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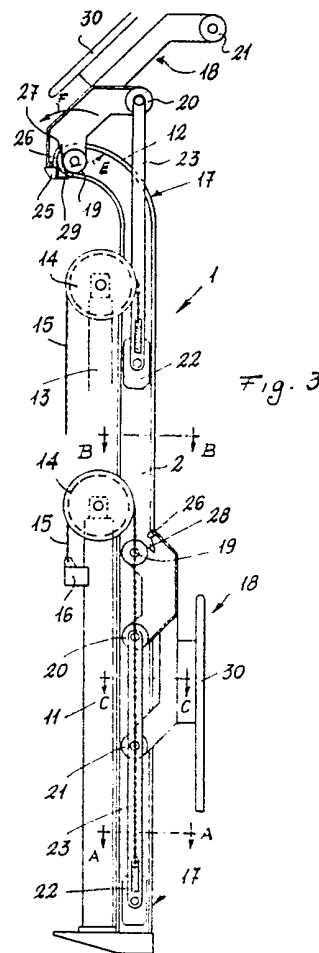
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(54) Device for overturning refuse bins into the body of a collection vehicle

(57) This invention relates to a device for overturning refuse bins into the body of a collection vehicle. The device is of the type comprising a pair of guides 2 approachable to and withdrawable from said collection vehicle body, and a carriage 18 mobile along said guides and provided with gripping and release means for said bin, and is characterised in that said guides comprise a curved end part 12 with terminal stop members 25. The carriage comprises pairs of wheels 19-21 cooperating with said guides, one of said pairs of wheels 19 cooperating with said terminal stop members for overturning said carriage as a result of the raising of this latter by means of a ram 11.



