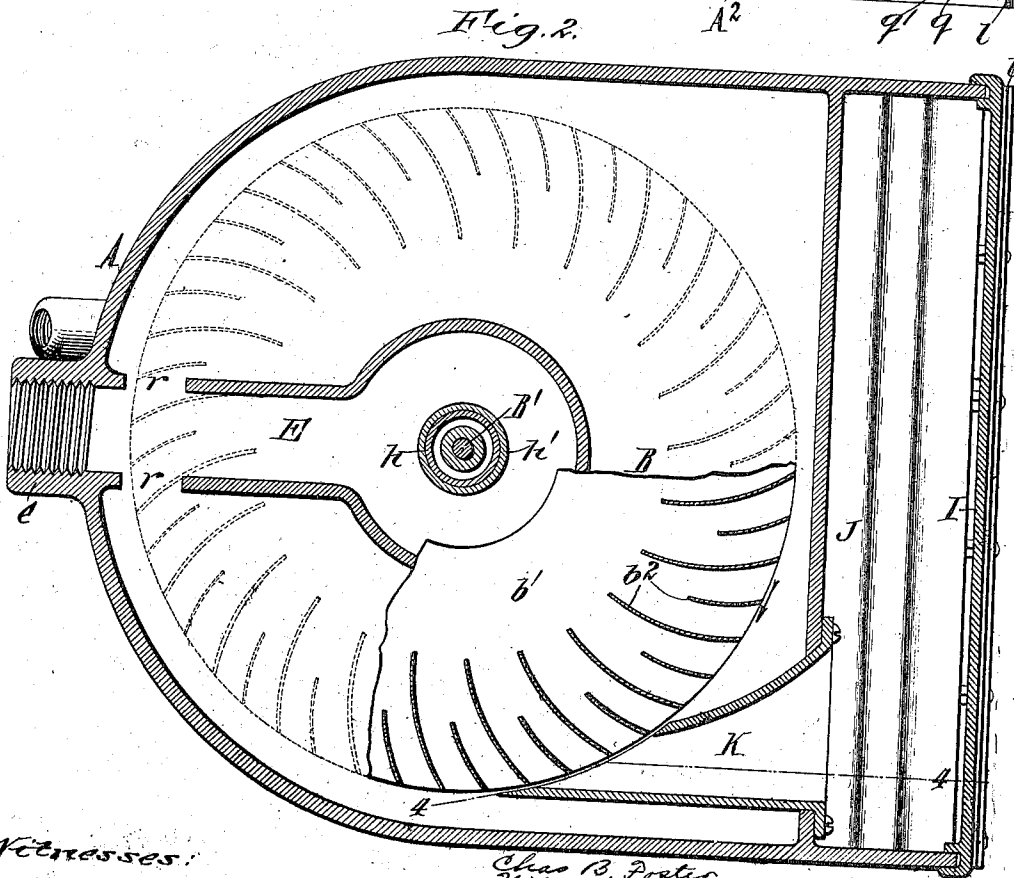
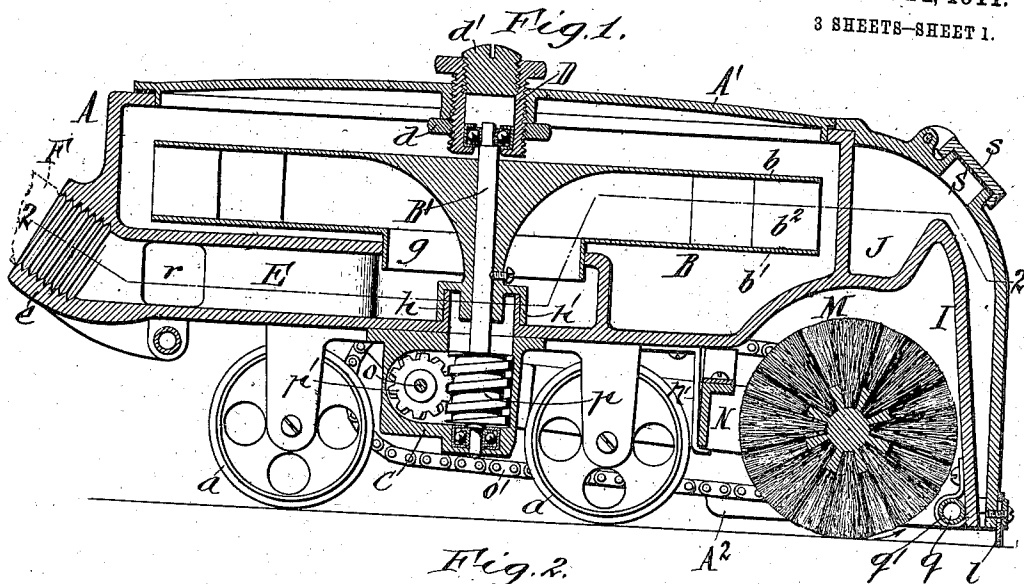


