the longitudinal dimension of the compacting space has been selected for the position of the pivot of the reciprocal motion for the apparatus according to the invention.

The principal advantage of the method and apparatus according to the invention is that the displacement member continuously performs compacting work during its entire cycle of motion, thus allowing continuous dumping of waste into the filling opening

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of the apparatus without any need of making technically complicated or vulnerable provisions, while there is furthermore no need whatever for sealing the space around the displacement member.

- 5 According to a further development of the invention, the supply opening of the compacting space can be closed with two swing covers, which, in the open position, are maintained with the use of stops in an inclined position so as to form a chute for the waste supplied.
- 10 According to the invention, the housing of the apparatus can furthermore be equipped with a hinged wall, in such a way to allow the compacted waste to be discharged from an entire opened wall. The supply opening is preferably provided in the hinged wall.

- The invention is particularly suitable for designing the apparatus
- 15 in such a way that the housing is additionally constructed in the form of a mobile container which can also be subjected to further transportation. To this end, the housing is equipped with wheels. It furthermore is an advantage for the driving means to be readily disconnectable.

- 20 In order to explain the invention, a preferred embodiment of an apparatus with the use of which the method according to the invention can be implemented is described hereinafter, reference being made to the drawing.

In the drawing,

- 25 Fig. 1 is a lateral view of such an apparatus;
Fig. 2 is a front view along the arrow II in Fig. 1;
Fig. 3 is a top view along the arrow III in Fig. 2;
Fig. 4 is a schematic view of an auxiliary installation.

- The apparatus comprises a housing 1 constituting the compacting
- 30 space proper, a cover structure 2 for closing the compacting space, two swing covers 3 for closing the filling opening 13 as well

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as for forming a chute when they occupy the opened position, for which purpose use is made of stops 12, a displacement member 4, here provided in the form of a plate, the lower end of which is hinged to the bottom of the compacting space, a set of hydraulic or pneumatic cylinders 5 for driving the displacement member 4, a set of slides 6 for sealing the slot in the side wall of the compacting space, a set of sleeves 7 within which the cylinders 5 are movably suspended and which are mounted on both sides of the compacting space, a locking mechanism 8 for fixing the cover 2, a unit 9 which provides the hydraulic or pneumatic energy, the coupling of the unit to the apparatus preferably being accomplished with the aid of quick-detachable couplings, a set of road wheels 10 for making the apparatus mobile, and a control unit 11 comprising such components as valves, switches, pilot lamps, relays and the like.

The operation of the apparatus is as follows when the starting signal has been imparted to the control unit, the displacement member 4 starts performing its motion cycles. This means that it reciprocates a number of times between the positions 20 and 30. The number of cycles to be performed is adjustable. The waste which is being dumped into the filling opening is forced to the left or to the right, depending on the position of the displacement member 4 at the moment of entry of the waste. Upon completion of the adjusted number of cycles, the displacement member 4 stops in its rest position 40. When the displacement member 4 approaches its turning point 20 or 30, and upon exceeding during this motion a pre-adjusted pressure in the pressure system, it does not continue on its path but reverses its direction of travel and moves towards the other turning point. These motions will be repeated until the adjusted operating time has expired, whereupon the displacement member 4 resumes its rest position 40. The fact of the high pressure in the pressure system being reached is the effect of the counterpressure produced by the waste which has been compressed by the displacement member 4. Once the high pressure is reached in both directions of travel, the apparatus can be

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said to be "full". When the filling opening and the covers 3 have been closed, the waste is contained in a fully confined space, and the apparatus can be transported. The quick-detachable couplings (not shown) of the energizing lines are then disconnected, so that the apparatus can be freely moved. The apparatus is emptied by unlocking the locking mechanism 6, whereupon the entire apparatus is tilted about its longitudinal axis, in such a way that the cover 2 comes to lie undermost. The hinged cover 2 turns to its opened position under its own weight, and the waste falls out of the apparatus. When the apparatus has been tilted back to its original position and the locking mechanism 8 has been locked, the apparatus can be returned to its usual or its desired location.

BAD ORIGINAL



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C L A I M S
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1. Method of compacting waste, the waste to be compacted being conveyed through an opening into the confined space designed for the compacting process, which compacting space houses a reciprocating, close-fitting displacement member, under the action of
5 which displacement member the waste supplied is forced further into the compacting space during each cycle, as a result of which the waste is compacted, characterized in that the waste to be compacted is introduced alternately on the one side and on the other side of the displacement member, in such a way as to allow
10 the waste to be compressed on both sides of the displacement member in the compacting space.

2. Apparatus for implementing the method according to claim 1, consisting of a box-like housing which encloses a compacting space which houses in a close fit a reciprocating displacement
15 member, driving means for moving the displacement member and comprising a supply opening in a wall of the housing for supplying the waste to be compacted to the compacting space, characterized in that the displacement member (4) is located in the central area of the compacting space, in such a way as to allow
20 compacting of the waste to take place on both sides of the displacement member (4).