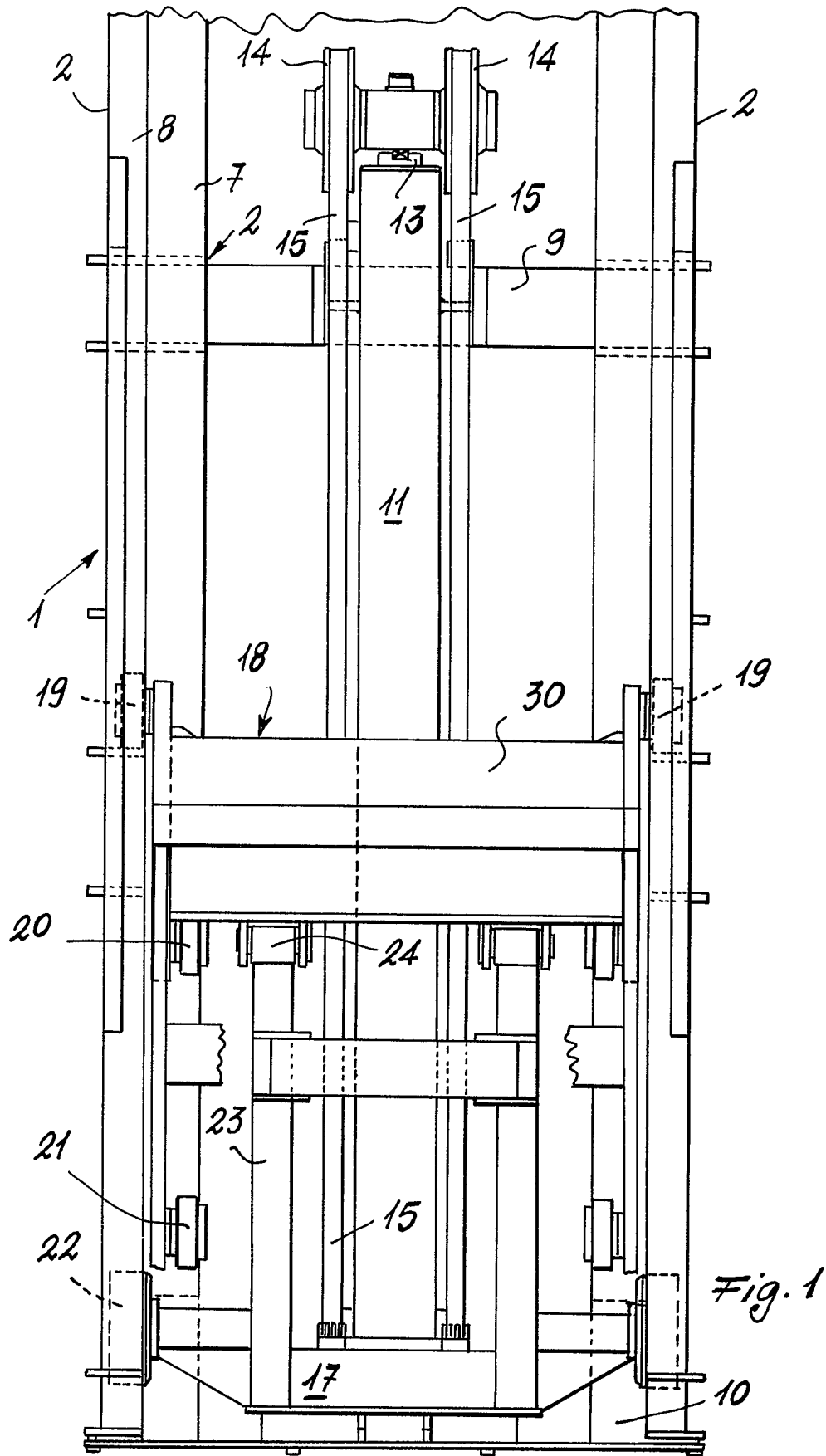


Fig. 1

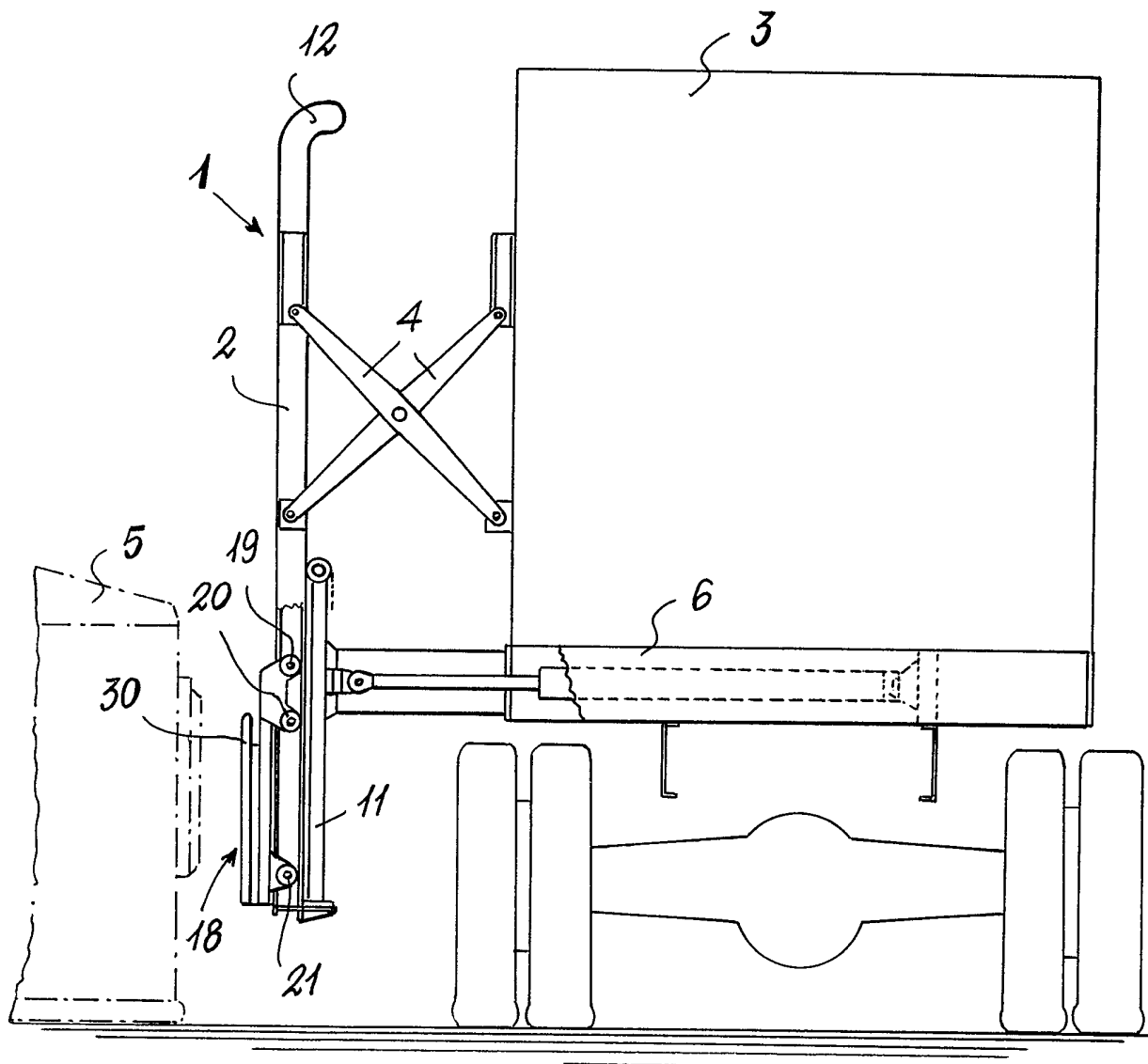


