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(54) Container tipper for automatically gripping socket-fitted refuse containers and overturning them into the body of a motor vehicle.

(57) A container tipper for automatically gripping socket-fitted refuse bins and overturning them into the body of a motor vehicle, characterised by comprising a rocking structure (12) alignable with the bin (5), a plurality of arms (13', 13''..., 14', 14''...), each having an end block intended to engage a respective socket of said bin, means (19) associated with said arms to move them from a first substantially vertical position to a second position angularly inclined to said rocking structure, means (25) for preventing the rocking of the structure (12) and means (29) for locking the bin onto said rocking structure during its overturning.

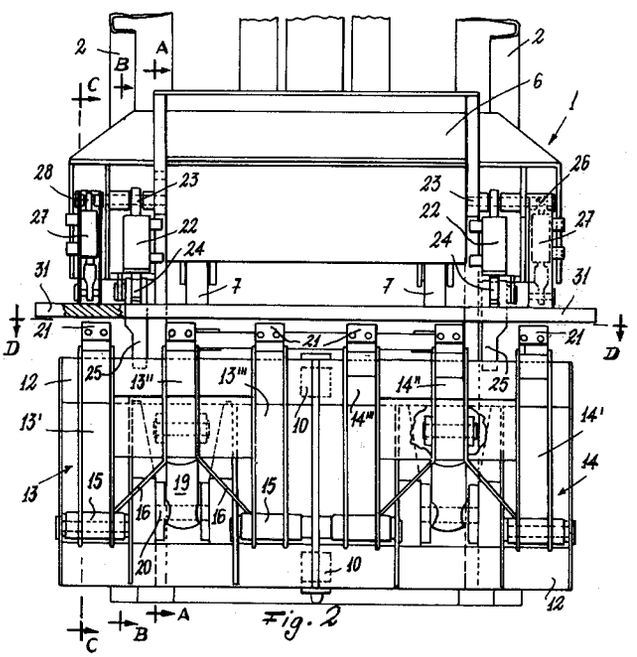

Fig. 2

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This invention relates to a device for automatically gripping socket-fitted refuse containers and overturning them into the body of a collecting motor vehicle.

It is known to use refuse containers comprising on at least their front face a plurality of sockets designed to cooperate with a comb device forming part of the container tipper associated with a refuse collecting vehicle. These socket-fitted containers, provided with castors, are currently wheeled manually in front of the comb device so that when this latter moves upwards it hooks the various teeth of the comb device into the respective sockets of the container so as to raise it and overturn the refuse collected in the container into the body of a motor vehicle.

The container socket structure is advantageous because containers of different capacity can be gripped and emptied by a single type of container tipper as the sockets are of standard dimensions for any container capacity. In this respect, the teeth of said single type of container tipper engage some or all of the sockets according to the length and hence the capacity of the container to be gripped and emptied.

However, as already stated, this socket-fitted container has the drawback of having to be wheeled manually into an exact position in front of the comb of the container tipper, thus requiring vehicle personnel to be made available on the ground and hence involving additional cost, and also involving a container positioning operation which takes a relatively long time.

An object of the present invention is to provide a device for gripping socket-fitted containers and overturning them into the body of a motor vehicle in a manner which is automatic and hence obviates the aforesaid drawbacks.

This and further objects of the invention will be apparent to the expert of the art on reading the ensuing description.

According to the invention the container tipper for automatically gripping socket-fitted refuse bins and overturning them into the body of a motor vehicle is essentially characterised by comprising a rocking structure alignable with the bin, a plurality of arms, each having an end block intended to engage a respective socket of said bin, means associated with said arms to move them from a first substantially vertical position to a second position angularly inclined to said rocking structure, means for preventing the rocking of the structure and means for locking the bin onto said rocking structure during its overturning.

The container tipper of the invention is illustrated by way of example on the figures of the accompanying drawings, in which:

Figure 1 is a schematic rear view of a motor vehicle provided with the container tipper of the invention;

Figure 2 is a front view of the overall container tipper;

Figure 3 is a view of the container tipper from above, on the line D-D of Figure 2;

Figure 4 is a section on the line C-C of Figure 2;

Figure 5 is a section on the line B-B of Figure 2;

Figure 6 is a section on the line A-A of Figure 2;

Figures 7a, b, c, d and e schematically illustrate the various operating stages of the container tipper.

