F. A. ENGLISH.

SUCTION CLEANER.

APPLICATION FILED AUG. 13, 1914.

1,209,272.

Patented Dec. 19, 1916.

3 SHEETS—SHEET 1.

Fig. 2.

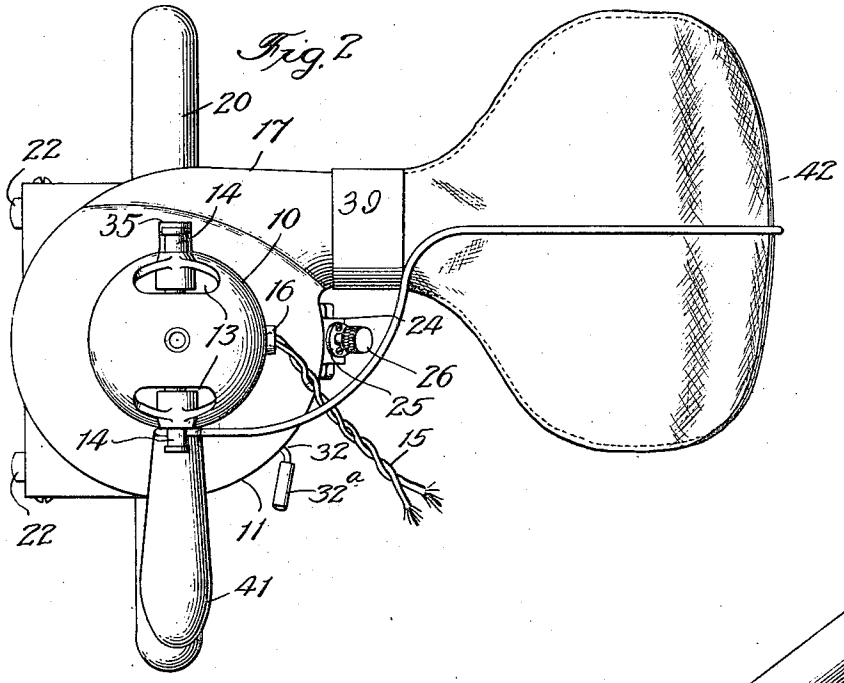
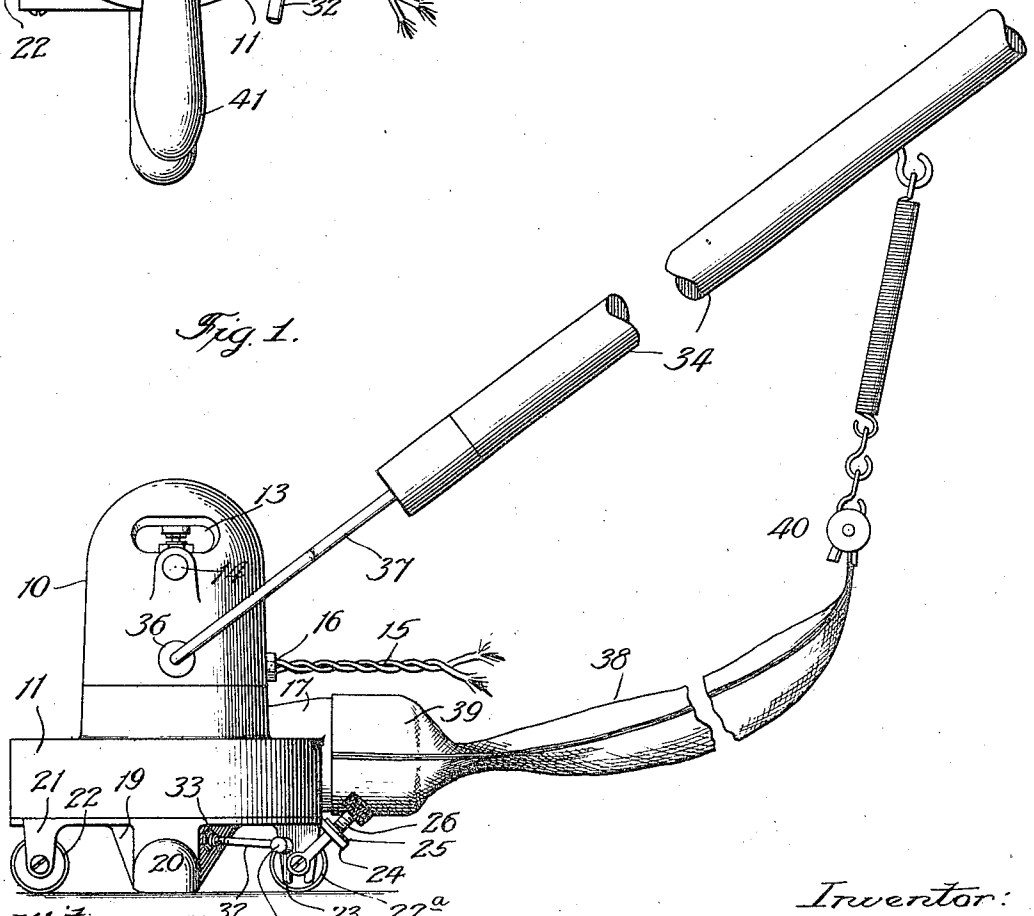


