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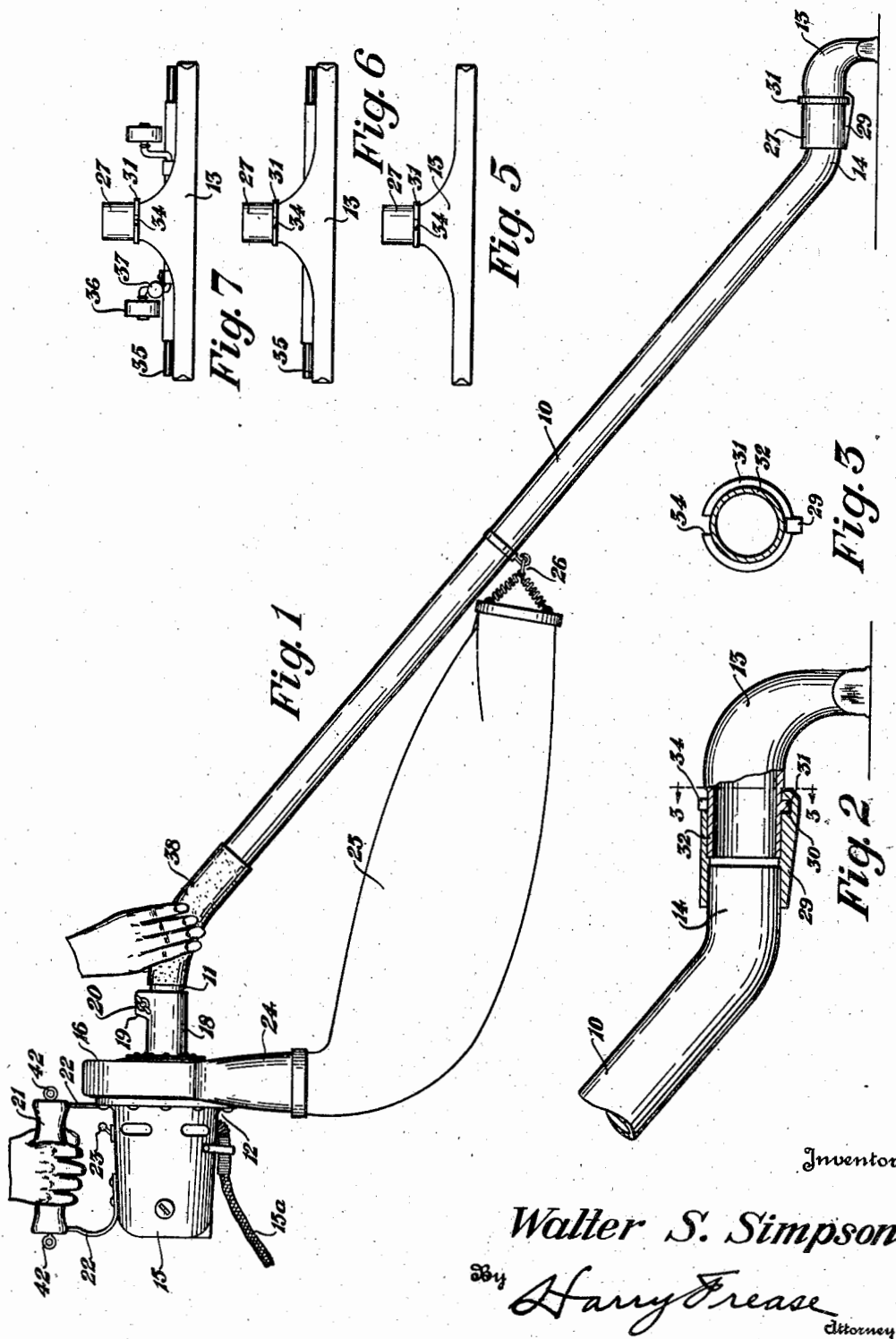
W. S. SIMPSON

