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 (72) Inventor: FRIEDRICH RAINER



(54) IMPROVEMENTS RELATING TO FLOOR SWEEPERS

(71) We, LEIFHEIT INTERNATIONAL GUNTER LEIFHEIT GMBH, a body corporate organised and existing under the laws of the Federal Republic of Germany, of 5408 Nassau/Lahn, Federal Republic of Germany, 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:—

The invention relates to a floor sweeper having a roller brush drivable by floor engaging wheels with the wheels and roller brush mounted in a casing, and at least one dirt container.

It has been previously proposed to form the dirt container or containers from parts of the casing. To this end a portion of the casing forming the dirt container has been constructed to be open to the top or bottom and closable by a flap or cover. The flap or cover is pivoted on the casing and additional means are required for pivotally mounting the flap or cover and for retaining the flap or cover in the working position and for permitting a transfer into the emptying position.

According to the invention there is provided a floor sweeper having a roller brush drivable by floor engaging wheels with the wheels and roller brush mounted in a casing, and at least one dirt container formed as a housing with a top wall, a bottom wall and side walls which close the housing on all sides except for the side which faces the roller brush, the dirt container being mounted in a recess in the casing and being limitedly displaceable relative to the casing between a working position and an emptying position.

The limitedly displaceable mounting of the dirt container in a recess in the casing makes it possible to manufacture the sweeper in a simple manner, whereby the components can be produced inexpensively

and the dirt container can be transferred in simple manner into its emptying position.

For transferring it into its emptying position, the dirt container is preferably mounted in the casing for downwardly displacement when transferring it into the emptying position. In the emptying position the dirt can be emptied therefrom merely by tipping the sweeper.

A spring can be associated with the dirt container to bias it to its working position. Thus, the spring maintains the dirt container in its working position, until the dirt container is pressed into its emptying position against the action of the spring. After releasing the dirt container, it automatically returns to its working position.

A locking system can be associated with the dirt container to retain it in its working position. Thus, the dirt container can reliably be secured in its working position.

The locking system may comprise at least one locking projection on the casing, preferably formed by a locking rail which co-operates with an edge portion of the dirt container. In simple manner, this can bring about locking over the entire width of the dirt container, so that undesired tipping or tilting thereof is prevented.

For transferring it into its emptying position, the dirt container can be mounted on the casing in a vertically downwardly displaceable manner by co-operating guide members and guide grooves. By means of said guide members and guide grooves the dirt container can reliably be guided in the casing. The guide members are preferably provided on the casing and the guide grooves on the dirt container.

In the emptying position and in the working position the dirt container can engage stops on the casing. As a result, in both the emptying and working positions the dirt container positively engages with stops on the casing, so that the predeter-

mined positions can be reliably maintained.

The stop which defines the emptying position can be formed by projections from the casing extending towards lateral side walls of the dirt container and co-operating with projecting portions of the top wall of the dirt container.

The stop which determines the working position can be formed by a wall member provided in the casing and extending parallel to the roller brush, against which wall engages the edge of the bottom wall of the dirt container adjacent the brush roller, the wall member, when the dirt container is in the working position, closing the lower portion of an open side of the dirt container through which open side dirt is thrown by the roller brush in operation of the sweeper with the wall member defining the lower edge of a dirt intake opening of the dirt container. As a result, in the working position, the edge of the bottom wall of the dirt container which is adjacent the roller brush engages with said wall member over the entire width of the dirt container, and said wall member prevents any dust falling out of it in operation. Without said wall member, the dirt container can be produced in a particularly simple manner by injection moulding from a plastics material using a simple mould. The face of said wall member which faces the roller brush extends parallel to the roller brush, is inclined and has its bottom edge spaced by a distance measured horizontally from the axis of the roller brush less than the radius of the roller brush. This face forms in simple manner an introduction slope for the dirt.

In a particularly simple manner, the face of said wall member facing the brush roller can be constructed in curved manner about the axis of rotation of the roller brush. The face of said wall member remote from the roller brush can be substantially vertical.

The dirt container can have its bottom wall substantially rectangular, its side and front or rear walls substantially vertical, and its top wall integral with the side and front or rear walls. As a result, the dirt container can be constructed in particularly simple manner by injection moulding and forms a closed chamber for the dirt.