3. Apparatus according to claim 2, characterized in that the displacement member is plate-shaped and that the reciprocating motion of the displacement member (4) is a swivel motion.

25 4. Apparatus according to claim 2 or 3, characterized in that the supply opening (13) is closed with two swing covers (3), which, in the open position, are maintained with the use of stops (12) in an inclined position so as to form a chute for the waste supplied.

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5. Apparatus according to any one of the preceding claims, characterized in that the housing has a hinged wall (2), in such a way that the compacted waste can be discharged along an entirely opened side.
- 5 6. Apparatus according to claim 5, characterized in that the supply opening (13) is provided in the hinged wall (2).
7. Apparatus according to any one of claims 2 to 6 inclusive, characterized in that its is equipped with road wheels (10).

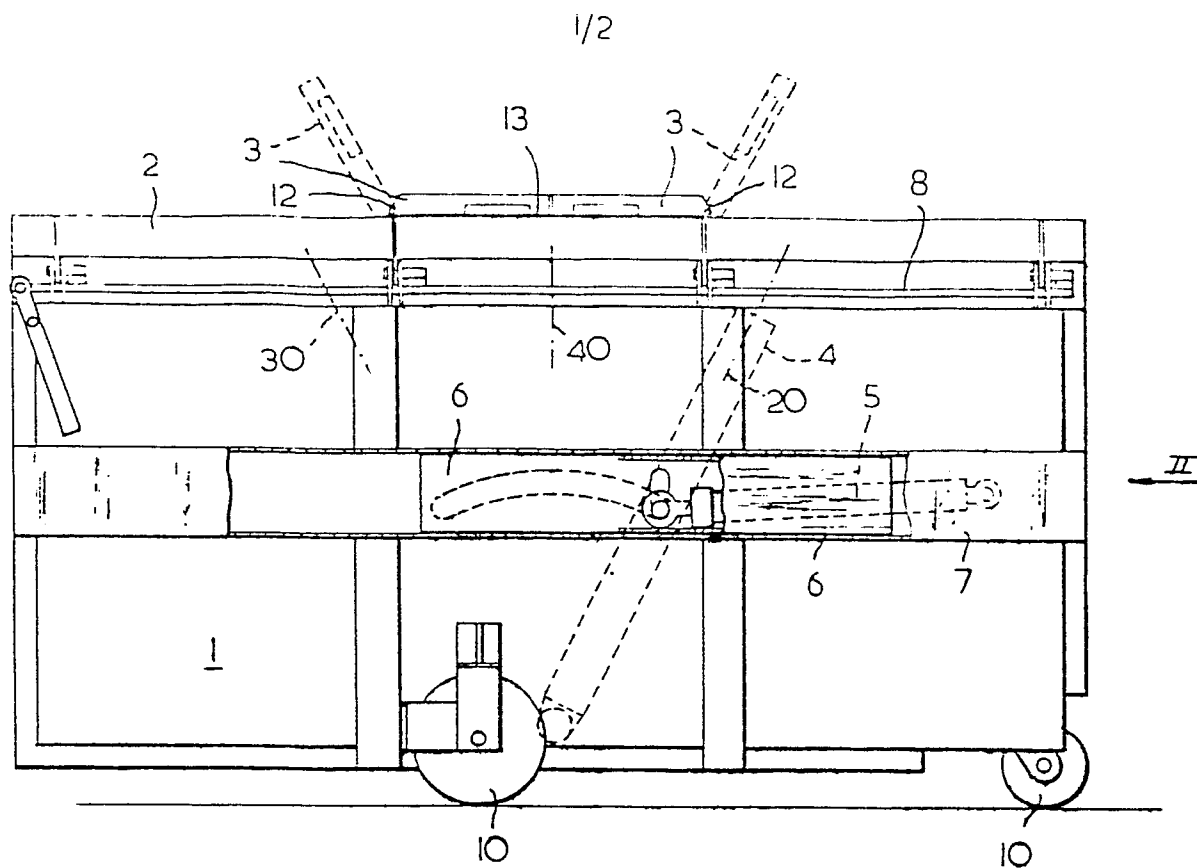


FIG. 1

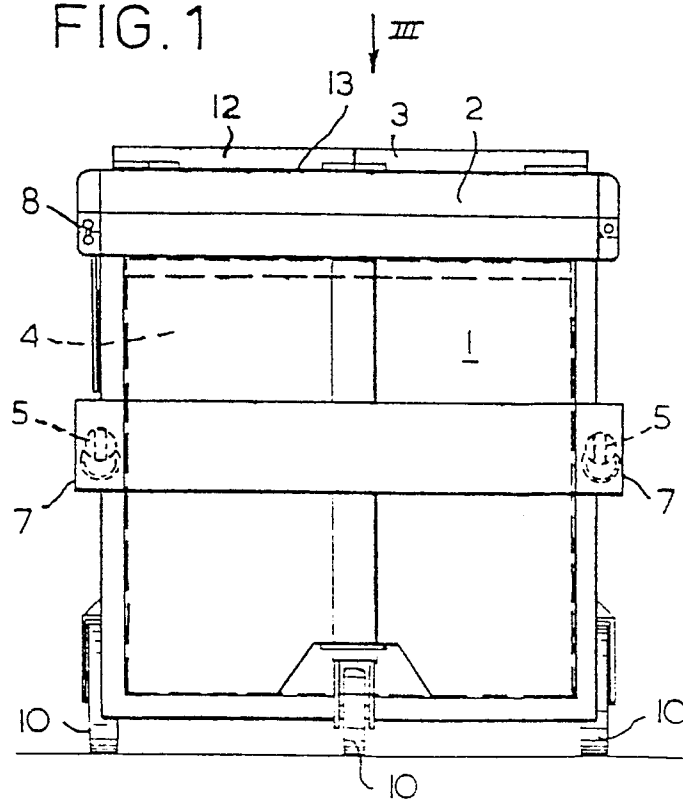


FIG. 2

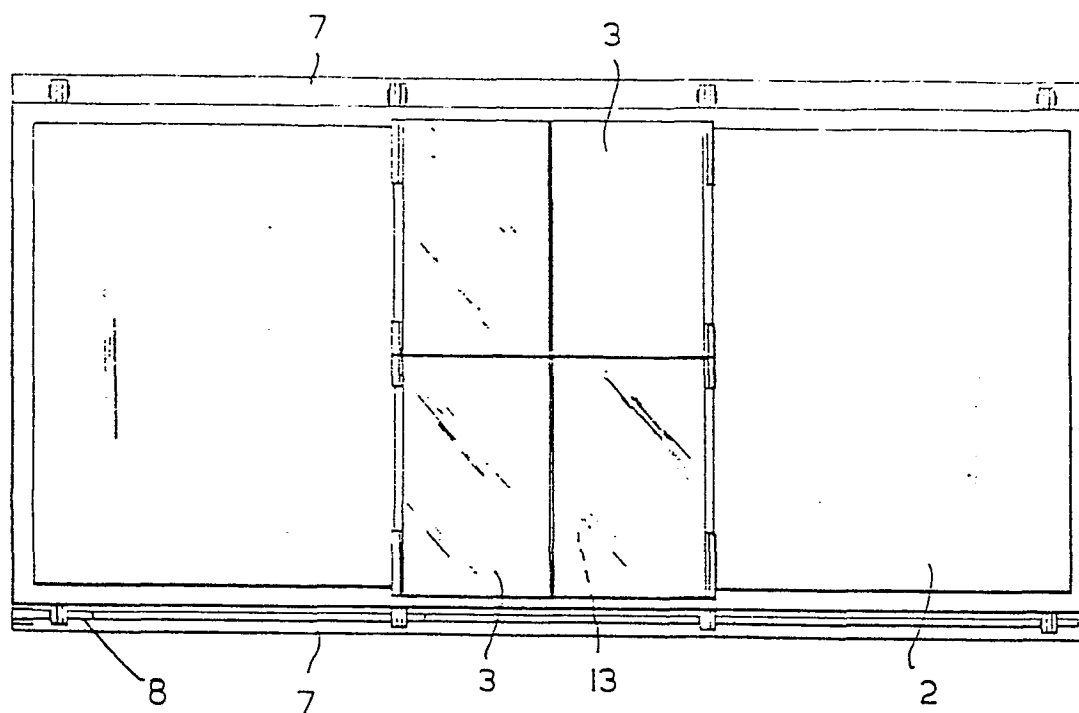


