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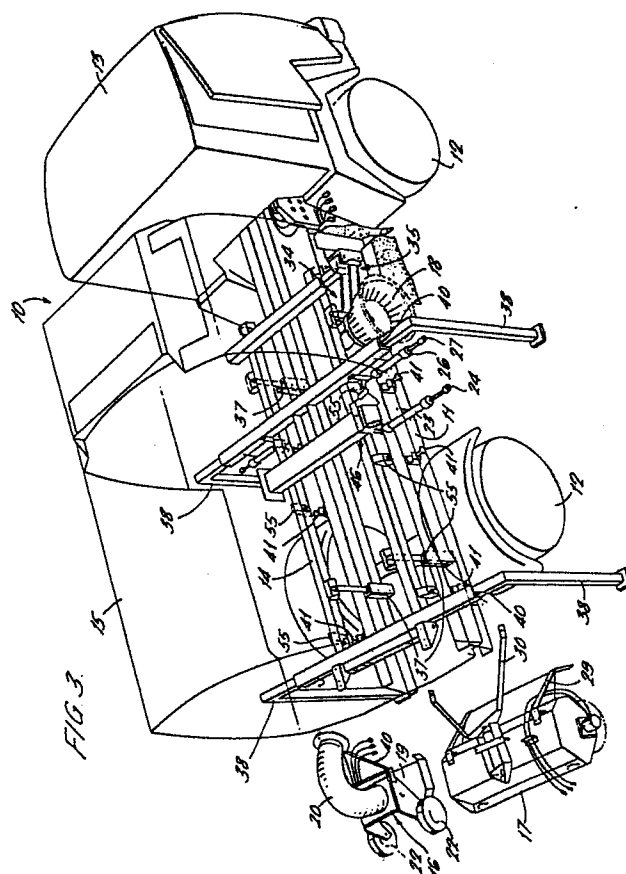
Applicant: **JOHNSTON ENGINEERING LIMITED**
Johnston House Hatchlands Road
Redhill RH1 1BG(GB)

Inventor: **Duthie, Anthony James**
4 St. Georges Gardens Kings Road
Horsham West Sussex(GB)

Representative: **Alexander, Thomas Bruce et al**
Boult, Wade & Tennant 27 Furnival Street
London EC4A 1PQ(GB)

Improvements in road sweeping vehicles.

A demountable suction type road sweeping vehicle (10) includes a self propelled chassis (11), road wheels (12), a subframe (14) which is supported by and removable from the chassis, an airtight container mounted on the subframe, means for generating a vacuum within the container and sweeping equipment. The sweeping equipment comprises at least one rotatable brush (18) which is movable upwardly clear of the road wheels to enable the chassis to be driven out from under the bodywork after it has been raised and supported on legs (38). This enables the chassis of vehicles which carry specialist equipment such as road sweepers, to be utilised with a range of "bodies". This has been hitherto difficult and the changing over of bodies has been time consuming due to the complexity in design of road sweepers which carry much equipment, which needs to be removed before demounting.



IMPROVEMENTS IN ROAD SWEEPING VEHICLES

This invention relates to road sweeping vehicles, and more particularly such vehicles having interchangeable or demountable bodywork.

It is generally known to have commercial vehicles incorporating interchangeable or demountable bodywork in order to maximise the utilisation of the vehicle. For example a simple type van body may be loaded up in one place after removal from the vehicle chassis whilst the chassis is used to transport another body elsewhere.

This practice is being extended to other vehicles having specialist equipment which would otherwise have a limited use, for example, winter gritting vehicles. There is now a demand for such demountable capability of equipment such as road sweeping equipment which could be usefully interchanged with gritting equipment as only one type of equipment is particularly useful according to weather conditions.

In general road sweeper bodywork, particularly that of suction type sweepers, is complex in design and has sweeper brushes under the chassis, further brushes depending from other parts of the vehicle between the wheels, suction nozzles and sometimes water spray equipment which may also be situated between the wheels.

There are available some road sweepers having demountable bodywork, but which are of limited use. Due to the complexity of the sweeper equipment certain aspects of the vehicle must be disassembled or equipment left on the chassis which involves complicated, time consuming procedures resulting in a chassis with limited use.

