significant amount of energy being imparted to the dust. With the brush bar rotating in such a direction that the bristles move from the front edge of the suction inlet towards the rear edge, the rotating bristles sweep dust rearwardly through the suction inlet and into the suction chamber. The suction of air causes air to flow underneath the sole plate and around the brush bar to help lift the dirt and dust from the surface of the carpet and then carry it from the suction inlet through the cleaner head towards the separating apparatus.

It is known to provide a cleaner head which includes a pair of contra-rotating brush bars. For example, WO 2018/127680 describes a cleaner head which includes a front brush bar located at a front of the cleaner head, and a rear brush bar located at the rear of the cleaner head. The brush bars rotate in opposite angular directions so that the bristles of the front brush bar are swept rearwardly over the floor surface, and the bristles of the rear brush bar are swept forwardly over the floor surface. A suction chamber is located between the brush bars, and a suction port is located centrally at the top of the suction chamber.

In use, as such a cleaner head is moved forwards over a floor surface large debris, such as rice or Cheerios® which have become entrained within the air drawn towards the cleaner head, is unable to pass beneath the brush bar, due to its contact with the floor surface, and so enters the suction chamber from around the ends of the front brush bar. From there, the large debris passes along suction chamber, from both ends of the front agitator, towards the suction port. As the movement of the cleaner head is reversed, such debris enters the suction chamber from around the ends of the rear agitator, and passes along the suction chamber, from both ends of the rear agitator, towards the suction port.

SUMMARY

In a first example, the present disclosure refers to a cleaner head for a vacuum cleaning appliance, the cleaner head comprising:

a housing defining a suction chamber, the suction chamber having a suction inlet;

a front agitator supported for rotation relative to the housing in a first rotational direction;

a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and

a plurality of wheels for supporting the cleaner head, each wheel being rotatable relative to the housing about a first axis which is perpendicular to the suction inlet.

In a first aspect, the present disclosure refers to a cleaner head for a vacuum cleaning appliance, the cleaner head comprising: a housing defining a suction chamber, the suction chamber having a suction inlet; a front agitator supported for rotation relative to the housing in a first rotational direction;a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and a plurality of wheels for supporting the cleaner head, each wheel being rotatable relative to the housing about a first axis which is perpendicular to the suction inlet and is perpendicular to the rotational axes of the front agitator and the rear agitator.

Each agitator preferably comprises a brush bar which rotates about the longitudinal axis thereof. The front agitator rotates in the first rotational direction so as to sweep dirt and debris rearwardly towards the suction chamber, and the rear agitator rotates in the second rotational direction so as to sweep dirt and debris forwardly towards the suction chamber. The agitators preferably rotate at the same angular speed so that the traction generated by the agitators is equal and opposite. The agitators are preferably cylindrical in shape. The agitators are preferably arranged so that their longitudinal axes are parallel, and are preferably horizontal when the cleaner head is positioned on a floor surface. The housing preferably defines a front opening which exposes the first agitator at the front of the cleaner head, and a rear opening which exposes the second agitator at the rear of the cleaner head. The plurality of wheels support the cleaner head so as to allow a change in the direction in which the cleaner head is moved over a surface. Each wheel is arranged to rotate relative to the housing about a first axis which is perpendicular to the suction inlet. Each wheel may be further rotatable relative to the housing about a second axis which is parallel to the first axis.

In use, air enters the suction chamber through at least one suction inlet, and exits the suction chamber through a suction port. The suction chamber preferably comprises a central suction port, that is, a port which is located both midway between the front agitator and the rear agitator, and midway between the side edges of the suction chamber. The cleaner head comprises a baffle located within the suction chamber, and thus between the agitators. The baffle is preferably located beneath the suction port, preferably so that the baffle is located vertically beneath the suction port during use of the cleaner head.

