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(54) A TRANSPORTATION CONTAINER AND A VEHICLE INTENDED TO  
 FACILITATE USE OF THIS CONTAINER

(71) We, BENNES MARREL, a French Joint Stock Company of Zone Industrielle, Andrezieux Boutheon (Loire), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to transportation equipment comprising a container and a vehicle intended to facilitate the use of this container.

In the equipment concerned the container is provided with an ejector. A container of this type is used for transporting loose products and in particular household refuse.

A container with an ejector of the known type comprises an internal pusher or ejector able to slide in the container over the entire length of the latter. A long hydraulic telescopic ram is arranged horizontally between the front wall of the container and the plate of the pusher. When the ram is retracted, the pusher is located at the front of the container. The latter may thus be loaded, for example filled with compacted household refuse. The door of the container is then closed and the latter is placed on a vehicle which conveys it to a rubbish dump, or to a factory for the treatment of refuse. More often than not, the vehicle used is a semi-trailer lorry.

Once the vehicle has reached the unloading site, the rear door of the container is opened and the long telescopic ram of the pusher is actuated. The effect of this is to push the plate of the pusher rearwards and to eject the refuse through the rear opening of the container.

The empty container is then returned to its site of use for receiving and compacting refuse, where the empty container is deposited on a storage and waiting surface; then the vehicle receives another full container and begins a new circuit.

This equipment of known type has a serious drawback. In fact, each container must have

its own control members and hydraulic distribution members in order to be able to actuate:

- the ejection pusher on the one hand and
- the system for opening and closing the door on the other hand.

In particular, each container must have its own telescopic ram, i.e. a ram whose extended length is currently of the order of approximately 10 meters, which means that it must be equipped with special guide means for preventing buckling. This ram and its accessories constitute an extremely expensive arrangement which considerably increases the overall price of the container.

To avoid or at least mitigate these drawbacks there is described and claimed in our co-pending Application No. 7928701, (Serial No. 1580459) transportation equipment comprising a container provided with an internal ejection pusher and a rear door which is openable from a closed position and lockable in said closed position, a vehicle on a loading platform of which the container or another similar interchangeable container may be placed, all the hydraulic means for controlling the door of the container and its ejector are permanently mounted on the vehicle, with which they remain integral, whereas for control of its door and ejector, the container comprises mechanical means connection of which to the hydraulic control of the vehicle takes place automatically solely by placing the container on the loading platform.

With such an arrangement it is possible to service several simple and inexpensive containers with a single vehicle which in turn comprises a complete hydraulic power unit.

The present invention concerns a modification of the equipment in our co-pending Application No. 7928701, (Serial No. 1580459) and according to the present invention there is provided transportation equipment comprising a container provided with an internal ejection pusher and a rear door which is openable from a closed position and lockable

in said closed position, a vehicle on a loading platform of which the container or another similar interchangeable container may be placed, all the hydraulic means for controlling the door of the container and its ejector being permanently mounted on the vehicle, with which they remain integral, whereas for the control of its door and ejector, the container comprises mechanical means connection of which to the hydraulic control of the vehicle takes place automatically solely by placing the container on the loading platform, and wherein a system for locking the rear door of the container comprises

- at least one arm whose front end is pivoted on the container by a main pivot whose axis is substantially horizontal in a transverse plane of the container, the rear end of said arm supporting a hook able to co-operate with a finger member integral with the edge of the door opposite a vertical pivot axis about which the door is pivotable to open and close, and
- at least one hydraulically controlled lifting system fitted laterally at the rear in the loading platform of the vehicle and able to actuate the or each locking arm on the container above the upper surface of said platform.

In the ensuing description reference will be made to the accompanying drawings in which Figs. 1 to 16 show transportation equipment disclosed in our co-pending Application No. 7928701, (Serial No. 1580459) that equipment being modified according to the invention of which an example is illustrated in Figs. 17 to 23 of the aforesaid drawings. In the drawings:—

Fig. 1 is a general view showing diagrammatically transportation equipment disclosed in our co-pending Application No. 7928701, (Serial No. 1580459) with the container in position for road transportation by the vehicle;

Fig. 2 is a similar view, partly in longitudinal section, of the platform and container of Fig. 1, showing the rear door of the container in open position;

Fig. 3 shows diagrammatically, detail of the ejector in the container in Fig. 1 when the ejector is in the waiting position;

Fig. 4 shows the ejector of Fig. 3 at the end of its ejection stroke;

Fig. 5 is a perspective view showing the arrangement of the platform of a semi-trailer in Fig. 1 ready to receive the container;

Fig. 6 is a perspective view which shows the front of the container in Fig. 1 ready to be placed on the platform of the semi-trailer;

Fig. 7 is a fragmentary longitudinal sectional view, on an enlarged scale, on line VII—VII of Fig. 10 of the front of the container illustrated in Figs. 6 and 10 when its ejector is in the locked waiting position;

Fig. 8 is a similar view to Fig. 7 showing the ejector unlocked solely by the fact of having placed the container on the semi-trailer (Figs. 3 and 4);

Fig. 9 is a cross sectional view, on an enlarged scale, on line IX—IX (Fig. 4) of the container and longitudinal members provided on the semi-trailer for preventing transverse movement of the container during transportation;

Fig. 10 is a similar section on line X—X (Fig. 4), in this case no part of the semi-trailer being shown;

Fig. 11 is a perspective view on an enlarged scale of the rear lower left-hand corner of the container in the preceding Figs., when its door is in the locked position;

Fig. 12 shows on an enlarged scale the rear left-hand corner of the loading platform of the semi-trailer in Fig. 5 in the waiting position, i.e. before the container is placed on the latter;

Fig. 13 shows the rear left-hand upper corner of the container when its door is in the locked position, for example during transportation on the semi-trailer;

Fig. 14 shows the position when the door of the container is closed, of members provided on the semi-trailer and on the container for controlling the door, when the door of the container in Fig. 1 is closed;

Figs. 15 and 16 are views similar to Figs. 13 and 14, illustrating the operation of unlocking and opening the door of the container;

Fig. 17 is a plan view of the rear end of a container of transportation equipment formed according to the invention;

Fig. 18 is a view similar to that of Fig. 17, but with the door of the container open;

Fig. 19 is a side view, in the direction of arrow XIX in Fig. 17, of the container in combination with a loading platform of a vehicle in transportation equipment formed according to the invention, there being shown in locked position the locking system for the door of the container;

Fig. 20 shows an enlarged fragment of Fig. 19;

Fig. 21 is a view similar to that of Fig. 20, but with the locking system in the unlocked position;

Fig. 22 shows an enlarged fragment partly in section on line XXII—XXII in Fig. 19, and

Fig. 23 is a perspective view of a fragment of the vehicle in Figs. 19 to 21.

