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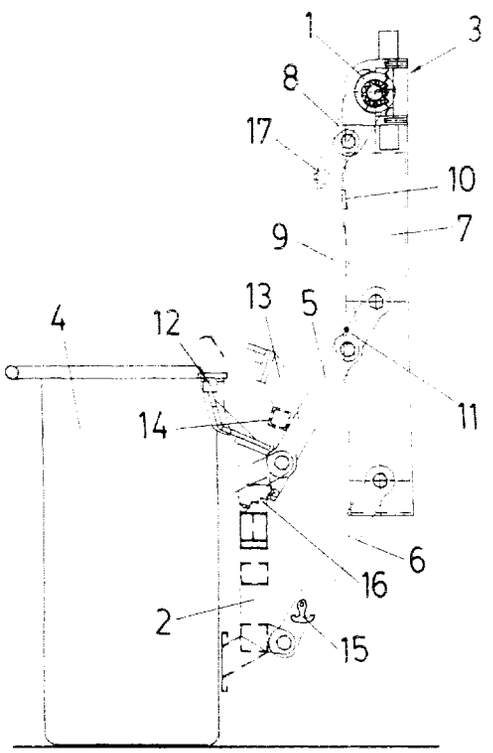
(54) Lifting and tipping device for emptying refuse receptacles

(57) Is used for unloading the garbage contained in a container into a truck, and comprises a main rotation axis (1) driven by a single hydraulic rotatory actuator (3) which produces the rotation of the axis and consequently the elevation of a supporting structure (2) onto which the container (4) is coupled by way of a hinged connecting rod assembly associated to the main axis (1), causing the supporting structure to rotate as a result of the rotatory movement of a movable frame (7), to which frame is also associated the hinged connecting rod assembly which remains integral to the frame during the latter's rotation up to the tilted discharge position in which the garbage is dumped into the truck.

FIG. 1



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Description

OBJECT OF THE INVENTION

The present invention consists in an elevator mechanism used in garbage collecting trucks for raising garbage containers, tipping them inward to dump the contents and subsequently lowering them down to the starting position, the mechanism being formed by a set of connecting rods hinged to each other and to the container's supporting structure and rotatory frame, its displacement resulting from the vertical movement of a single hydraulic rotation actuator laterally integral to the mechanism's main rotatory axis which provides the container with a vertical and rotatory movement.

A further object of the invention consists in incorporating an attachment means which is easily coupled and de-coupled to the garbage container in order to provide it with movement jointly with the supporting structure during the mechanism's tipping phase, furthermore preventing the falling of the container.

BACKGROUND OF THE INVENTION

Container elevator mechanisms applied mainly to garbage collecting trucks use two or more cylinders which provide vertical movement to the structure onto which the container is coupled, plus a horizontal movement for tipping the container and dumping the garbage from its upper position into the truck.

This system requires incorporating a series of adjustment means designed to synchronize the movement of both cylinders to achieve the desired movement of the structure and consequently of the container.

It is therefore necessary to include a hydraulic circuit with a series of control valves and accessories which contribute toward an increase in the complexity of the mechanism and add substantially to the cost of the assembly.

Bearing in mind the problems involved in providing a solution to the above, the development of a more simple mechanical elevator, such as the one described hereunder, is called for.

DESCRIPTION OF THE INVENTION

The present invention optimizes the operating conditions of the container elevator mechanisms presently used in garbage collecting trucks by means of a structure formed by a series of hinged connecting rods driven by a single hydraulic revolving actuator which provides vertical movement to the container in a first phase of its trajectory, plus a tipping motion towards the truck in a subsequent phase of its trajectory.

The single hydraulic revolving actuator is laterally attached to the mechanism's main rotating axis, and to this rotating axis is associated a movable frame onto which are hinged said connecting rods, the frame remaining fixed during the container's vertical trajectory and rotating with the rest of the structure from its vertical elevated position to the uppermost inclined position at which the dumping of the garbage takes place.

Thus, during the movement of the container in a vertical direction the connecting rods move in a way that the container hardly rotates while being raised, said frame remaining in a fixed position and the connecting rods remaining motionless in respect to the frame during the tipping of the container towards the garbage truck, while the frame rotates around the mechanism's main axis and carries with it the set of connecting rods.

It should be noted that, as opposed to other mechanisms, the main rotation axis remains stationary, its rotation merely driving the mechanism which moves the container towards or away from the truck.