1,940,609

VACUUM CLEANER

Filed Sept. 17, 1928

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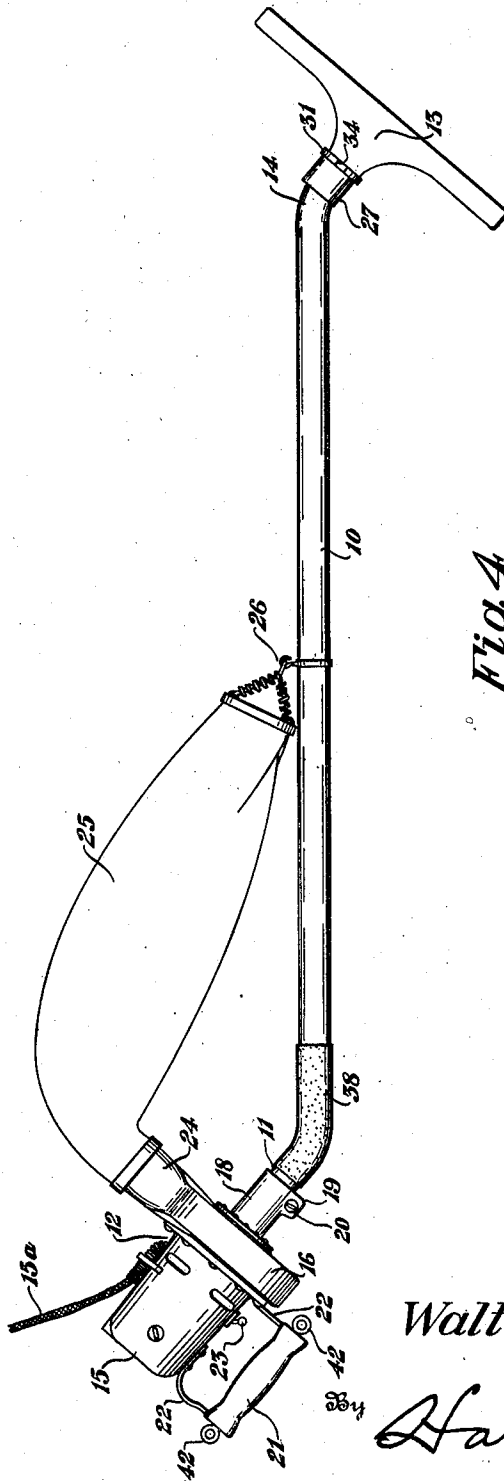