Fig. 1 shows a semi-trailer 1 coupled to a road tractor 2. The platform of the semi-trailer 1 carries a container 3.

This container 3 comprises:

- a hollow parallelepipedal body 4;
- a rear door 5 which can be raised about an upper pivotal arrangement 6, to which it is connected by lateral arms 7;
- engagement couplings 8 known by the

name of "corner fittings", provided for receiving the hooks of lifting gear of the type known as a "spreader";

- an internal ejection plate 9 (Figs. 3 and 4) intended to be pushed rearwards in order to discharge the refuse or loose material placed in the container, through the open door 5.

By means of the "corner fittings" 8, the spreader lifting gear which is not shown is able to lift the container 3 in the known manner and deposit it either on the ground or on the platform of the semi-trailer 1.

Over its entire length, the platform 10 of this semi-trailer comprises a centering relief 11 with oblique sides 12 (Fig. 5). This relief 11 is constituted by two longitudinal members 13 of the platform 10 (Fig. 9).

At the front, the platform 10 is surmounted by a box 14 whereof the central part comprises a horizontal base 15. On three sides (along the front edge and two lateral edges), this rectangular base 15 is surrounded by oblique guide walls 16, which surmount the latter to form a type of funnel which is flared upwards. At their lower part, the oblique walls 16 are connected to the base 15 by vertical centering walls 17. A fixed pin 18 whose top is frustoconical rises from the centre of the flat base 15.

Located inside the box 14 are the hydraulic means provided for controlling the ejector plate 9 of the container 3. In particular, these hydraulic means comprise a large horizontal ram 19. The latter is preferably a telescopic ram comprising five stages 20, 21, 22, 23 and 24. The stage 20 of small section is fixed to a point 85 of the box 14 (Fig. 4). The stage 24 of large section is intended to move rearwards thus entraining the plate 9. For this it comprises:

- Two engagement flanges 25 which project from the latter on either side;
- a cam 26 projecting upwards;
- a guide bracket 27 whose ends bent inwards form slide blocks 28 (Fig. 9).

The intermediate stage 22 also comprises a guide bracket 29 whose ends bent inwards form slide blocks 30 (Fig. 10).

When the ram 19 is in the retracted position (Figs. 3 and 5), the blocks 28 and 30 are all supported by two rails 31 integral with the platform 10 of the semi-trailer.

At the rear, in each of its two corners, the semi-trailer 1 comprises a hydraulically controlled lifting system 32 (Figs. 5, 12, 14 and 16). Each of these two systems 32 comprises:

- An upper plate 33 of T-shaped section;
- a lower plate 34 of T-shaped section;
- two connecting rods 35 and 36 pivoted one on the other at their centres by a pin 37, in order to form an extensible mechanism of the type known as "Nuremberg Scissors";
- a horizontal hydraulic ram 38 whose body is supported on the chassis of the semi-trailer, whereas its rod pivots on a pin 39 integral

with the lower and front end of the connecting rod 36;

- an elongated opening 40 cut in the vertical web of the T 34 to receive the pin 39 and guide it horizontally when the ram 38 moves it towards the front or rear;

— a pin 41 fixed to the rear of the vertical web of the T 34 for pivoting the rear end of the connecting rod 35;

— an elongated opening 42 cut in the vertical web of the T 33 for receiving the pin 43 of the front upper end of the connecting rod 35 in order to guide this pin horizontally when it slides towards the front or towards the rear;

- a pin 44 fixed to the rear of the vertical web of the T 33 for pivoting the rear end of the connecting rod 36.

It will be understood that it is sufficient to extend the ram 38 in order to push the pin 39 rearwards (Fig. 16, arrow 45) and raise the upper plate 33, which rises (arrow 46) whilst remaining parallel to itself.

In its lower part, the container 3 comprises a tunnel 47 over its entire length (Figs. 6, 9 and 10), whose oblique sides 48 enable the latter to fit exactly on the centering relief 11 of the semi-trailer.

This tunnel 47 projects towards the inside of the container 3, above the base of which it supports two longitudinal rails 49. The rails 49 are located on either side of the tunnel 47. They are able to be placed exactly in extension of the rails 31 of the semi-trailer, when the container 3 has been placed on the platform 10 (in the case of Figs. 3 and 4). The arrangement of the rails 31 and 49 thus forms a single guide along which the guide brackets 27 and 29 may slide from the waiting position of Figs. 3 or 5 (ram 19 completely retracted) to the ejection position where the ram 19, extended to the maximum, pushes the plate 9 as far as the rear opening of the container.

The ejection pusher 9 is hollow. It opens towards the bottom at the front of the container, which thus comprises a cavity 50 at this point (Figs. 6 and 7). A cross piece 51 welded to the pusher 9 is located in this cavity. The cross piece 51 is provided with two forks 52 which open downwards and cover the flanges 25 on either side of the large section 24 of the ram 19, when the container 3 is placed on the semi-trailer 1 (Figs. 3, 4, 6 and 7).

The front part of the pusher also comprises a transverse pin 53 (Figs. 7 and 8) on which a locking hook 54 is pivoted. The nose 55 of this hook is directed towards the front and upwards. It automatically engages under the edge of the front wall 56 of the container 3, when it is subjected to the sole action of a return spring 57, stretched between the hook 54 and a point 57 on the front wall of the pusher 9. Opposite the nose 55, the hook 54 comprises a lever 58 on whose back the cam

26 is able to bear when the container rests on the semi-trailer 1. Thus:

— when the container 3 is placed on the ground, the pusher 9 is locked in the front position (Fig. 7);

— when it is supported by the semi-trailer 1 with the cam 26 engaged under the lever 58 (Fig. 8), the pusher 9 is automatically unlocked, ready to move back as soon as it is pushed by means of the telescopic ram 19.