Movement of the container is integral to the lateral supporting structure onto which the connecting rods hinge, this action causing the displacement of said supporting structure and consequently of the container.

The supporting structure is fitted with a lower plate in lateral contact with the front face of the container, plus a gripping and holding mechanism in the container's upper base which ensures attachment when tilted.

The hinged connecting rod assembly essentially comprises upper connecting rods integral to the main rotation axis, each or which is hinged at the other end thereof to respective slightly elbowed arms, the lower ends of which are in turn hinged to a sector adjacent one of the ends of an intermediate connecting rod extending between the movable frame and the container's supporting structure, being furthermore fitted with a parallel lower connecting rod which likewise hinges between the movable frame and the container's supporting structure.

The gripping and holding mechanism in the container's upper base, mounted onto the upper end of the supporting structure, comprises a comb provided with upwardly oriented claws which are inserted in recesses at the front upper face of the container, and also comprises a counter-comb which hinges around the supporting structure around which said intermediate connecting rod is also jointed.

The counter-comb is open when the container lies in its lower position, rotating towards the comb and against the container's upper base as the container reaches its upper position, so that the container's attachment to the structure between the comb and the counter-comb is ensured while the container rotates towards or away from the truck's garbage deposit.

The counter-comb is fitted with an internal projection which constitutes a contact and thrusting means for a part shaped as a screw which protrudes from the elbowed arm and which, upon moving upwards, pushes and causes the subsequent progressive rotation of the counter-comb in the direction of the upper base of the container coupled to the comb.

Furthermore, it should be underlined that the coun-

ter-comb is fitted with a spring fixed to its lower end and to the container's supporting structure, said spring being extended when the counter-comb rotates in order to facilitate recovery of the original position of the counter-comb when the latter's extension ceases to make contact with the pusher in the elbowed arm, this condition generating the lowering motion of the container from its maximum vertical elevated position down to the initial lowermost position.

On the other hand, in the elevation phase and once the container has reached its uppermost vertical position and is conveniently secured to the supporting structure with the aid of the counter-comb, the assembly composed of connecting rods and supporting structure starts to rotate jointly with the movable frame.

The elbowed arm comprises an internal support or abutting element which comes into contact with the main rotation axis when the container reaches its the raised position, thus managing to bind the connecting rod assembly to the rotation of the axis and cause the movable frame to rotate until an optimal slanting position is reached wherein the full contents in the container are dumped into the truck.

In order to integrate to a larger extent the hinged connecting rod assembly to the movable frame in order to bind the movement of the supporting structure and container to the movable frame, the lower connecting rod is fitted with a hanging safety hook which rotates by the effect of gravity when the frame tilts up to a position in which the hook anchors onto a stub protruding from the frame. This hook attachment feature prevents unforeseen falls of the hinged structure.

As the frame descends, the hook rotates and becomes disengaged from the stub, the movement of the frame becoming thus liberated from that of the container.

The hook can also be rotated in the opposite direction and coupled onto the stub in order to provide a support for the hinged assembly on the frame when the mechanism is not in operation, thus preventing unintended movement.

Recovery of the container's initial lower position is attained progressively as the single hydraulic rotatory actuator ceases to receive pressure. Being exempt of additional valves and connections, the installation is less complex.

In order to adjust the position of the elevator, the mechanism incorporates a lever designed to increase or reduce the pressure coming from the single hydraulic rotatory actuator.

It should also be stated that the mechanism is applicable to other types of containers, namely of the type fitted with side stubs engaged by anchoring arms extending sideways from the supporting structure and which couple onto said container stubs to facilitate the raising of the container.

The possibility is also contemplated wherein the elevator mechanism is divided into two independent rotatory halves, each of which is equipped with a single hydraulic rotatory actuator fitted with a control which allows for independent or synchronized operation.

In the above case and as a result of the shorter width of the mechanism in question, a single lower connecting rod may be installed in a central position, as opposed to the device using a single mechanism which spans the whole width of the truck and which, as previously described, is fitted with two lower connecting rods.

If the truck is fitted with two mechanisms, the elevators may be operated in an out-of-phase mode, e.g. one of them going up while the other goes down.

DESCRIPTION OF THE DRAWINGS

To complement the description being provided and in order to help toward a better understanding of the characteristics of the invention, a set of drawings is attached to this specification, forming an integral part thereof, wherein the following is shown in an illustrative and non limiting character:

Figure 1 shows a side view of the elevator mechanism with the container in its lower position.

