

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 463 189 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **90111837.2**(51) Int. Cl.⁵: **B65F 3/20**(22) Date of filing: **22.06.90**

(43) Date of publication of application:
02.01.92 Bulletin 92/01

(84) Designated Contracting States:
AT BE CH DE DK ES FR GR LI LU NL SE

(71) Applicant: **VALLE TEIRO S.r.l.**
Via E. Vecchia n. 102
I-17019 Varazze (SV)(IT)

(72) Inventor: **Dossena, Roberto**
Via E. Vacchia n. 102
I-17019 Varazze (SV)(IT)
Inventor: **Vedeo, Marco**
Via E. Vacchia n. 102
I-17019 Varazze (SV)(IT)

(74) Representative: **Ferrarotti, Giovanni**
Studio di Consulenza Tecnica Via Alla Porta
Degli Archi 1/7
I-16121 Genova(IT)

(54) **Remover/compactor of garbage in the dump boxes of garbage trucks by means of swinging drag scoop.**

(57) The remover/compactor is consisting of two sliders (7), two primary arms (13), one end of which is hinged on a cross drive shaft (8) connected to the sliders (7), whereas the other end of the primary arms are bearing a second cross shaft (14). One end of the two secondary arms (15) is hinged on the second shaft (14), while the other end of these arms is hinged on a third shaft (16) located at a higher level and supported by fixed side plates (12), so that the two secondary arms (15) can swing together with the moving sliders (7) by means of hydraulic fluid powered pistons on guides (6) mounted on the side walls of the dump box (1). A power scoop or shovel (17), lifted and lowered by hydraulic fluid powered pistons (18), is mounted on the second shaft (14). The secondary swinging arms (15) promote a curvilinear forward and reverse motion of the scoop (17), both when nearing the charging mouth and during garbage removal/compaction.

EP 0 463 189 A1

This invention covers a Remover/compactor of garbage dumped into the garbage truck by a scoop or shovel mounted on a hinge-support subject to traversing and swinging motion .

Various refuse compactors installed in garbage trucks are already known, such as for instance the Italian Patent n° 1.159.178 regarding a compactor consisting of a trolley horizontally moving along the truck edges, driven by hydraulic fluid powered pistons and a shovel hinged on a transverse axis located at the rear end of this trolley which is thus placed in almost horizontal and almost vertical downward position by means of hydraulic fluid powered pistons. The garbage accumulated at the back of the truck body is thus pushed forward and is compacted by the coordinated movement of the trolley and of the scoop at the forward end of the box. The compactor in question is normally installed on medium and small sized open-top garbage trucks.

Large-capacity garbage trucks, which may be partially closed and provided with a collecting pocket or well into which the refuse coming from the road garbage bins is discharged, may be provided with a remover/lifting device having mainly the aim to empty the collecting pocket or well so as to make room for more garbage. These removing/lifting devices are also equipped with a revolving scoop mounted on a trolley sliding along sloping lateral guides. These already known removing/lifting devices moving along sloping guides have, however, some drawbacks, the first and most serious of which lies in the fact that the scoop, when lifted, approaches the rear-end edge of the charging opening, while moving almost parallel to the trolley guides. If there are any bulky, rigid or resisting items between the charging edge and the transverse portion of the scoop, the scoop will refuse to budge and may cause cracking or failure of the box edge, of the scoop or of its supporting structure and drives.

Furthermore, these known removing/lifting devices, although they efficiently empty the rear part of the garbage truck, are poor compactors since they cannot efficiently reach the waste located immediately behind the charging mouth and are only able to lift and transfer the garbage from the charging site to the existing pile without proper compaction.

This invention has the aim to provide for a garbage remover/compactor sliding along guides fitted on the longitudinal upper edge of the box, designed for large-capacity and partially closed garbage trucks. In this way, the scoop approaches the transverse edge of the charging mouth in an upward movement so that the scoop cannot stick fast to any bulky and resisting objects. The invention has also the aim to ensure efficient removal of

the garbage from the charging area and to provide for partial compaction of the waste after lifting and after its removal from the zone adjacent to the charging mouth.