At the rear, on each side of its door which can be raised, the container comprises a locking mechanism illustrated in Figs. 11 and 13 to 16.

This mechanism comprises a vertical upright 59 able to slide vertically along the outer wall of the container. In its upper part, each upright 59 has an elongated opening 60 extending downwards, in which a transverse pin 61 integral with the corresponding arm 7 is engaged. The pin 61 is located at the rear of the pivot 6 for the door 5: it is thus sufficient to raise the uprights 59 (Fig. 15, arrow 62), in order to raise the door 5 about its opening pivot 6.

In its lower part, each upright 59 comprises a transverse pin 63 on which a roller 64 rotates freely. The pin 63 passes through an elongated opening 65, cut in an arm 66, whose front end is pivoted at 67 on the side of the container 3, to the lower part of the latter. The pivot 67 is constituted by a tubular crank pin which is also integral with a crank arm 68. The latter is therefore rigidly connected to the arm 66 with which it may swing. The end of the crank arm 68 is pivoted by a pin 69 to one end of a connecting rod 70, whereof the other end supports a pivot pin 71. The latter is supported by the back of a hook 72, between the nose 73 and the pivot pin 74 of this hook. The nose 73 of the hook is directed upwards and towards the rear of the container. The pin 74 is fixed laterally to the wall of the container. The pin 71 is located below the pin 74.

In its lower part, the door 5 comprises two lateral flanges 75 located on either side of the container. Each flange 75 is provided with a transverse finger member 76 behind which the nose 73 of the corresponding hook 72 is able to rise, when the door 5 is locked in the closed position (Figs. 1, 11 and 14).

At the front, the front wall of the container 3 is provided with a rectangular plate 77 which projects horizontally beyond the latter (Figs. 6 and 7). This plate is provided in its centre with an opening 78 able to cover the pin 18 of the box 14 (Figs. 3 and 5). Furthermore, two triangular braces 79 make the attachment of the plate 77 to the front of the container more rigid. It will be noted that the contour of the plate 77 is identical to that of the base 15 of the guide funnel 16—17 provided on the box 14 of the semi-trailer (Fig. 5).

The operation is as follows:

When the container 3 stands alone, for example placed on the ground (Fig. 6), it comprises no hydraulic means. Its ejector/pusher 9 is locked in the front position by the hook 54 (Fig. 7). The rear door 5 is locked in the closed position (Fig. 11).

To lift the container 3 from the ground, the spreader or grab of a travelling crane is used. The container is raised above the semi-trailer 1 (Fig. 5), then lowered progressively onto the platform 10 of the latter. The plate 77 is introduced approximately into the mouth of the funnel 16, whose oblique walls ensure primary guidance as the container is lowered further. The opening 78 in the plate 77 is thus centered on the pin 18, whose frustoconical top renders the centering more accurate. Centering of the container in the longitudinal direction is ensured by the oblique sides of its lower tunnel 47 intended to fit on the relief 11 of the platform 10.

At the end of this lowering movement of the container, the forks 52 of the cross piece of the pusher 51 automatically cover the engaging flanges 25 of the ram 19. Similarly, the rollers 64 of the rear uprights 59 are automatically placed on the lifting plates 33 of the semi-trailer.

The arrangement is finally in the transportation position illustrated in Fig. 1.

To empty the contents of the container 3, one begins by extending the rear rams 38. Starting from the position of Figs. 13 and 14, the latter causes raising of the uprights 59. During this first stage of movement, the door 5 remains stationary about its pivot 6. The elongated opening 60 in each upright 59 is raised about its pivot 61 which remains stationary as long as it does not abut against the lower edge of this opening 60.

On the other hand, from this first stage of movement, raising of the crank arm 68 pulls on the connecting rod 70 and causes tilting of the hook 72, whose nose 73 is lowered, thus releasing the locking finger member 76 of the door 5. The latter is henceforth released.

By continuing the raising movement of the plates 33, i.e. of the uprights 59, opening of the door 5 is caused, as pins 61 are in abutment with the case of the elongated opening 60: the door 5 is thus raised about its pivot 6, as indicated by the arrows 80 (Figs. 15 and 16).

It is henceforth possible to extend the telescopic ram 19, whose flanges 25 push the ejector plate 9 backwards, which was previously unlocked by the cam 26, which has disengaged the hook 54. Guidance of the ram 19 and plate 9 is ensured by the rails 31 and 49.

It will be seen that simple positioning of the container on the semi-trailer 1 automatically causes all the necessary locking or unlocking operations, such that the equipment is directly ready for use.

The equipment described above with reference to Figs. 1 to 16 is modified (particularly with reference to the rear door of the container) in accordance with the present invention which is now described by way of example with reference to Figs. 17 to 23 showing a semi-trailer 101 and a container 102 supported by a platform 103 of the semi-trailer.

10 The container comprises:

— a hollow parallelepipedal body 104;  
— a series of peripheral reinforcing belts which completely surround the body 104 in several successive transverse planes from front to rear. The last belt 105 and the next to the last belt 106 are shown;

15 — a rear door 107 able to close-off the rear opening 108 of the container, or to open by pivoting about a vertical pin 109 integral with the container (Figs. 17 and 18).

The equipment includes a system for locking the door 107 on the opening 108 of the container 102 (Figs. 19 and 20).

20 On the container, this locking system comprises only mechanical parts, all the hydraulic members being provided on the vehicle 101.

25 Three locking arms 110 to 112 which are substantially identical are aligned vertically along the left-hand vertical wall of the body 104, against the outer face of this wall. Each arm is flattened parallel to said wall and is pivoted by its front end on a pivot 113 whose substantially horizontal axis is located in a transverse plane of the container. Each pivot 30 113 is mounted in a yoke 114 integral with the rear side of a left-hand vertical part of the belt 106.

The rear end of each locking arm is provided with a hook 115, whose lower profile comprises, from front to back, a semi-circular notch 116, then a ramp 117 sloping rearwards and upwards. The notch 116 is intended to cover a cylindrical finger member 118 integral with the vertical edge 119 of the 35 door 107, opposite the pin 109.

