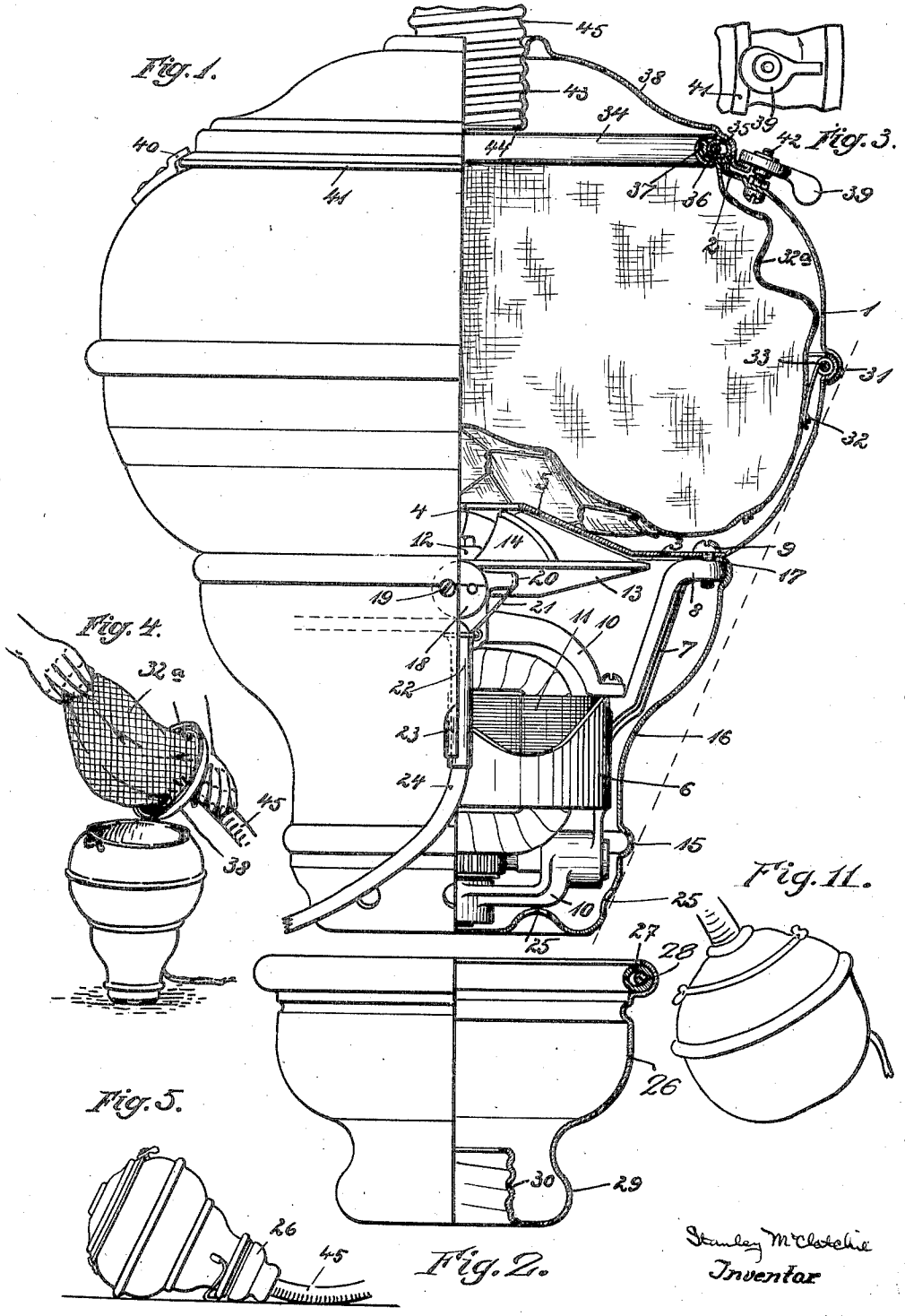
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VACUUM CLEANER

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VACUUM CLEANER

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Fig. 6.