The recess in the casing which receives the limitedly displaceable dirt container can be open at the top, at the bottom and in the direction away from the roller brush. Thus, in simple manner, two such dirt containers can form a large part of the upper surface, the lower surface and front and rear surfaces of the sweeper.

Preferably, two dirt containers are provided one in front of the roller brush and the other behind the roller brush. The casing can have two casing side parts

extending parallel to one another and parallel to the direction of movement of the sweeper in use, the casing side parts having the wheels mounted therein and being interconnected by a casing middle part which covers the roller brush and extends at right angles to the direction of movement of the sweeper in use. Thus, the casing is constructed in H-shaped manner and permits a particularly inexpensive manufacture.

The invention is diagrammatically illustrated by way of example in the accompanying drawing which shows a floor sweeper according to the invention as viewed from one side.

Referring to the drawing, a floor sweeper, particularly a carpet sweeper, is intended for reciprocating movement in use. The sweeper has a casing 10 of generally H-shape with two casing side parts 11 extending parallel to one another and to the direction of movement of the sweeper in use, the casing side parts 11 being interconnected by a middle casing part 12 which extends at right angles to the direction of movement. In the two casing side parts 11 wheels 13 are mounted which, upon movement of the sweeper over the floor to be cleaned, are rotated by engagement with the floor and thereby drive a roller brush 14 which acts on the floor with a sweeping action. The roller brush 14 is covered by the middle casing part 12.

To allow sweeping action and dirt collection in both directions of movement reciprocating operation, two dirt containers 15 are associated with the brush roller 14, one of the dirt containers 15 being located in front of the brush roller 14 and the other dirt container 15 being located behind the brush roller 14.

Except on its side facing the brush roller 14, each dirt container 15 is closed on all sides. Thus, each dirt container has a substantially rectangular bottom wall 16, opposite lateral vertical side walls 17, on the side remote from the brush roller 14 a vertical wall 18 and a top wall 19 which forms the top of the dirt container and which is formed integral with the vertical walls 17, 18. The dirt containers 15 can each be manufactured in a particularly simple manner by injection moulding from a plastics material. The bottom wall 16 of each dirt container forms part of the underside of the casing of the sweeper, and the top wall 19 of each dirt container forms part of the top of the casing of the sweeper. The wall 18 of each dirt container forms part of either the front or the rear wall of the casing of the sweeper.

Each dirt container 15 is mounted in a recess in the casing 10 and can be moved vertically downwards from its working position into an emptying position. For this

purpose, each dirt container 15 has on the outer face of each of its side walls 17 two guide grooves 20, formed in each case by a pair of juxtaposed ribs 21. The casing 10 has co-operating guide ribs 22 which engage in the respective guide grooves 21 of the dirt container 15. In each of the emptying position and the working position, the dirt containers 15 engage on stops provided on the casing 10. The stops which determine the emptying position are formed by projections 23 provided on the casing 10 and extending towards the side walls 17 of the dirt container 15. In the emptying position, the projections 23 engage the underside of portions of the top wall 19 which project laterally beyond the side walls 17. In the drawing, this emptying position is shown at the left-hand side.

The stops which determine the working position are formed, for each dirt container 15, by a wall member 24 of the casing extending parallel to roller brush 14 and which is engaged by the edge of the bottom wall 16 of the dirt container 15 which faces the brush roller 14. The wall member 14 also closes the lower portion of the open side of the dirt container 15 which is towards the brush roller 14 and with its upper edge defines the lower rim of the dirt introduction opening of dirt container 15. Thus, the wall members 24 of the casing 10 not only form stops for the dirt containers but also part of the dirt containers, that is to say the part which prevents any dust falling out of the container in normal use. The face of each wall member 24 which is towards the roller brush 14 is inclined and at the lower edge projects beyond the roller brush 14, so that an introduction slope is formed. The face of the wall member 24 facing the roller brush 14 is curved about the axis of rotation of the roller brush 14. The side face of each wall member 24 remote from the roller brush 14 is substantially vertical.

A spring or springs 25, only one can be seen in the drawing, to maintain the dirt containers 15 in their working positions has or each have a first leg 26 engaged with one of the dirt containers 15 and a second leg 26 engaged with the other of the dirt containers 15. The spring 25 has a middle part engaged with the underside of the brush roller 14, and the first and second legs engaged against the undersides of the top walls 19 of the dirt containers.