40 Finally, each locking arm comprises a central rectilinear portion 120 which always remains substantially horizontal and passing through which is a pivot 121, by means of which the arm is pivoted on a vertical rod 122, such that the three arms always remain parallel. Each arm is constantly biased downwards by a helical spring 123 which extends obliquely between a hole 124 in the 45 central portion 120 and a hole 125 provided in a flange 126 welded to the belt 106, below the yoke 114.

The three hooks 115 project to the rear of the orifice 108, passing through recesses 127 cut in the left-hand vertical member of the belt 105, whereas no part of the mechanism projects laterally from the container, whose overall width is that of the belts (Fig. 21).

50 The central portion 120 of the lower arm 110 is also integral with a support 128 which

extends downwards in order to support a roller 129 whose axis is parallel to the axis of the pivot 113 and upwards to support a spindle 130 whose axis is parallel to this same axis. The yoke 114 on which the arm 110 is pivoted, comprises a rear extension 131. A pivot 132, integral with this extension, is engaged through a lever 133 whose large side diverges upwards from the pivot 132 in order to terminate in a handle 134. The small side 70 135 of the lever 133 diverges rearwards from the pivot 132 in order to terminate in a hole 136 engaged around the pivot or spindle 130. The hole 136 has a diameter clearly greater than that of the spindle 130, in order to facilitate normal clearance of the entire mechanism without jamming.

75 On the semi-trailer, the locking system is fitted in a recess 137 provided at the rear, in the left-hand edge of the plate 103 and limited towards the rear by a transverse extension 138 of the plate 103. A transverse pivot 139 is connected by its inner end to the plate 103 and by its outer end to a support 140 which extends at the front of the extension 138 80 (Fig. 23).

The pivot 139 passes through a shoe 141 comprising:

— an edge 142 used for co-operating with the roller 129;

— a lateral abutment 143 able to co-operate with the support 140;

— a pivot 144 by means of which the shoe 141 is pivoted on the front end of a ram 145, whose rear end is pivoted on a yoke 146 by a pivot 147. The yoke is integral with the front wall of the recess 137. When the ram 145 is actuated, it pivots through a small angle in a vertical plane parallel to the major axis of the semi-trailer 101. This angle is so small that the axis of ram 145 is always substantially horizontal. 95

The operation is as follows.

When the rear door 107 normally closes the opening 108, the three finger members 113 110 are trapped in the notches 116, since the arms 110 to 112 are simultaneously biased downwards (Fig. 19):

— by gravity, owing to their own weight,  
— by the springs 123. 115

Locking of the door 107 is thus ensured in a permanent manner whether or not the container 102 is located on the semi-trailer 101.

To control unlocking of the door 107, fluid under pressure is supplied to the inside of the ram 145 in order that it extends, thus pivoting the shoe 141 in the direction shown by arrow 148 (Fig. 20). The useful edge 142 thus rises above the upper level of the plate 103, raising the support 128 by means of the roller 129. The three arms 110 to 112 are raised simultaneously and the finger members 118 are released from the notches 116 to facilitate opening of the door 107. 120

The movement 148 of the shoe 141 is 130

limited by the abutment 143 bearing on the support 140.

As soon as the arms are raised, the lever 133 pivots in the direction of arrow 149.

5 Conversely, the three arms may be raised simultaneously by acting manually on the lever 133 in the direction 149, whether or not the container 102 is placed on the semi-trailer 101.

10 It will be seen that the simple fact of placing the container 102 on the semi-trailer 101, by lowering the container onto the semi-trailer by simple vertical translation, automatically causes connection of the mechanical parts provided on the container for locking the door and the hydraulic control means permanently mounted on the vehicle or semi-trailer 101.

20 Although, in the example described with reference to Figs. 17 to 23, the arms 110 to 112 are located on the left-hand side, it is clear that they could also be located on the right-hand side, in a general arrangement which is absolutely symmetrical with respect to the central vertical plane of the semi-trailer and with respect to the central plane of the container, if the axis 109 for pivoting the door 107 is located on the left-hand side.

30 Since, in the normal position, the hydraulic control system integral with the semi-trailer remains completely fitted in the support platform, the semi-trailer may even comprise a hydraulic control system on each side, in order to receive either containers provided with a rear door which opens from the right-hand side or left-hand side.

#### WHAT WE CLAIM IS:—

40 1. Transportation equipment comprising a container provided with an internal ejection pusher and a rear door which is openable from a closed position and lockable in said closed position, a vehicle on a loading platform of which the container or another similar interchangeable container may be placed, 45 all the hydraulic means for controlling the door of the container and its ejector being permanently mounted on the vehicle, with which they remain integral, whereas for the control of its door and ejector, the container comprises mechanical means connection of which to the hydraulic control of the vehicle takes place automatically solely by placing the container on the loading platform, and 50 wherein a system for locking the rear door of the container comprises

— at least one arm whose front end is pivoted on the container by a main pivot whose axis is substantially horizontal in a transverse plane of the container, the rear end of said arm supporting a hook able to co-operate with a finger member integral with the edge of the door opposite a vertical pivot axis about which the door is pivotable to open and 65 close, and

— at least one hydraulically controlled lifting system fitted laterally at the rear in the loading platform of the vehicle and able to actuate the or each locking arm on the container above the upper surface of said platform. 70

2. Transportation equipment according to claim 1, in which each locking arm is generally rectilinear and flattened parallel to a vertical lateral wall of the container, whereas it is located against the outer side of this wall in order to remain substantially horizontal whilst pivoting in a vertical plane parallel to said wall. 75

3. Transportation equipment according to claim 1 or claim 2, in which the rear end of the or each locking arm, provided with a hook, passes through a recess provided in a vertical member of a rearmost outer belt for reinforcing the container in order to project to the rear of the opening in the container, whereas the main pivot of the arm is mounted on a vertical part of the next to the rearmost outer belt for reinforcing the container, such that the arrangement of the locking mechanism remains set inwards with respect to the overall width of the container defined by the belts. 80 85 90