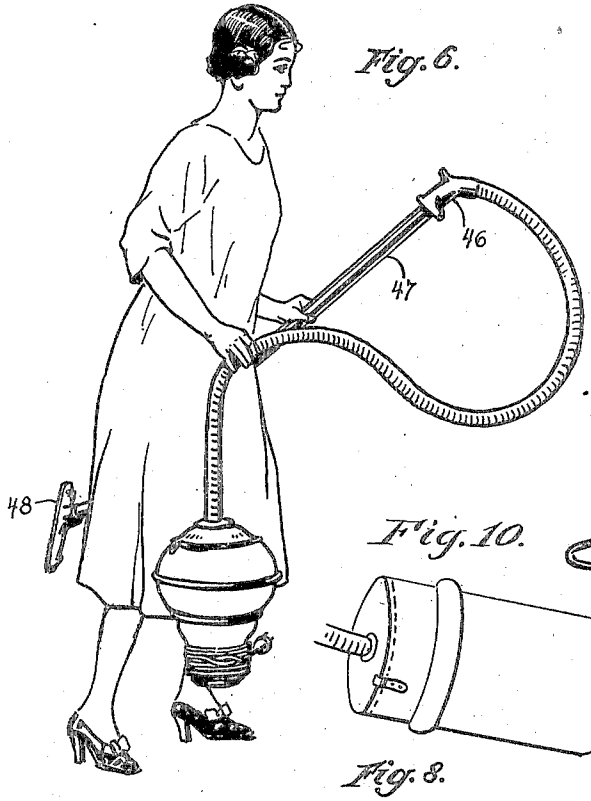


Fig. 7.

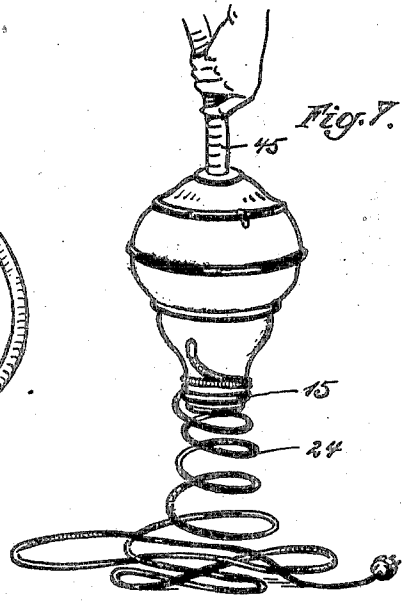


Fig. 10.

Fig. 8.

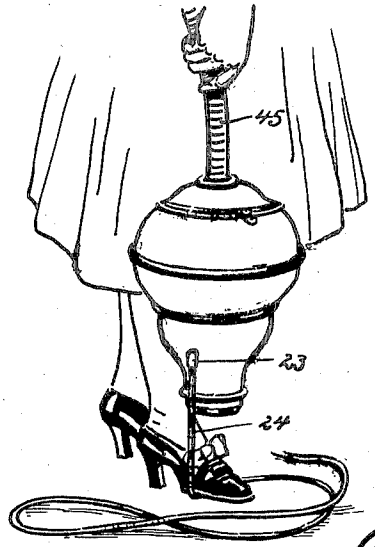


Fig. 9.

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Patented July 16, 1929. 1,721,459

UNITED STATES PATENT OFFICE.

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VACUUM CLEANER.

Application filed March 13, 1924, Serial No. 698,951, and in Germany September 24, 1921.

This invention relates to portable vacuum cleaners, and has for its main object the provision of a particularly light, simple and inexpensive motor-driven cleaner of a distinctly novel type, which can be carried about and manipulated in a different manner and operated more readily and effectively than other previously known types. Further objects and advantages will become apparent as the description proceeds.