Fig. 2

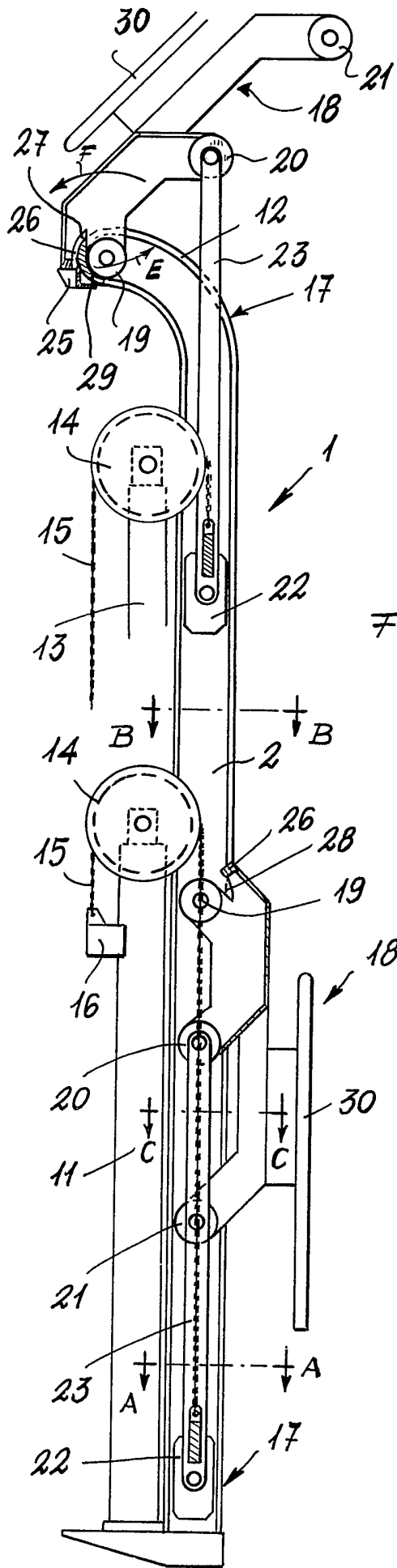
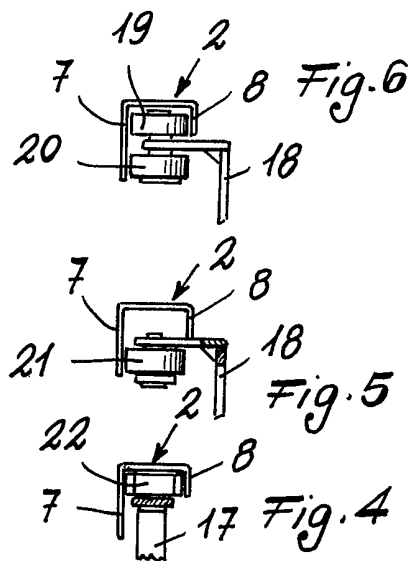