4. Transportation equipment according to any preceding claim, in which the hook of each locking arm has a lower profile which comprises, from front to back 95

— substantially semi-circular notch which is open at the bottom in order to cover a cylindrical finger member integral with the vertical edge of the door opposite the pivot axis of the door, and 100

— a ramp sloping upwards and rearwards, a helical spring also being stretched between the arm and a fixed point of the container located below the main pivot of the arm, in order that the arm constantly tends to drop into the lower position under the joint effect of gravity and of the spring, a finger member also being able to co-operate with the ramp of one arm in order to control lifting of the arm when the door is closed, then to allow the arm to fall and remain trapped in the notch. 105 110

5. Transportation equipment according to any one of claims 1 to 4, in which the container is provided with at least two locking arms connected to each other by means of a vertical rod which is pivoted on each arm by a pivot parallel to the main pivot, but engaged in the central part of the arm, such that the arms always remain parallel to each other in the same substantially vertical plane, in vertical alignment. 115 120

6. Transportation equipment according to claim 5, in which the lower locking arm is located close to the lower surface of the container, the central part of this arm being integral with an abutment which extends downwards in order to terminate in a roller 130

able to cooperate with the hydraulic lifting system.

7. Transportation equipment according to claim 5 or claim 6, in which an L-sectioned lever is pivoted on the container by a pivot whose axis is substantially horizontal in a transverse plane of the container, this lever comprising a long arm which diverges upwards from the pivot in order to terminate in a handle and a short arm which diverges rearwards from the pivot in order to terminate in a hole engaged around a spindle parallel to said pivot, but integral with the central part of the lower locking arm, this spindle having a diameter less than that of the hole in order to facilitate a slight variation of the relative spacing of their respective axes, the pivoting movement of the L-sectioned lever and of the locking arms being linked in a reversible manner, such that it is possible to unlock the door by pushing the handle forwards, whereas the long arm of the lever moves forwards when the lifting system is actuated.

8. Transportation equipment according to any of claims 5 to 7, in which the lifting system comprises a ram whose axis remains substantially horizontal whilst pivoting in a vertical plane parallel to the major axis of the vehicle, the front end of this ram being pivoted on a fixed point of the vehicle and the rear end of the ram being pivoted on a shoe which pivots about a substantially horizontal and transverse pivot integral with the vehicle, this shoe comprising a useful edge which

remains retracted in the loading platform of the vehicle, whilst the ram is retracted, but which rises above the upper level of the loading platform in order to simultaneously raise all the locking arms by lifting the lower locking arm when the ram is extended.

9. Transportation equipment according to claim 8, in which the lifting system is fitted in a recess provided in a lateral edge of the loading platform, this recess being limited towards the rear by a transverse extension of said platform, the pivot about which the shoe pivots being integral with a yoke mounted on this extension, the arrangement of the system being set inwards with respect to the overall width of the loading platform.

10. Transportation equipment according to any of claims 1 to 9, in which the loading platform has two said lifting systems, one on the right and one on the left of the platform, which are symmetrical to each other with respect to the central vertical plane of the vehicle and which thus enable the vehicle to operate either with containers provided with a said door opening either on the right or on the left.

11. Transportation equipment as claimed in claim 1, and substantially as hereinbefore described with reference to Figs. 17 to 23 of the accompanying drawings.

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Chartered Patent Agents,  
Agents for the Applicants.

FIG. 1

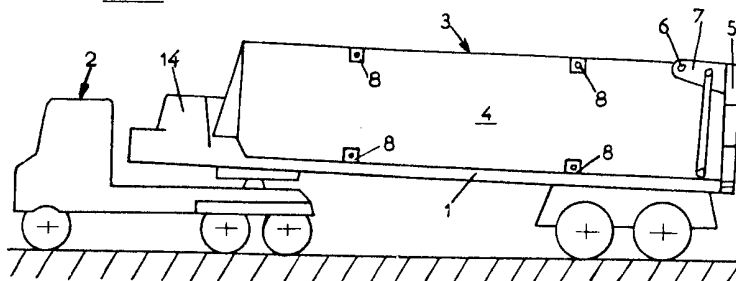


FIG. 2

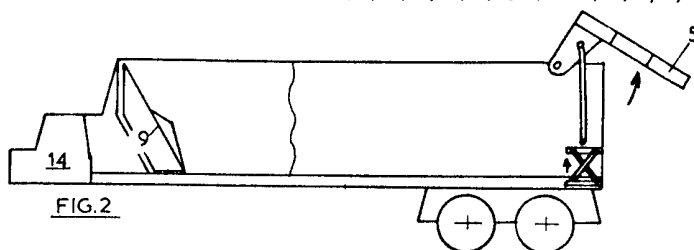


FIG. 3

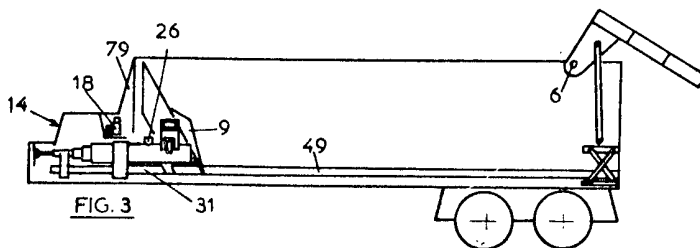
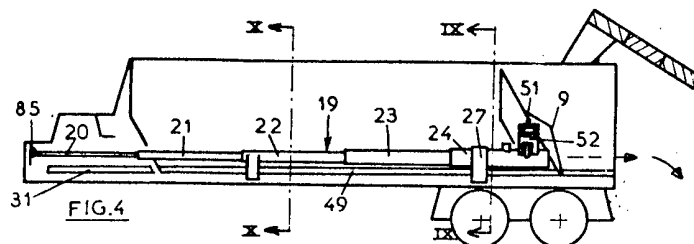