According to the present invention there is provided a suction type road sweeping vehicle comprising a self propelled chassis having at least four road wheels, a subframe which is supported by and removable from the chassis and, mounted on the subframe, an airtight container having an outlet communicating with means for generating a vacuum within the container, at least one suction conduit communicating at one end with the container and provided at the other end with a suction nozzle and at least one rotatable brush provided with means for moving the brush upwardly clear of the road wheels.

Preferably the brush is movable upwardly and outwardly.

The brush moving means may also comprise a support frame on which the brush is mounted, and which is pivotally mounted on the subframe about an axis above the level of the road wheels and is operable to move the brush between a working position and a position clear of the road wheels.

Preferably means are provided to elevate the

subframe away from the chassis.

Other sweeping equipment may also be provided with quick means to detach said equipment from support means to which it is attached, the support means also being mounted on a pivoted support frame which is operable to move the support means to a position clear of the road wheels.

A preferred embodiment of the invention will now be described in detail by way of example, with reference to the accompanying drawings, in which:

Fig.1 is a schematic representation of a road sweeping vehicle with parts omitted for clarity.

Fig.2 is a schematic representation of the road sweeping vehicle of Fig. 1 with further parts omitted, showing a subframe removed from the chassis.

Fig.3 is a further schematic representation of the road sweeping vehicle of Fig.1 showing a brush and other sweeping equipment in a demount position.

Fig.4 is a schematic representation of a support frame in a 'working' position and in dotted lines the support frame in a 'demount' position.

Figs.4a and 4b show a latching system for supporting the brush of Fig.3 in the demount position.

Figs.5, 6, 7 and 8 show various quick release mechanisms for the sweeping equipment of the road sweeping vehicle of Fig.1.

Fig.9 is a schematic representation of the subframe of the road sweeping vehicle of Fig.1 demounted from the chassis.

A suction road sweeping vehicle 10 comprises a self propelled chassis 11 including road wheels 12 and drivers cab 13, a subframe 14 on which is mounted an airtight container 15, a suction fan (not shown) and an auxiliary engine (not shown) for driving the fan and sweeping machinery. The road sweeping vehicle 10 also comprises sweeping equipment which includes suction equipment 16, a wide sweep brush assembly 17 and a pair of channel brushes 18, one located on either side of the vehicle 10, of which only one is shown.

The suction equipment 16 comprises on each side of the vehicle 10, a nozzle 19 connected by a conduit 20 to an inlet duct 21 into the container 15. Each conduit is situated between the front and rear wheels 12, behind a channel brush 18. The nozzle 19 is supported by wheels 22 to keep it at a fixed distance from the ground whilst in operation.

The nozzle 19 is pivoted on a draw bar 28, the free end of which is supported by wheels 22. the pivoting end of which is attached to the subframe 14.

The suction equipment 16 is suspended from

the subframe 14 by means of hydraulic suspension cylinder 23 which may be activated to lift the suction nozzle 19 and wheels 22 off the ground when not in use. The cylinder 23 has, at one end attached to the nozzle 19, a quick release mechanism 24 (see Fig.6) which enables the nozzle 19 to easily be detached from the cylinder 23. The suction conduit 20 also comprises a quick release mechanism 25 (see Fig. 5) which enables it to be easily detached from the inlet duct 21. A quick release tow pin 31, shown in Fig. 8 enables easy detachment of the draw bar 28 from the subframe 14.

The sweeping equipment further comprises a wide sweep brush assembly 17 which is situated underneath the vehicle 10 between the front and rear wheels. The brush 17 is mounted for rotation about a horizontal axis on a frame 29 and is driven by a hydraulic motor (not shown). The frame 29 is pivotally attached to one end of a tow bar assembly 30, which is attached to subframe 14. This assembly 30 is also connected to the subframe 14 by means of a hydraulic suspension cylinder 26 which may be operated to lower and raise assembly 17. A further quick release mechanism 27 (see Fig.8) enables the brush assembly 17 to be released quickly from its mounting.

The tow pin 32, see Fig. 4, enables quick release of the tow bar assembly 30 from subframe 14.

