

April 3, 1934.

J. C. DOEMLING

1,953,340

SUCTION CLEANER

Filed June 9, 1930

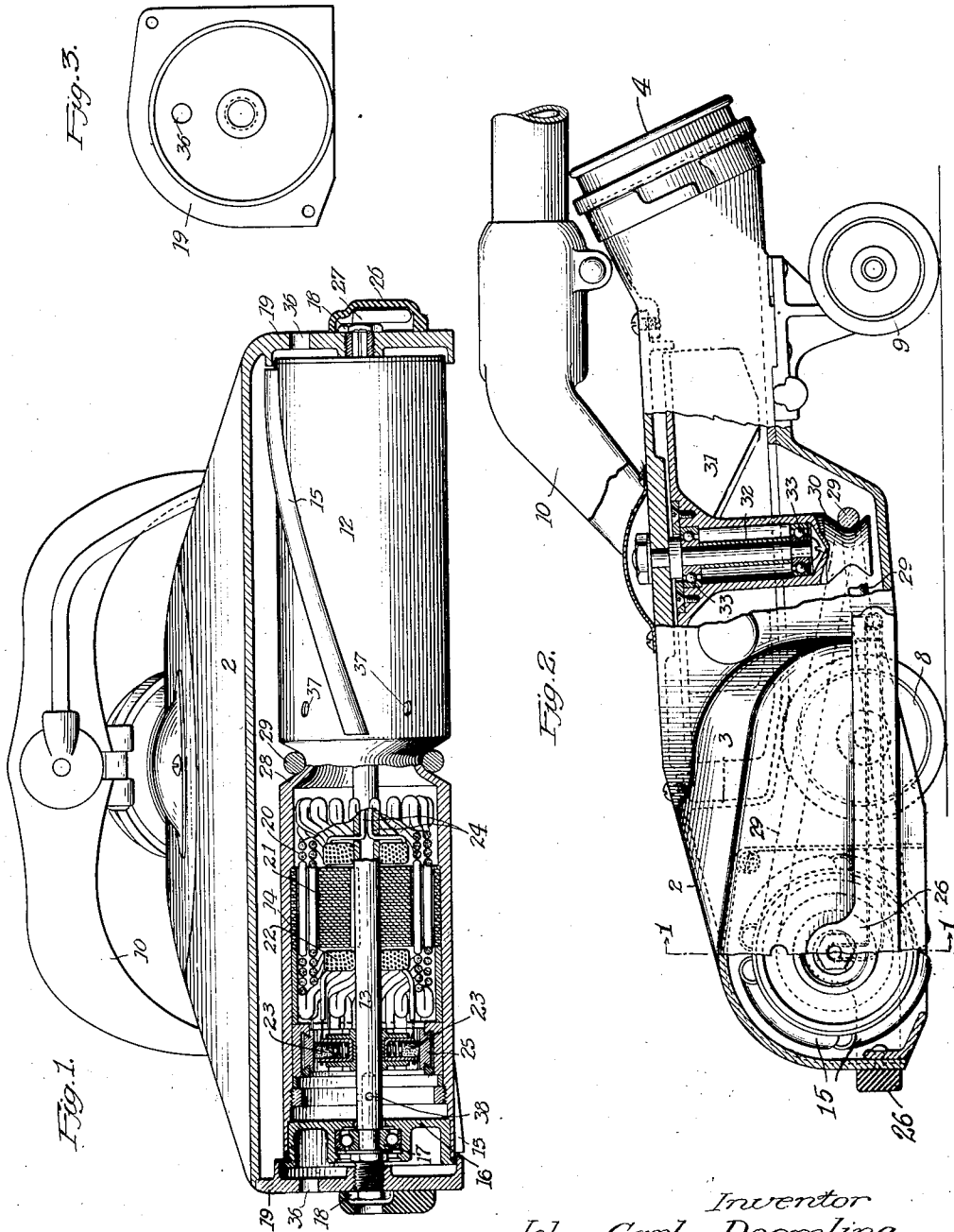


Fig. 1.

