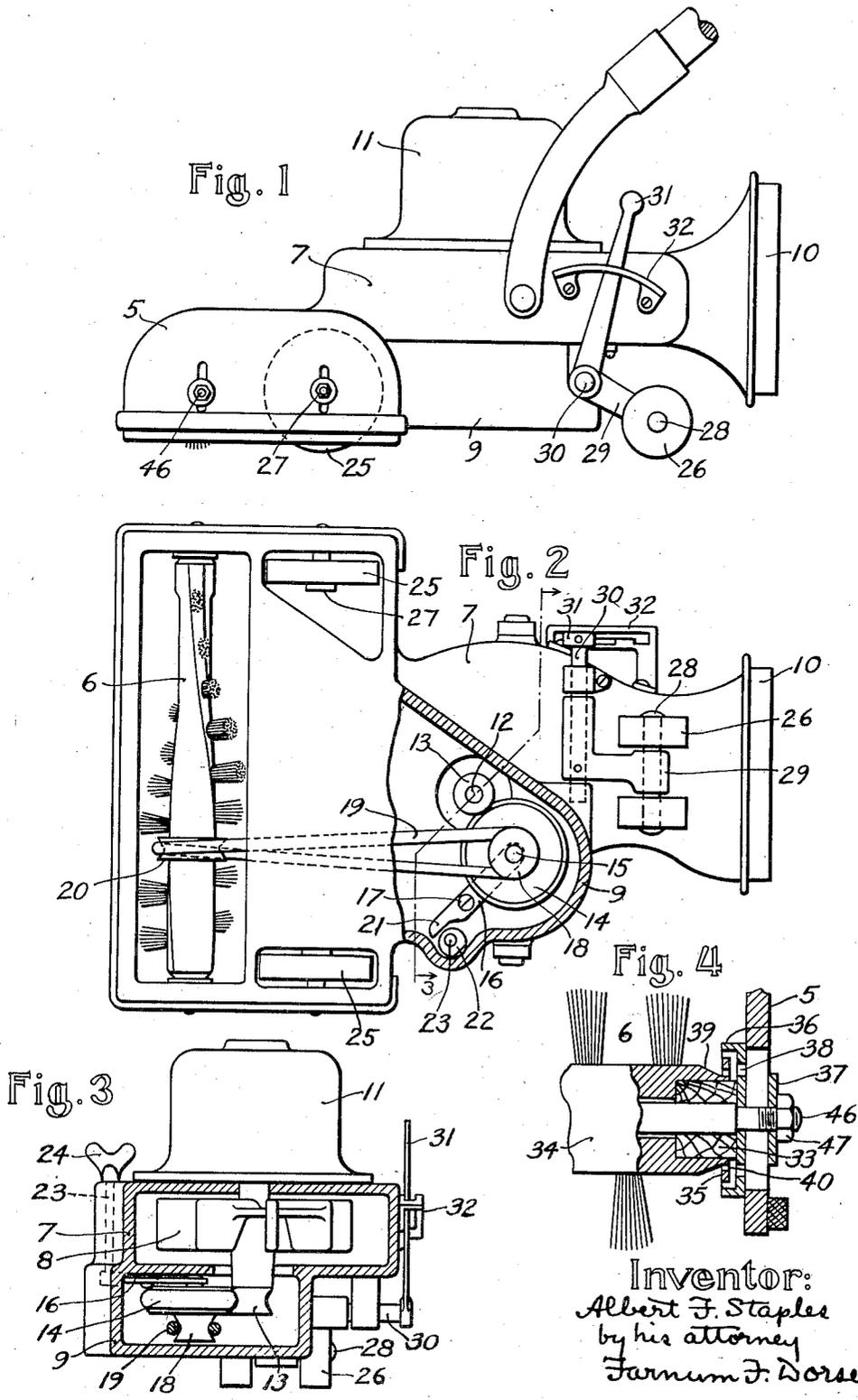


A. F. STAPLES.
 SUCTION SWEEPER.
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SUCTION-SWEEPER.

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To all whom it may concern:

Be it known that I, ALBERT F. STAPLES, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Suction-Sweepers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to suction-sweeping apparatus of the kind in which a rotary brush is connected with and driven by the same source of power as a rotary blower or fan, these parts being inclosed in a casing which is supported on wheels and moved over the carpet or floor to be cleaned.

