Feb. 21, 1939. L. F. McCARDLE 2,148,125

SUCTION CLEANING TOOL

Filed April 16, 1936 2 Sheets-Sheet 1

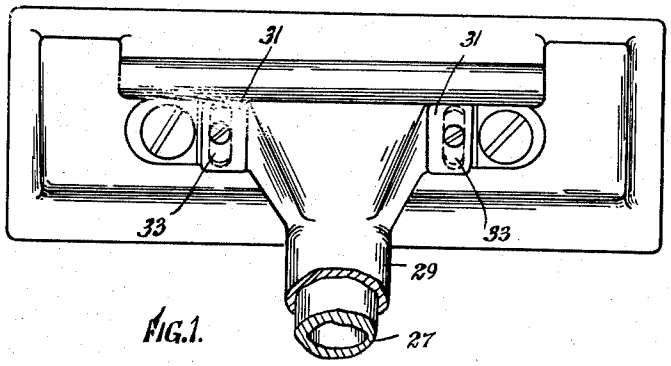


FIG. 1.

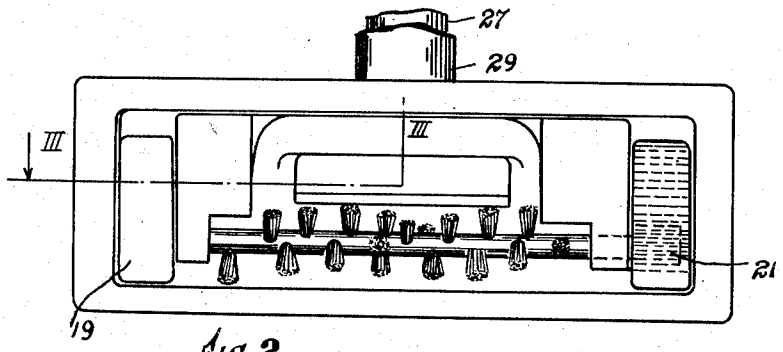


FIG. 2.

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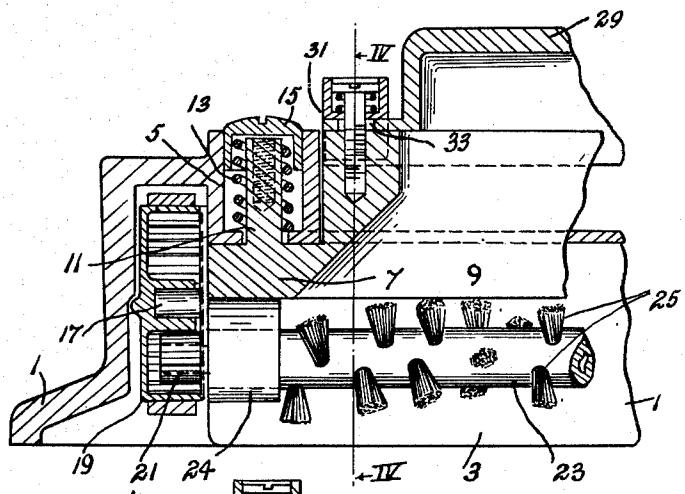


FIG. 3.

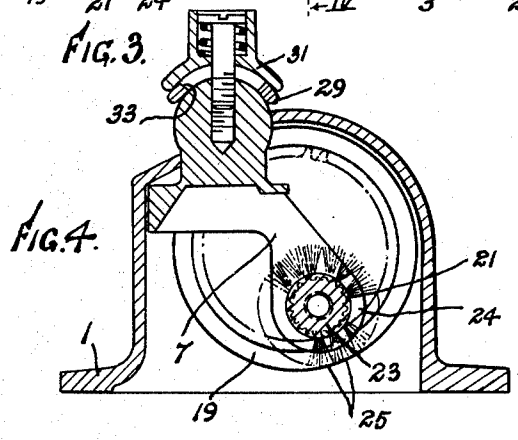


FIG. 4.

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UNITED STATES PATENT OFFICE

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SUCTION CLEANING TOOL

Lionel Frank McCardle, London, England

Application April 16, 1936, Serial No. 74,756
In Great Britain April 26, 1935

2 Claims. (Cl. 15—158)

This invention relates to suction cleaning tools of the kind comprising a suction nozzle capable of being moved over the surface to be cleaned by a handle attached thereto, and a brush, beater or agitator (referred to generically hereinafter as agitating means) located within the nozzle.

The main object of this invention is to provide a cleaning tool which may be used with practically any of the existing types of vacuum cleaners whether they are of the type in which the motor and receptacle for the dust are carried by the operating handle or of the type in which the dust receptacle and motor are mounted in a separate casing to which the operating handle is connected by means of a length of flexible tubing, and which is so constructed and arranged that all matter which clings closely to or is embedded in the surface being cleaned may be efficiently removed without undue labour and fatigue to the operator of the tool.

A further object of the invention is to provide a suction cleaning tool with simple and reliable means for rotating the brush.