As is well known, portable electric vacuum cleaners in general consist essentially of four parts, motor, fan, dust receptacle, and cleaning tool or nozzle. The first three of these parts are practically invariably grouped together, and for convenience will here be collectively designated as the power-plant. The power-plant may either be rigidly attached to the cleaning nozzle, so as to be moved with it at every movement and stroke, or a length of flexible hose may be interposed between plant and nozzle, in such a manner as to relieve the operator in cleaning of the necessarily heavy weight and considerable bulk of the power-plant. The use of a flexible hose has obviously great advantages. For cleaning upholstery, hangings, et cetera, the hose is practically indispensable, and in floor cleaning it considerably facilitates operation. However, the disposal of the power-plant has offered a very difficult problem in machines of the hose type. One manner of handling this problem has been to hang the power-plant from the operator's shoulder. This is such an obstruction and inconvenience for the operator that the method has found only very limited application. The usual way of disposing of the problem has been to let the power-plant rest on the floor. Cleaners thus disposed have had the power-plant mounted either on wheels or in a container provided with a flat bottom to rest directly on the floor. The machine is intended to remain sitting in a fixed upright position, until picked up by a handle specially provided and set down elsewhere. In order to obtain a reasonable operating radius, a long hose is generally provided; this is naturally bothersome, as well as a source of considerable frictional losses with consequent drop in vacuum. The most serious disadvantage, however, is that the power-plant must be made very heavy in order to avoid upsetting by the hose. The twisting, turning and pulling of the hose incident to the work of cleaning will upset any machine of this construction which is not quite heavily built, so as to hold its bottom in spite of such strains. Such a heavy construction, with the long hose involved, is cumbersome and expensive, and for this reason cleaners of the hose type have not come into such general use as those in which the power-plant is normally rigid with the nozzle, in spite of the advantages otherwise attaching to cleaning with a nozzle freed of the encumbrance of the power-plant. Machines of the rigid type have become well-known under the form of the common bag-and-handle, carpet-sweeper variety of vacuum cleaner. These may be made comparatively light, but still, the extra weight and bulk to be continuously shoved about in the cleaning operation is a considerable inconvenience. Moreover, the cleaning of upholstery, hangings, et cetera, with such machines is practicable only by connecting up an accessory hose and nozzle generally supplied extra for the purpose. This change-over from floor to upholstery cleaning is a troublesome operation.

The present invention concerns mainly a vacuum cleaner of the hose type, but the power-plant is so disposed and the general design is such as to make possible an extremely light, simple, and efficient construction. In the drawings accompanying and forming a part of this application I have shown certain forms in which my inventive ideas may be embodied. Fig. 1 is a side elevation, partly in section, of a preferred form of power-plant for my improved cleaner; Fig. 2 shows a blower attachment device; Fig. 3 is a top view of a part of the device shown in Fig. 1; Figs. 4, 5, 6, 7, 8, and 9 illustrate the manner of using my cleaner in its preferred form; and Figs. 10 and 11 are side elevations of some modified forms in which certain features of my invention may be embodied.

I prefer to make my power-plant with a casing symmetrical about a longitudinal axis and divided into two chambers by a centrally apertured transverse diaphragm, one of the chambers containing the dust receptacle and the other the fan and motor. A suction hose is axially attached to the dust chamber. The machine is intended to lie on its side and