According to the invention, these objectives are attained by the mobile trolley which is consisting of two guided cursors running along sloping sliders fitted on the upper edge of the side walls of the truck body. These sliders are interconnected by a first cross shaft on which the ends of the first two longitudinal arms are hinged. These arms are supported at their other end by a second shaft, which in turn is supported by two more articulated arms swinging on a third cross shaft located at a higher level and supported by plates secured onto the side walls of the truck body near the charging mouth. Thee scoop providing for removal, lifting and compaction of the garbage is hinged onto the second shaft on which the two pairs of arms are knuckle-jointed. The scoop thus normally performs the lifting and lowering movements.

In addition to its own movements, the scoop also makes a traversing motion due to lengthwise movement of the sliders, while swinging due to the oscillating movement of the second arms.

Near the charging mouth, the scoop is lifted to prevent its hurting against the top of the refuse. After the charging mouth has been emptied and before the material is lifted, the scoop is sufficiently lowered to clear the area immediately behind the charging mouth.

The invention in question is illustrated in a practical exemplifying implementation in the attached drawings, in which:

Fig.1 shows a longitudinal section of the body of a garbage truck, according to X-X in Fig. 5;

Fig.2 shows the longitudinal section of the truck body according to Y-Y in Fig. 5;

Fig. 3: shows the longitudinal section of the truck body according to Z-Z in Fig. 5;

Fig.4 shows the operating diagram of the remover/compactor

Fig. 5 shows a top view of the truck body fitted with the remover/compactor subject matter of this invention.

With reference to fig.1, the truck body 1 has a charging mouth 2 at the rear, partially covered 3 and provided with an emptying device 4.

The remover-compactor subject matter of this invention is consisting of two triangular plates 5 forming an extension of the side walls of the truck body 1 and fitted with two flat guides 6 sloping downward in direction of the charging mouth 2. Two sliders 7 are interconnected with these guides by means of a first cross shaft 8. The sliders 7 are driven in reciprocating motion by hydraulic fluid powered pistons 9, one end being connected to another shaft 10 linking the two sliders 7, whereas

the other end is connected to an articulated joint 11 of two trapezoidal plates 12 located near the rear end of the side walls of the truck body 1.

In fig. 1, this arrangement permits the sliders to move from position 7 to the "broken line" position 7'.

The shaft 8 connecting the two sliders 7 is also bearing two lengthwise articulated arms connected to the other end of the cross shaft 14. This cross shaft 14 is supported by the arms 15 articulated on a third shaft 16 resting on the two plates 12 located at the rear of the side walls of the truck body 1.

The latter arrangement is shown in fig.2 illustrating the movement of the first and second arm and of the second shaft between the positions 13, 14, 15 and the broken line positions 13', 14', 15' allowing the sliders to move from position 7 to its position 7'.

Finally, the scoop 17 hinged onto the second shaft 14 can be lifted and directed towards the charging mouth 2 located at the back of the truck body or lowered by the hydraulic fluid powered pistons 18 mounted on the shaft 10 connecting the two sliders 7. The shaft 19 is only serving as a reinforcing connection of the plates 12.

This arrangement of the scoop 17 is illustrated in fig. 3 showing how the movement of the sliders 7 causes the second shaft 14 to shift together with the scoop moving from 17 to its broken line position 17' in a circular motion which is upwards in its final section to prevent the scoop from hurting against rigid objects or refuse, according to the objectives of this invention.

