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(54) **Apparatus for vacuum and/or blowing of debris**

(57) Vacuum and blowing apparatus is provided having means for selecting between a first vacuum mode and a second blowing mode. A base portion of the apparatus is in contact with a surface from which

debris is to be collected and/or across or relative to which debris is to be blown in use and, depending from the base portion, a body portion of the apparatus supports a collection box for the reception of debris collected from the surface.

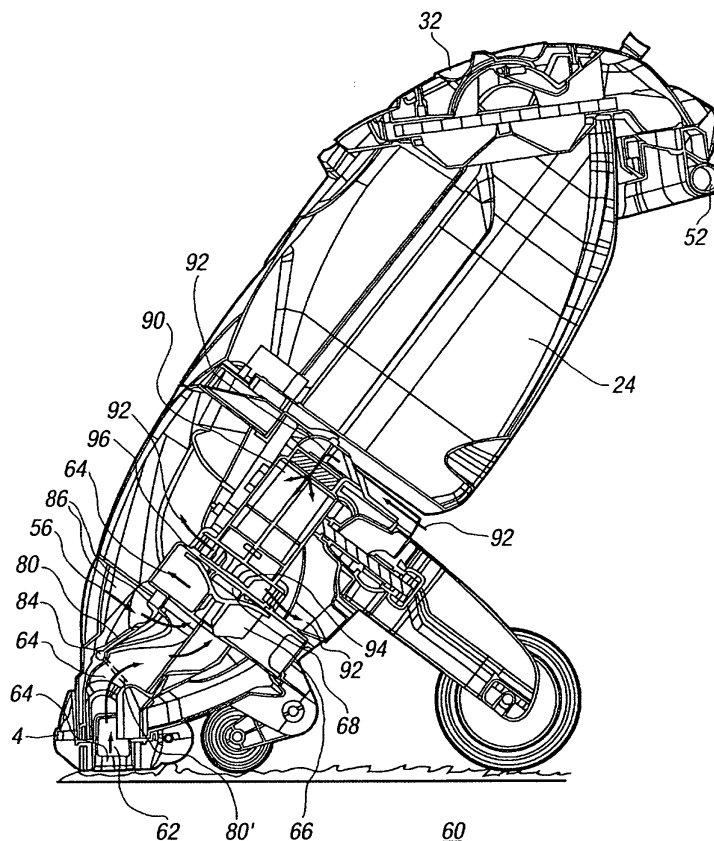


FIG. 2

EP 1 591 052 A2

Description

[0001] The invention which is the subject of this application is apparatus for use in an external environment such as a garden, park, paved area or the like for the purpose of collecting debris from a surface in the environment in a first use of the apparatus and/or in a second use of the apparatus, for blowing air from the apparatus in a directed manner onto a surface or area so as to allow debris to be moved to a particular location.

[0002] The provision of apparatus which allows the collection of debris in an external environment is previously known but typically, a user of said apparatus is provided to sit on or stand behind the apparatus as the same moves across the surface. The debris which is collected is typically collected into a bag made of a flexible sheet material such that the collected debris passes into the bag and the dust and finer particles which are collected can pass through the bag into the environment. This type of apparatus, due to its bulk and weight, tends to be used exclusively for industrial or commercial usage such as for example by park authorities, Council authorities, Estate owners and/or the like.

[0003] A further known type of apparatus is that which is typically carried by a user using a shoulder strap and, in this case, an elongate funnel is provided which can be hand held and directed towards a surface at a particular location thereon to allow debris to be collected, again typically into a bag of flexible sheet material. It is also known for this form of apparatus to be convertible to act as a blower.

[0004] A problem with the apparatus which is required to be carried is that as collected debris builds up in the bag, the apparatus can become heavy and therefore be difficult for the user to use the apparatus for any significant period of time. As a result, this form of apparatus tends to be used simply as apparatus for small scale debris collection.

[0005] The aim of the present invention is to provide apparatus which allows for the collection and/or blowing of debris and which is in a form so as to be user friendly, yet ensuring that the efficiency of collection of the debris is at least maintained or improved with respect to the conventional apparatus.

[0006] In a first aspect of the invention there is provided apparatus which, in use, is upstanding, said apparatus having a base portion in contact with the surface from which debris is to be collected in a vacuum mode and/or across which debris is to be blown in a blower mode and, depending from said base portion, the body of the apparatus supports a collection box, located as part of the apparatus for the reception of debris collected from said surface.

[0007] Preferably the apparatus allows user selection of at least two operating modes; a first vacuum mode and a second blowing or blower mode.

[0008] Preferably the apparatus is of a type being substantially upstanding or upright in use. This allows the

apparatus to be moved across a surface in use by a user, with the user typically standing adjacent the apparatus and steering the same in a required direction. Preferably the apparatus is manually powered and steered by the user.

[0009] The apparatus is typically of a type for use exclusively outdoors, such as in the garden. The apparatus could also be used indoors if required. However, conventional vacuum devices are only capable of use indoors, thus the present invention has a significant advantage over prior art devices.