In apparatus of the kind in question the fan is commonly rotated at a high rate of speed by means of an electric motor, and the brush is driven by belt-and-pulley connections with the shaft of the fan-motor. This arrangement results in an excessively high speed of rotation in the brush. One object of the present invention, accordingly, is to improve the mechanism by which the brush is driven, in such a manner as to permit a lower rate of rotation in the brush. To this end, it is proposed to employ a speed-reducing friction-drive, interposed between the electric motor and the belt-connections.

Another object of the invention is to permit the driving-mechanisms between the motor and the brush to be readily disengaged when it is desired to operate the fan alone. This is accomplished by the operation of the speed-reducing mechanism just referred to, in a manner which will be presently described.

Another object of the invention is to provide simple and effective means for preventing the collection of threads and other matter at the ends of the rotary brush. This purpose is accomplished by the construction and arrangement of parts hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation of a suction-sweeper embodying the present invention; Fig. 2 is a

bottom plan-view with the housing partly broken away; Fig. 3 is a section approximately on the line 3—3 in Fig. 2; and Fig. 4 is a detail vertical sectional view showing the construction of the brush and adjacent parts.

The invention is illustrated as embodied in a suction-sweeper of the type shown, for example, in United States Patent No. 1,247,837 granted November 27, 1917, to H. E. Hoover, and the details of construction of the sweeper are shown only so far as is necessary for an understanding of the present invention.

The sweeper, as shown in the drawings, comprises a brush-housing 5 within which a brush 6 rotates, this brush working through the open bottom of the housing, against the carpet or floor surface which is to be cleaned. Behind the brush-housing is a fan-casing 7 in which a fan 8 rotates, and the brush-housing is connected with the fan-casing by a housing 9, through which the dust-laden air is introduced at the eye of the fan-casing, in the usual manner. The fan discharges through an outlet 10, which may be connected with the usual dust-bag (not shown).

The mechanism is driven by an electric motor having a casing 11 fixed on the top of the fan-casing. The motor-shaft 12 depends through the fan-casing, and at its lower end is mounted a wheel 13 located within the housing 9. In the usual construction, as shown in the said Patent No. 1,247,837, the wheel 13 acts as a pulley, being connected by a belt directly within the pulley on the brush. In accordance with the present invention, however, the wheel 13 is employed as a frictional drive-wheel. It cooperates with a friction-wheel 14 which is provided with a rim of rubber or other suitable material. The wheel 14 is mounted on a stud depending from a lever 16, and this lever is pivoted on a screw 17 fixed in the housing 9.

A pulley 18 is fixed to the friction-wheel 14 so as to be rotated thereby, and a belt 19 connects the pulley 18 with a pulley 20 on the brush. The belt 19 is made of rubber or other elastic material, and it has sufficient tension to cause the friction-wheel 14 to be held firmly in engagement with the drive-

wheel 13. The lever 16, being free to rock, will permit the parts to accommodate themselves to wear. So long as the belt is in place, therefore, the mechanism is maintained constantly in operative condition without the necessity of any adjustments on the part of the user, and the ratio of the wheels 13 and 14 is such as to substantially reduce the speed at which the brush is driven, with relation to the speed of rotation of the motor-shaft.

It is often desired to use a suction-sweeper merely as an air-exhausting and dust-collecting device, a hand-operated cleaning tool being connected, through a hose, with the opening in the bottom of the housing. In this case it is desirable to disconnect the brush from the motor, in order to reduce the load upon the latter and permit the fan to operate at its highest efficiency. The power-transmission mechanism just described affords a convenient opportunity for doing this, since it is necessary, for the purpose, only to swing the lever 16 in a direction to disengage the friction-wheel 14 from the drive-wheel 13. Accordingly, the lever 16 is provided with an arm 21 which cooperates with a cam 22 at the lower end of a shaft 23. This shaft is journaled in the housing and is provided, at its upper end, with a head 24 by which it may be conveniently turned. In Fig. 2 the transmission-mechanism is in operative position, but a half-turn of the shaft 23 and the cam causes the latter to engage the arm 21 and swing the friction-wheel out of operative position.