The channel brush 18 is driven by a hydraulic motor (not shown) and is of the type described in applicants patent No. 1592778. The channel brush assembly 33 is mounted on a gantry system 34. The gantry system 34 is pivotally mounted to the subframe 14 and is operable to move the channel brush assembly 33 from a working position, shown in Figs. 1 and 4 whereby the channel brush 18 may be operated to sweep the road, or a storage position to a demount position as shown in Figs. 3 and 9. When the channel brush assembly 33 is in the 'demount' position the support gantry 35 is swung outwardly and upward through 90° until the brush assembly 33 is in the position shown in Figs. 3 and 9. Fig. 4 shows the 'demount' position of the support gantry 33 in dotted lines and the 'working' position in solid lines. A locking device may be used to lock the support gantry 33 in either of its positions.

The gantry 35 and brush assembly 33 are secured in the working position by means of a locking screw bolt 41 operable by keys 42 (see fig.2).

To secure the gantry 35 and brush assembly 33 in the demount position a latch system as shown in Figs.4, 4a and 4b is used. The latch system comprises a hook 100 pivotally mounted on cross member 52. The hook 100 may be biased in

a locked position (see fig.4a) or an unlocked position (see fig.4b) by means of a spring 101. The spring 101 is secured to the cross member 52 at one end and its other end is retained in a slot 102 in the hook portion 100 so as to be slidable from one end of the slot 102 to the other end.

Gantry 35 has a pivoting member 103 which is pivotally secured to the cross member 52 and which rotates through 90° when the gantry 35 is moved from one position to another. At an end of the pivoting member 103 away from the point of pivot is a peg 104 which extends from the pivoting member 103 to the gantry 35.

Before the gantry 35 is moved to the demount position, the latch 100 is in the position shown in fig.4b. As the gantry 35 is moved to the demount position, the peg 104 strikes a lip 105 of the hook, forcing it upwards. This causes the hook 100 to pivot into the position shown in fig.4a thus locking the gantry securely in the demount position.

To release the gantry 35 to allow it to be moved back to the working position the spring 101 is moved into the position shown in fig.4b. Raising the gantry 35 and brush assembly 33 slightly will cause the latch to release and allow the gantry 35 to be lowered to the working position.

A secondary support gantry 46 is provided to support the hydraulic suspension cylinders 23, 26 of the nozzle 19 and brush 17.

The subframe 14 comprises two longitudinal members 50 and three cross members 51, 52, 53. Cross members 52 and 53 are hollow box section members having sockets 40 in both ends thereof. Longitudinal members 50 have jack sockets 54 and catches 55, which are positioned in co-ordination with the jacks 37 and locks 41 described below. Mounted on chassis 11 are locks 41, operable by keys 42, which connect with the catches 55 provided on the subframe 14 to latch the subframe 14 in position on the chassis.

Also mounted on the chassis 11 are jacks 37 which are operable by hydraulic power system 45 to raise and lower the jacks 37 in synchronisation. The jacks fit in sockets 54 provided on the subframe 14 as described previously.

A disconnect station 43 is provided, see Fig.1, to disconnect the cab controls 44 from the power lines leading to the sweeper equipment mounted on the subframe 14.

In order to demount the bodywork of the road sweeping vehicle 10 from the chassis 11, the locks 41 are first unlocked by means of keys 42. The subframe 14 is then raised by means of the hydraulic jack system 45 until a fixed height is reached, see Fig. 3. Support legs 38 are inserted into sockets 40 in the subframe 14. The hydraulic system may then be released and the subframe remains in a raised position supported by legs 38.

The wide sweep brush 17 and suction equipment 16 are then released from their hydraulic suspension cylinders 26 and 23 respectively and may be stored inside the vehicle body 15 as shown in Fig. 9.

The support gantries 35, 46 are then pivoted from the working position to the 'demount' position whereby the channel brush assembly 33 and hydraulic cylinders 23, 26 are swung clear of the road wheels.

The cab controls 44 are then disconnected at the disconnect station 43 and the vehicle chassis 11 may be driven forwards clear of the bodywork supported by legs 38 to complete the demount process as shown in Fig. 9.

The gantry system 34 may be operated manually by some form of power system.