[0010] Preferably the apparatus is provided with one or more wheels or rollers to allow the apparatus to be moved across a surface in use. In one example, the base portion is provided with wheels or rollers associated therewith. In a further embodiment the body portion of the apparatus can have one or more wheels or rollers associated therewith.

[0011] The wheels and/or rollers can be mounted on arms and said arms are preferably movable with respect to the apparatus to allow the position and/or height of the base portion and/or further portion of the apparatus to be moved between different positions. The required position is typically selected by a user. For example, the rear or underside surface of the apparatus can be moved to different heights relative to the surface, thereby allowing a suitable height to be selected depending on the size of the user.

[0012] In one embodiment, one or more rear wheels are mounted on one or more arms and said arms are movable between a storage condition and a contact position; and one or more front wheels or rollers mounted on arms, said front and/or rear arms selectively adjustable between a number of positions so as to allow the height of the underside of the base portion from said surface, to be selected by the alteration of the position of the arms with respect to the apparatus.

[0013] Typically the apparatus includes a series of passages or channels which define an air flow pathway in the vacuum mode from the base portion of the apparatus to the collection box. The air flow passage includes the passage of air and debris past the vanes of a fan unit prior to entering the collection box. Typically, the fan unit is provided so as to allow the debris which passes in the air flow to be shredded into smaller sizes prior to reaching the collection box, thereby allowing improved load capacity of the collection box.

[0014] Typically, when the air and debris enters the collection box, the debris enters at a location at or adjacent to the upper edge of the collection box whereupon the debris falls downwardly into the collection box and the air exits the collection box through at least one aperture. Typically, the at least one aperture is provided with filter means so as to prevent or minimize the dust particles leaving the collection box. Typically, the filter means includes two filter layers, each of which can be selectively removed and preferably are washable.

[0015] In one embodiment, the filter means is located

in a lid portion which forms one of the walls of the collection box when closed. Typically the lid portion is hingedly movable between an open position and a closed position and, when in the closed position, clamping means on the same engage with the body of the apparatus and collection box to secure the lid in position. These clamping means can also be used to secure the collection box in position with respect to the body of the apparatus, thereby achieving an effective air seal, between the lid and the collection box and the collection box and the body of the apparatus at the location of entry of the air flow and debris into the collection box from the body.

[0016] Typically, the fan unit is provided within the body of the apparatus. The fan unit can be driven by any suitable drive means such as an electronic motor, in which case connection to a power supply is provided, or an engine in which a fuel tank for the fuel supply for the engine is provided. Although not necessary, in one embodiment the movement of the apparatus along the surface can be driven by connection of at least one of the wheels to the drive means.

[0017] When the apparatus is operated in a vacuum mode, the air flow passes from the base portion of the apparatus to the collection box. In a blower mode, air enters the body of the apparatus through at least one aperture open to the external environment and passes through part of the body, past the fan unit and then leaves the body of the apparatus via a tube or conduit, so as to allow the user to direct the location of the exit of the tube so as to exert the blowing force onto a selected location on the surface. The tube or conduit is typically substantially flexible to increase the ease with which the same can be directed to a selected location of the surface or debris.

[0018] Typically, in selecting to move between blower and vacuum operations, flap means are moved in the air passageway in response to the user selection. The flap means are located with respect to air passages in the apparatus so as to allow the selective opening and closure and redirection of air flow depending on the positioning of the flap at that time.

[0019] Preferably first and second flap means are provided which are movable to allow selection between said blower and vacuum modes. Typically, both flaps are moved in response to user selection means with the flaps being resiliently biased towards positions for said blowing and vacuuming modes so that, when in said positions, a seal is achieved.

[0020] In a further embodiment of the invention, a third air flow system is provided within the apparatus, said air flow controlled so as to induce air either from externally of the apparatus or from another air flow within the apparatus, and direct said air flow around the motor unit of said apparatus so as to provide a cooling effect. Typically, the fan unit which is connected to the motor, includes a series of vanes which, when the motor is driven, serve to act on the air in this air system and move

the air to provide the cooling effect on the motor.

[0021] Typically the fan unit includes a sealing layer or plate which serves to seal the motor and motor chamber from the ingress of water, debris or other material which may be collected by the apparatus, particularly when in the vacuuming mode. Typically, the vanes of the fan unit which impact on the debris are located at a first side of the sealing plate and the motor unit and motor chamber are located at a second side of the sealing plate or layer.

[0022] In one embodiment the motor unit is an electric motor connected by cable to a mains electric supply or battery supply carried on the apparatus. Alternatively the motor unit is a combustion engine and in this embodiment the engine is connected to a fuel container carried on the apparatus.

[0023] Typically, the entry into the base of the apparatus through which the air and debris passes, is provided as wide as possible but is provided with a series of fingers which, preferably, depend from a side of the aperture, and preferably only one side, towards the opposing side, so as to prevent or minimise the opportunity of a person's hand or other part of their anatomy from entering contact with the fan unit. By providing the fingers such that they will only depend from one side towards the other side of the aperture, so the opportunity for debris collection and snagging on the fingers is reduced compared to that which occurs when the fingers depend across the entire aperture.