The baffle is preferably disposed on, more preferably integral with, a baffle plate which extends across the suction chamber, preferably lengthways across the suction chamber

wheel. For example, whilst the support may be formed from a relatively rigid material, for example a plastics material such as a polycarbonate, the guide member may be formed from a relatively flexible material, for example a polyurethane such as TPU. Providing the guide member as a separate component to the support for the wheel can enable a greater degree of control of the direction and/or speed at which the impacting debris moves away from the guide member, through selection of the shape and/or material from which the guide member is formed.

The front and/or rear guide members may be used in other types of cleaner head to guide debris towards the suction chamber. For example, a passive cleaner head, that is, a cleaner head which does not include any moving agitators for agitating debris from a floor surface, may include an arrangement of wheels and guide members for guiding debris towards the suction chamber. The wheels may be mounted on a sole plate which defines a suction inlet of the cleaner head. For example, a pair of front wheels may be located adjacent a front edge of the cleaner head, and a pair of rear wheels may be located adjacent a rear edge of the cleaner head. Each wheel may be located adjacent a front corner of the cleaner head, with each wheel being associated with a guide member which rotates with the wheel relative to the housing to guide debris towards the suction inlet. As another example, a cleaner head may comprise a single agitator or brush bar, which may be located towards the front of the cleaner head, with front and rear wheels, and so front and rear guide members, located rearwardly of the agitator.

In a second example, the present disclosure refers to a cleaner head for a vacuum cleaning appliance, the cleaner head comprising:

a housing defining a suction chamber, the suction chamber having a suction inlet;

a front agitator supported for rotation relative to the housing in a first rotational direction;

a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and

a plurality of wheels located between the agitators for supporting the cleaner head.

In a second aspect, the present disclosure refers to a cleaner head for a vacuum cleaning appliance, the cleaner head comprising: a housing defining a suction chamber, the suction chamber having a suction inlet; a front agitator supported for rotation relative to the housing in a first rotational direction; a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and a plurality of wheels located between the agitators for supporting the cleaner head, each wheel being rotatable relative to the housing about a first axis which is perpendicular to the rotational axes of the front agitator and the rear agitator.

The plurality of wheels support the cleaner head so as to allow a change in the direction in which the cleaner head is moved over a surface. Each wheel is arranged to rotate relative to the housing about a first axis which is perpendicular to the suction inlet. Each wheel may be further rotatable relative to the housing about a second axis which is parallel to the first axis. The wheels may mounted directly on the housing of the cleaner head for rotation relative thereto. Alternatively, the wheels may be rotatably mounted on one or more cartridges which are connected to the housing. For example, the cleaner head may comprise a first cartridge located on one side of the suction inlet, and a second cartridge located on the other side of the suction inlet. Each cartridge may comprise a respective one of the front wheels and a respective one of the rear wheels.

In an example where the cleaner head comprises both a front agitator and a rear agitator, each cartridge preferably comprises a respective one of each of the front guide members and the rear guide members. Each cartridge is preferably located between the front agitator and the rear agitator, and is preferably located on a respective side of the suction chamber. Each cartridge preferably comprises a plurality of apertures, each being located adjacent a respective one of the agitators, and through which entrained debris enters a respective one of the channels along which debris is guided towards the suction chamber.

Where the cleaner comprises a single agitator, each cartridge also preferably comprises a pair of wheels and a pair of guide members which are each rotatable relative to the cartridge with a respective one of the wheels. Each cartridge is preferably located rearwardly of the agitator, and is preferably disposed on a respective side of the suction chamber.

Each cartridge is preferably arranged such that the first axes of the wheels of that cartridge are located in a plane which is orthogonal to the suction inlet. Where the cleaner head comprises an agitator which rotates about an axis which extends in a direction which is parallel to the suction inlet, this plane is preferably orthogonal to the rotational axis of the agitator.

CLAIMS

1. A cleaner head for a vacuum cleaning appliance, the cleaner head comprising:

a housing defining a suction chamber, the suction chamber having a suction inlet;

a front agitator supported for rotation relative to the housing in a first rotational direction;

a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and

a plurality of wheels for supporting the cleaner head, each wheel being rotatable relative to the housing about a first axis which is perpendicular to the suction inlet and is perpendicular to the rotational axes of the front agitator and the rear agitator.