A locking system to maintain the dirt containers 15 in the working position comprises, for each dirt container, a locking projection 28 integral with the casing 10 and formed by a resilient locking rail 27 which co-operates with the edge of the top wall 19 of the dirt container 15. Thus, the dirt container can reliably be maintained in the

working position, which is depicted at the right-hand side of the sweeper shown in the drawing. To transfer one of the dirt containers 15 into the emptying position, it is pressed downwardly to overcome the force of the locking system. Further downward movement into the emptying position is performed against the action of the spring leg 26. On releasing the dirt container 15, it automatically returns into the working position under the force of the spring leg 26 but it can be manually aided if desired.

WHAT WE CLAIM IS:—

1. A floor sweeper having a roller brush drivable by floor engaging wheels with the wheels and roller brush mounted in a casing, and at least one dirt container formed as a housing with a top wall, a bottom wall and side walls which close the housing on all sides except for the side which faces the roller brush, the dirt container being mounted in a recess in the casing and being limitedly displaceable relative to the casing between a working position and an emptying position.

2. A floor sweeper according to claim 1, in which the or each dirt container is mounted in the casing in a manner such that it can be moved vertically downwardly to move to its emptying position from its working position.

3. A floor sweeper according to claim 1 or claim 2, including a spring to bias the or each dirt container to its working position.

4. A floor sweeper according to any one of the claims 1 to 3, including a locking system to retain the or each dirt container in its working position.

5. A floor sweeper according to claim 4, in which the locking system comprises for the or each dirt container at least one locking projection, preferably formed by a resilient rail which engages an edge portion of the dirt container when the dirt container is in its working position.

6. A floor sweeper according to any one of claims 1 to 5, in which, to enable the or each dirt container to be transferred between its working position and its emptying position, the dirt container is mounted in the casing in a vertically displaceable manner by co-operating guide members and guide grooves.

7. A floor sweeper according to claim 6, in which the guide members are provided on the casing and the guide grooves on the dirt container or dirt containers.

8. A floor sweeper according to any one of claims 1 to 7, including stops provided on the casing and engaged by a dirt container in both its emptying position and its working position.

9. A floor sweeper according to claim 8, in which the stop which determines the emptying position comprises projections

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- provided on the casing and extending towards lateral side walls of the dirt container and co-operating with projecting portions of the top wall of the dirt container.
- 5 10. A floor sweeper according to claim 9, in which the stop which determines the working position comprises a wall member provided in the casing and extending
- 10 parallel to the roller brush, against which wall member engages the edge of the bottom wall of the dirt container adjacent the roller brush, the wall member, when the dirt container is in the working position,
- 15 closing the lower portion of an open side of the dirt container, through which open side dirt is thrown into the dirt container by the roller brush in operation of the sweeper with the wall member defining the lower
- 20 edge of a dirt intake opening of the dirt container.
11. A floor sweeper according to claim 10, in which the face of said wall member adjacent the roller brush is inclined and at
- 25 its lower edge is spaced by a distance measured horizontally from the axis of rotation of the brush roller which is less than the radius of the roller brush.
12. A floor sweeper according to claim
- 30 11, in which said face of said wall member is curved about the axis of rotation of the roller brush.
13. A floor sweeper according to claim
- 35 10, in which the face of said wall member remote from the roller brush is substantially vertical.
14. A floor sweeper according to any one of claims 1 to 13, in which the dirt container has its bottom wall substantially rectangular, its side and front or rear walls substantially vertical and its top wall
- 40 formed integral with the side and front or rear walls.
15. A floor sweeper according to any one of claims 1 to 14, in which the recess in the casing which receives the displaceable dirt container is open towards the top, the bottom and in the direction away from the roller brush.
- 45 16. A floor sweeper according to any one of claims 1 to 15, in which two dirt containers are provided one in front of the roller brush and the other behind the roller brush and the casing has two casing side parts extending parallel to one another and parallel to the direction of movement of the
- 50 sweeper in use with the wheels mounted in said casing side parts and the said casing side parts interconnected by a casing middle part which covers the roller brush and extends at right angles to the direction of
- 55 movement of the sweeper in use.
17. A floor sweeper substantially as hereinbefore described and illustrated with reference to the accompanying drawings.
- 60 65
- D. YOUNG & CO.,
Chartered Patent Agents
9 & 10 Staple Inn,
London WC1V 7RD.
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