FIG. 3

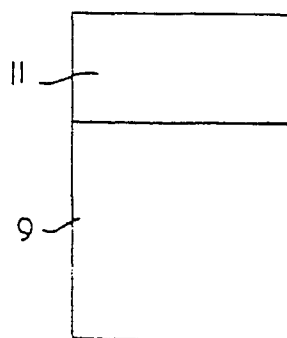


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

0013587
Application number
EP 80 20 0019

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ¹)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>GB - A - 1 513 365</u> (A. EHINGER) * Whole document *	1,2	B 30 B 9/30
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X	<u>FR - A - 2 314 823</u> (LOCANER) * Whole document *	1,2	
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	<u>US - A - 4 070 962</u> (R.A. PETERSON) * Column 11, line 25 - column 12, line 21; figure 11 *	1-3	TECHNICAL FIELDS SEARCHED (Int.Cl. ¹)
	--		B 30 B
	<u>FR - A - 2 289 334</u> (SIMON-VICARS) * Whole document *	1,2	
	--		CATEGORY OF CITED DOCUMENTS
	<u>GB - A - 912 632</u> (ETHYL CORP.) * Whole document *	1,2	
	----		X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
The present search report has been drawn up for all claims			& member of the same patent family corresponding document
Place of search The Hague		Date of completion of the search 17-03-1980	Examiner BOLLEN