Fig. 1.



Witnesses: Chas. H. Bull

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3 SHEETS—SHEET 2.

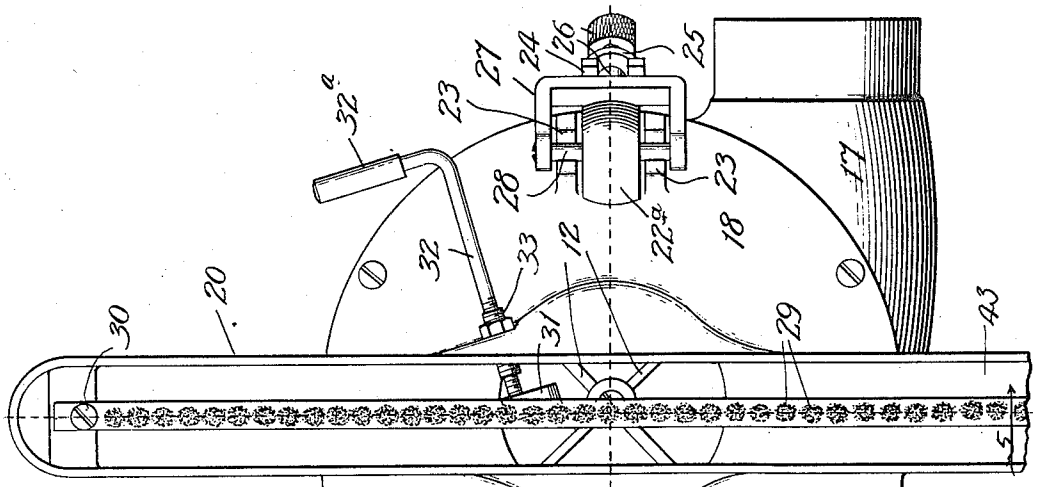
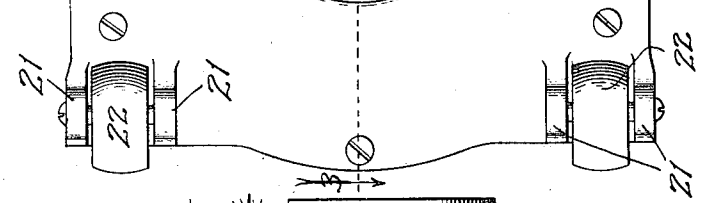


Fig. 4.