Fig. 4

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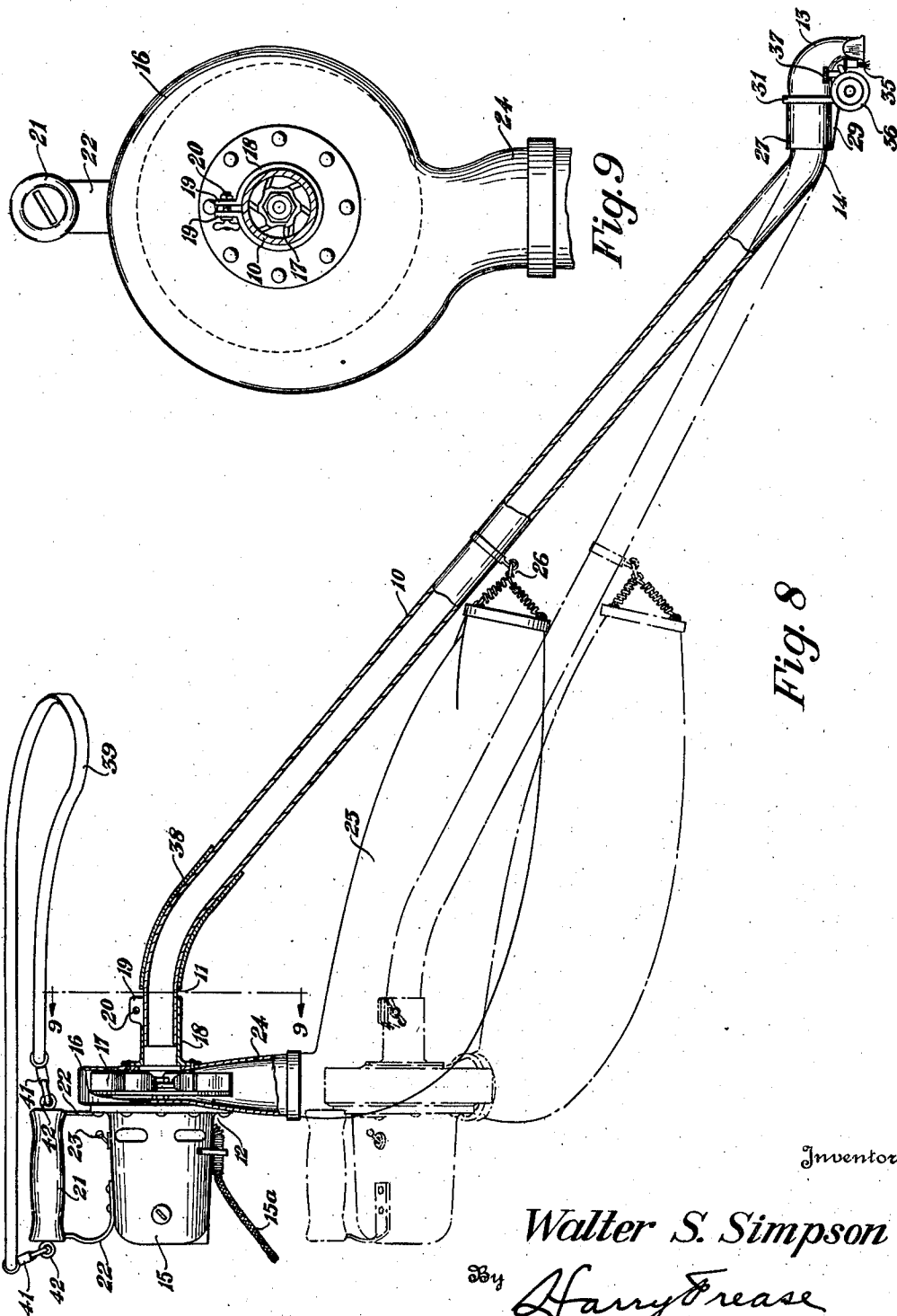
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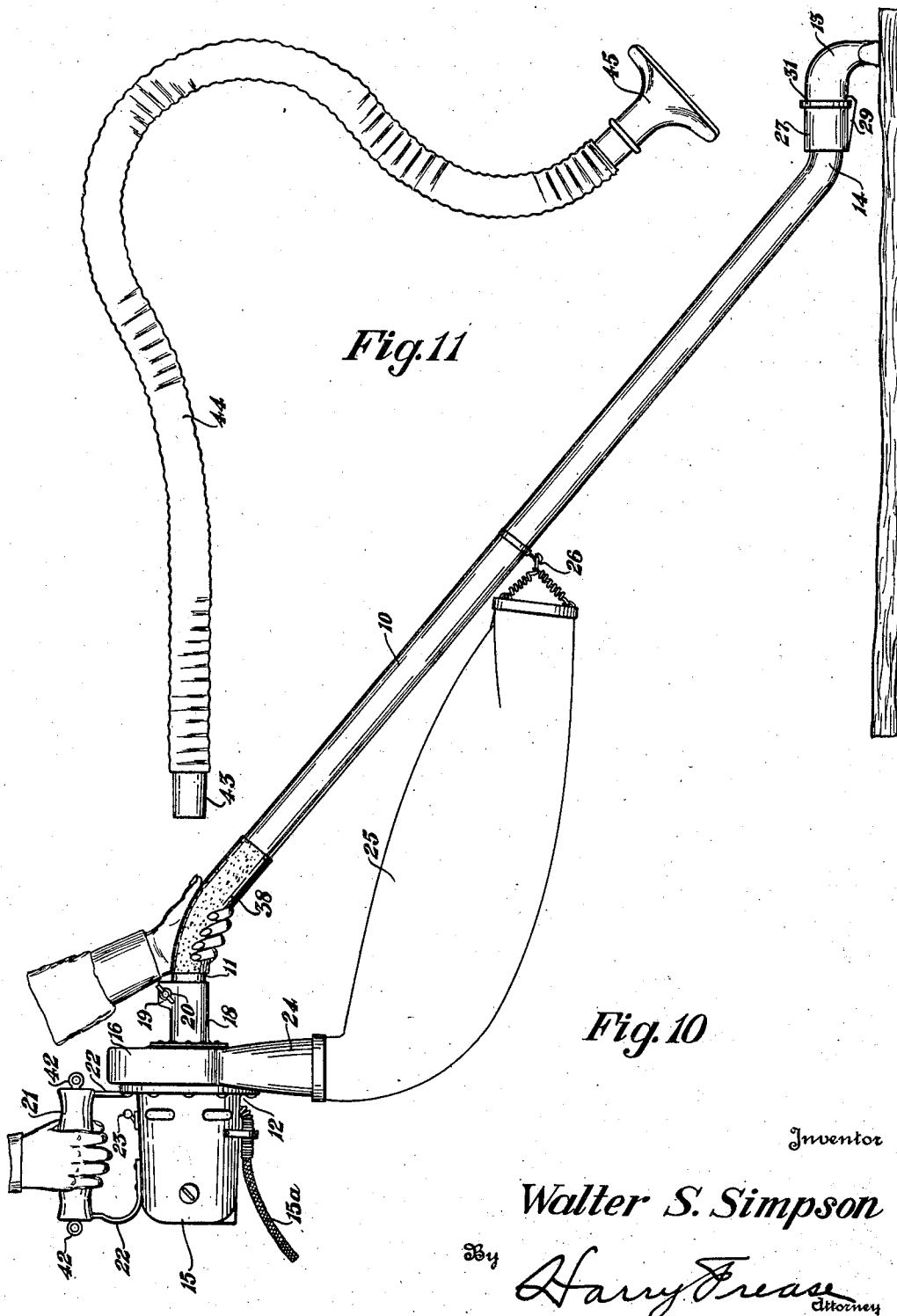
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UNITED STATES PATENT OFFICE