The parts of the sweeper, as so far described, are supported near the front by wheels 25, and near the rear by wheels 26. The wheels 25 are journaled upon short studs 27 which are arranged to be adjusted vertically, in the usual manner, so as to regulate the distance from the floor-surface of the bottom of the housing 5. Since such an adjustment of the wheels 25 would otherwise result in a change of the angle between the floor-surface and the bottom of the housing, it is desirable to adjust the wheels 26 vertically at the same time in order to maintain the housing substantially parallel with the floor. To this end, the wheels 26 are mounted on a spindle 28, carried at the rear end of an arm 29. The arm is fixed to a rock-shaft 30, journaled at the bottom of the fan-casing 7, and at its outer end the rock-shaft carries an upwardly extending arm 31 of which the upper end is in convenient position for manipulation. The arm 31 cooperates with a notched segment 32 fixed to the fan-casing, and the arm is retained normally in engagement with one or the other of the notches, by its resiliency. When it is necessary to adjust the wheels 26, this may be conveniently done by bending the

arm 31 outwardly, to free it from the notch, whereupon it may be swung forwardly or rearwardly, as the case may demand, thus raising or lowering the wheels 26.

The brush 6, as shown particularly in Fig. 4, comprises a metal body 34 which is provided, at its ends, with bearing-sleeves 33, and these sleeves run upon a rod 46 which is mounted transversely in the housing 5 and passes through a longitudinal opening in the brush. The rod 46 is vertically adjustable, in the usual manner, in slots in the housing, and is provided, at its outer ends, with nuts 47 engaging washers 37, which are thus clamped against the outer surfaces of the housing. Difficulty is experienced, in the operation of a suction-sweeper, through the tendency of threads and hairs to wind about the ends of the brush and impede the rotation of the brush by becoming interposed between these ends and the housing. It is customary, accordingly, to provide at each end of the brush, a cup-like guard 36 which projects inwardly from the housing around the end of the brush. This device has not proved entirely successful, however, and one feature of the present invention lies in the improved means for accomplishing the same result. To this end the body 34 of the illustrated brush is provided, at each extremity, with an annular flange 35, while the body is grooved just inside the flange so as to provide a conical surface 39 tapering toward the flange, as shown in Fig. 4. It has been found that this formation of the brush causes threads and hairs to wind away from the end of the brush, and thus away from the point at which they might otherwise clog the bearing-surfaces. To further promote the object in view, the guard 36 is provided with perforations 38, and the flange 35 is provided with perforations 40. The suction within the housing causes air to enter constantly through these perforations, thus producing streams of air flowing inwardly over the conical surface 39 and tending to blow threads away from the extremity of the brush.

While the several features of the invention are best used in conjunction with each other, thus producing a complete and efficient suction-sweeper, it will be apparent that they are not necessarily limited to this conjoint use, and that the invention is susceptible of embodiment in various other forms within the scope of the following claims.

The invention claimed is:—

1. A brush, for a suction-sweeper, comprising an elongated body provided with bristles and with an annular flange at the end; the body, adjacent the flange, tapering to the inner surface thereof and forming an acute angle therewith, and the flange being

perforated, near its base, to provide air-passages discharging over the tapered surface.

2. In a suction-sweeper, a rotary brush
5 comprising an elongated body provided with
bristles and with an annular flange at the
end, the flange being perforated, near its
base, to provide air-passages discharging over

the surface of said body; in combination
with a casing, in which the brush is rota-
tably mounted, having a portion closely em- 10
bracing said flange, the casing being pro-
vided with an opening for admitting air to
the flange.

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