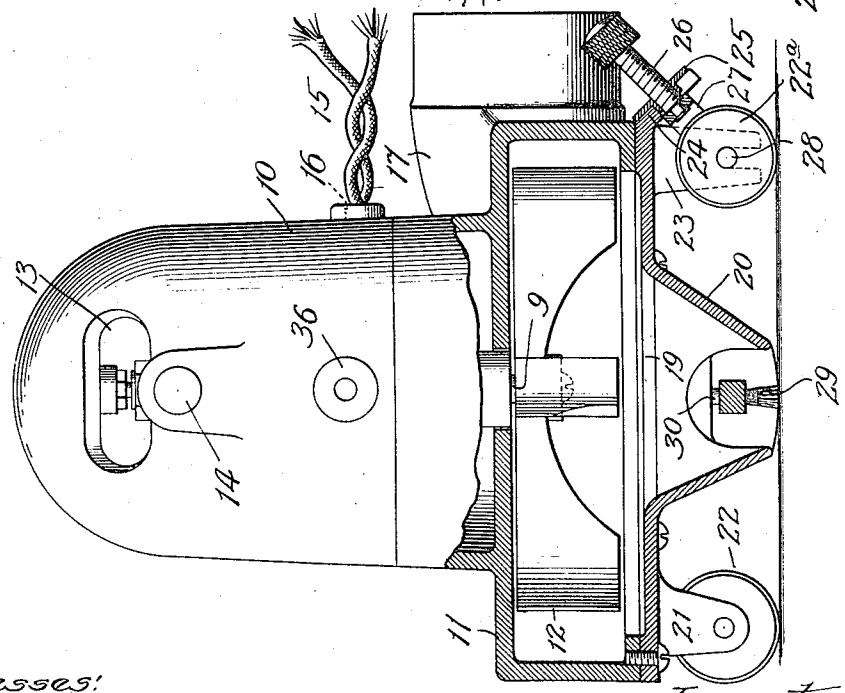


Fig. 3.

Witnesses:

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3 SHEETS—SHEET 3.

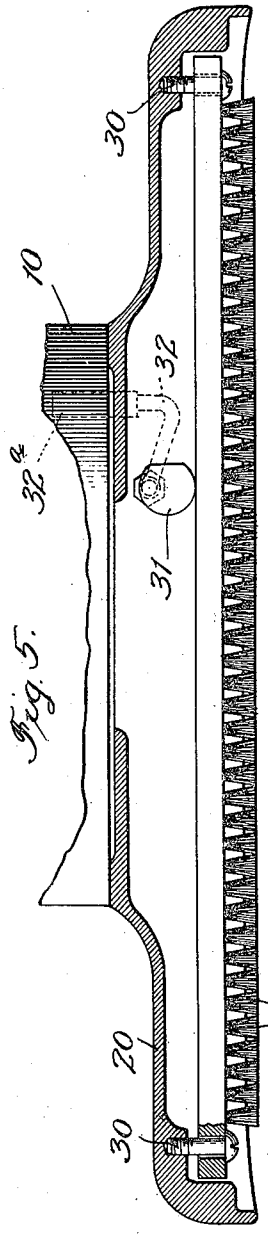


Fig. 5.

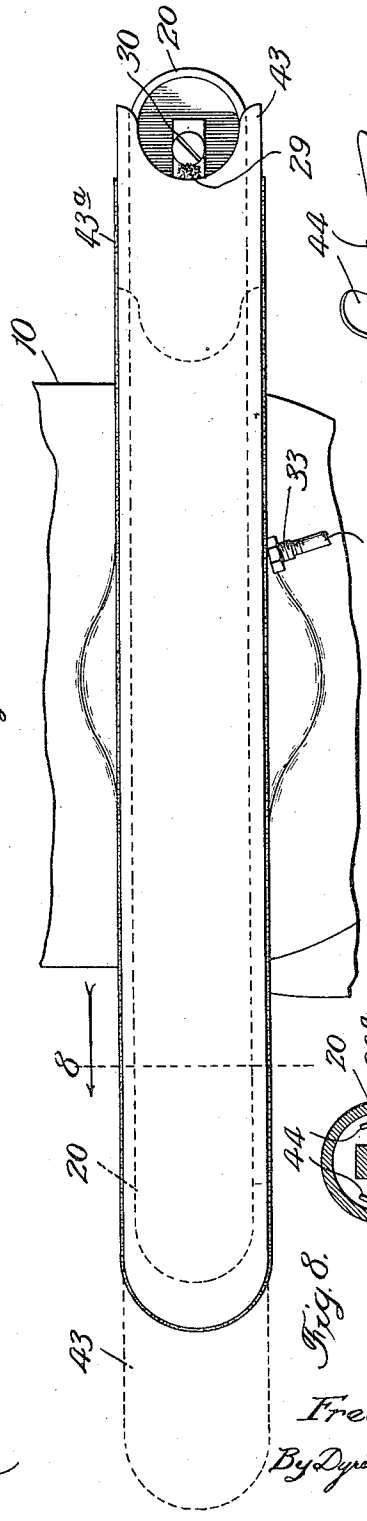


Fig. 6.