Fig. 3



## SPECIFICATION

**Device for overturning refuse bins into the body of a collection vehicle**

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This invention relates to a device for overturning refuse bins into the body of a collection vehicle.

Various methods are currently known for emptying bins into a vehicle body, but these conventional methods have various drawbacks. Those methods in which a pair of guides are made to approach and to withdraw from the side of the vehicle body incorporate a bin gripping and release carriage which is made to slide along the guides by suitable devices, and they require specific means for overturning the bin which are of complicated, bulky and costly structure.

The object of the present invention is to provide a device for overturning bins, in which the overturning is effected simply and reliably by the mere effect of the raising of the carriage.

In particular, the device according to the invention is of the type comprising a pair of guides approachable to and withdrawable from the body of a collection vehicle, and a carriage mobile along said guides and provided with gripping and release means for said bin, and is essentially characterised in that said guides comprise a curved end part with terminal stop members, said carriage comprising pairs of wheels cooperating with said guides, one of said pairs of wheels cooperating with said stop members for overturning the carriage as a result of the raising of this latter.

According to an important characteristic of the invention, said guides have a C cross-section constituted by a wide flange and an opposing narrow flange, a first pair of said wheels cooperating with said wide flange and with said opposing narrow flange, and the second pair cooperating only with said wide flange, the first pair of wheels being disposed overlying said second pair, this latter being provided on the ends of uprights of a frame provided with slide blocks caused to slide along the guides by drive means, which advantageously comprise a hydraulic cylinder and a cable system.

The invention is illustrated diagrammatically by way of example in the Figures of the accompanying drawings, in which:

*Figure 1* is a front view of the lower part of the device;

*Figure 2* is a side view of the device mounted on the body of a collection vehicle;

*Figure 3* shows the device with the carriage in the lowered and raised (overturning) positions;

and

*Figures 4, 5 and 6* are sections on the lines A-A, B-B and C-C of *Figure 3*.

With reference to said Figures, the device, indicated overall by 1, comprises a pair of guides 2 mounted on a vehicle body 3 by means of a pantograph joint 4. The device 1 is controlled by a cylinder 6 so as to move from a first position alongside the body 3 for overturning into this latter the refuse contained in a bin 5, to a second position for gripping said bin 5 and for returning it to its nor-

mal position.

The guides 2 are of C cross-section, each defined by a wide slide flange 7 and an opposing narrow flange 8, and are joined together by an intermediate crosspiece 9 and a base crosspiece 10, this latter acting as a support for a hydraulic cylinder 11. The upper ends of the guides 2 comprise a curved part 12.

The rod 13 of the cylinder 11 carries a pair of pulleys 14 for the sliding of cables 15 which have one end fixed at 16 to the cylinder 11 (*Figure 3*) and their opposite end fixed to a frame 17 associated with a carriage indicated overall by 18.