In attaining the above and other objects and in carrying out the above invention a suction cleaning tool of the kind referred to is provided with means whereby the brush beater or agitator is mounted on a movable or retractable carriage or cradle which may be raised to an inoperative position or lowered so as to bring the brush beater or agitator into contact with the surfaces to be cleaned and also with driving means for rotating the brush. As will be hereinafter more fully described, the brush is rotated by said driving means to cause relative movement between the brush periphery and the surface to be cleaned, thereby to provide cleaning action, only when it is in its lowered or working position. In the preferred embodiment of the invention the retractable carriage includes a member having a section opening therein and the agitating means, or brush, is mounted on the carriage so that only a segment of the peripheral surface thereof is directly in the suction path leading from the mouth of the nozzle to the opening. With this arrangement, a powerful pulling force is exerted on any matter clinging to the brush with the result that such matter is removed from the brush and carried away by the air stream.

In order that the present invention may be more clearly understood, it will now be described with reference to the accompanying drawings, which illustrate one form of suction cleaning tool embodying the invention.

In the drawings:—

Fig. 1 is a top plan view of this form of tool: Fig. 2 is a bottom plan view of the same: Fig. 3 is a section on a larger scale than Fig. 2, taken on the line III—III in Fig. 2: and Fig. 4 is a section, on the same scale as Fig. 3, taken on the line IV—IV in Fig. 3.

A nozzle plate 1 formed of any suitable material such as a synthetic resinous material is provided with a central aperture 3 and formed on either side of the aperture 3 are hollow bosses 5. A brush carrying member or carriage 7 is arranged to lie in the nozzle plate and is disposed to slide therein perpendicularly or substantially so with respect to the surface to be cleaned. As shown in Fig. 3 of the drawings, the carriage 7 is provided with a recess 9 through which the dust-laden air passes and is also provided with a pair of upstanding lugs 11 which are adapted to pass into the hollow bosses 5. A spring 13 surrounds each lug 11 and is confined in the boss 5 by means of a cap 15 secured to the upper end of the lug by any suitable means, such for instance as a screw which will allow of alteration of the tension of the spring 13 if and when desired. The arrangement so far described serves normally to maintain the carriage 7 in a position well above the lower edge of the plate 1, but allows it to be moved downwardly against the action of the springs 13.

The carriage 7 has formed integrally therewith a pair of outwardly extending cylindrical pins 17 one at either end thereof, each pin forming in effect a shaft for a roller 19, each roller being hollow and having gear teeth cut on its inner peripheral edge. Meshing with the gear teeth of each roller 19 is a pinion 21 secured to the end of a shaft 23 which carries agitating means in the form of a brush, the shaft 23 being journalled in bosses 24 formed on the carriage 7. The size of each roller is such that when the carriage 7 is in its retracted position it is held clear of the surface to be cleaned, but upon downward movement of the carriage it will contact with said surface and similarly the length of the bristles 25 on the brush is such that contact is only made with the surface when the carriage is in its lowered position.

The usual hollow operating handle 27 connected to the fan chamber through a tubular handle is secured to the carriage through the medium of a hollow fitment 29 which fits over the recess 9 in the carriage 7, clamping plates 31 (best seen in Fig. 4) serving to hold the fitment in place on the carriage, and slots 33 in the fitment allowing limited movement thereof so that

the most convenient angular position of the handle for the operation may be readily obtained by the operator.

In using the above form of suction tool, the operator merely moves the tool over the surface to be cleaned and any dirt or other matter will be sucked through the nozzle in well known manner. Upon encountering thread, hairs or similar material which clings closely to the surface being cleaned and which the ordinary suction will not remove, by downward pressure on the handle, the operator will move the carriage 7 downwardly until the rollers 10 contact with the surface being cleaned, and then movement of the nozzle will cause the brush to be rotated, thereby disturbing the closely clinging or embedded material and causing it to be sucked through the nozzle.

From Fig. 4 it will be seen that the shaft of the brush is offset with respect to the opening 9 in the carriage member 7 so that only the portion of the brush periphery to the left of the vertical plane through the shaft axis lies directly in the path of the air stream which passes from the opening of the main nozzle member 1 to the opening of the orifice or recess in the carriage member 7. As a result of this offsetting of the brush with respect to the passage 9, the brush does not impede the passage of air between the two openings and yet all portions of the periphery of the brush are exposed to the air stream to be cleaned thereby when the brush is being rotated.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made in the structure thereof and it is contemplated in the appended claims to cover all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. A suction tool for a vacuum cleaner comprising a suction nozzle, a retractable carriage mounted in said nozzle, normally stationary agitating means carried by the carriage, an operating handle secured to the suction nozzle, means operated by pressure on the operating handle for bringing said agitating means into contact with a surface to be cleaned, and driving means for causing said agitating means to rotate only when the latter is brought into contact with said surface.

2. A suction tool for a vacuum cleaner comprising, in combination, a suction nozzle, a retractable carriage mounted within said nozzle, normally stationary agitating means carried by said carriage, driving means for rotating said agitating means, said driving means including a roller adapted to be rotated to impart rotation to said agitating means when said roller engages a surface to be cleaned and during movement of said nozzle over said surface, a shaft rotatably supporting said roller and carried by said carriage, means normally restraining said carriage to a position such that said roller and said agitating means cannot engage the surface to be cleaned, an operating handle for said nozzle, and means operated by said handle for moving said carriage to a position for bringing said agitating means and said roller into engagement with the surface to be cleaned.

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