FIG. 4



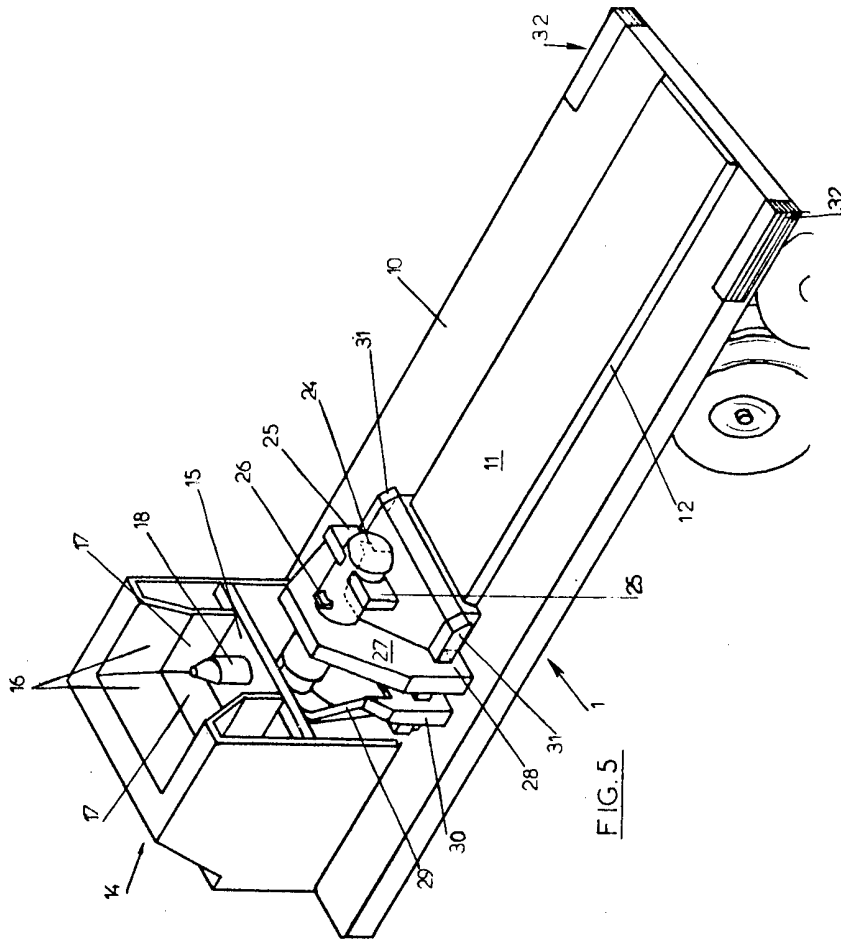


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COMPLETE SPECIFICATION

13 SHEETS

*This drawing is a reproduction of  
the Original on a reduced scale*  
**Sheet 2**



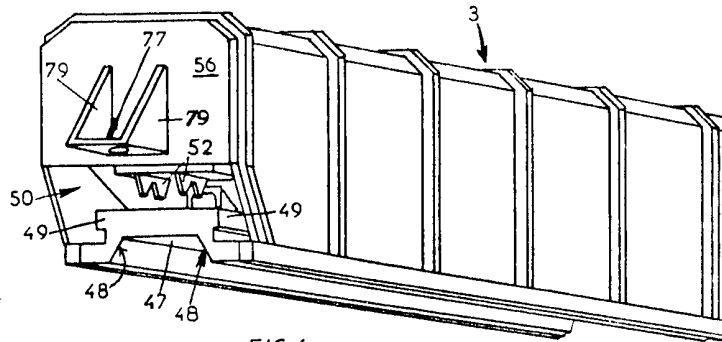


FIG. 6

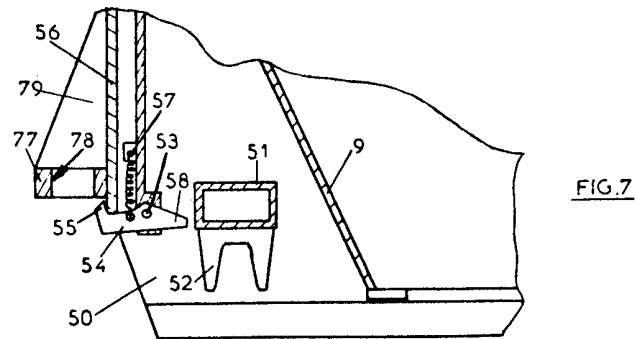


FIG. 7

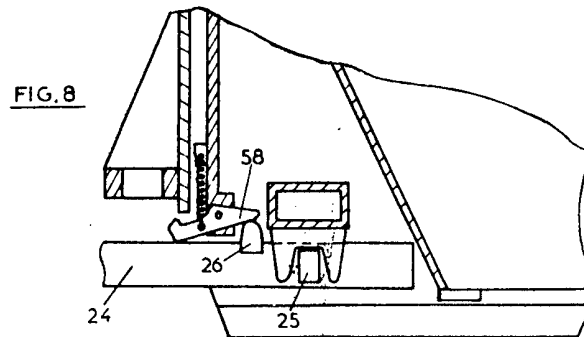


FIG. 8

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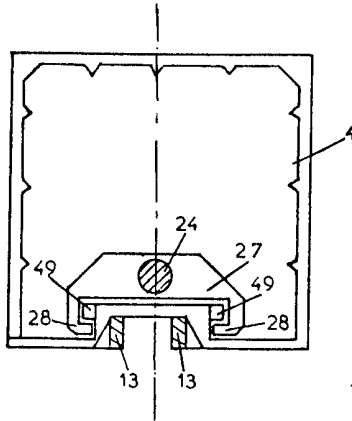