[0024] It will be appreciated by persons skilled in the art that the present apparatus can be used exclusively in a vacuum mode (i.e. not have a blower mode) or a blower mode (i.e. not have a vacuum mode) if required and, when operated in such exclusive modes, any of the features described herein may be provided on the apparatus.

[0025] Thus, according to further independent aspects of the present invention there is provided a blower apparatus; and a vacuum apparatus.

[0026] According to a yet further aspect of the present invention there is provided vacuum and blowing apparatus, said apparatus having means for selecting between a first vacuum mode and a second blowing mode, a base portion in contact with a surface from which debris is to be collected and/or across or relative to which debris is to be blown in use and, depending from said base portion, a body portion of the apparatus supports a collection box for the reception of debris collected from said surface.

[0027] Specific embodiments of the invention are now described with reference to the accompanying drawings, wherein:-

Figures 1a - d illustrate various views of the apparatus in accordance with one embodiment of the invention;

Figure 2 illustrates a cross sectional elevation of the

apparatus along the longitudinal centre line of said apparatus; and

Figure 3 illustrates a cross sectional elevation of the apparatus along a longitudinal axis offset to one side of the centre of the apparatus.

[0028] Referring firstly to Figures 1a - d, there is illustrated the apparatus in accordance with one embodiment of the invention.

[0029] The apparatus, as can be seen, is an upstanding or free standing item and in this case is provided with a cable to allow the drive means motor to be connected to an electric power supply.

[0030] The apparatus 2 has a base portion 4 which is provided to be located adjacent to a surface along which the apparatus is provided to be pushed or moved by the user who grips the handle arrangement 6. Adjacent to the base portion are provided a first set of wheels or rollers 8 and a second rear set of wheels or rollers 10. The first set of wheels or rollers 8 are mounted on an arm 12 which is in turn mounted on a portion of the body 14 of the apparatus. The arm 12 is rotatable as indicated by arrow 16 about a pivot location and is engageable in a series of positions via engagement means, such as a ratchet mechanism, so as to allow the adjustment of the height of the wheels 8 and hence allow the distance between the underside of the base 4 and the surface to be adjustable.

[0031] The wheels 10 are mounted on arms 18 which are rotatable about pivot point 22 so as to allow the same to be moved, approximately through 90° as indicated by arrow 20 to a storage position wherein the arm 18 and wheels 10 take up less space (i.e. are arranged in closed proximity to the body of the apparatus). Depending upwardly from the body 14 there is provided a collection box 24 which is retained within the body between the arms 26, 28, a receiving face 30 on the body and a lid portion 32. The lid portion 32 is shown in the closed position and, when in said position, clamping means are provided on the lid portion which engage with the arms 26, 28 of the body and hence clamp down onto the collection box acting to retain the collection box in position and also acting to form sealing engagement between the lid 32 and the collection box 24, and the collection box 24 and receiving base 30.

[0032] Also provided externally of the apparatus are cable receiving means 34 which are movable between the flush position shown in Figures 1a - d and a protruding position so as to allow the cable to be wound around the same. The cable (not shown) is attached to a switch box 36 located on the handle 6. The switch box 36 includes a lever 38 which, when depressed by a user, causes the connection of the electricity supply to the motor within the body of the apparatus and the cable passes from the switch box to the motor to allow the supply of electricity for the motor to operate. The switch box can also include a neon indicator 40 which, when the

electricity supply is provided to the switch box, is illuminated. The handle arrangement 6 comprises a gripping portion 42 which is slidably received in members 44, 46 which in turn are received in a collet arrangement 48. Rotational adjustment means 50 are provided so as to allow the relative position of the handle 6 to be adjusted by rotation about the member 50. Selective adjustment of the length of the handle is possible within a predetermined limit by the sliding movement between the gripping portion 42 and the members 44 and 46.

[0033] Returning now to the lid 32, and although not shown, the lid includes therein filter means, said filter means typically being of a number of layers, the use of which will be described in more detail subsequently.

[0034] The apparatus also has mounted externally, a flexible hose member 52 which is shown in location for storage but which can be removed from said position by a user such that the end 54 of the hose can be directed by the user to a particular location on a surface or to particular debris on said surface.

[0035] In the base unit 4 there is provided an aperture which allows the flow of air into the body of the apparatus. The aperture leads to a passage and said passage includes an aperture 56 selectively open to the environment. Both the aperture 56 and the aperture in the base unit are provided with fingers so as to allow the flow of air through the apertures but act as a safety means to prevent a person's anatomy being placed into the apertures.

[0036] Referring now to Figures 2 and 3, the internal aspects of the apparatus can be described. It should be appreciated that the apparatus is shown in a position for use in contact with a surface 60 and that the surface may of course be horizontal rather than as shown in illustrative purposes.

[0037] A key aspect of the apparatus is that there are provided a series of air flow systems some of which can be operated at the same time or are selectively operated. These air flow systems will now be described with reference to parts of the apparatus which are provided internally of the same.