C. B. FOSTER & W. W. GLIDDEN.
PNEUMATIC CLEANER.
APPLICATION FILED APR. 17, 1906.

983,988.

Patented Feb. 14, 1911.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3.

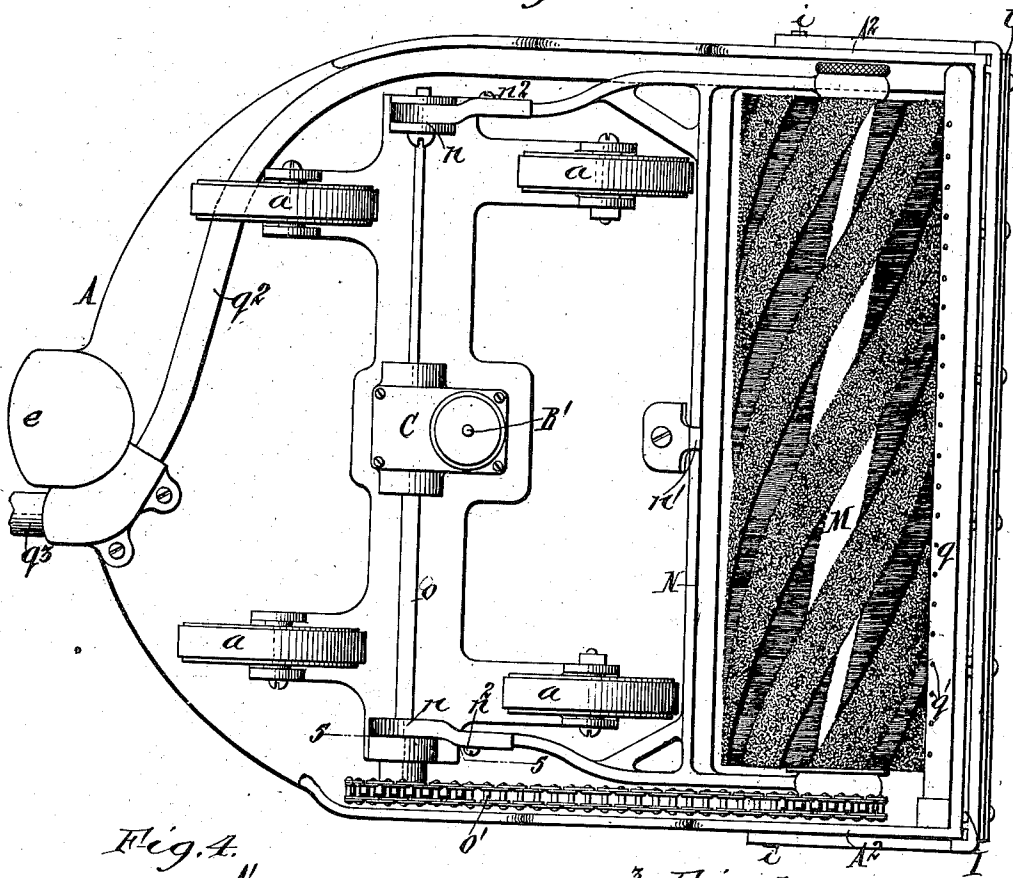


Fig. 4.