With reference to said figures, the container tipper, indicated overall by 1, comprises conventionally a pair of slide guides 2 mounted on a motor vehicle body 3. The container tipper is operated conventionally by a cylinder 4, which moves it from a first position alongside the body 3 into a position for overturning into this latter the refuse contained in a bin 5 which is provided on its front face with a plurality of sockets designed to cooperate with a comb device forming part of the container tipper 1.

With particular reference to Figures 2-6, the container tipper 1 consists of a lifting frame 6 provided with a pair of mutually rigid arms 7 pivoted at 8 to the frame 6. The described structure forms part of the previous Italian patent application No. 24109 A/84.

Rigid with the frame 6 there is a fixed structure 9 provided with a pair of hinges 10 cooperating with a vertical pin 11 on which there is hinged a rocking structure 12 housing two groups 13 and 14 of arms 13', 13'', 13''' and 14', 14'', 14''' intended to engage the sockets of the container 5, as will be apparent hereinafter.

For clarity, reference will be made only to the first group 13, the second group 14 being identical to the first.

The arms 13' and 13''' are pivoted to the rocking structure 12 by simple pins 15, and by means of brackets 16 support the central arm 13'' which is provided with a pin 17 cooperating with a slot 18 in the rod of a hydraulic cylinder 19 pivoted at 20 to the frame 12. The arms 13',....14',.... conventionally comprise end blocks 21, representing those parts of the container tipper which engage the sockets.

As stated, the structure 12 is rockable by virtue of the pin 11. To prevent rocking of the structure for the reasons described hereinafter, a pair of cylinders 22 pivoted at 23 to the lifting frame 6 are provided, their rod being connected at 24 to a locking element 25 pivoted to the frame 6 at 26.

To lock the bin 5 when gripped by the blocks 21 and during lifting, there is pivoted to the frame 6 at 26, practically to the side of the cylinder 22, a further cylinder 27 having its rod connected at 28

to a locking element 29 pivoted at 30 to the frame 6. On the end of the element 29 there is fixed a crosspiece 31 extending along the entire width of the structure 12.

The proposed arrangement also allows the container tipper to move laterally from its normal rest position.

This is achieved by providing slide means 32 slidable along a support guide 33 rigid with the body 3, said slide means being controlled by a hydraulic cylinder 34. The container tipper can be moved by the cylinder 34 in either direction.

In operation, as illustrated in Figures 7a, b, c, d and e, the bin 5 is roughly centered initially, for example using a first telecamera T1. Fine centering is determined by using the cylinder 34, then the container tipper is moved outwards and the rocking structure 12 simultaneously unlocked by disengaging the locking elements 25 by operating the cylinder 22. Operating in this manner, the rocking structure 12 arranges itself exactly parallel to the bin 5 as soon as it makes contact with it. As shown in Figure 7b, a pair of sensors 3 determine and control the alignment of the rocking structure 12 with the bin 5 and automatically terminate the outward movement of the container tipper 1.

As shown in Figure 7c, the two arm groups 13 and 14 are released by operating the cylinders 19. Because of the presence of the slots 18, the groups 13 and 14 lie by gravity against the front part of the bin 5.

The reason for providing two arm groups 13 and 14 is to be able to use the same container tipper 1 for gripping two smaller bins 5 which are side by side but not perfectly aligned.

In this latter case the first group operates on the first bin and the second on the second bin.

As shown in Figure 7c, the raising of the container tipper begins and continues until the blocks 21 have engaged the bin sockets. A sensor (not shown) associated with one or more of the blocks 21 senses when this engagement has taken place, terminates the raising operation and then retracts the arm groups 13 and 14 by operating the cylinders 19, which during this stage exert a pulling action on the pins 17 by means of the end of the slot 18. When the arms have been completely retracted, the locking elements 25 are operated by the cylinders 22 to return the rocking structure 12 to its correct position (Figure 7d).

During the raising operation the locking elements 29 are operated by the cylinder 27 so that their crosspiece 31 acts on the top of the socket to lock the socket and hence the bin 5 between the crosspiece 31 and the blocks 21, so enabling the bin to be overturned (Figure 7e) and hence emptied.

Claims

1. A container tipper for automatically gripping socket-fitted refuse bins and overturning them into the body of a motor vehicle, characterised by comprising a rocking structure (12) alignable with the bin (5), a plurality of arms (13', 13''..., 14', 14''...), each having an end block intended to engage a respective socket of said bin, means (19) associated with said arms to move them from a first substantially vertical position to a second position angularly inclined to said rocking structure, means (25) for preventing the rocking of the structure (12) and means (29) for locking the bin onto said rocking structure during its overturning.