Figure 2 shows a side view of the elevator mechanism with the container in its uppermost vertical position.

Figure 3 shows a side view of the elevator mechanism with the container in its slanted unloading position.

Figure 4 shows a front view of the elevator mechanism.

PREFERRED EMBODIMENT OF THE INVENTION

In the light of these figures, a preferred mode of embodiment of the garbage container elevator mechanism for trucks is described which essentially comprises a main rotation axis (1) driven by a single hydraulic rotatory actuator (3) which produces the rotation and consequently the elevation of a supporting structure (2) onto which the container (4) is coupled by way of a hinged connection rod assembly associated to the main axis (1) ; and rotation of the supporting structure by the rotatory movement of a movable frame (7) also associated to the hinged connecting rod assembly which remains integral to the frame during the latter's rotation up to the tilted discharge position in which the garbage is dumped into the truck.

The hinged connecting rod assembly comprises upper connecting rods (8) integral to the main rotatory axis (1), each of which is hinged at its other end to respective slightly elbowed arms (9), the lower ends of which are in turn hinged to a sector adjacent one of the ends of an intermediate connecting rod (5) extending between the frame (7) and the supporting structure (2) in the container, being furthermore fitted with a parallel lower connecting rod (6) which likewise hinges between the frame (7) and the supporting structure (2) in the container (4) while the container is tilted.

The supporting structure (2) in container (4) com-

prises a supporting comb (12) for said container (4) associated to a rotatory counter-comb (13) around the hinge between the supporting structure (2) and the intermediate connecting rod (5), which counter-comb (13) is fitted with a part (14) extending from it which comes in contact with a pusher (17) located in the elbow of elbowed arm (9) during the raising movement, causing the counter-comb (13) to rotate until it contacts the upper base of container (4) and fixes it in said position.

The counter-comb (13) is fitted with an extensible spring (16) in its upper end, associated at its other end to the supporting structure (2) designed to facilitate the recovery of the initial position of the counter-comb (13) during the lowering of the container (4) from its slanting position.

The lower connecting rod (6) is fitted with a safety hook (15) hanging from it by the effect of gravity which couples onto a stub (11) protruding from frame (7) in order to join the hinged connecting rod assembly and the container's supporting structure (2) with the frame (7) during the frame's rotatory movement, or in the supporting structure's elevated vertical position when the mechanism is not in operation, acting as a safety means.

The elbowed arm (9) is fitted with a supporting block (10) in its inner face which comes in contact with the main axis (1) in order to associate the movement of the hinged assembly to the movement of said rotating axis (1).

This description need not be more extensive for an expert on the subject to grasp the scope of the invention and the advantages deriving therefrom.

The materials, shape, size and arrangement of the elements are liable to variation provided the essential nature of the invention is not altered.

The terms used in this specification must always be taken in their broad and non limiting sense.

Claims

1. Garbage container elevator mechanism for trucks, of the type which is coupled to the container in order to raise it and tilt it for unloading the garbage contained therein into the truck, essentially characterized in that it comprises a main rotatory axis (1) driven by a single hydraulic rotatory actuator (3) which produces rotation of the axis and consequently the elevation of a supporting structure (2) onto which the container (4) is coupled by way of a hinged connecting rod assembly associated to the main axis (1), causing the rotation of the supporting structure by the rotatory movement of a movable frame (7) to which is also associated the hinged connecting rod assembly which remains attached to the frame during the latter's rotation up to the slanting discharge position in which the garbage is dumped into the truck.

2. Garbage container elevator mechanism for trucks, according to the previous claim, characterized in that the hinged connecting rod assembly comprises upper connecting rods (8) integral to the main rotatory axis (1), each or which is hinged at the other end thereof to respective slightly elbowed arms (9), the lower ends of which are in turn hinged to a sector adjacent one of the ends of an intermediate connecting rod (5) extending between the frame (7) and the supporting structure (2) for the container (4), being furthermore fitted with a connecting rod (6) parallel to and lower than the previous connecting rod which likewise hinges between the frame (7) and the supporting structure (2) for the container (4) during the tilting of the container.