Fig. 2.

Fig. 3.

Witness
R. B. Davison

Inventor
John Carl Doemling
By Harry S. Demaree
Atty.

UNITED STATES PATENT OFFICE

1,953,340

SUCTION CLEANER

John Carl Doemling, Chicago, Ill., assignor to
The Hoover Company, North Canton, Ohio, a
corporation of Ohio

Application June 9, 1930, Serial No. 459,893

1 Claim. (Cl. 15—8)

The present invention relates to suction cleaners and particularly to a new and novel cleaner construction in which the surface covering agitator is driven by a separate actuating motor. More specifically the invention relates to an improved suction cleaner construction in which the source of power for the agitator, positioned within the nozzle, is formed integrally therewith and is cooled in a novel manner. In its preferred embodiment the present invention encompasses the driving of the suction-creating fan from the agitator-motor instead of the driving of the agitator from the fan-motor as in the usual construction.

In the ordinary suction cleaner of the type which embodies positive agitating means, which are usually positioned within the suction nozzle of the cleaner, it is customary to connect the fan-driving motor to the agitator by means of a power-transmitting belt. A second form of power transmission which is sometimes used, but with a lesser degree of success because of its relative inflexibility, is a rotatably mounted shaft gear-connected to the driving motor shaft and to the agitator. This latter form is also objectionable in that it becomes noisy after being used for a considerable period. The first-mentioned power transmission means is that most commonly used but is itself open to the objection that it must be serviced at intervals as the belt is worn out or is broken as is often the case when the agitator becomes stuck. In a suction cleaner constructed in accordance with the present invention no power-transmitting means from a source of power to the agitator is required as the power source is positioned within and directly connected to the agitator and, while in a preferred embodiment a driving belt is used to drive a fan, it carries power from the agitator to the fan instead of from the fan to the agitator with a resulting advantage in that if for any reason the agitator becomes locked the flow of power to the belt likewise stops thereby avoiding belt injury.

It is a matter of common knowledge that, in the usual type of suction cleaner in which the suction-creating fan is driven by a motor with which it is co-axial, the overall height of the machine is relatively great. This is true whether the machine is of the vertical motor type or of the horizontal motor type. In a suction cleaner constructed in accordance with the present invention the source of power for the cleaner is positioned concentrically of the rotary agitator which is positioned within the suction cleaner nozzle and in the preferred embodiment the fan

is driven from the agitator by means of a belt. Such a construction permits of a lesser overall height than in the ordinary suction cleaner thereby increasing the range of cleaner use and so its desirability as a household tool.

It is an object of the present invention to provide a new and novel suction cleaner construction in which the surface agitator is provided with an individual source of power. It is another object of the present invention to provide a suction cleaner construction in which the source of power for the agitator comprises a motor which is positioned therein. Still another object of the invention is the provision of a novel suction cleaner construction of a lesser overall height than the usual cleaner construction. A further object is the provision of a new and novel suction cleaner construction in which the suction-creating fan is driven from the agitator instead of the agitator from the fan, as in the usual suction cleaner construction. Other and more specific objects will appear upon reading the specification and considering the drawing annexed thereto.

Referring now to the drawing in which a preferred embodiment of the present invention is disclosed:

Fig. 1 is a section through the nozzle and enclosed agitator which are constructed in accordance with the present invention, the section taken upon the lines 1—1 of Fig. 2;

Fig. 2 is a side view of the cleaner shown in Fig. 1 with certain parts of the cleaner casing broken away and the suction-creating fan and its supporting means shown partly in section;

Fig. 3 is a side view of the removable nozzle end plate.