The flow diagram of the path followed by the transverse end of the scoop 17 starting from its rest position A is shown in fig.4. In particular, the motion sequence is the following:

- section AB shows the path of the sliders 7 driven by the hydraulic fluid powered pistons 9. This path is curved; its initial portion is downward whereas its final section is moving upwards. The scoop thus reaches its upper position 17' above the charging mouth 2;
- section BC shows the path of the scoop 17' swinging on the shaft 14, the oscillation being caused by the hydraulic fluid powered pistons 18. This path is circular and permits the scoop to remove the garbage from the charging mouth 2;
- Section CD shows the path of the scoop induced by the sliders returning from their position 7' to their rest position 7. This curvilinear section permits to clear a good deal of the zone adjacent to the charging mouth and to compact part of the refuse in the lower areas of the truck body from where it can be lifted and heaped on the already existing pile, according to the objectives of this invention.

- section DA shows the path of the scoop 17 when it is lifted by the pistons 18 and brought back to its initial rest position .

From the foregoing description it can be observed that the proposed arrangement permits the scoop to clear not only the charging mouth area, but also a large part of the truck body by compacting the refuse in the lower zone and heaping it on the pile, while preventing the scoop from hurting and being blocked against rigid or resisting items inside the charging mouth.

For exemplification purposes, Fig. 5 shows the arrangement of the various components mentioned above, although these may also be arranged otherwise; e.g. the second arms 15 may be mounted inside the first arms 13 (as shown in this drawing) or externally.

