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

(11) Publication number: **0 314 238 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88202327.8**

(51) Int. Cl.[4]: **B65F 3/00 , B65F 3/20**

(22) Date of filing: **18.10.88**

(30) Priority: **26.10.87 NL 8702545**

(43) Date of publication of application:
03.05.89 Bulletin 89/18

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

(71) Applicant: **GEESINK B.V.**
Betonweg 8
NL-8305 AG Emmeloord(NL)

(72) Inventor: **Barmentloo, Adrianus**
16, Meteorenstraat
NL-8303 BA Emmeloord(NL)

(74) Representative: **Barendregt, Drs. F. et al**
EXTERPATENT B.V. P.O. Box 90649
NL-2509 LP 's-Gravenhage(NL)

(54) Container with several compartments for a refuse lorry, and refuse lorry provided with such a container.

(57) A container (2) for a refuse lorry is divided by means of at least one horizontal partition (3) into several compartments (4,5) lying above each other. The filling openings of the compartments (4,5) are disposed on the rear of the container (2). The container (2) is provided on the rear with a rear loader (6) having a filling opening (7) and a compacting mechanism (8). The rear loader (6) has a trough (21) which is divided in by means of at least one horizontal partition (22) into several compartments (23,24) lying above one another and corresponding to the compartments (4,5) of the container (2). The compartments (23,24) connect to the filling opening (7) via slide plates (25,26). With this container (2) different types of refuse separated from each other, can be deposited each in one of the compartments (4,5) of the container (2).

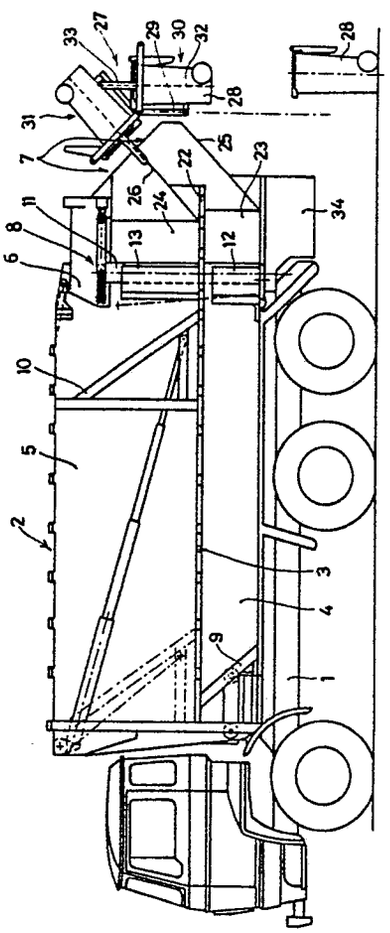

FIG. 1

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Container with several compartments for a refuse lorry, and refuse lorry provided with such a container.

The present invention relates to a container for a refuse lorry, which is divided by means of at least one horizontal partition into several compartments lying above one another, each of which is provided with a pusher blade and a filling opening.

A refuse lorry with a container of the above-mentioned type is known from, for example, German Patent Specification 3,537,546.

In this known refuse lorry the compartments are loaded by means of side loading at the front of the container through openings positioned above one another. Each compartment contains a packing blade. The position of this packing blade relative to a loading opening determines which compartment is loaded. The packing blade also presses the load backwards and acts as a pusher blade when the unloading flap of the compartment at the rear of the container is open.

This known refuse lorry has a number of disadvantages. In the first place, the loading takes place at the side, which is dangerous for the loaders, on account of projecting parts in the direction of travel, and is difficult because of parked cars and obstacles on the kerb. Besides, it is necessary to have an indicator between a refuse container with a certain contents and the position of the various packing blades. The refuse is compacted by moving the packing blade fully back, which takes additional time because loading cannot be carried out during the movement of the pusher blade. If the packing blade is moved back partially to save time, the compacting will not be optimum and uniform, since there is no compacting mechanism with retaining device. Another disadvantage is that if the refuse has to be dumped into a lower compartment, the refuse has to pass the upper cylinder for operating the packing blade of an upper compartment. The cylinder thus has to be screened, and the refuse can become caught up in this screen.