In another embodiment of the invention, the hydraulic jack system is replaced by using support legs 39 (also shown in Fig. 2) which incorporate manually activated jacks. Thus the system may be produced more cheaply since no hydraulic system is required on the chassis 11 itself and therefore requires less adaptation of the vehicle and chassis 11.

In another embodiment, the sweeper equipment comprising the suction equipment 16 and wide sweep brush 17 need not be detached from their suspension cylinders 23, 26, and are also swung into a demount position.

The advantages of the system of demountable bodywork are that the process of demounting is simplified and hastened. The sweeper equipment may be left intact and the elevation of the equipment required is minimised. Thus there is no requirement for additional equipment such as cranes to be involved, as the vehicle 10 may comprise all the necessary parts.

The equipment left on the chassis 11 after demounting, is at most the hydraulic jack system 45 and locks 41, and at least just the locks 41. This maximises the potential usefulness of the chassis 11 for other activities.

Also, the only equipment that needs be disconnected is at most the suction equipment 16 and wide sweep brush 17 for storage, and locks 41 and cab controls 44 and at least just the locks 41 and cab controls 44.

Claims

1. A suction type road sweeping vehicle (10) comprising a self propelled chassis (11) having at least four road wheels (12), a subframe (14) which is supported by and removable from the chassis and, mounted on the subframe, an airtight container (15) having an outlet communicating with

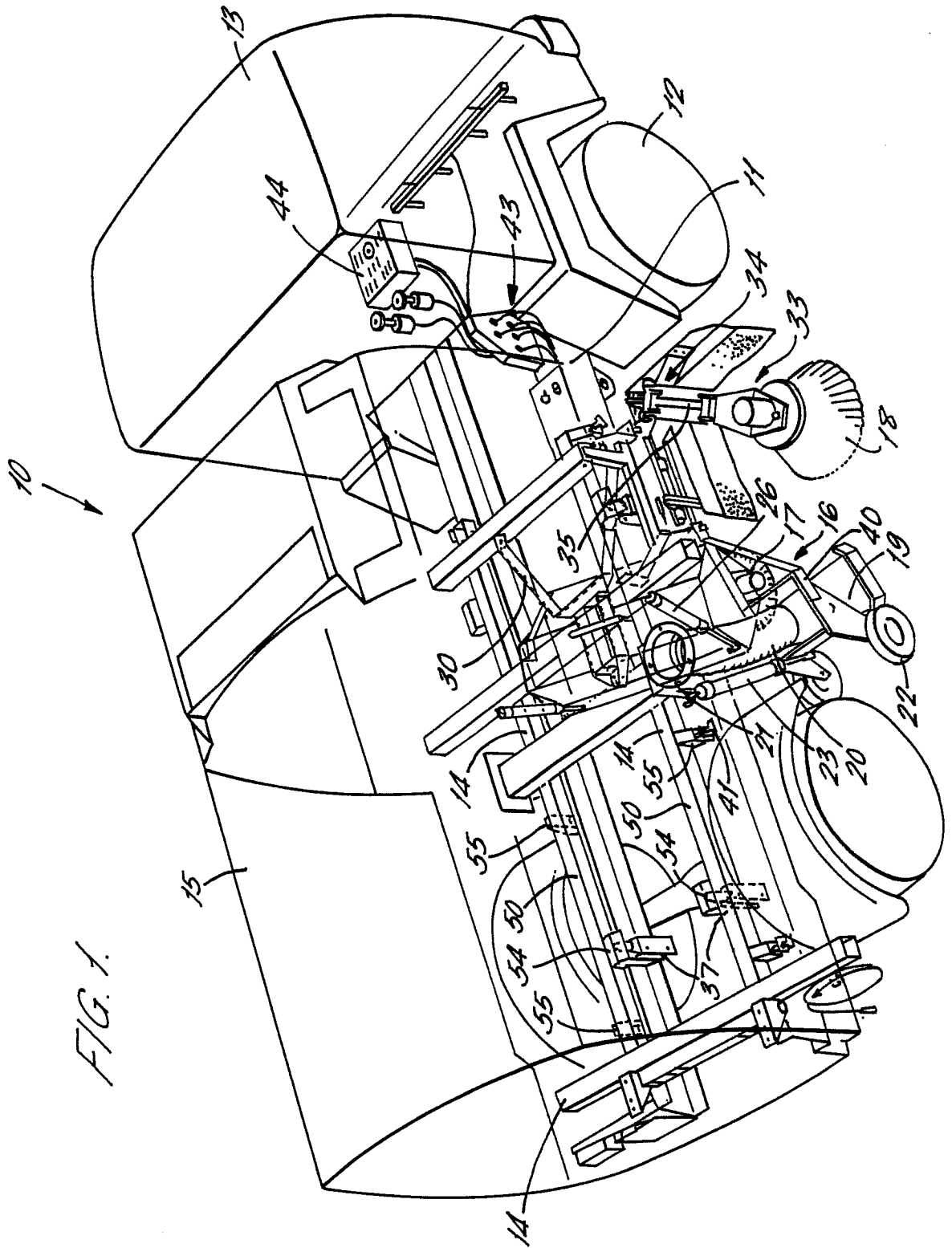
means for generating a vacuum within the container, at least one suction conduit (20) communicating at one end with the container and provided at the other end with a suction nozzle (19) and at least one rotatable brush (18) characterised by the provision of means (34) for moving the brush upwardly clear of the road wheels.