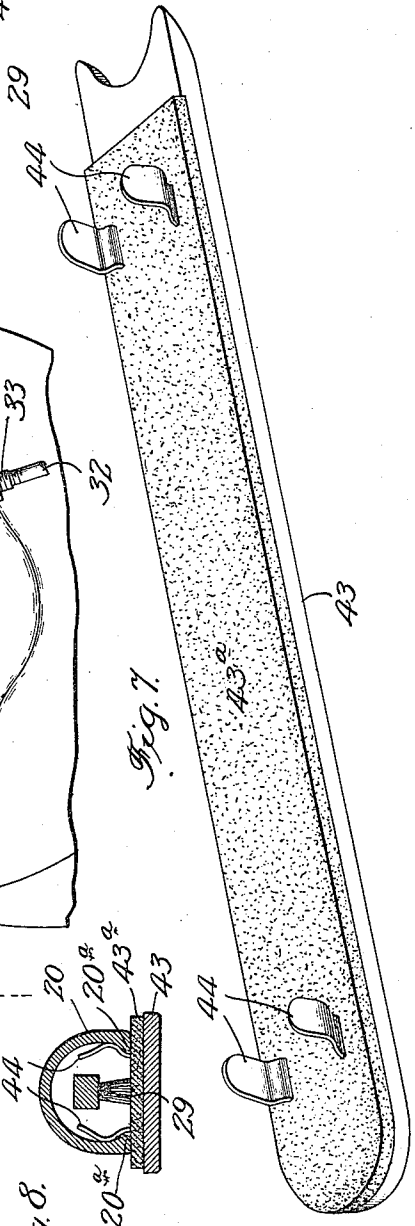


Fig. 7.

Fig. 8.

Witnesses:

Chas. H. Buell.

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UNITED STATES PATENT OFFICE.

FREDERICK A. ENGLISH, OF CHICAGO, ILLINOIS, ASSIGNOR TO BIRTMAN ELECTRIC CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SUCTION-CLEANER.

1,209,272. Specification of Letters Patent. Patented Dec. 19, 1916.

Application filed August 13, 1914. Serial No. 856,681.

To all whom it may concern:

Be it known that I, FREDERICK A. ENGLISH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Suction-Cleaners, of which the following is a specification.

My invention relates to an improvement in the class of suction-cleaners employing an incased motor-driven fan operating to suck dust and refuse matter from the surface to which the cleaner is applied and discharge the same into a suitable receptacle or bag.

The more important objects of my improvement are to provide a construction of suction-cleaning machine which shall enable it to be provided in small proportions while capable of performing its work as efficiently as do larger or more expanded machines of the same type; and to enable the machine to be readily converted from the condition wherein it is adapted to be wheeled, by pushing it through the medium of a handle, over a floor or other surface to be cleaned, into a condition adapting it to be held in the hand and guided in operating it against elevated surfaces, tuft-buttons, and the like; to provide a brush in the suction-nozzle with simple and improved means for adjusting it. These and other objects are accomplished by my improved machine, illustrated in the accompanying drawings, in which—

Figure 1 is a broken view showing, in side elevation, a suction-cleaner embodying my improvements, and in condition to be wheeled over a floor; Fig. 2 is a top plan view of the same in its condition for carrying it in the hand and guiding it in its cleaning work; Fig. 3 is a view of the same in elevation partly sectional, the section being taken on line 3, Fig. 4; Fig. 4 is a bottom plan view of the machine; Fig. 5 is a broken view presenting the nozzle in longitudinal section and showing the adjustable brush in place therein, the section being taken on line 5, Fig. 4; Fig. 6 is a broken view showing the valve-covered nozzle in inverted plan; Fig. 7 is a perspective view of the nozzle-valve, and Fig. 8 is a section on line 8, Fig. 6.