[0038] Base 4 is shown with an aperture 62 which allows the collection of debris from the surface 60 as indicated by arrow 64. The debris is then caused by air flow to pass through the channel or passage as indicated by the arrows 64 towards a fan unit 66 which rotates about axis 68. The rotation of the vanes of the fan unit 66 causes debris in the air flow 64 to be shredded. The action of the fan unit causes the debris and air flow 64 to pass to the side of the fan unit as indicated by arrow 64 whereupon, reference to Figure 3 illustrates the subsequent movement of the air flow 64 and debris past the fan unit into a deposition channel 70 and into collection box 24. The deposition channel is shaped as shown such that debris is emitted at the location 72 near the top of the collection box and then falls downwardly as indicated by arrows 74 to rest at the base of the collection box. By the provision of the deposition channel of

this shape, so the debris in the collection box cannot re-enter the deposition channel 70 and hence block the air flow 64. The air which enters the collection box eventually leaves the same as indicated by arrow 64 passing through the filter means 76 in the lid 32 and leaves the apparatus via the port 78 with the filter means collecting dust from the airflow. This therefore completes the first air system of the apparatus and illustrates the vacuum function of the same. The lid with the filter means is typically provided adjacent the top of the collection means or opposite to the surface on which the debris collects in the collection means.

[0039] The second air flow system can be selectively activated instead of the first air flow system herein described and is used in the blower mode. In this case, a user operated manual switch is provided on the body of the apparatus. In Figures 2 and 3, the apparatus is shown in the arrangement where the apparatus is for use in the vacuuming mode. However, when the switch is operated by the user to change from a vacuum mode or other mode to a blower mode, then flaps 80 and 82 are pivotally moved about respective pivot points 84, 86 to the position shown in dotted lines in Figures 2 and 3, 80' and 82' respectively. The movement of the flaps serves to alter the air passage as follows. Firstly, the movement of the flap 80 to a position 80, allows the entry of air through aperture 56 as indicated by arrow 86 in Figure 2. The air then passes into the fan unit 66 from where the air passes as indicated by arrows 86 in Figure 3, until it reaches the flap 82 in position 82'. This flap serves to divert the air flow as indicated by arrow 86 towards the entry aperture 88 of pipe 52. The air then enters the pipe 52 moving therealong to the exit aperture 54 as referred to in figures 1a - d. As the pipe is flexible, at least in certain portions, the same can be moved to a selected position by the user to provide the blowing effect. This therefore concludes the air flow system for the blower option.

[0040] A third air flow system is provided to allow a cooling effect to be created on the motor unit 90 within the body and this air flow is indicated by arrows 92 whereupon air enters the chamber in which the motor unit is mounted, passes around the motor 90 to cool the same and is encouraged to leave the motor chamber by the rotation of the vanes of a second part 94 of the fan unit which is connected for rotation to the motor unit. The parts 94 and 66 of the fan unit are separated by a sealing layer 96 which prevents the ingress of water, debris or dust from the fan unit 66 through to the motor chamber. Typically, the sealing layer is provided as a labyrinth seal.

[0041] In one embodiment, it is preferred that the base unit will be selectively removable from the apparatus so as to allow the interchangeability of the same with particular debris collection heads fitted to suit particular tasks. For example, different types of scraping heads, brush heads and/or the like can be used.

[0042] Furthermore, in one embodiment, at the base

unit there is provided a brush or strip of flexible material, said brush or strip provided so as to be contactable with the surface as the apparatus base unit 4 is moved along the surface. The provision of the brush or strip of material in contact with the surface serves to separate debris from the surface and thereby allow the debris to be more easily collectable by the suction action of the air flow 64. In one embodiment, the brush unit is pivotally movable such that the same pivots between first and second positions upon front and reverse directions of movement of the apparatus and, furthermore, can be pivoted completely out of contact with the surface for storage.

[0043] The present invention therefore provides a unique apparatus for use in an external environment in that the apparatus is upstanding or self supporting and includes a collection box as part of the apparatus in use. Typically the collection box is formed of plastics material and is of a rigid structure such that, for removal of the collection box the lid 32 is opened and the collection box, with debris therein, removed from the body of the apparatus and carried to dispose of the debris at the desired location.

[0044] The provision of the three air flow systems in the apparatus firstly achieves the required cooling effect on the motor and importantly, allows the user selection of the apparatus to be used in a vacuuming mode and a blower mode by simple user selection. The apparatus herein described therefore provides the possibility for users in a domestic situation to achieve the vacuuming and/or blowing effect in an external environment in a manner which was not previously possible.

Claims

1. Apparatus which, in use, is upstanding, said apparatus having a base portion in contact with the surface from which debris is to be collected in a vacuum mode and/or across which debris is to be blown in a blower mode and, depending from said base portion, the body of the apparatus supports a collection box, located as part of the apparatus for the reception of debris collected from said surface.
2. Apparatus according to claim 1 wherein one or more wheels or rollers are provided for contact with the surface on which the apparatus is movable in use.
3. Apparatus according to claim 2 wherein the one or more wheels or rollers are provided on the base portion of said apparatus.
4. Apparatus according to claim 2 wherein the one or more wheels or rollers are mounted on one or more arms, said arms movable between two or more different positions so as to allow the height or position of the base portion from said surface to be selected.