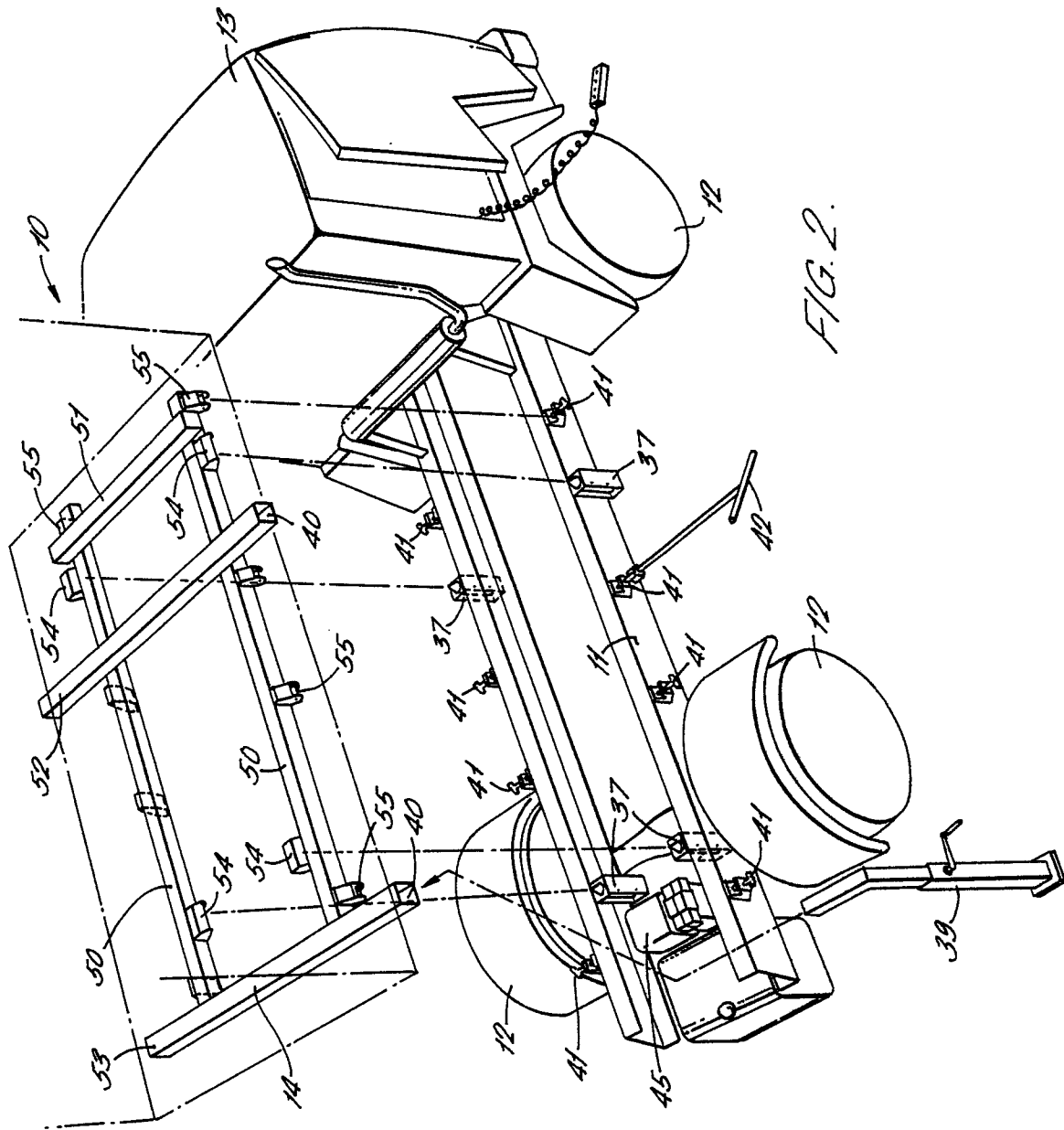
2. A road sweeping vehicle (10) as claimed in Claim 1 characterised in that the brush (18) is movable upwardly and outwardly.