to roll about freely on the floor, following with a minimum of resistance the movements of the hose. In the preferred form shown in Fig. 1 of the drawings, the dust chamber is formed like a covered bowl, the bottom of which constitutes the diaphragm dividing the two chambers. This bottom 3 of the dust chamber is provided with a central aperture 4 for the inlet of air to the fan in the motor chamber. Below this bottom is a motor supporting frame comprising a cylindrical ring 6 having projecting legs 7 terminating in feet 8 fastened to the bottom by screws 9. This frame also comprises end members 10—10 in which is journaled the armature shaft, while field members 11 are carried by the ring 6. Secured to the shaft is an exhaust fan comprising a hub 12, a circular disc 13 and a plurality of blades 14 the disk cooperating with the conical portion 5 of the bottom 3 to define a chamber which is tapered from within outwardly, the fan blades being similarly tapered. The casing 16 forms the sides and bottom of the motor chamber. It may be made of sheet aluminum and held in place by an inner flange 17 engaging between the feet 8 and the bottom 3. On the lower part of the casing 16 is a bead 15 which serves to protect this part against indentation and also to hold certain other parts in place, as will hereinafter appear. A switch 18 of the pull-chain type is mounted in the upper part of the casing 16 by means of screws 19. The pull arm 20 of this switch is attached by means of the wire or cord 21 to the sleeve 22. This sleeve reciprocates in the bushing 23 which is attached to the casing 16. The cord 24 conveying current to the motor is cemented in the sleeve 22. The way in which the switch is operated is shown in Fig. 8. With one foot on the cord the operator pulls on the hose. By the tension thus imparted to the cord the sleeve 22 is brought downwards, carrying with it the switch arm 20 and bringing the well-known ratchet mechanism of the pull switch into play. By simply drawing the electric cord taut as indicated, the motor is alternately turned on and off. It is advantageous to bring out the cord at a reentrant portion of the casing, as indicated in the drawing, in order to avoid injury to the same. Apertures 25 are provided in the bottom part of the casing 16 for the egress of air from the fan.

An attachment device 26 for blowing purposes is provided. This is provided with a hollow rubber ring 27 held in place by the spring ring 28. By grasping the handle portion 29 the rubber ring is forced over the bead 15. The end of the hose which otherwise serves for dust sucking is then screwed into the threaded portion 30. The appearance of the assembly for blowing purposes is indicated in Fig. 5. The attachment is held quite securely in place by the cooperation of the rubber ring with the bead 15, and the entire blast of air from the fan is conveyed to the hose, as the egress apertures of the casing 16 are all below the bead.

The cord is conveniently disposed of by wrapping around the casing 16, as seen in Fig. 6. It is prevented from slipping off by the bead 15. The end of the cord may be secured by a simple tie-loop. When released, the cord uncoils automatically, as shown in Fig. 7.

The casing 1 of the dust chamber may be made in two parts, preferably of sheet aluminum, spun together at the bead 31. The joint may be rendered air-tight by smearing with white-lead, or some similar substance, before the bead is finally spun over. Located inside the casing is a wire basket 32, spaced from the sides and bottom thereof, and here shown as supported by a wire rim 33 engaging in the bead 31. This basket is put in place before the two halves of the casing 1 are spun together. Received in this basket is a dust-bag 32^a of material which is easily pervious to air but not to dust. It has its mouth disposed in the groove of a grooved ring 34. Also disposed about this ring is the soft rubber tube 35, which is tied in place in the groove by means of the wire 36. The bag mouth is held securely in place beneath the rubber tube, and is prevented from slipping out by the seam 37. The rubber ring 35 is arranged to fit quite snugly into the cover 38, so that when the latter is removed the bag is lifted out at the same time. The dirt is then shaken down onto the cover as appears in Fig. 4; the bag is separated from the cover only after the dirt has been thoroughly loosened from its sides and shaken down. When the cover is finally pulled away, the dirt falls out in a pile, and the operator is spared the unpleasantness of the flying dust generally incident to shaking down a dust-bag. The rubber ring also fits snugly against the casing rim 2, so as to render the joint between cover and casing air-tight. The cover is guided laterally by the rim 2, and is held down by the catches 39 and 40 bearing on the rim 41. The catch 39 is threaded onto the screw 42 which is secured to the casing. This catch is released by turning in a counter-clockwise direction, as is made clear by the Fig. 3. As soon as the catch 39 is released, the cover may be tipped up and the rim 41 disengaged from the fixed catch 40. Formed in the middle of the cover is a threaded portion 43, provided with a bottoming flange 44. Into this portion is screwed one end of the helical hose 45.