1,940,609

VACUUM CLEANER

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Application September 17, 1928
Serial No. 306,524

6 Claims. (Cl. 15-15)

The invention relates to vacuum cleaners including a suction cleaning nozzle or tool having a long, narrow slot with coplanar lips adapted for being presented to or abutted against a carpet, floor or other objective surface to be cleaned.

When such a cleaning tool is formed or associated directly with an exhausting unit including a fan and a motor, with a rearwardly extending handle, as in the ordinary portable electric cleaners, the machine is somewhat cumbersome and difficult to operate because its weight is located at the forward end of the handle. Moreover, the proximity of the motor-fan unit to the cleaning tool prevents the same from passing under low objects and into constricted places.

And when such a tool is located on the forward end of a tubular handle or shank having its rear end connected with a suction hose communicating with a suction inlet, as in the ordinary stationary cleaning systems, the tool may readily enter under a low object or into a restricted place, but the considerable weight and substantial stiffness of the somewhat cumbersome hose makes it difficult to properly manipulate the cleaning tool, especially when the work is done by a housewife or a housemaid.

The object of the present improvement is to provide a portable electric cleaner which avoids the difficulties of the ordinary portable cleaner, while embodying the benefits of a tool having a tubular handle, without the encumbrance of a heavy suction hose.

This object may be attained by providing a straight tubular shank having its ends bent or bevelled in opposite directions to substantially the same angle, upon the forward angled end of which is swiveled the cleaning tool in well known manner for angling the tool by a rotation of the handle, and upon the rear angled end of which is detachably fixed the inlet neck of the exhausting unit, which may include a centrifugal fan and a coaxial motor in a substantially integral case, with a handle on the upper side of the motor case substantially parallel with the axis thereof.

By such a location and arrangement of the parts, the cleaning tool on the forward end of the tubular shank can be manipulated the same as a cleaning tool on the forward end of a tubular handle, by one hand of the operator grasping the handle on the motor case, assisted if desired, by the other hand grasping the adjacent bend of the tubular shank; and in the operation of the cleaner, the well balanced weight of the motor-fan exhausting unit is freely carried by the handle without the encumbrance of a heavy hose,

and the cleaning tool is freely manipulated without the encumbrance of an adjacent fan and motor.