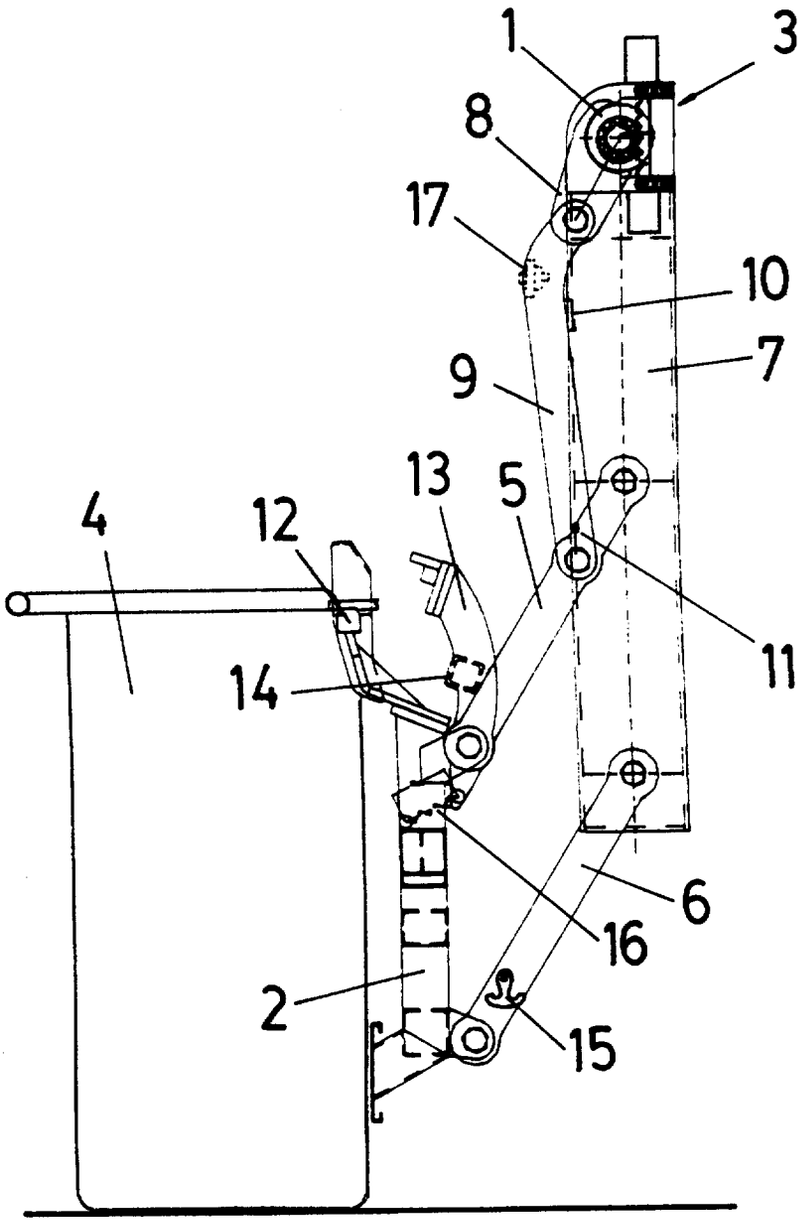
3. Garbage container elevator mechanism for trucks, according to the previous claims, characterized in that the supporting structure (2) for the container (4) comprises an attachment comb (12) for the container (4) and a rotatory counter-comb (13) which hinges around the supporting structure (2) with the intermediate connecting rod (5), which counter-comb (13) is fitted with a pusher (17) located in the elbow of elbowed arm (9) during the raising movement, causing the counter-comb (13) to rotate until it contacts the upper base of container (4) and fixes it in said position.

4. Garbage container elevator mechanism for trucks, according to claim 3, characterized in that the counter-comb (13) is fitted with an extensible spring (16) in its upper end, associated at its other end to the supporting structure (2) in order to facilitate the recovery of the initial position of the counter-comb (13) during the lowering of the container (4) from its slanting position.

5. Garbage container elevator mechanism for trucks, according to claims 1 and 2, characterized in that the lower connecting rod (6) is fitted with a safety hook (15) hanging from it by the effect of gravity and which couples onto a stub (11) protruding from frame (7) in order to join the hinged connecting rod assembly and the container's supporting structure (2) with the frame (7) during the frame's rotatory movement, or in the supporting structure's elevated vertical position when the mechanism is not in operation, acting a safety means.

6. Garbage container elevator mechanism for trucks, according to claims 1 and 2, characterized in that the elbowed arm (9) is fitted with a supporting part (10) in its inner face which comes in contact with the main axis (1) in order to associate the movement of the hinged assembly to the movement of said rotating axis (1).