Secured to the opposite end of the hose 45 is the hand-nozzle 46 (Figs. 6 and 9) which is particularly intended for cleaning upholstery, hangings, et cetera. This is formed for the reception of the rigid tube 47 reaching down to the floor-nozzle 48. The nozzles

46 and 48 may be conveniently made a tapered fit on the ends of the tube 47.

While I have shown certain preferred forms in which my invention may be embodied, it is obvious that there are many other ways in which my inventive ideas may be practically carried out, and I do not at all restrict myself to the particular forms shown and described. I have indicated in Figs. 10 and 11 certain illustrative designs for the power-plant. Fig. 10 illustrates a casing of substantially cylindrical form having the hose carried out through one of its ends, and Fig. 11 illustrates a power-plant with a casing having a broad, rounded bottom adapted to tip about indiscriminately.

However, I prefer the shape shown in Fig. 1 because of the fact that it assumes a more convenient position for emptying the dust bag as shown in Fig. 4 and because of the fact that it presents the hose at a more direct and convenient angle and rolls more readily upon the floor, as well as for certain minor reasons such as the convenience with which a blowing attachment can be affixed and the different parts fastened and secured together.

The general manner of handling my new type of cleaner in its preferred form is shown in Figs. 6 to 9. Fig. 6 shows the machine being carried in for use, Fig. 7 the cord being uncoiled, Fig. 8 the current being turned on by pulling on the cord-operated switch, and Fig. 9 the power-plant being laid on its side. As appears from the drawings, the power-plant is arranged to be carried, set down, picked up and generally manipulated by the hose, which acts as its sole handle. The hose is always within the operator's grasp, and he is thus able to manage the machine entirely without stooping. Further, the powerplant is arranged to tip, turn, glide, and roll about on the floor so as to follow automatically all the movements of the operator and to yield to the natural twisting and pulling tendencies of the hose. The user's entire attention may be given to the manipulation of the nozzle, which can be made extremely light. The hose need be only five or six feet long. With the preferred construction which I have shown, the complete power-plant need weigh no more than five pounds. Where the plant is to hold its own against the movements of the operator and the twisting and pulling of the hose, as in other cleaners of the hose type, this part must weigh at least fifteen or twenty pounds, and is generally made even much heavier in practice. Moreover, a hose ten or fifteen feet long is required to give a reasonable operating radius, which adds further to the weight and cumbersomeness and diminishes the efficiency. The prime novel features which make possible the extremely light, simple, efficient, cheap, and convenient construction herein set forth are the symmetrical structure, the adaption to tip and lie on the side, the employment of the hose as the carrying handle, and the rounded contour of the surface which rests on the floor.

Having thus described my invention, what I claim is:

1. A vacuum cleaner comprising a hose, a suction tool at one end thereof, a casing secured to the other end thereof so as to be carried thereby, a dust bag carried inside that end of said casing to which said hose is attached, an electric motor carried within said casing, and a suction device between said bag and motor and communicating with said hose through said bag, said casing being exteriorly rounded so as to turn, tip, and roll bodily to accommodate itself to the movements of the hose.

2. A vacuum cleaner comprising, in combination, a hose, a hollow casing secured to one end of said hose and having an enlargement at the end from which the hose projects, a dust bag in said enlargement and communicating with the hose, a fan and motor in said casing, and a working tool at the other end of said hose, said casing shaped to roll bodily on the floor while the cleaner is in use and said hose constituting the handle for said casing.

3. A vacuum cleaner comprising a hose and a casing formed as a surface of revolution about an axis said hose being attached to and communicating with said casing concentrically, a motor, a fan and a dust separator all located inside said casing, said casing arranged to roll bodily on the floor while the cleaner is in use and a portion of the casing nearest said hose having a peripheral enlargement whereby said casing may assume a position with its axis oblique to the floor on which it lies.

In testimony whereof, I hereunto affix my signature.

STANLEY McCLATCHIE.