A preferred embodiment of the invention is illustrated in the accompanying drawings forming part hereof, in which

Figure 1 is a side elevation of the improved cleaner, showing the same in position for operating upon a floor;

Fig. 2, an enlarged sectional view of the swivel connection for the tool or nozzle;

Fig. 3, a section on the line 3-3, Fig. 2;

Fig. 4, a plan view of the improved cleaner, showing the manner of manipulating the same to angle the tool and lower the tubular shank;

Fig. 5, a plan view of the tool or nozzle shown in Figs. 1 and 2;

Fig. 6, a modified tool provided with a brush;

Fig. 7, a still further modification of the tool in which a brush and casters are provided;

Fig. 8, a longitudinal sectional view of the cleaner provided with the form of cleaning tool shown in Fig. 7;

Fig. 9, a section on the line 9-9, Fig. 8;

Fig. 10, an elevation of the improved cleaner showing the same in position for cleaning walls, draperies and the like; and

Fig. 11, an elevation of the flexible hose and upholstery tool for connecting with the exhausting unit.

Similar numerals refer to similar parts throughout the drawings.

The elongated tubular shank 10, which may be made of metal or other rigid material, has one end angled as by bending at 11, for rigid connection with the exhausting unit shown generally at 12. The cleaning tool or nozzle 13 is adapted to be swiveled to the other end of the shank, which may be angled in the manner disclosed in the Spencer Patent No. 981,893 or as shown in the Tice Patent No. 1,161,908.

As illustrated in the accompanying drawings, this end of the shank may be angled by bending as shown at 14, to a plane substantially parallel with the upper end 11.

The motor-fan exhausting unit comprises the normally horizontal motor 15, and the fan casing 16, in which is mounted the coaxial exhausting fan 17, and the axial inlet neck 18 which may be split and provided with the flanges 19 having the clamping screw 20 for clamping the angled upper end 11 of the shank within the neck.

The intermediate or main portion of the tubular shank is preferably formed straight, with its axis located at an angle to the axis of the ex-

hausting unit and is inclined therefrom as shown in the drawings. This main portion of the shank is preferably normally located at an angle of about forty degrees to the objective surface, when the cleaner is in operation as shown in Figs. 1 and 10.

The motor may be of any usual and well known construction, having the flexible cord 15a for connection to an electric outlet in the baseboard or floor.

The handle grip 21 is located substantially parallel to and above the normal upper side of the motor and is connected thereto as by the brackets 22, and is so positioned with reference to the switch 23 that the same may be operated by a finger of the hand gripping the handle 21.

The fan casing is provided with the normally depending outlet neck 24, which is preferably diametrically opposed to the handle 21 for the connection of a dust collector bag 25 of usual construction, the opposite end of the bag being detachably connected to the tubular shank as indicated at 26.

A tubular coupling 27 may be fixed to the outer or lower angled end 14 of the tubular shank for the purpose of providing a swivel connection for the cleaning tool.

The under side of the coupling 27 is provided with a rib 29 extending beyond the end of the coupling and provided with the notch 30 to receive the annular flange 31 formed upon the neck 32 of the cleaning tool or nozzle shown generally at 13.

This annular flange is provided with a notch 34 at the upper side of the tool of sufficient width to accommodate the rib 29. In placing the tool upon the tubular coupling, the tool is inverted, permitting the notch 34 to accommodate the rib 29 and the neck of the tool is inserted into the tubular coupling, the annular flange 31 being brought into position to register with the notch 30 of the rib 29 and the tool is then given a half turn, assuming the position best shown in Fig. 2, the annular flange 31 preventing accidental removal of the tool from the coupling and permitting relative rotation of the parts of nearly 180 degrees in either direction.

This provides a simple swivel connection between the tool and the tubular shank 10 and permits the shank to be rotated upon the axis of the angular portion 14 to any desired or necessary degree required to angle the tool and turn the shank downward to permit the same to be moved under furniture or other low objects and into restricted places. In Fig. 4 is illustrated the method of turning the tubular shank 10 upon the axis of the angular portion 14.

For the purpose of operating upon different kinds of surfaces, the cleaning tool may be provided with a brush 35 as shown in Fig. 6 or with the brush and casters 36 as shown in Fig. 7, the casters being provided with an adjusting screw as at 37 to regulate the height of the tool nozzle from the floor or other surface to be cleaned.