5. Apparatus according to claim 4 wherein one or more of said arms are movable between an in use position, wherein the wheels or rollers contact the surface, and a storage position. 5
6. Apparatus according to claim 1 wherein said apparatus includes a series of passages which define an air flow pathway in the vacuum mode from the base portion to the collection box, said air flow pathway including the passage of air and debris past the vanes of a fan unit prior to entering the collection box. 10
7. Apparatus according to claim 6 wherein the fan unit is provided so as to allow the debris which passes in the air flow to be shredded into a smaller size prior to reaching the collection box. 15
8. Apparatus according to claim 1 wherein when air and debris enter the collection box, the debris enters at a location at or adjacent an upper edge of the collection box and thereafter said debris falls downwardly into the collection box, and the air exits the collection box through at least one aperture. 20
9. Apparatus according to claim 8 wherein said at least one aperture is provided with filter means to prevent or minimise the dust particles leaving the collection box. 25
10. Apparatus according to claim 9 wherein the filter means includes at least two filter layers. 30
11. Apparatus according to claim 9 wherein the filter means are located in a lid portion of the collection box, said lid portion forming one of the walls of the collection box when in a closed position. 35
12. Apparatus according to claim 11 wherein when the lid portion is in the closed position, the lid is held in position by clamping means which engage with the body of the apparatus and collection box to secure the lid in position. 40
13. Apparatus according to claim 12 wherein the clamping means are also used to secure the collection box in position with respect to the body of the apparatus. 45
14. Apparatus according to claim 1 wherein said apparatus includes a series of passages which define an air flow pathway in the blower mode, air entering the body of the apparatus through at least one aperture open to the external environment and passing through part of the body, past the fan unit and then leaves the body of the apparatus via a tube by which the user can direct the air flow. 50
15. Apparatus according to claim 1 wherein when the apparatus is provided with selection means to allow a user to select between a vacuum mode or a blower mode. 55
16. Apparatus according to claim 15 wherein the selection means includes or operates flap means which are movable in air flow passages in the apparatus in response to user selection to alter the airflow pathway between said vacuum mode and said blower mode.
17. Apparatus according to claim 16 wherein first and second flap means are provided in said apparatus and each flap means is movable.
18. Apparatus according to claim 16 wherein the flap means are moved in response to user selection and said flaps are resiliently biased towards the selected position for said blowing and vacuuming modes.
19. Apparatus according to claim 1 wherein a further airflow system is provided within the apparatus, said air flow controlled to induce air either from externally of the apparatus or from another air flow within the apparatus and direct said air flow around a motor unit of said apparatus to provide a cooling effect.
20. Apparatus according to claim 1 wherein a fan unit in the apparatus includes a sealing layer which serves to seal a motor or motor chamber which drives the fan unit from the ingress of water or debris or other material which may be collected by the apparatus when in the vacuuming mode.
21. Apparatus according to claim 20 wherein vanes of the fan unit which impact on debris being sucked into the apparatus in the vacuum mode are located on one side of said sealing layer, and the motor chamber or motor are located on a second side of said sealing layer.
22. Apparatus according to claim 1 wherein one or more air flow apertures defined in the base and/or body of the apparatus are provided with a series of fingers which depend from a side of the aperture towards the opposing side so as to prevent or minimize the opportunity of a person's hand or other part of their anatomy from entering the aperture.
23. Apparatus according to claim 1 wherein the base portion is selectively removable to allow one or more different types of collection heads to be fitted to the apparatus.
24. Apparatus according to claim 23 wherein the one or more collection heads can include one or more

scraping means or brush means associated therewith.

25. Apparatus according to claim 24 wherein said scraping means and/or brush means are pivotally mounted to said collection head. 5
26. Apparatus according to claim 1 wherein the collection box is substantially rigid. 10
27. Apparatus according to claim 1 wherein said apparatus is self supporting in an in use position.
28. Apparatus according to claim 1 wherein said apparatus is manually powered for movement across a surface. 15
29. Apparatus according to claim 1 wherein said apparatus is for use exclusively in an outdoor environment. 20
30. Vacuum apparatus, which, in use, is upstanding, said apparatus having a base portion in contact with the surface from which debris is to be collected in a vacuum mode and, depending from said base portion, the body of the apparatus supports a collection box, located as part of the apparatus for the reception of debris collected from said surface. 25
31. Blower Apparatus which, in use, is upstanding, said apparatus having a base portion in contact with the surface across which debris is to be blown in a blower mode and, depending from said base portion, the body of the apparatus supports a collection box, located as part of the apparatus for the reception of debris collected from said surface. 30 35
32. Vacuum and blowing apparatus, said apparatus having means for selecting between a first vacuum mode and a second blowing mode, a base portion in contact with a surface from which debris is to be collected and/or across or relative to which debris is to be blown in use and, depending from said base portion, a body portion of the apparatus supports a collection box for the reception of debris collected from said surface. 40 45