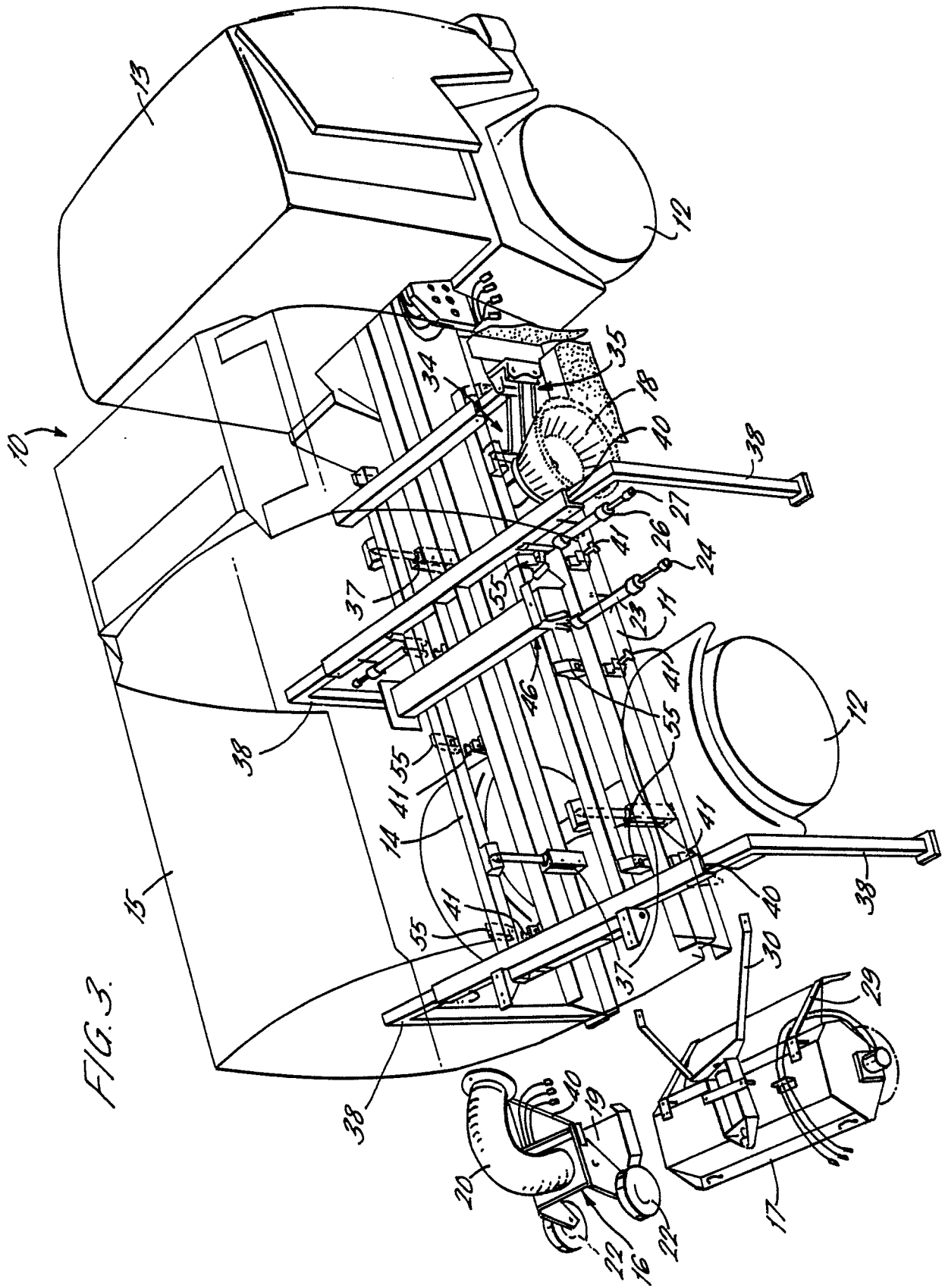
3. A road sweeping vehicle (10) as claimed in either Claim 1 or Claim 2 characterised in that the brush moving means (34) comprise a support frame (35) on which the brush is mounted, and which is pivotally mounted on the subframe (14) about an axis above the level of the road wheels (12) and is operable to move the brush (18) between a working position and a position clear of the road wheels.