FIG. 9

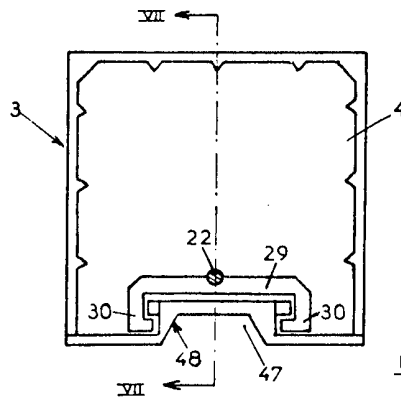


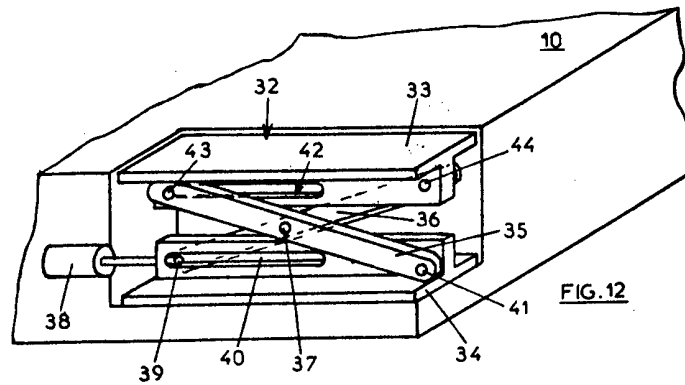
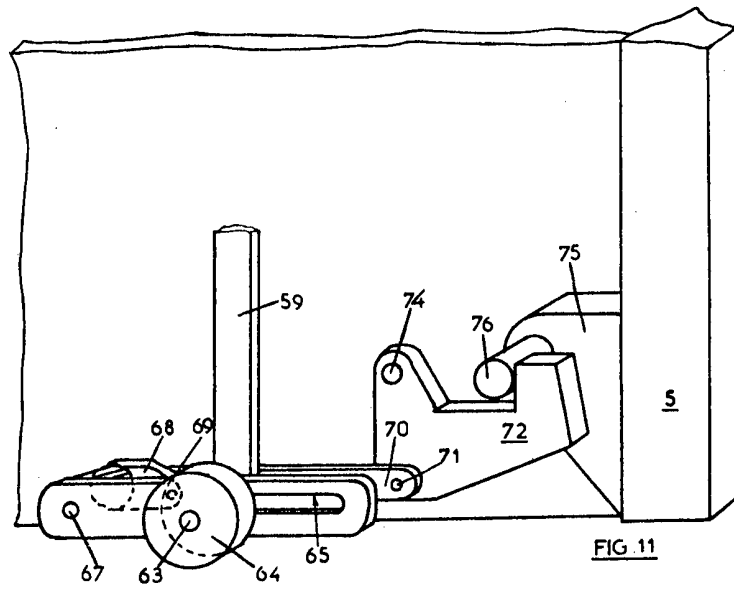
FIG. 10

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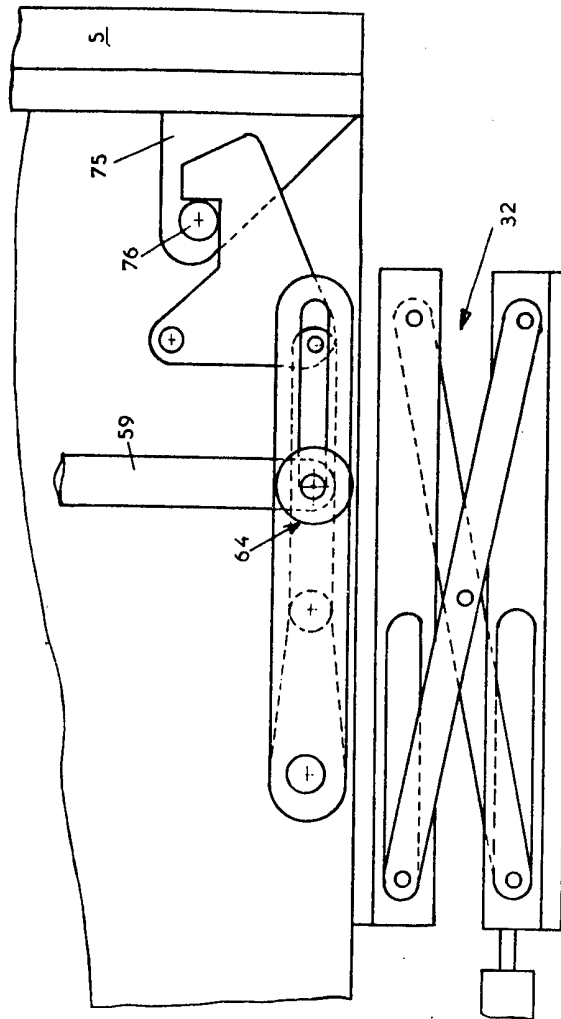
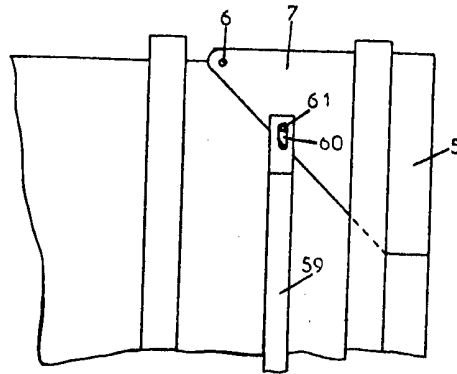
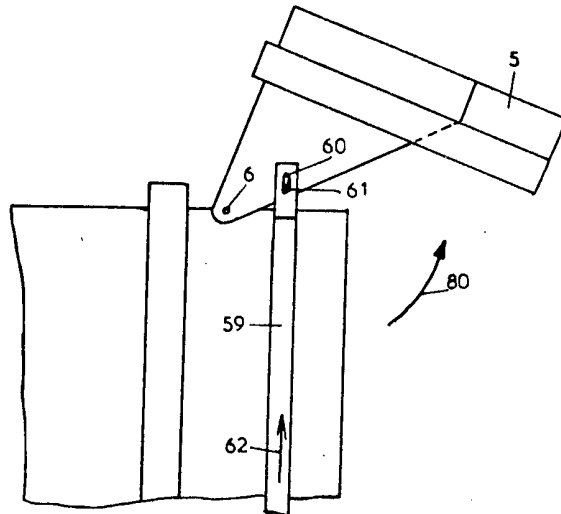