2. A cleaner head according to claim 1, wherein each wheel is rotatable relative to the housing about a second axis which is perpendicular to the first axis.

3. A cleaner head according to claim 1 or claim 2, comprising at least one pair of wheels rotatably mounted on at least one cartridge.

4. A cleaner head according to claim 3 wherein the pair of wheels comprises a front wheel and a rear wheel.

5. A cleaner head according to claim 3 or claim 4 wherein each cartridge is located adjacent a respective end of the suction chamber.

6. A cleaner head according to any of claims 3 to 5 wherein each cartridge is located adjacent the agitators.

7. A cleaner head according to any of claims 3 to 6, wherein each cartridge is located between the front agitator and rear agitator

8. A cleaner head according to any preceding claim, wherein each wheel is in the form of a caster.

9. A cleaner head according to any preceding claim further comprising a baffle located within the suction chamber.

10. A cleaner head according to claim 9, wherein each cartridge engages a respective side surface of the baffle.

11. A cleaner head according to any preceding claim wherein the front agitator and rear agitators are arranged so that their longitudinal axes are parallel to one another.

12. A cleaner head according to any preceding claim wherein the housing defines a front opening which exposes the first agitator at the front of the cleaner head.

13. A cleaner head according to any of claims 1 to 12 wherein the housing defines a rear opening which exposes the rear agitator at the rear of the cleaner head.

14. A cleaner head according to any preceding claims wherein each agitator is in the form of a brush bar comprising an elongate body.

15. A cleaner head according to claim 14 wherein the elongate body is covered with a plush of synthetic fibres.

16. A cleaner head according to any preceding claim comprising a drive assembly for driving the rotation of the agitators relative to the housing

17. A cleaner head according to claim 16 wherein the drive assembly is arranged to drive the agitators to rotate relative to the housing at the same angular velocity.

18. A cleaner head for a vacuum cleaning appliance, the cleaner head comprising:

a housing defining a suction chamber, the suction chamber having a suction inlet;

a front agitator supported for rotation relative to the housing in a first rotational direction;

a rear agitator supported for rotation relative to the housing in a second rotational direction opposite to the first rotational direction; and

a plurality of wheels located between the agitators for supporting the cleaner head, each wheel being rotatable relative to the housing about a first axis which is perpendicular to the rotational axes of the front agitator and the rear agitator.

19. A cleaner head as claimed in claim 18, wherein each wheel is rotatable relative to the housing about a first axis which is perpendicular to the suction inlet.

20. A cleaner head according to claim 19, wherein each wheel is rotatable relative to the housing about a second axis which is perpendicular to the first axis.

21. A cleaner head according to any of claims 18 to 20, wherein the plurality of wheels comprises two pairs of wheels, each pair being located towards a respective side of the cleaner head.

22. A cleaner head according to claim 21 wherein each pair of wheels comprises a front wheel and a rear wheel.

23. A cleaner head according to claim 21 or claim 22, wherein each pair of wheels is rotatably mounted on a respective cartridge.

24. A cleaner head according to any of claims 18 to 23, wherein each wheel is in the form of a caster.

25. A cleaner head according to any of claims 18 to 24, wherein the front agitator and rear agitators are arranged so that their longitudinal axes are parallel to one another.

26. A cleaner head according to any of claims 18 to 25 wherein the housing defines a front opening which exposes the first agitator at the front of the cleaner head.

27. A cleaner head according to any of claims 18 to 26 wherein the housing defines a rear opening which exposes the rear agitator at the rear of the cleaner head.

28. A cleaner head according to any of claims 18 to 27, wherein each agitator is in the form of a brush bar comprising an elongate body.

29. A cleaner head according to claim 28, wherein the elongate body is covered with a plush of synthetic fibres.