In operating the cleaner upon a floor or the like, the handle 21 may be grasped in the right hand and the left hand placed upon the grip 38 at the upper portion of the tubular shank, to guide the cleaning tool upon the floor, as illustrated in Fig. 1. With this position of the hands the switch 23 is easily accessible to the fingers of the right hand so that the switch may be operated without removing the hand from the handle 21.

The cleaner is nicely balanced in this manner, as the motor, which constitutes the greater weight

of the cleaner, is suspended directly beneath the handle 21.

In order to clean draperies, walls or the like, the cleaner may be operated in the position shown in Fig. 10, the motor being held in substantially vertical position and supported by the operator grasping the handle 21 in one hand, the other hand grasping the tubular shank to guide the cleaning tool over the objective surface.

For the purpose of permitting free use of both of the operator's hands in manipulating the cleaner over a vertical objective surface, a strap 39 may be provided for supporting the exhausting unit from the operator's shoulder. This strap may be provided with any suitable detachable connections such as the harness snaps 41 arranged to be connected to the eyes 42 upon the handle grip.

The strap may be placed over the shoulder or around the neck of the operator, thus supporting the entire weight of the cleaner and leaving both hands free for manipulation of the tubular shank and cleaning tool.

When it is desired to clean upholstered furniture or the like, the tubular shank may be detached from the inlet neck of the exhausting unit and the nipple 43 of the flexible hose 44 may be clamped within the inlet neck. Any suitable upholstery cleaning tool such as indicated at 45 may be fixed upon the other end of the flexible hose and the exhausting unit may be supported in one hand or upon the strap above described.

It will be seen that the center of gravity of the motor-fan exhausting unit is directly beneath the handle grip, thus permitting the exhausting unit to normally hang in such position that the axis thereof is located in a vertical plane passing through the handle.

The center of gravity of the entire cleaner is located at the intersection of the axis of the tubular shank with the axis of the exhausting unit, or approximately at the joint between the tubular shank and the inlet neck of the fan, thus evenly balancing the device at this point.

The weight of the entire cleaner is considerably less than the weight of the ordinary portable cleaner having the same capacity and the greater portion of the weight is located at the most convenient place for handling in the cleaning operation.

In this manner the concentration of the weight directly under the hand of the operator permits operation of the cleaning tool without being encumbered by the weight of an adjacent exhausting unit, on one side, and not subject to the weight of the drag of the suction hose on the other side.

Moreover, any kind of nozzle may be attached by swiveling to the end of the tubular shank, as for instance, a bare floor tool having face strips of fabric or felt, such as are commonly used on the tubular handle of the stationary apparatus, but which cannot be substituted on the ordinary portable cleaner.

In this manner the improved cleaner can be used effectively for community cleaning in schools, hospitals, theaters, churches and other public buildings in place of stationary cleaners which require piping, installation and expensive exhausting equipment.

On the other hand the improved cleaner gives all of the advantages of the ordinary portable cleaner for individual or residential use, together with all of the advantages of the stationary cleaner, which is too expensive for such uses.

The tubular shank may be detached from the

motor-fan exhausting unit and a suitable hose or nozzle attached to the outlet neck of the fan, in place of the dust collector bag, thus providing a convenient unit for blowing, spraying or similar purposes.

In the ordinary portable cleaner it is necessary to either detach the nozzle or get a special coupling to the fan casing for attaching a flexible hose eight or ten feet long in order to clean walls, draperies and the like, while the improved cleaner is ready for instant use in cleaning walls and the like by merely tipping the same up to the position shown in Fig. 10, without making any changes in the cleaner.

From the above it will be seen that a portable cleaner is provided which embodies the advantages of the stationary type of cleaner without any of the objections thereto, the cleaner being extremely flexible in use and the cleaning tool arranged to readily enter under low objects or into restricted places.

When the cleaning tool is entered under low objects or in restricted places, by turning the tubular shank 10, upon the axis of the angular portion 14, the connections of the dust collector bag with the outlet neck 24 and with the tubular shank 10 at 26, are also turned, thereby turning the distended bag with the tubular shank so that the bag extends to one side or the other of the tubular shank and exhausting unit as shown in Fig. 4, rather than depending downward therefrom as shown in Fig. 1.