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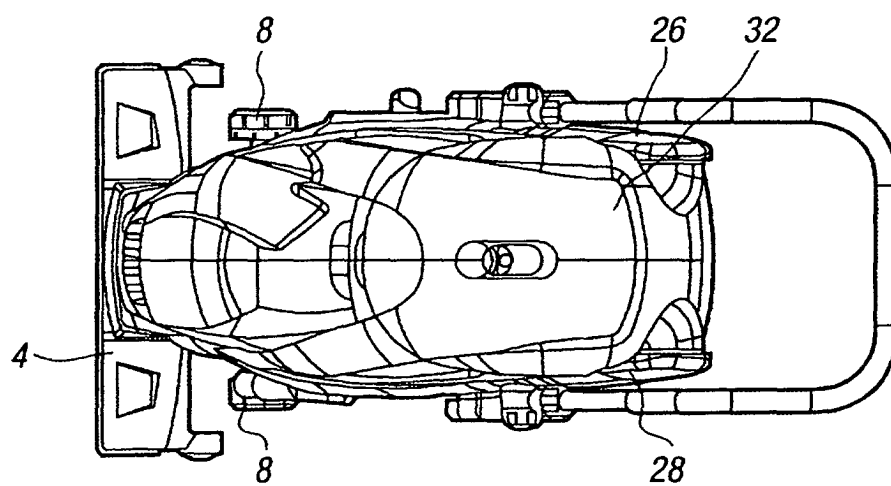
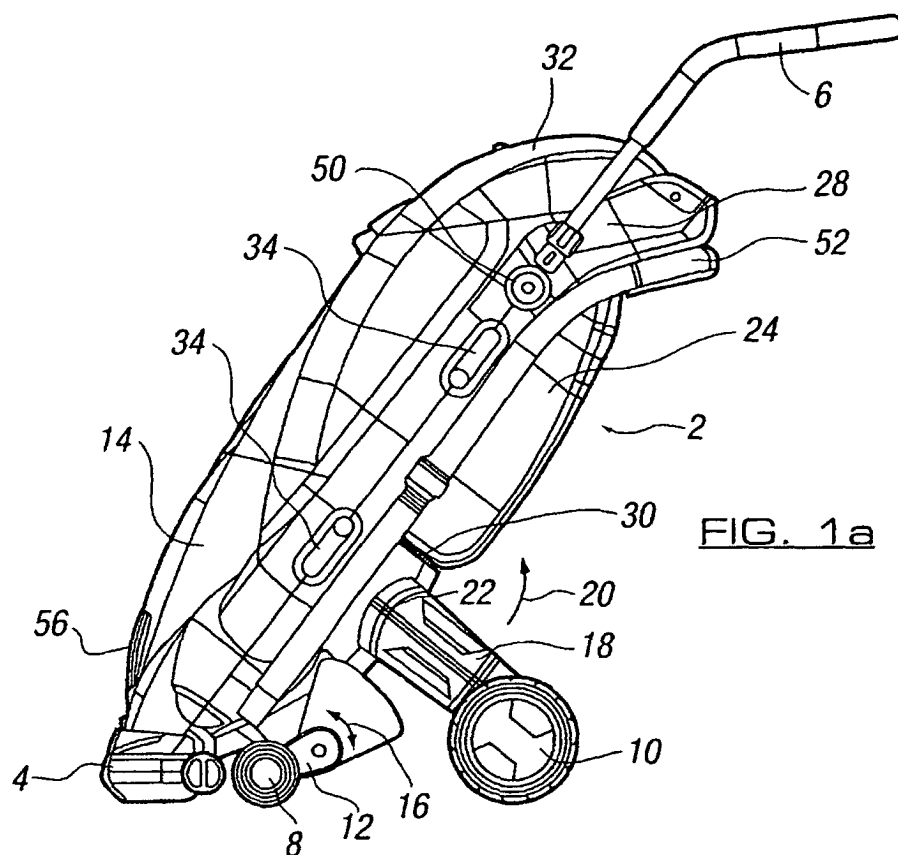