An electric motor, of which the shaft 9 is shown in Fig. 3, but which is the same as is ordinarily employed in suction-cleaners, and does not, therefore, require further illustration, is housed in a vertically extending casing 10 of general conical shape. Below the casing 10, and shown to be formed integral with the lower section of the latter, is a generally circular casing 11 of relatively large diameter, centrally into which the motor-shaft projects and carries a rotary suction fan 12. Diametrically opposite openings 13 are shown to be provided for air-circulation, as usual, in the rounded end of the casing 10. Adjacent to these openings are supported the commutator-brushes 14 of the motor, and a current-conductor 15 connects with the motor-field through an opening at 16 in the back of the casing 10 near its lower end. An exhaust-nozzle 17 is cast as an integral part of the fan-casing to extend backwardly and tangentially on one side thereof, as shown. The open bottom of the casing 11 is covered by a circular plate 18 containing a central opening 19 and fastened in place as by the screws shown in Fig. 4. An elongated suction-nozzle 20, of the generally rounded cross-sectional shape represented in Fig. 8, and having downwardly rounded ends, is shown to be formed on the bottom of the plate as an integral part thereof; and it extends across the covering plate and the hole 19 therein. This nozzle is of considerably greater length than the width of the section of the casing 11 crossed by it, so that the nozzle projects at both ends beyond the fan-casing; and this nozzle is beaded along the opposite inner edges of its open bottom, as shown at 20^a in Fig. 8, for the purpose hereinafter explained. At opposite ends of the forward edge of the plate 18 are formed downwardly projecting pairs of bearings 21 for rollers 22. A pair of bearing-members 23, similar to the bearings 21 but having the lower ends of its members bifurcated, depends centrally on the rear portion of the covering-plate, from the edge of which inclines downwardly a bifurcated lip 24 having a nut 25 rigidly secured to its upper side to extend across the bifurcated section of the lip and receive a thumb-screw 26. This thumb-screw carries loosely on its lower end a yoke 27, the arms of which are rigidly connected by a pin 28 projecting at its ends through the bifurcated members of the bearing 23 and affording the journal for a third or rear roller 22^a. By means of the described support for the rear roller, the yoke

27 carrying it may, by turning the screw 26, be lowered to tip the machine forwardly to any desired extent within a limited range, on its forward rollers, thereby to bring the nozzle 20, which crosses the bottom of the fan-casing slightly forward of its diametrical center, more or less close to the surface against which the suction-nozzle is applied.

A narrow brush 29 is loosely supported at its ends, to extend lengthwise and centrally in the suction-nozzle, by screws 30 depending in the nozzle ends (Fig. 5) and passing loosely through holes in the end-portions of the brush, whereby the brush normally hangs loosely and bears yieldingly against a surface on which the cleaner is used. To cause the brush to be protruded rigidly beyond the mouth of the suction-nozzle, as for working deeply into the thick nap of a carpet, rug, or the like, a cam 31 is supported in the nozzle, in position to be releasably engaged with the back of the brush, on the inner end of a stem 32 working in a bearing 33 (Fig. 4) in the rear side of the suction-nozzle, beyond which the stem projects and is provided with a handle 32^a extending at a right-angle beyond the wall of the fan-casing into a position to be accessible to a foot of the user of the cleaner. As the bearing 33 is shown, it comprises an internally-threaded bushing in the nozzle-wall held by lock-nuts at opposite sides of the latter; and the stem is finely threaded to work without material longitudinal movement in the bushing and be held, as the essential purpose, against lengthwise displacement.

For wheeling the machine over a surface to be cleaned, a suitably long push-handle 34 may be provided. For connecting this handle with the machine, the casing 10 has side-sockets 35 and 36 projecting diametrically opposite each other, and the handle is provided on its inner or forward end with a spring fork 37, the ends of which engage with the opposite sockets 35 and 36 and thus pivotally connect the handle with the motor-casing between its ends. In this manner of using the cleaner a bag 38, of suitable fabric, is coupled by a collar 39 on one end to the exhaust-nozzle 17. The rear end of this bag is usually left open or unsewed to facilitate emptying it, and in use it is held folded, in closed condition, by suitable metal clamping means, indicated at 40 in Fig. 1, but presenting no features of novelty. The bag may be releasably suspended at its rear end on the handle 34 as represented in the last-named figure.