This inherent result of the combined organization of the various elements prevents the bag, which normally depends downward, from being interposed between the floor and the tubular shank and exhausting unit, when the tubular shank is moved downward by turning to enter the cleaning tool and the shank under low objects.

The downward movement of the tubular shank and exhausting unit by turning the tubular shank, and the consequent turning of the bag with the shank, is also shown in dot dash lines in Fig. 8 of the drawings.

A further advantage of the organization of elements arises because of the fact that in normal operation of the cleaner, as shown in Fig. 1, the connection of the dust collecting bag 25 with the exhausting unit outlet neck 24 is at an upper portion of the bag above the remaining portion of the bag.

This arrangement causes dirt and foreign matter picked up by the cleaner and expelled through the outlet neck 24 of the exhausting unit to accumulate by the action of gravity in the lower portions of the bag away from the outlet neck 24 leaving the same unrestricted.

Thus the accumulation of dirt and foreign matter in the dust bag will not decrease the working efficiency of the exhausting unit as is the case with the ordinary portable cleaner, in which the connection between the dust collecting bag and the outlet neck of the exhausting unit is at the lowermost portion of the bag.

With this ordinary construction the dirt and foreign matter accumulated in the dust bag falls by the action of gravity downward in the bag to the exhausting unit outlet passage, restricting or clogging the passage opening and materially reducing the working efficiency of the exhausting unit.

I claim:

1. A vacuum cleaner including a tool having a slot with coplanar lips, a tubular shank swiveled to one side of the tool and normally extending upward at an angle from the plane of its lips, a motor-fan exhausting unit rigidly secured to the upper end of the shank at an angle from its axis, upon an axis substantially parallel with the plane of the lips and a dust collector bag connected at one end to the exhausting unit and having its other end connected to said shank.

2. A vacuum cleaner including an exhausting unit comprising a fan casing, a normally horizontal motor and a coaxial fan in said fan casing, a hand grip connected to the exhausting unit, a tubular shank rigidly connected at one end with the fan casing and thence extending at an angle to the axis of the exhausting unit, a cleaning tool swiveled to the other end of the shank, and a dust collector bag connected at one end to the exhausting unit and having its other end connected to said shank.

3. A vacuum cleaner including an exhausting unit comprising a fan casing, a normally horizontal motor and a coaxial fan in said fan casing, a tubular shank rigidly connected at one end with the fan casing and thence extending at an angle to the axis of the exhausting unit, a cleaning tool swiveled to the other end of the shank on an axis substantially parallel with the axis of the exhausting unit, and a dust collector bag connected at one end to the exhausting unit and having its other end connected to said shank.

4. A vacuum cleaner including an exhausting unit comprising a fan casing, a normally horizontal motor and a coaxial fan in said fan casing, a tubular shank having an angular end axially, rigidly connected to the fan casing and thence extending at an angle to the axis of the exhausting unit, a cleaning tool swiveled to the other end of the shank on an axis substantially parallel with the axis of the exhausting unit, and a dust collector bag connected at one end to the exhausting unit and having its other end connected to said shank.

5. A vacuum cleaner including a tool having a slot with coplanar lips, a tubular shank swiveled to one side of the tool and normally extending upward at an angle from the plane of its lips, a motor fan exhausting unit rigidly secured to the upper end of the shank at an angle from its axis, upon an axis substantially parallel with the plane of the lips, a handle spaced above the motor and substantially parallel with its axis, and a dust collector bag connected at one end to the exhausting unit and having its other end connected to said shank.

6. A vacuum cleaner including a tool having a slot with coplanar lips, a tubular shank swiveled to one side of the tool and normally extending upward at an angle from the plane of its lips, a motor-fan exhausting unit rigidly secured to the upper end of the shank at an angle from its axis, upon an axis substantially parallel with the plane of the lips, and a dust collector bag connected at an upper portion with the motor-fan exhausting unit and at a lower portion with the shank, whereby matter expelled from the exhausting unit will collect in the lower portions of the bag away from the connection of the bag with the exhausting unit leaving the same unrestricted.

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