2. A container tipper as claimed in claim 1, characterised in that said arms are combined into one or more groups (13, 14), each group being provided with operating means (19).

3. A container tipper as claimed in the preceding claims, characterised in that the operating means (19) for the arms and/or arm groups comprise a cylinder, the rod of which is provided with means (18) to allow said arms and/or arm groups to freely rotate into said second position and be controlledly returned from said second position to said first position.

4. A container tipper as claimed in claim 3, characterised in that said means allowing free and controlled rotation of said arms consist of slots (18) or the like cooperating with pins (17) associated with said arms.

5. A container tipper as claimed in the preceding claims, characterised by comprising means (32, 33, 34) for determining, relative to said body (3), controlled movements of said container tipper about its normal rest position.

6. A container tipper as claimed in the preceding claims, characterised by being mounted on raising guides (2) of conventional type by means of a lifting frame (6), said lifting structure comprising on its centre line a pair of hinges (10) which cooperate with a pin (11) forming the pivot for the rocking of said structure (12).

7. A container tipper as claimed in one or more of the preceding claims, characterised in that the blocks (21) comprise sensor means arranged to indicate when the engagement of the bin has taken place.

A container tipper as described, illustrated,

claimed and for the objects specified.

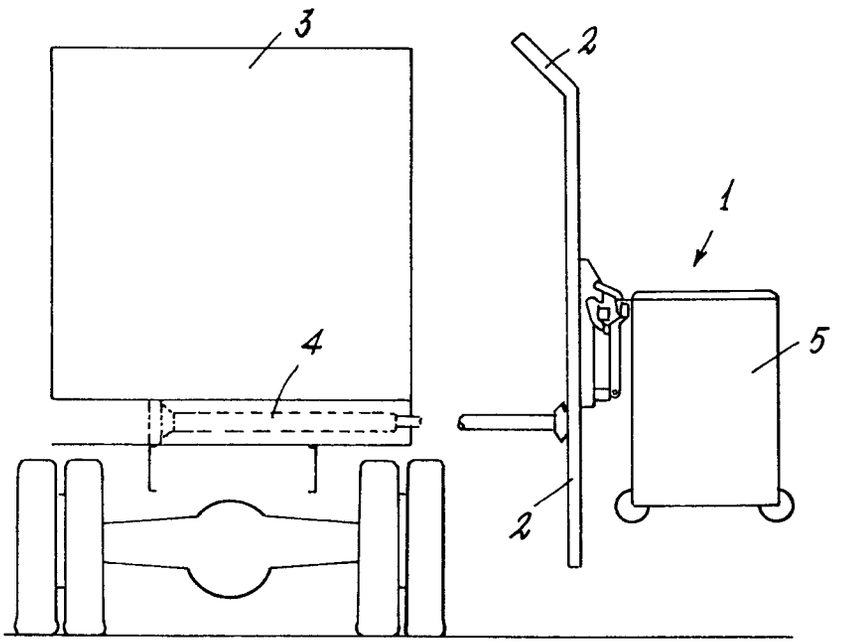


Fig. 1

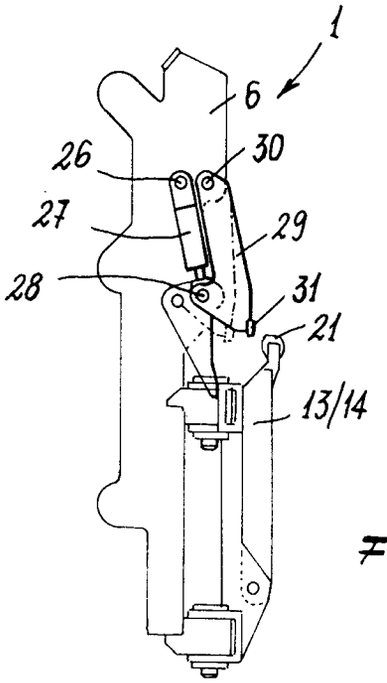
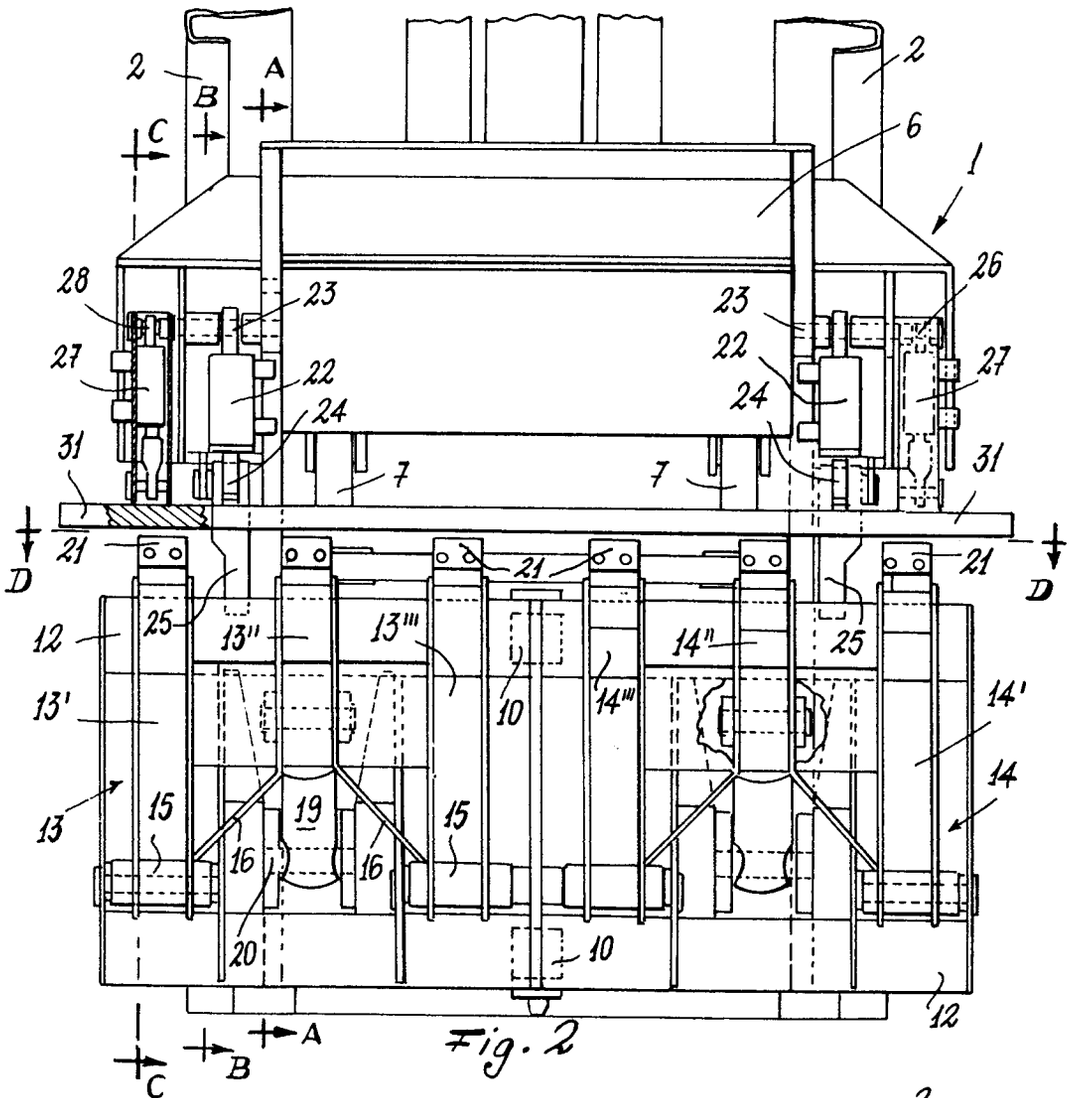


Fig. 4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13
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Fig. 2

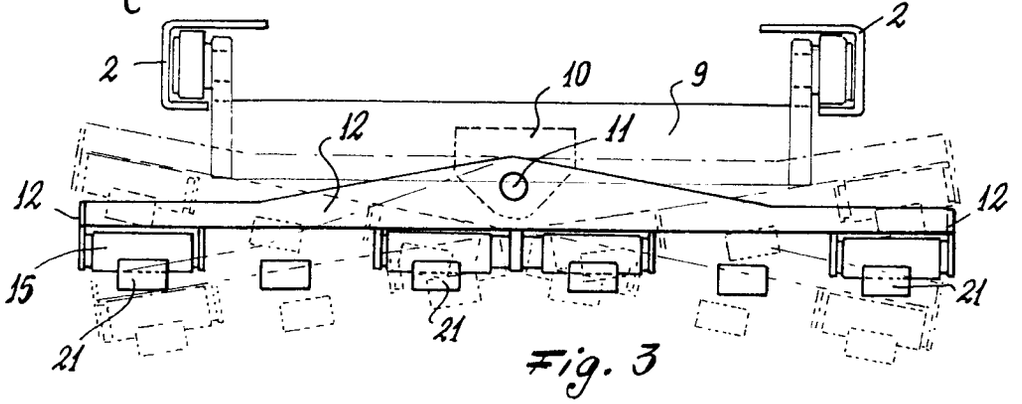
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Fig. 3