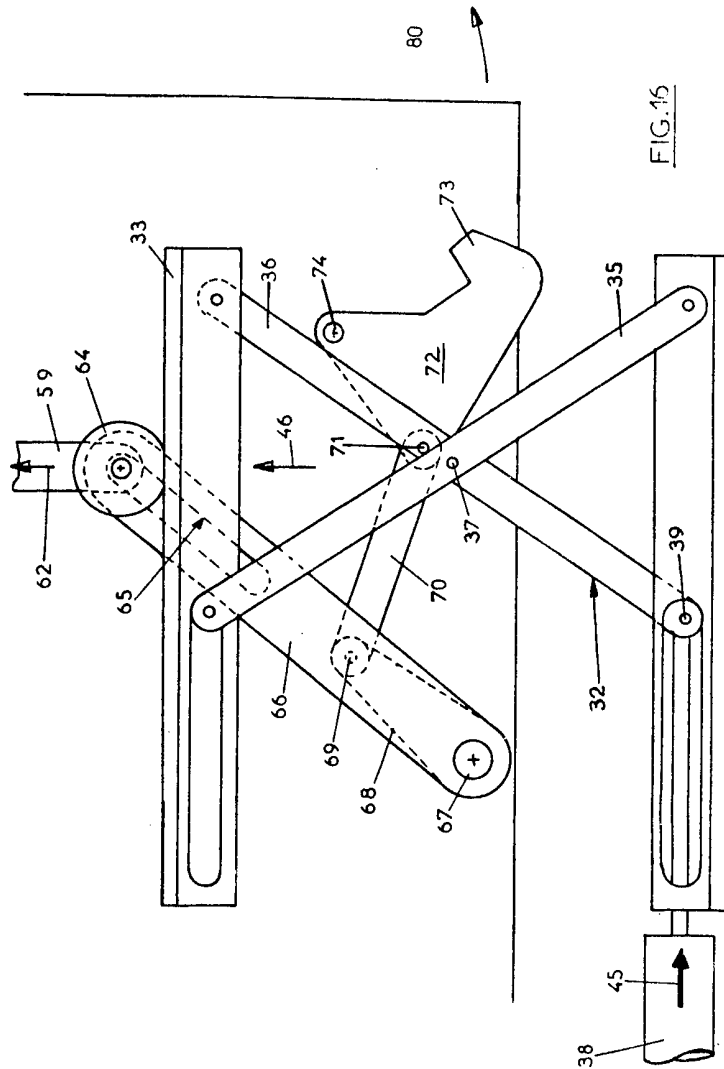
FIG. 14

FIG 13FIG 15

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FIG. 15



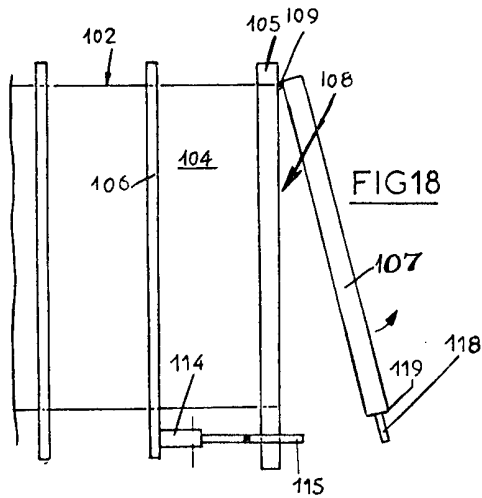
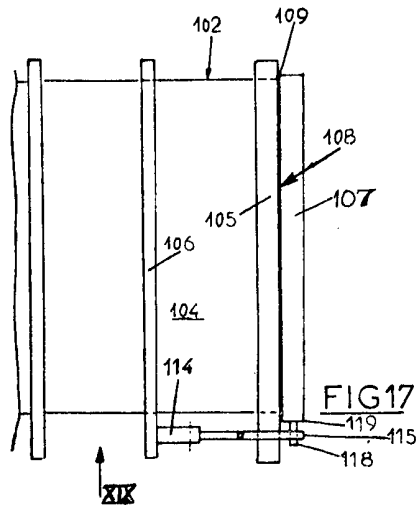
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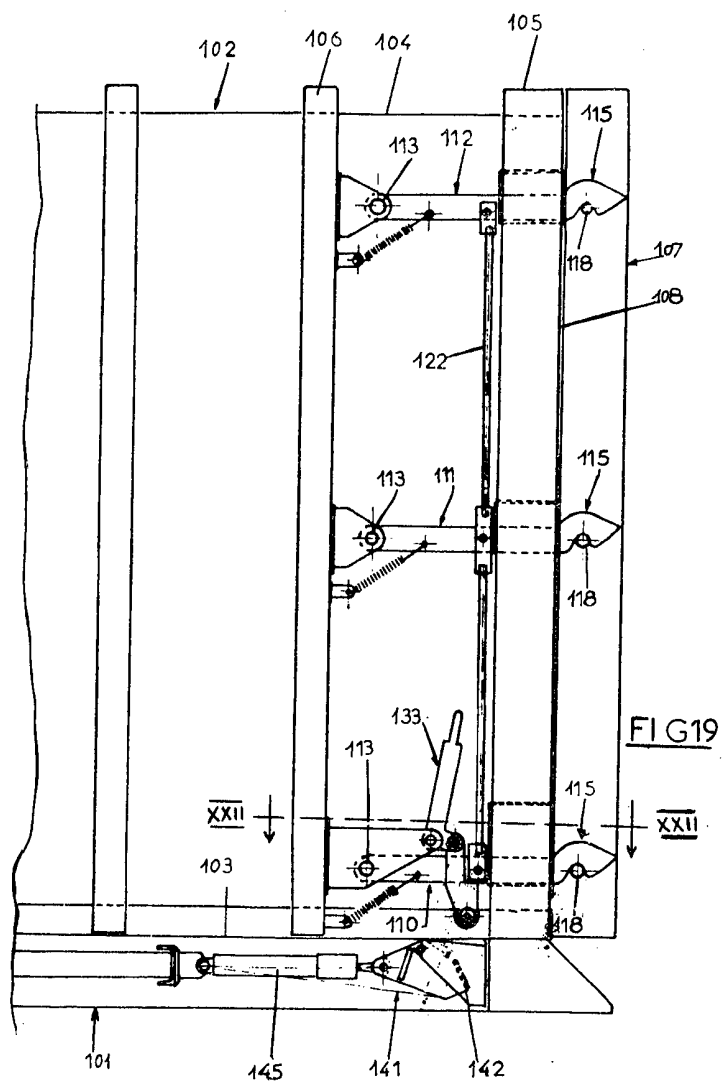


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