The motor and fan casings and the suction-nozzle are made as light in weight as possible to adapt the machine to be carried by the user in one hand for guiding it in its cleaning purpose in positions where it is impracticable to roll it by the handle 34. These parts are therefore preferably made of aluminum. To adapt the machine for such hand-use, the bag 38 and handle 34 are removed, and are replaced by a handle 41 and a relatively small bag 42 (Fig. 2), which may be supported as shown in Fig. 2, to extend horizontally from the exhaust-nozzle. The handle 41, which is comparatively short and preferably hollow, rigidly fastens on the socket 36 in any suitable manner.

A slide-valve 43 (Figs. 5 to 8, inclusive) is provided, as an attachment, to partially close the suction-nozzle, on which it is adjustable. As shown, this valve comprises a strip of metal, preferably aluminum, covered on its inner face with packing material 43^a, such as felt, and having spring fingers 44 projecting in pairs from that face near its opposite ends. One end of this slide-valve is convexly rounded to coincide with the adjacent end of the nozzle 20 when applied thereto as hereinafter described, and the opposite end is concavely recessed to form with the adjacent nozzle-end a circular opening into the nozzle when the valve is in its most advanced position. To apply the valve, it is placed against the nozzle-mouth, thereby projecting into the same the fingers 44, which engage at their shoulders the beads 20^a along the edges of the mouth and hold the valve in place. By sliding the valve backwardly, with relation to its concave end, the opening between the latter and the adjacent end of the nozzle may be rendered any desired size for covering relatively small surfaces or objects to be cleaned by holding the machine, while working, by the handle 41 in the operator's hand to be guided over such surfaces or objects. Thus, for example, for cleaning the tuft-buttons in upholstered furniture, and the like, the valve may be adjusted to the position represented by full lines in Fig. 6, to form a comparatively small, circular opening in one end of the nozzle-mouth, to cover a tuft-button to which the opening is applied; and to enlarge the opening and thus suit it for other special applications, the valve may be moved backwardly, to the desired extent, on the nozzle-mouth. When the entire length of the nozzle is desired to be used for suction through it, the valve is not used, and may be readily removed from its operative position of attachment by pulling it off.

I realize that considerable variation is possible in the details of construction thus specifically shown and described, and I do not intend by illustrating specific or preferred embodiments of my features of improvement to be limited thereto.

What I claim as new and desire to secure by Letters Patent is—

1. In a suction-cleaner, an upright motor-casing, a fan-casing on the lower end of the motor-casing provided with an exhaust-

nozzle and a bottom opening, a suction-nozzle extending across the bottom of the fan-casing, forward rollers journaled on the fan-casing, a roller-bearing and a nut-carrying lip centrally on the rear side of the fan-casing, a roller adjustably journaled in said bearing, and a screw working in the nut and connected with the roller for adjusting it to raise and lower the nozzle.

2. In a suction-cleaner, an upright motor-casing, a fan-casing on the lower end of the motor-casing provided with an exhaust-nozzle and a bottom opening, a suction-nozzle extending across the bottom of the fan-casing, forward rollers journaled on the fan-casing, a roller-bearing centrally on the rear side of the fan-casing comprising bifurcated members, a lip extending adjacent said members and provided with a nut, a screw working in said nut, a yoke on said screw and embracing said bearing-members, a journaling pin supported at its ends on the yoke-arms to work in the bifurcations of said members, and a roller on the pin between said bearing-members.

3. In a suction-cleaner. an upright motor-casing, a fan-casing on the lower end of the motor-casing provided with a bottom opening, a suction-nozzle extending across the bottom of the fan-casing, and a slide-valve fitting the mouth of said nozzle and attached thereto to adapt it to be longitudinally adjusted thereon for regulating the size of the mouth-opening to correspond approximately with the dimensions of tuft-buttons and the like to be cleaned by application thereto of the nozzle.

4. In a suction-cleaner, an upright motor-casing, a fan-casing on the lower end of the motor-casing provided with a bottom opening, a suction-nozzle extending across the bottom of the fan-casing and at its ends beyond the same, a slide-valve fitting the mouth of said nozzle and provided with a recess in one end, and spring fingers on the inner face of said valve to enter said mouth and removably and reciprocably attach the valve in place.

FREDERICK A. ENGLISH.

In presence of—

D. C. THORSEN,

O. C. AVISUS.