FIG. 1



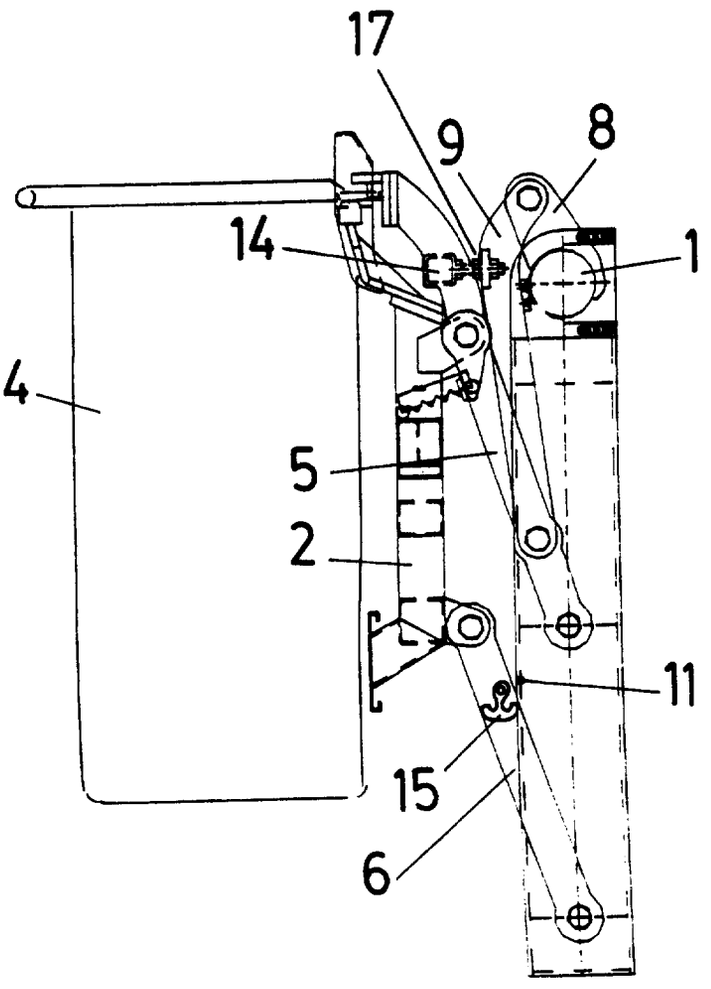


FIG. 2

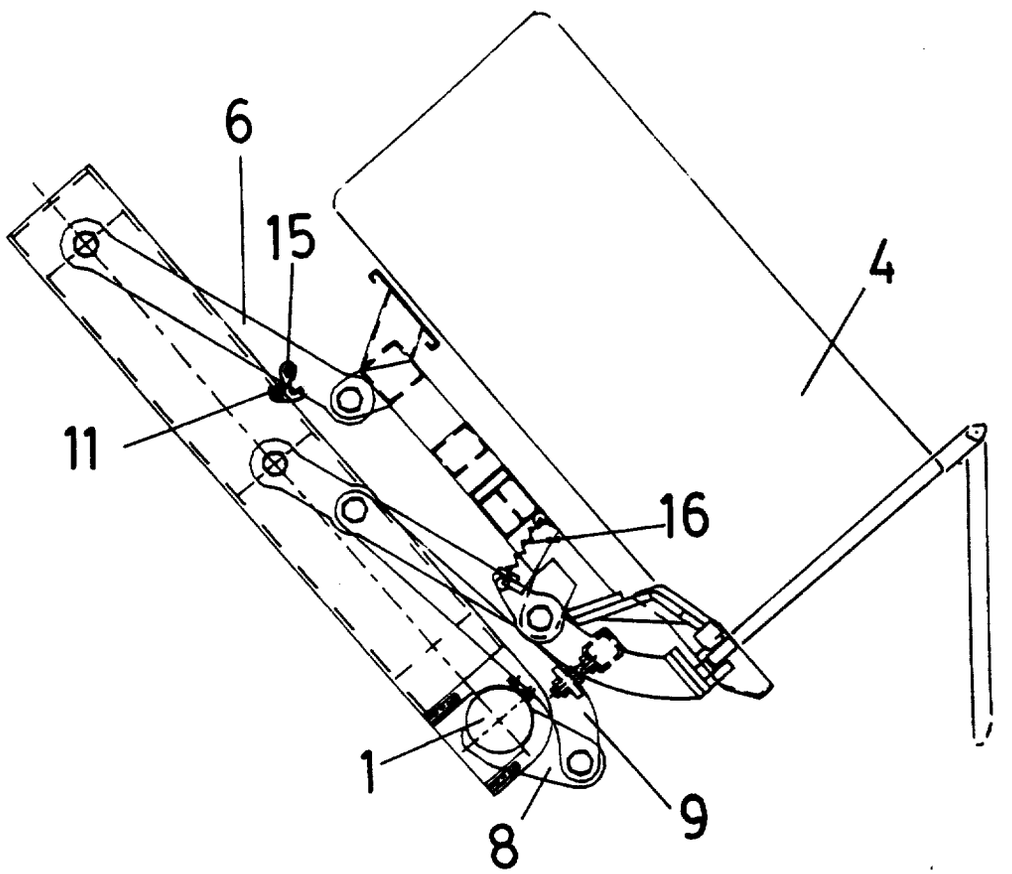


FIG. 3

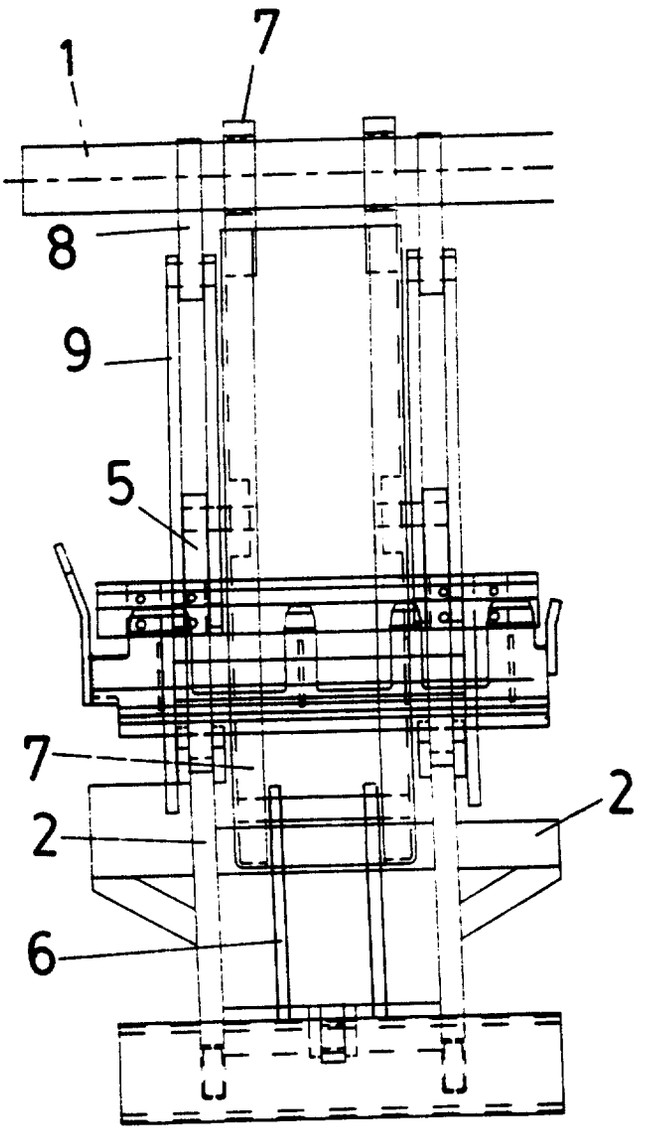


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 97 50 0094

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.6)
Y	EP 0 122 493 A (K. SCHMITZ) * page 4, line 15 - page 8, line 12 * * figures 1-4 *	1-6	B65F3/04
Y	US 4 365 922 A (E. BORDERS) * column 2, line 4 - column 3, line 6 * * figure 4 *	1-6	
Y	WO 94 07773 A (WIRTH GALLO MESSTECHNIK AG) * page 4, line 33 - page 5, line 32 * * figures 4,5 *	3,4	
Y	US 3 286 860 A (J. NAAB) * column 5, line 47 - column 6, line 2 * * figure 5 *	5	
A	EP 0 010 719 A (ZÖLLER-KIPPER GMBH) * page 13, line 19 - page 18, line 3 * * figures 1-5 *	1,2,5	
A	EP 0 358 046 A (ZÖLLER-KIPPER) * column 9, line 52 - column 10, line 25 * * figure 3 *	3-5	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31 October 1997	Smolders, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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