The carriage 18 comprises a first pair of opposing wheels 19 arranged to slide along the guides 2 contained between the elements 7 and 8 (*Figure 6*), a second pair of opposing wheels 20 arranged to slide along the guides 2 but only on the wide flange 7 thereof (*Figure 6*), and a third pair of opposing wheels 21 which are also arranged to slide along the guides 2 but only on the wide flange 7 thereof (*Figure 5*).

The frame 17 carries on each side a slide block 22 arranged to slide along the guides 2 contained between the elements 7 and 8 (*Figure 4*), and each slide block is rigid with one end of an upright 23 of the frame 17, the other end of which is hinged at 24 to the carriage 18, the hinge 24 being coaxial with the shafts of the wheels 20.

As can be seen from *Figure 3*, the curved part 12 of each guide 2 carries a stop 25 arranged to cooperate with a tooth 26 provided on the carriage 18, and an appendix 27 arranged to cooperate with a corresponding cavity 28 associated with the tooth 26. An arcuate stop member 29 is also provided.

In the embodiment illustrated, the device by which the carriage 18 grips the bin 5 is indicated by 30, and it not shown in specific detail as it can be constructed in any conventional manner.

When in operation, the cylinder 11 is operated to extract the rod 13 and thus pull the cables 15, to consequently slide the frame 17 and slide blocks 22 upwards. By way of the uprights 23, said slide blocks urge the carriage 18 upwards, this latter resting during this stage with all its wheels 19, 20 and 21 on the wide flanges 7 of the guides 2, and being prevented from overturning outwards by the engagement of the wheels 19 with the narrow flanges 8 of the guides.

On termination of their upward travel, the pair of wheels 19 (*Figure 3*) rests against the arcuate stop members 29, and the continued upward movement of the slide blocks 22 causes the carriage 18 and the bin 5 carried by it to be overturned (arrow F). It should be noted that during the overturning stage, the appendix 27 engages the cavity 28 of the carriage 18 so as to prevent the carriage undergoing any movement in the direction of the arrow E. The engagement of the tooth 26 with the stop 25 limits said overturning travel in the direction of the arrow F.

## CLAIMS

1. A device for overturning refuse bins into the

body of a collection vehicle, said device being of the type comprising a pair of guides approachable to and withdrawable from said collection vehicle body, and a carriage mobile along said guides and  
5 provided with gripping and release means for said bin, characterised in that said guides (2) comprise a curved end part (12) with terminal stop members (29), said carriage (18) comprising pairs of wheels (19, 20, 21) cooperating with said guides, one of  
10 said pairs (19) of wheels cooperating with said terminal stop members for overturning said carriage as a result of the raising of this latter.

2. A device as claimed in claim 1, characterised in that said guides (2) have a substantially C cross-section constituted by a wide flange (7) and an opposing narrow flange (8), a first pair (19) of said wheels cooperating with said wide flange and with said opposing narrow flange, and a second pair (20) cooperating only with said wide flange.

20 3. A device as claimed in claim 2, characterised in that said first pair of wheels is disposed overlying said second pair.

4. A device as claimed in claim 3, characterised in that the wheels of said second pair are mounted  
25 on the ends of uprights (23) of a frame (17) provided with slide blocks (22) caused to slide along said guides by drive means (11, 13, 14 and 15).

5. A device as claimed in the preceding claims, characterised in that the curved end part (12) of the  
30 guides and the carriage are provided with stop means for halting the travel of said carriage and for halting its overturning movement.

6. Conveying apparatus comprising a movable carriage for carrying a load, guide means for guiding  
35 said carriage along a predetermined path in a predetermined orientation, and means for driving said carriage along said path, wherein said guide means and driving means co-operate to tip the carriage at a predetermined stage in its travel whilst  
40 retaining the carriage in engagement with the guide means.

7. Apparatus as claimed in claim 6 arranged to drive said carriage in an upward direction and to tip it through the horizontal at or near the upper-  
45 most extent of its travel.

8. Apparatus for loading refuse bins into a container, substantially as described hereinabove with reference to the accompanying drawings.