The object of the invention is then to provide a container of the above-mentioned type which does not have the above-mentioned advantages.

This object is achieved with a container of the above-mentioned type, which is characterized in that the filling openings of the compartments are disposed on the rear of the container, and the container is provided on the rear with a rear loader having a filling opening and a compacting mechanism with which different types of refuse separated from each other, can be deposited each in one of the compartments of the container.

The design means that the container - and the refuse lorry provided with such a container - has no parts which project to the side, and is thus safe for the loaders, and during the collection of domestic refuse there is no problem with obstacles at the side of the street and on the pavement. Besides, known systems which have been tested in practice, and which have a new application here, can be used for the pusher blade and the compacting mechanism.

Further expedient and practical embodiments of the container according to the invention are described in dependent claims 2 - 8.

The invention also relates to a refuse lorry provided with a container according to the invention.

The invention will be explained in greater detail below by a description of an example of an embodiment, which reference to the drawing, in which:

Fig. 1 shows a schematic side view of a refuse lorry provided with a container according to the invention,

Fig.2a-2d shows the principle and the different positions of acompacting mechanism used in the refuse lorry according to Fig. 1, and

Fig. 3 shows a refuse container on a container cradle of a loading device for the container according to the invention.

In the refuse lorry shown in Fig. 1 a container 2 is provided on the chassis 1. Said container is provided with one or more horizontal partitions 3, dividing the container into a number of compartments 4 and 5 lying above one another. The compasrtment 4 for the heaviest refuse (fruit, vegetable and garden refuse) is at the bottom of the container 2. The position of the horizontal partitions 3 can be adjusted depending on the specific weight of the various refuse materials. The refuse lorry shown in Fig. 1 has a container 2 which is divided by means of one horizontal partition 3 into two compartments 4 and 5. Each compartment 4, 5 is provided with a filling opening at the rear.

The container 2 is provided at the rear with a rear loader 6, having a filling opening 7 and a compacting mechanism 8, by means of which different types of refuse separated from each other, can be deposited each in one of the compartment 4, 5 of the container 2.

A pusher blade 9, 10, which can act as a counter-pressure blade if necessary, is provided in each of the compartments 4, 5. After the rear loader 6 has been opened, refuse materials can be unloaded indepedently of each other by means of the pusher blade 9, 10 in question.

The compacting mechanism 8 comprises a rotary vertical shaft 11, on which a packing blade 12, 13 is fixed for each compartment 4, 5. As can be seen from Fig. 2, a lever 14 is fixed on the top side of the rotary shaft 11.

The piston rods of two cylinders 17 and 18 are hingedly connected to the lever 14 at points 15 and 16 of said lever 14. The cylinders 17 and 18 are hingedly connected to the rear loader 6 at points 19 and 20. The arrangement of these cylinders 17 and 18 is such that (see Fig. 2a-2d):

- each packing blade 12, 13 can make a circular stroke covering 210 degrees (105 degrees to the left and 105 degrees to the right);
- the two cylinders 17, 18 are not at their dead centre simultaneously;
- the two cylinders 17, 18 can exert a pressure running up to the maximum over a range of 90 degrees towards both sides.

Each packing blade 12, 13 makes the same rotary movement and moves in a trough 21 which is in the shape of a semi-circular vertical cylinder whose vertical end edges connect to the container 2. This trough 21 is also divided by means of a number of horizontal partitions 22 (one partition 22 in the embodiment illustrated) into compartments 23 and 24, corresponding to the compartments 4 and 5 of the container 2. The compartments 23 and 24 of the trough 21 connect via slide plates 25, 26 to the filling opening 7.

A loading device 27 is fixed on the rear loader 6. Two refuse containers 28 (so-called mini-containers) can be handled simultaneously and indepently of each other with this loading service.

The loading device 27 comprises two container cradles 29. With each container cradle 29 a refuse container 28 to be handled can first be lifted vertically along a guide frame which is not shown here, or via an arched track by lifting arms not shown here, by means of a known drive. The loading device 27 had also a tilting mechanism, not shown here, with which a lifted container cradle 29 with refuse container 28 can be tilted from the position indicated by 30 into the position indicated by 31 in Fig. 1 above the filling opening 7.