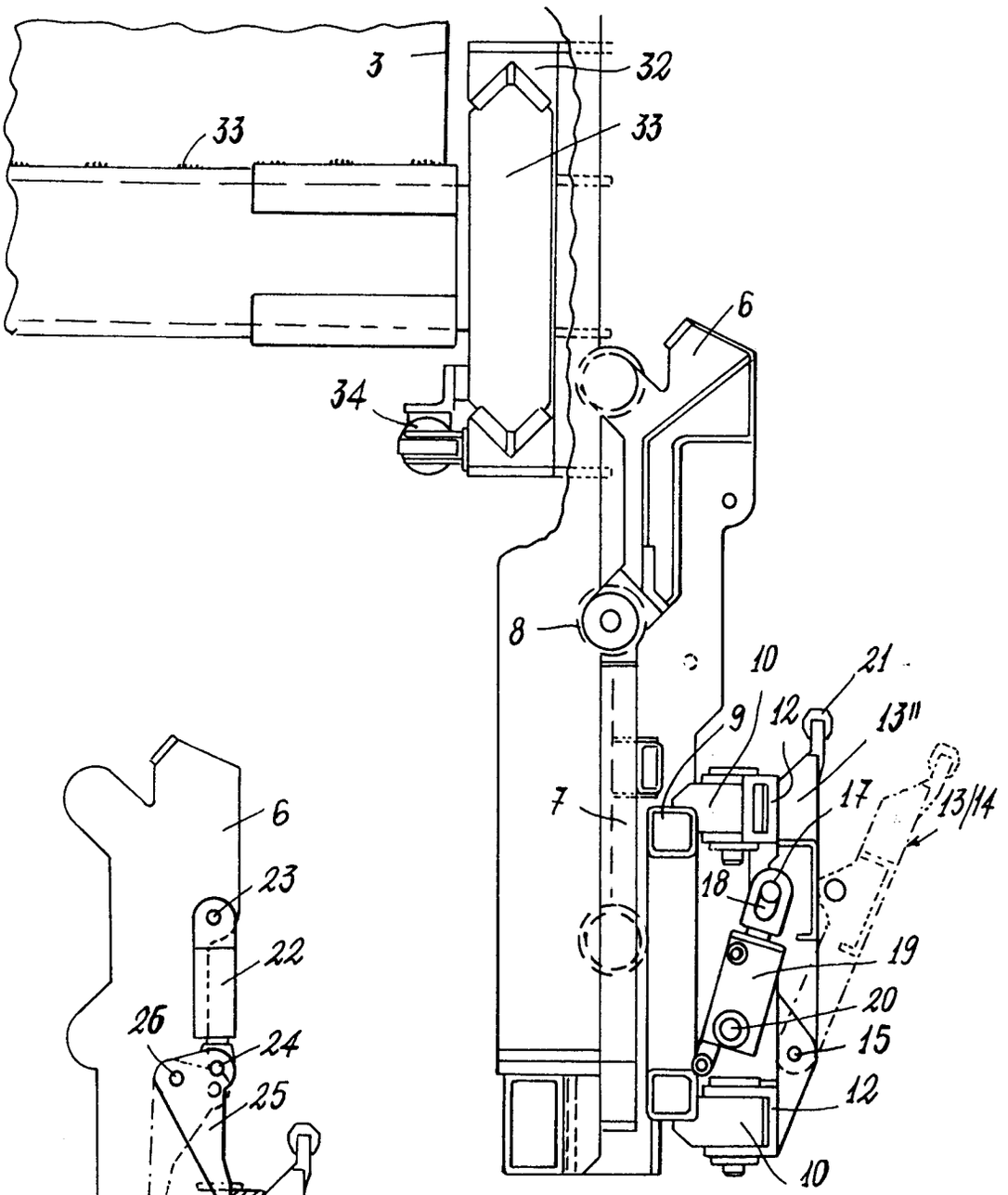
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Fig. 6