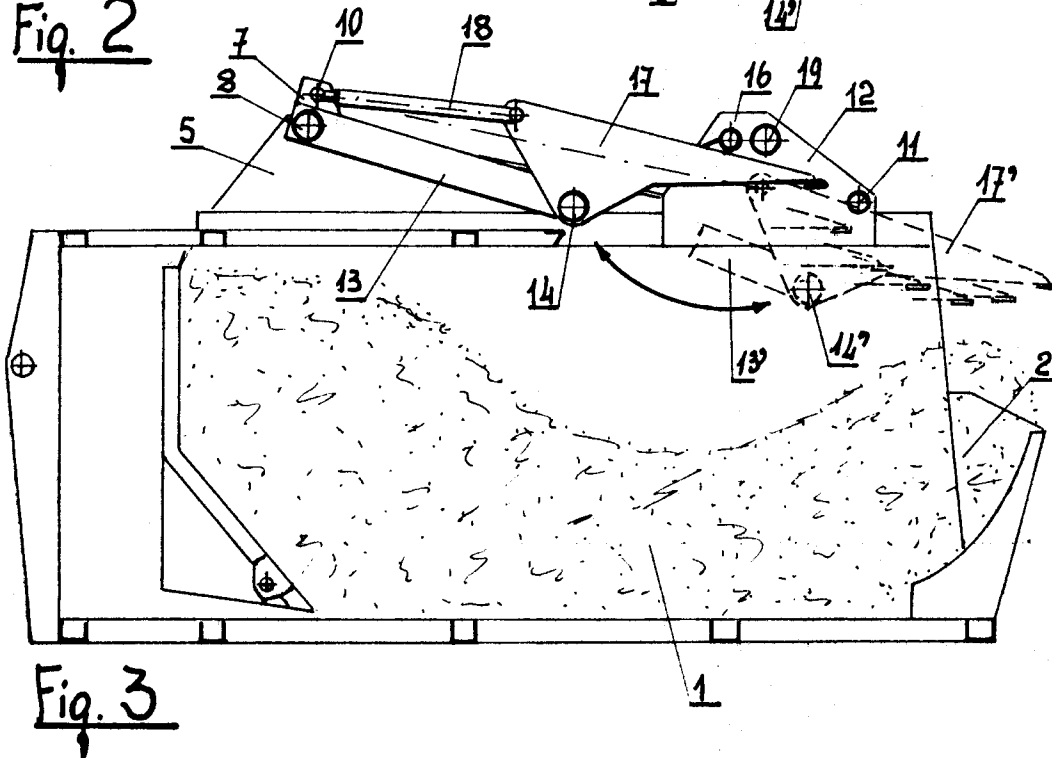
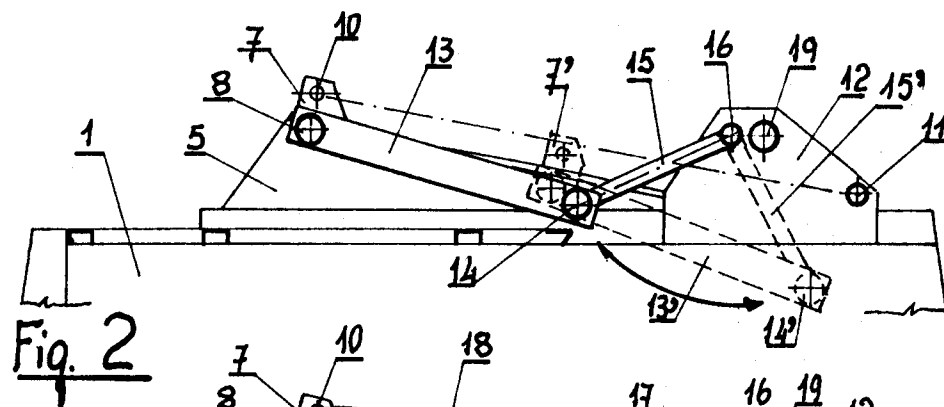
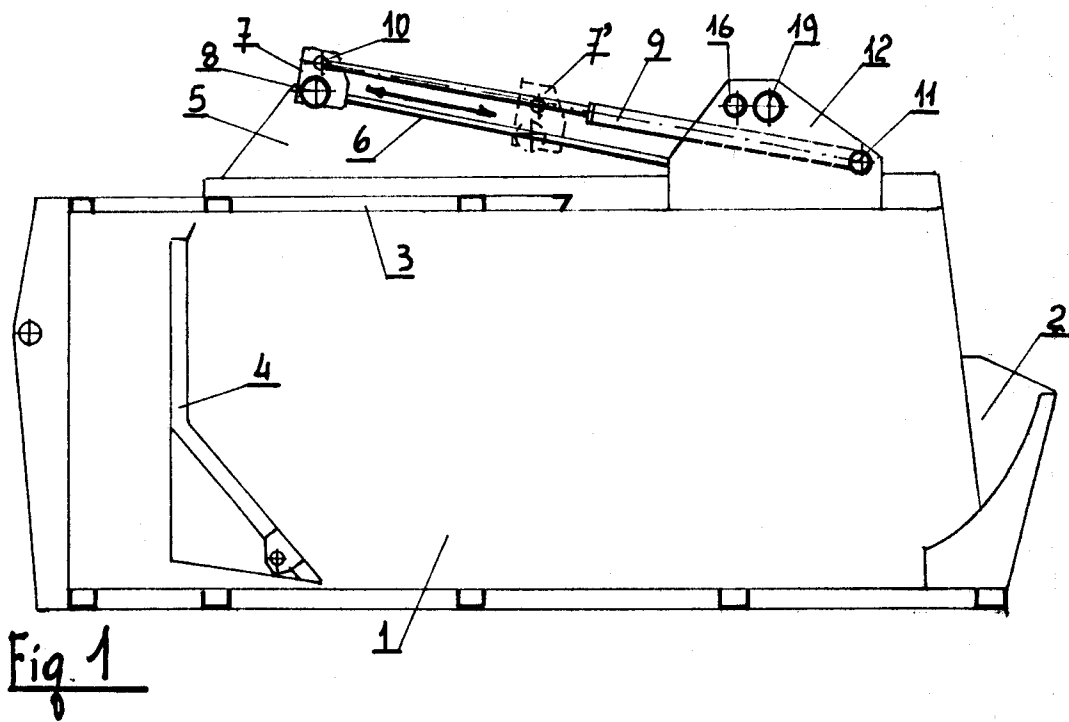
Claims