The loading device 27 shown here is designed for the handling of refuse containers 28 which are divided into compartments by means of a partition 32. The loading device is for that purpose provided with a dividing wall 33 against which the partition 32 of such a refuse container 28 rests when it is lifted to the top position by the container cradle 29. The dividing wall 33 is disposed in such a way that during the tilting movement of the container cradle 29 with refuse container 28 the dividing wall 33 remains in contact with the partition 32 of the refuse container 28 and tilts along with the refuse container 28. At the end of the tilting movement the dividing wall 33 connects to the slide plate 26. In this way the refuse which is separate in the container 28 will also go separately into the two compartments 23 and 24 of the rear loader 6, and will go from there through the appropriate packing blade 12, 13 into the appropriate compartment 4, 5 of the container 2.

In the embodiment shown the dividing wall 33 is transverse to the lengthwise direction of the container 2. It is, however, also possible to turn the dividing wall 90 degrees, so that it ends up in the lengthwise direction of the container. The slide plates in the rear loader will have to be adapted accordingly. This modified embodiment of a loading device is suitable for handling refuse containers in which the partition is turned 90 degrees relative to the partition 32 in the refuse containers 28 shown in Fig. 1.

It is also possible to use a loading device with which two ordinary refuse containers without compartment division can be handled. A refuse container with refuse A is then handled with the one container cradle and a refuse container with refuse B with the other container cradle. Each container cradle connects to its own compartment in the rear loader and the container 2. Alternatively, the use of, for example, an optical indicator operating on colour offers the possibility of emptying green containers with heavy fruit, vegetable and garden refuse automatically into the bottom compartment and grey containers with lighter refuse automatically into the top compartment. Both the green and the grey containers can thus be handled by both container cradles. When refuse containers without a compartment division are used refuse containers with different types of refuse are emptied on different levels.

Each container cradle 29 is provided with known pick up elements 35 which can grasp onder the downward flanged top rim of a refuse container 28 (Fig. 3). Each container cradle 29 is also provided with a vacuum operated suction cup 36, with which the refuse container 28 is held during the tilting movement. Such a suction cup has the advantage that catch arms catching the refuse container during the last part of the tilting movement are not necessary. When refuse containers without a compartiment division are used, said refuse containers being emptied on different levels, the application of catch arm would entail great technical difficulties. Another advantage of the application of a vacuum operated section cup is that the use of a much more complicated locking mechanism normally associated with pick up elements of the type shown in Fig. 3 is no longer necessary. Fur such a locking mechanism each container cradle must be provided with a movable hook construction and an steel angle section must be fitted on each refuse

container. These angle sections have the disadvantage that stacking of empty refuse containers is made impossible, so that transportation costs will raise disproportionately. Fitting the angle sections afterwards will entail additional costs.

The movements of the pusher blades 9 and 10, the compacting mechanism 8, the rear loader 6 and the loading device 27 are carried out by means of a hydraulic system via cylinders.

A space 34 is available at the bottom of the rear loader for collection of chemical waste such as oil, paint, and large and small batteries.

A refuse lorry with a container of the above-described type according to the invention has the following advantages:

- The system permits uniform loading, so that the stability of the vehicle is ensured.
- The loading device is not at the side, but solely at the rear of the body, which is safe for the loaders, and there is no problem with obstacles at the side of the street and on the pavement.
- It is possible to use different systems for the collection of refuse, namely with refuse containers which are divided into compartments, and with refuse containers which are not divided into compartments.
- It is possible to use two container cradles operating independently of each other, which doubles the collection capacity.
- As regards the pusher blade and the compacting mechanism, use is made of known systems which have been tested in practice, and which have a new application here.
- Separation of the refuse remains ensured, both during loading and during unloading. There is a possibility for taking away chemical waste.