6
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Fig. 5

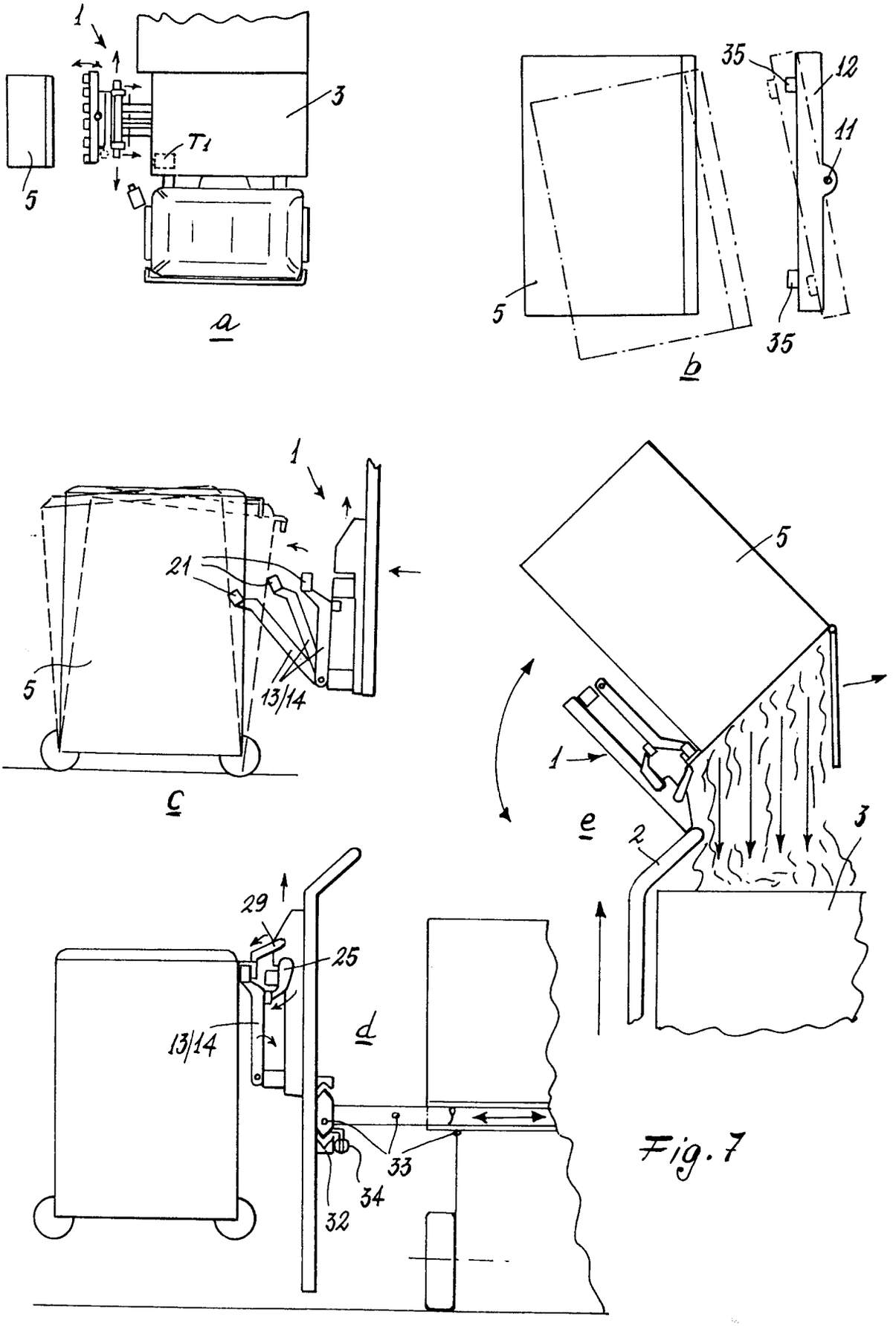

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number

EP 91 10 8624

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)
X,Y	EP-A-0 268 883 (NAAB) * column 9, line 40 - column 10, line 7 * * column 17, line 10 - column 18, line 51; figures 2,3,10,12 *	1,5,7	B 65 F 3/08
D,Y	GB-A-2 168 316 (LONGARETTI) * figure 2 *	5	
Y	EP-A-0 173 180 (WÜRTZ&NAAB) * column 11, line 37 - line 52; figures 1,2 *	7	
A	EP-A-0 078 011 (KAMPWERTH)		
A	EP-A-0 010 719 (NAAB)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B 65 F

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	30 September 91	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 catagory
A : technological background
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