1. Garbage Remover-compactor for garbage trucks provided with a trolley driven by hydraulic fluid powered pistons running on guides fastened onto the longitudinal walls of the truck body, equipped with a scoop or shovel mounted on the trolley, articulated on a cross shaft and driven by hydraulic fluid powered pistons from its lifted to its lowered position, **characterized** by the fact that :

- the two flat guides (6) are sloping downward toward the charging mouth (2) of the truck body (1) and are supported by two triangular plates (5) forming an extension of the side walls of the truck body;
- two sliders (7) moving along the flat guides (6) are driven by hydraulic fluid powered pistons (9);
- the first cross shaft (8) is interconnecting the two sliders (7),
- the first two arms (13) are hinged at one end onto the first cross shaft (8) of the sliders (7);
- a second articulated cross shaft (14) is connecting the other two ends of the first arms (13);
- the second couple of arms (15) is hinged onto one end of the second shaft (14);
- two plates (12) located near the rear end of the side walls of the truck body (1) are interconnected by a reinforcing shaft (19) and are bearing the other articulated ends of the second arms (15) by means of a third shaft (16) which is in a higher position than the second shaft (14) so that the second arms (15) can swing;
- a scoop or shovel (17) is articulated on

the second shaft (14) and is driven by hydraulic fluid powered pistons (18) from its lifted to its lowered position so that this scoop (17) can approach the charging mouth (2) in its lifting motion thus preventing the scoop from hurting and being blocked against the accumulated refuse, clear the charging mouth area, move and compact the garbage in the lower zones of the box in a curvilinear motion and lift the material, heaping it on the existing pile;

2. Operating method of the garbage remover-compactor as described in claim 1, **characterized** by the fact that the two transverse ends of the scoop or shovel (7) are performing the following movements:
- the initial path (AB) is covered by the sliders (7) moving towards the charging mouth (2). This path is curvilinear, its first section sloping downward whereas its final section is moving upwards due to the swinging motion of the second arms (15);
 - emptying section of the charging mouth (BC) : this path is covered by the oscillating scoop or shovel (17) from its lifted to its lowered position;
 - clearing section of the zone adjacent to the charging mouth and lifting of the garbage (CD) - this path is covered by the scoop or shovel (17) due to the sliders returning to their initial position. This path is curvilinear, Initially moving downward while moving upward at its final end due to the pendulum motion of the second arms (15);
 - return to rest position (DA) - the scoop or shovel (17) is lifted to its initial cycle position.