FIG. 1c

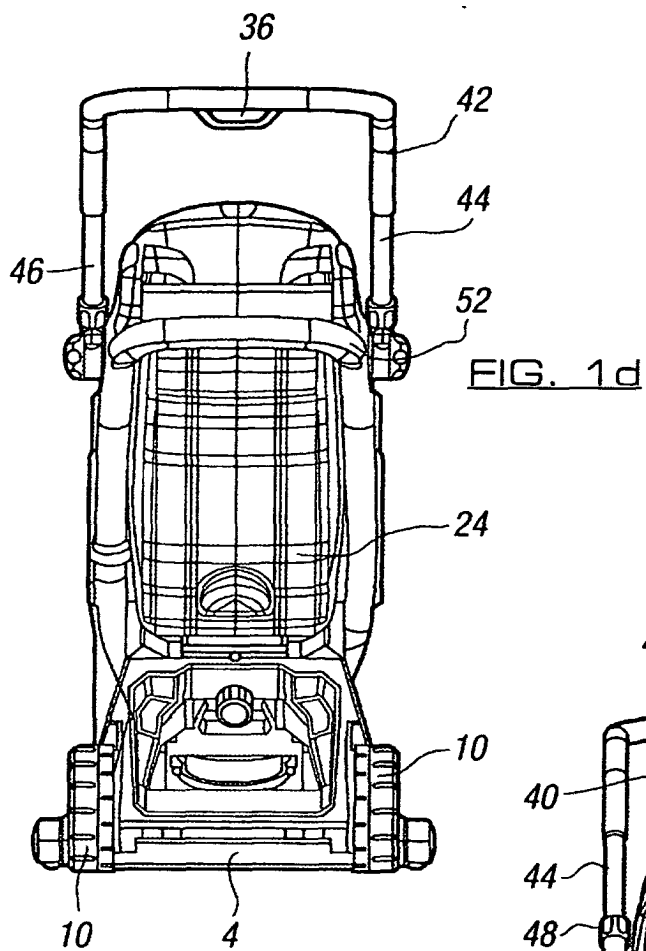
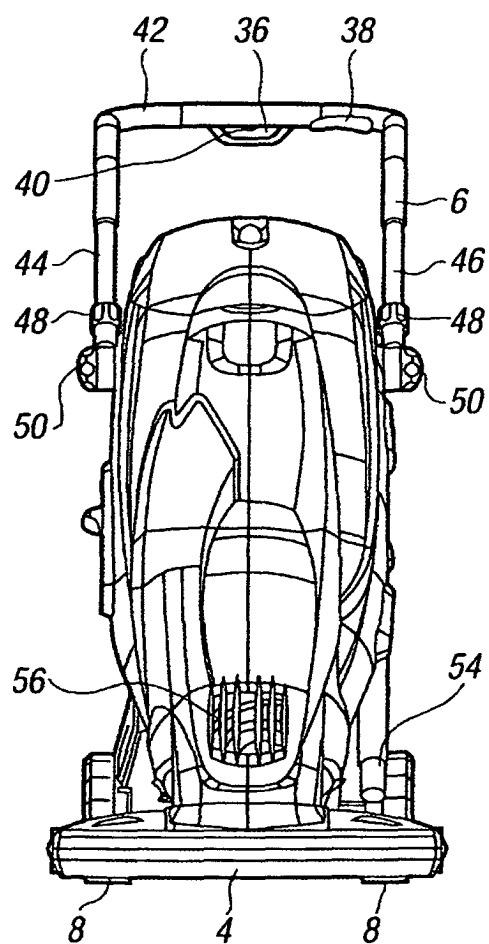