4. A road sweeping vehicle (10) as claimed in any one of the preceding claims characterised by the provision of means (45) to elevate the subframe (14) away from the chassis (11).

5. A road sweeping vehicle (10) as claimed in any one of the preceding claims characterised by the provision of other sweeping equipment (16, 17, 19, 20, 28) which is provided with quick release means (24, 25, 27, 31, 32) to detach said equipment from support means (14, 21, 23, 26) to which it is attached, some of the support means also being mounted on a pivoted support frame (46) which is operable to move the support means to a position clear of the road wheels (12).







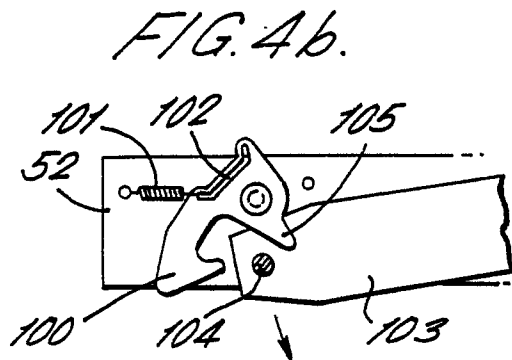
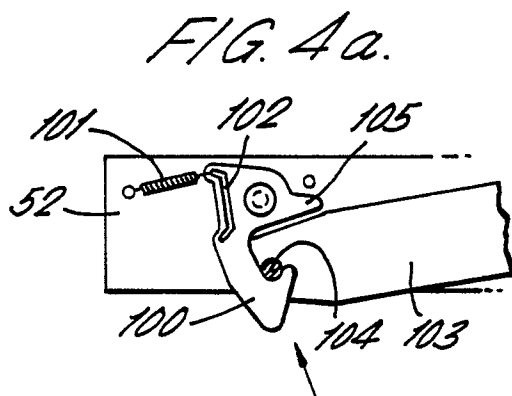
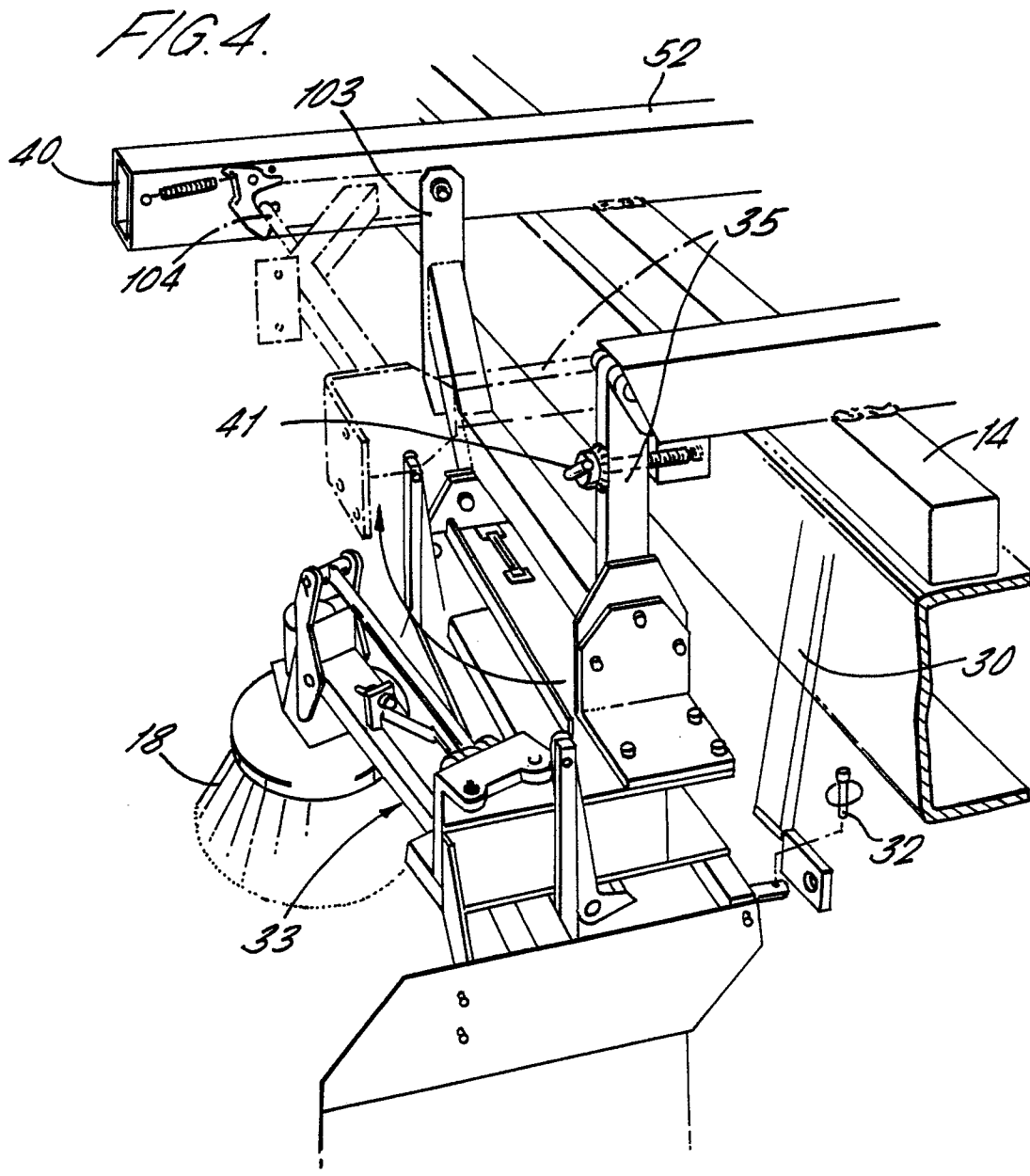


FIG. 5.

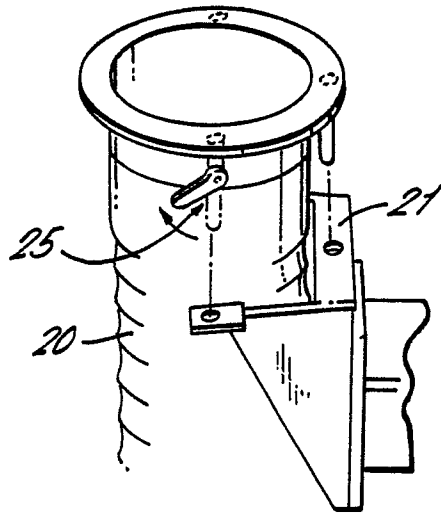


FIG. 6.

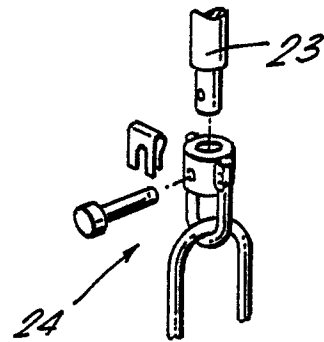


FIG. 7.

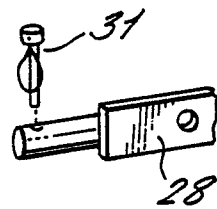


FIG. 8.