Claims

1. Container (2) for a refuse lorry, which is divided by means of at least one horizontal partition (3) into several compartments (4,5) lying above one another, each of which is provided with a pusher blade (9,10) and a filling opening, characterized in that the filling openings of the compartments (4,5) are disposed on the rear of the container (2), and the container (2) is provided on the rear with a rear loader (6) having a filling opening (7) and a compacting mechanism (8) with which different types of refuse separated from each other, can be deposited each in one of the compartments (4,5) of the container (2).

2. Container according to Claim 1, characterized in that the rear loader (6) has a trough (21) which is divided by means of at least one horizontal partition (22) into several compartments (23,24) which lie above one another and correspond to the compartments (4,5) of the container (2), and which connect via slide plates (25,26) to the filling opening (7).

3. Container according to Claim 2, characterized in that the trough (21) is in the shape of a semi-circular vertical cylinder whose vertical end edges connect to the container (2), and the compacting mechanism (8) comprises at least a rotary vertical shaft (11) on which a packing blade (12,13) for each compartment (4,5) is fixed in such a way that each packing blade (12,13) can make the same rotary movement.

4. Container according to any one of Claims 1-3, characterized in that a loading device (27) is fitted on the rear loader (6) for the handling of refuse containers (28), comprising at least one container cradle (29) with which a refuse container (28) to be handled can be lifted upright along a guide frame, or by means of lifting arms via an arched path, and a tilting mechanism for tilting the lifted container cradle (29) with refuse container (28) to above the filling opening (7).

5. Container according to Claim 4, characterized in that the loading device (27) is designed for handling refuse containers (28) which are divided into compartments by means of a partition (32), and is provided with at least one dividing wall (33) against which the partition (32) of such a refuse container (28) rests when it is lifted to the top position by the container cradle (29), said dividing wall (33) being disposed in such a way that during the tilting of the container cradle (29) with refuse container (28) it remains in contact with the partition (32) of the refuse container and tilts with the refuse container, and at the end of the tilting movement connects to the slide plate (26).

6. Container according to Claim 4, characterized in that the loading device (27) is designed for simultaneous and independent handling of preferably two refuse containers, and the rear loader (6) is provided with means for guiding the refuse from a particular refuse container (28) to one of the compartments (4,5) of the container (2).

7. Container according to Claim 6, characterized in that the loading device (27) is provided with detection means for detecting the type of refuse.

8. Container according the any one of Claims 4-7, characterized in that each container cradle (29) is provided with pick up elements (35) and a vacuum operated suction cup (36) with which a refuse container on the container cradle is held during the tilting movement.

9. Container according to any one of the claims 1-8, characterized in that the rear loader (6) is provided with a space (34) for taking chemical waste.

10. Refuse lorry provided with a container (2) according to one or more of Claims 1-9, mounted on the chassis (1) of the lorry.