FIG. 1b



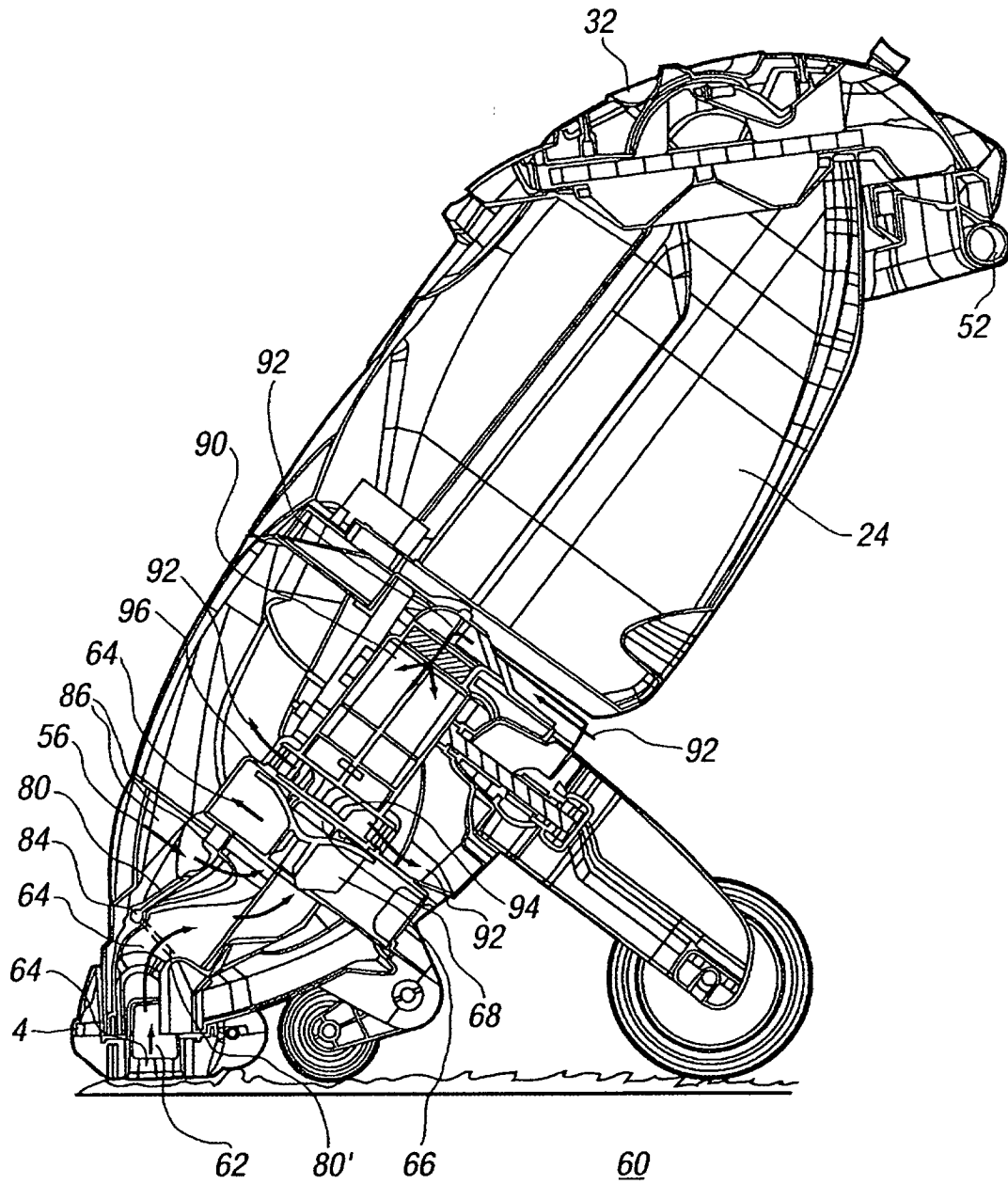


FIG. 2

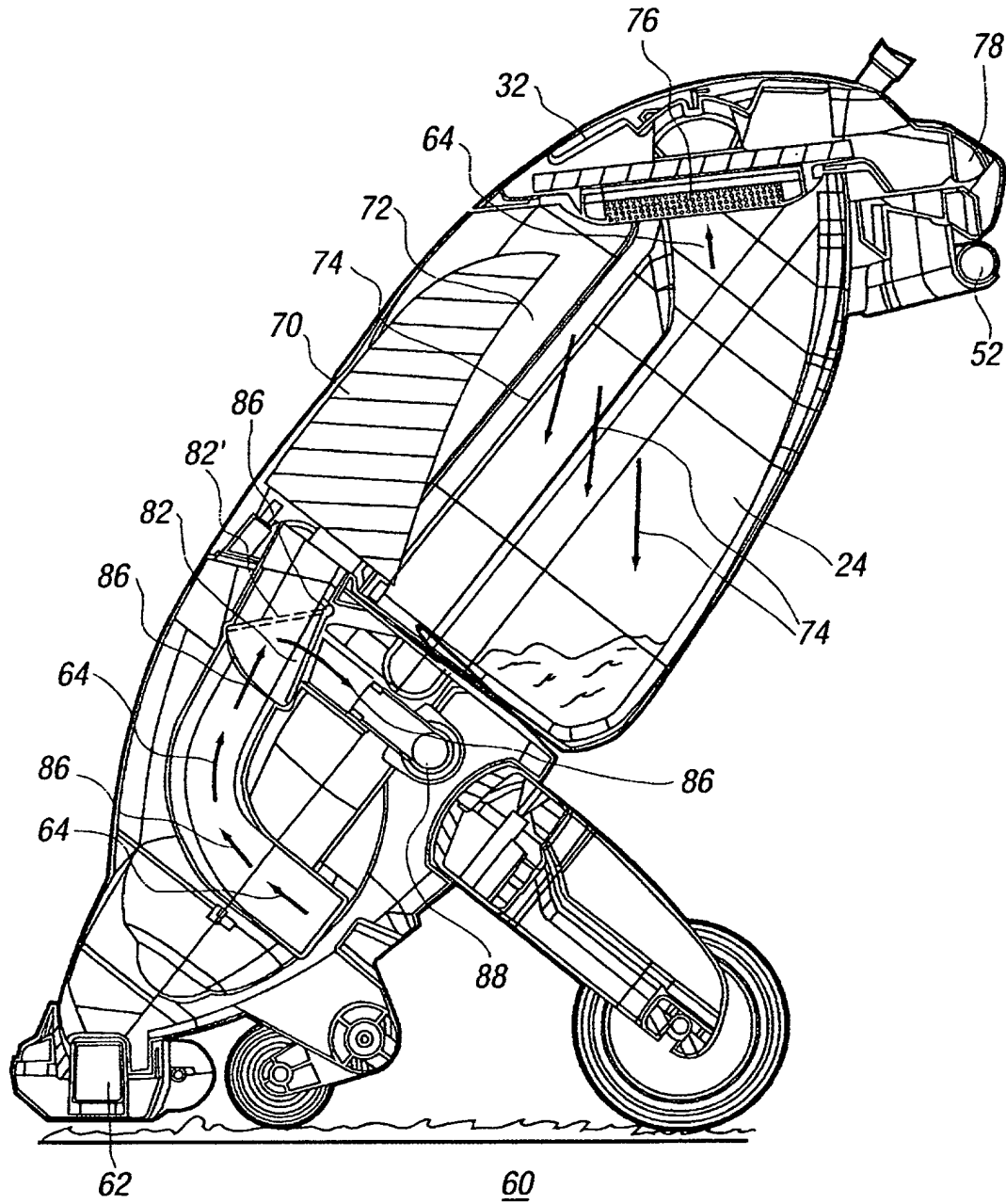


FIG. 3