Referring again to the drawing, the present invention is shown embodied in a suction cleaner in which the main casing comprises a nozzle 2, a fan chamber 3, and an exhaust outlet 4. This casing is supported upon front wheels 8, 8 of which one is shown, and a rear wheel 9. A pivoted handle 10 extends upwardly from the casing and affords means by which the operator can propel the machine. Positioned within the nozzle 2 and immediately above the mouth thereof is a rotary agitator 12 which comprises a hollow body 14, cylindrical in form and provided upon its exterior surface with helically extending beater elements 15, 15. The agitator 12 is rotatably supported upon the through shaft 13 by means of bearings 17, 17 at its ends which are carried by the end plates 16, 16 of the agitator. The ends of the shaft 13 are fixedly carried out-

side the bearings by seats 18, 18 which are themselves seated within the nozzle end plates 19, 19.

Within the hollow body of the agitator and carried by the stationary shaft 13 is the stationary field core, as indicated by the reference character 21, of an electric motor. The windings of this stator are indicated by the reference character 22. The rotor or armature of the motor is carried by the surrounding cylindrical agitator body, and the windings thereof are indicated by the reference character 20. A commutator 25 is also carried by body 14 which is electrically connected to the armature 20 and which cooperates with brushes 23, 23, secured to the shaft 13 and electrically mounted to the stationary field, to complete the motor structure.

The supporting shaft 13 is formed with a central bore which may or may not extend entirely through the shaft and from one end of the shaft current-conducting wires 24, 24 extend there-through and are connected to the stationary field. These conducting wires are formed into a cord 27 exterior of the nozzle, which cord extends, within a recess formed in the furniture guard 26 surrounding the nozzle, to the rear of the nozzle and then upwardly and along the hand bail.

The hollow supporting shaft 13 which is seated at its ends in the seat members 18, 18 is open at one of its ends through the furniture guard 26 to the exterior atmosphere. A radially directed opening 38 is provided in the shaft completing a passage from the exterior of the machine into the interior of the agitator. In the circumference of the agitator body 14 openings 37, 37 are provided which connect the interior of the agitator to the interior of the enclosing nozzle. In the operation of the machine it is clear that air will be drawn from the exterior atmosphere through the hollow shaft 13, through opening 38, through the agitator and out through the openings 37 into the surrounding nozzle, resulting in the cooling of the cleaner motor.

The nozzle end walls 19, 19 are provided with inwardly extending flanges which closely encircle the ends of the cylindrical agitator and cooperate therewith to prevent dirt and foreign matter from collecting about the supporting bearings 17, 17. Openings 36, 36 are provided in these end plates to permit the entrance of a small amount of air which will be drawn into the nozzle and between the agitator and surrounding flange to assist in preventing the entrance of dirt, strings and other foreign matter into the region of the bearing.

In this preferred embodiment of the invention the electric motor within the agitator performs the additional function of driving the suction-creating fan 31 within the fan chamber 3 thereby eliminating the usual motor which is positioned above the fan chamber and which increases the overall cleaner height. To permit this cooperation the agitator 12 is formed between its ends with an annular groove 28 which functions as a pulley serving to cooperate with a belt 29 which extends from it to the fan shaft. The fan 31 is itself rotatably mounted upon a stationary shaft 32 by bearings 33, 33. At the lower end of the fan shaft a pulley 30 is provided which cooperates with the belt 29 so that in the operation of the machine upon the rotation of the agitator, the fan will also be rotated.

I claim:

In a suction cleaner including a suction nozzle and means to draw a cleaning fluid therethrough, a hollow rotary agitator positioned in said nozzle, a stationary hollow shaft rotatably supporting said agitator and open interiorly thereto and to the exterior atmosphere, and a driving motor for said agitator mounted therein, the stationary part of said motor carried by said shaft and the rotatable part by said agitator, said agitator being provided with an opening which serves as a discharge for the motor cooling fluid entering through said hollow shaft.

JOHN CARL DOEMLING.

45

120

50

125

55

60

65

70

75

130