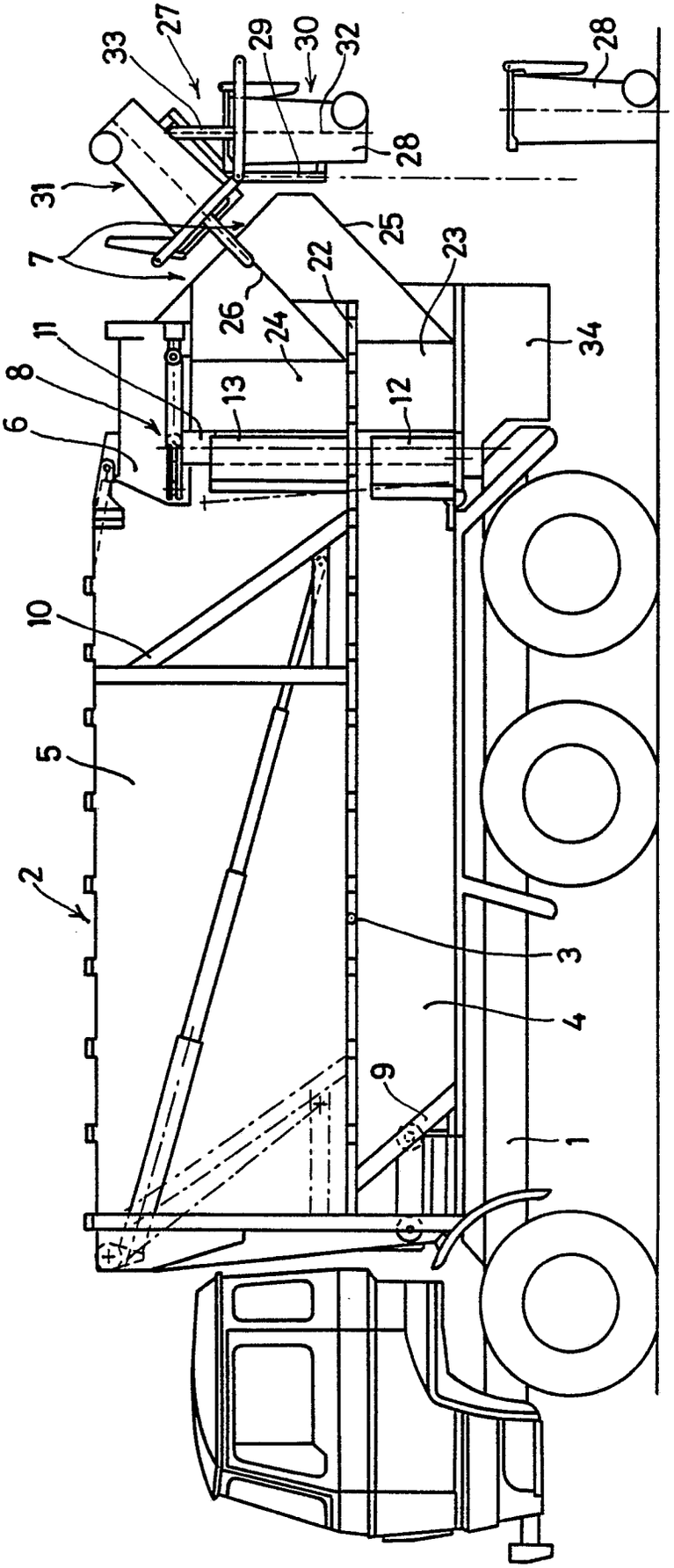

FIG. 1.

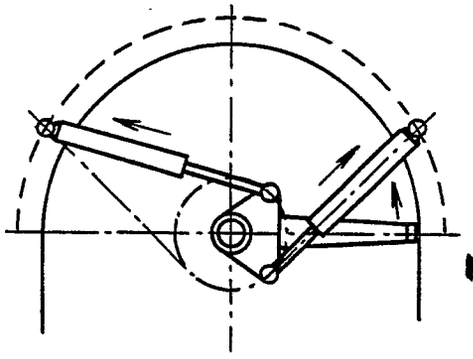

Fig. 2b.

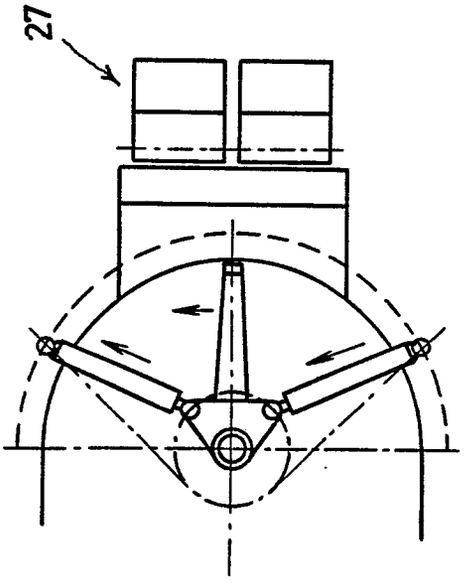

Fig. 2d.