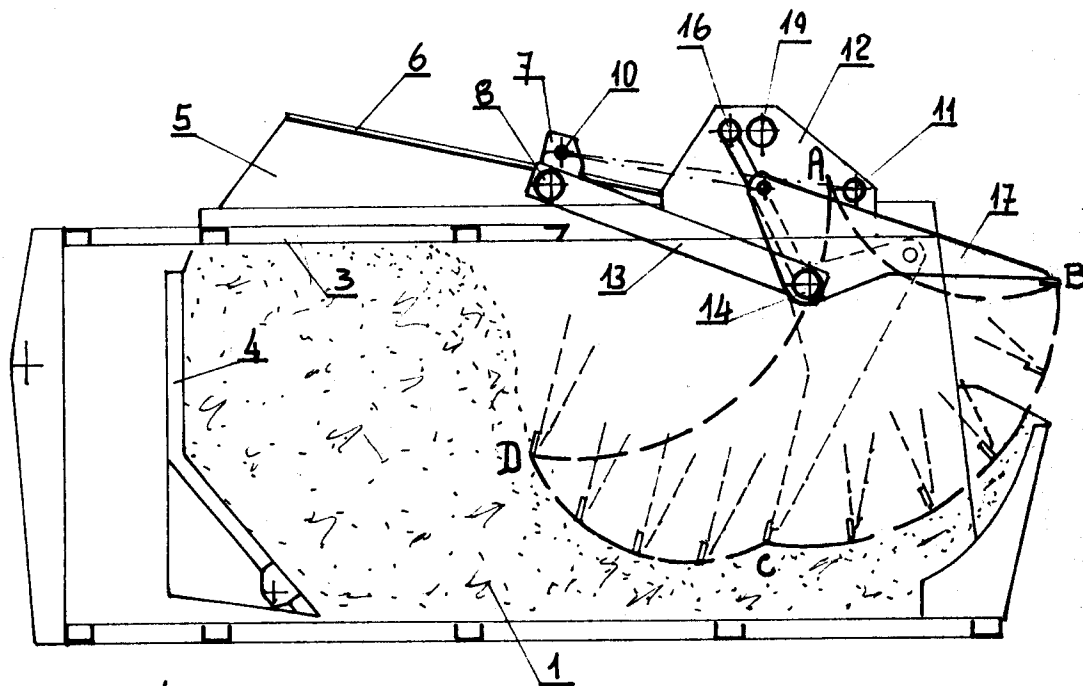


Fig. 4

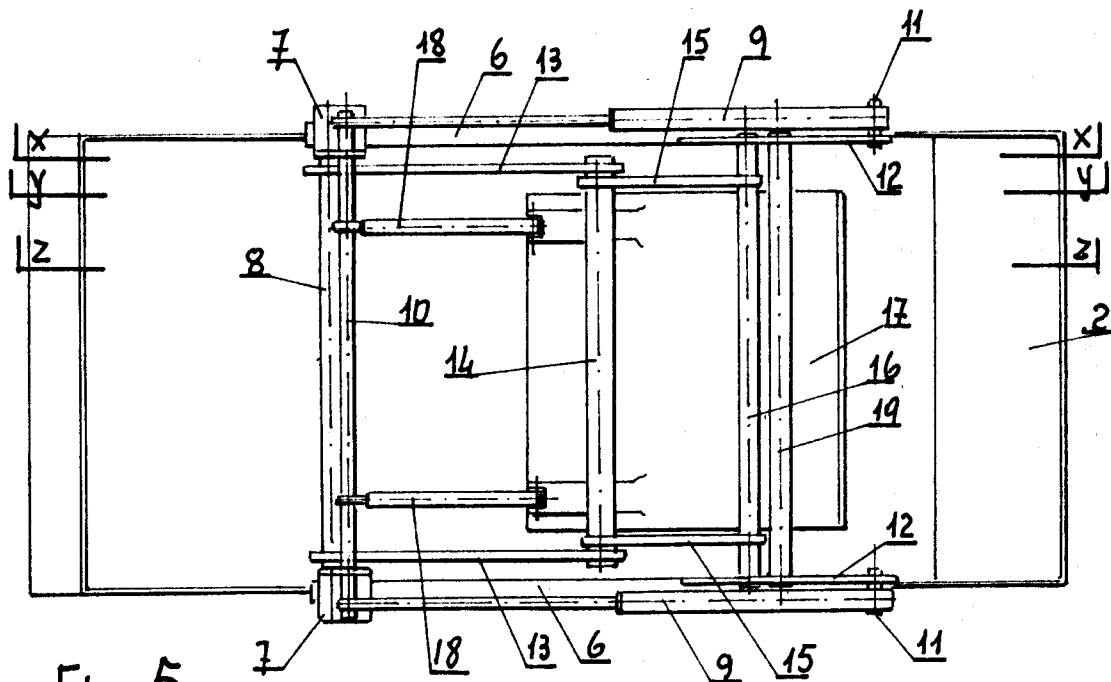


Fig. 5



European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 11 1837

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-3 874 529 (GOLLNICK) * Figures 3-7; column 3, line 32 - column 4, line 28 * - - -	1,2	B 65 F 3/20
A	US-A-4 453 880 (LEISSE) * Figures 1-4,9; column 3, lines 44-64 * - - -	1,2	
A	FR-A-2 430 905 (CTIA) - - -		
A	DE-A-2 709 141 (FECHNER) - - - - -		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 01 February 91	Examiner DEUTSCH J.P.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			