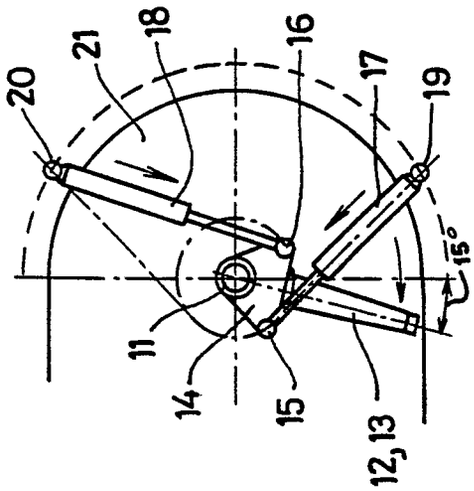

Fig. 2a.

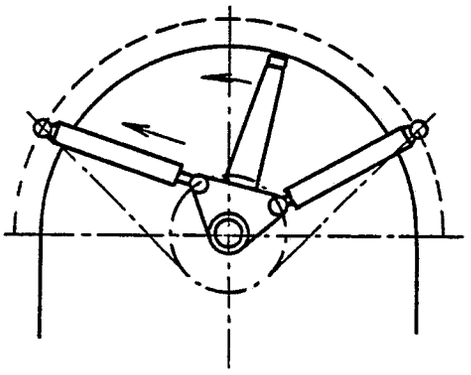

Fig. 2c.

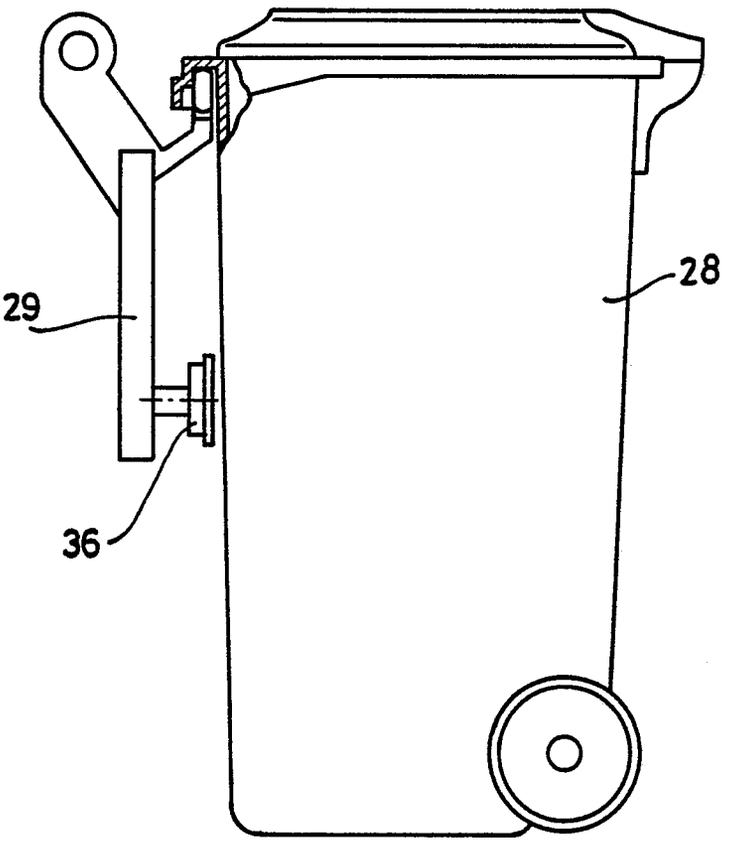

Fig : 3.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 20 2327

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.4)
A	DE-A-2 914 532 (M-U-T) * Page 9, line 21 - page 10, line 22; page 14, paragraph 2; figures 1,13 *	1	B 65 F 3/00 B 65 F 3/20
D,A	DE-A-3 537 546 (KNIERIM) * Column 5, line 50 - column 7, line 11; column 7, line 67 - column 8, line 36; figures 1-5,7,10,11 *	1,4,5,7	
P,A	DE-A-3 703 557 (WÜRTZ) * Abstract; figures 1-3 *	1,4,5	
A	DE-A-2 558 466 (EDELHOFF) * Page 7, line 8 - page 8, line 7; figures 1-3 *	4,8	
A	GB-A-1 032 920 (S.I.T.A.)		
A	FR-A-2 336 320 (DORNIER)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31-01-1989	MARTENS L.G.R.

CATEGORY OF CITED DOCUMENTS

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