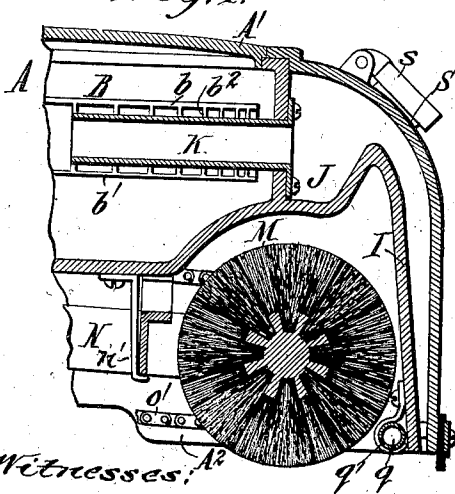


Fig. 5.

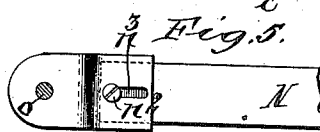
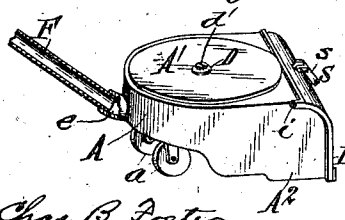


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

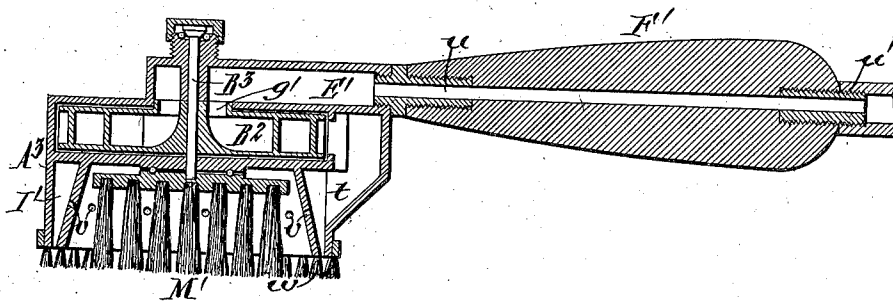
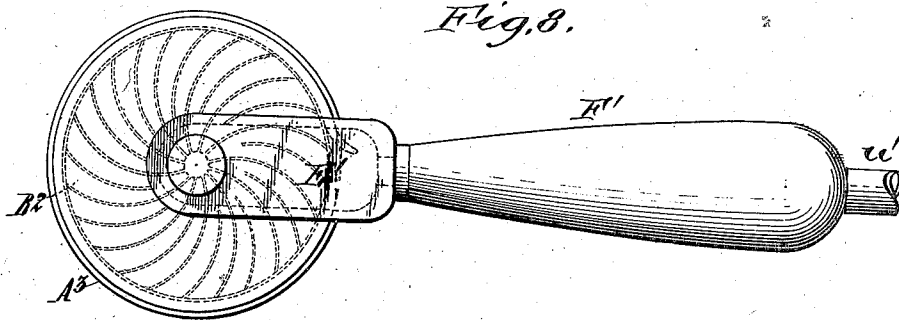


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC CLEANER.

983,988.

Specification of Letters Patent, Patented Feb. 14, 1911.

Application filed April 17, 1906. Serial No. 312,170.

To all whom it may concern:

Be it known that we, CHARLES B. FOSTER and WILMOT W. GLIDDEN, citizens of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pneumatic Cleaners, of which the following is a specification.

This invention relates to portable pneumatic cleaners. Its chief object is the provision of a simple device of this kind in which the same suction current is utilized for operating a cleaning brush and for carrying off dust and dirt and the water or other cleansing fluid, when the latter is used.

A further object is to so construct the cleaner that when water is used in quantities sufficient for scrubbing purposes, it does not impede or interfere with the operation of the rotary motor which drives the cleaning brush.

In the accompanying drawings consisting of 3 sheets: Figure 1 is a vertical longitudinal section of the cleaner. Fig. 2 is a horizontal section thereof in line 2—2, Fig. 1. Fig. 3 is a bottom plan view thereof. Fig. 4 is a fragmentary vertical section in line 4—4, Fig. 2. Fig. 5 is a similar section in line 5—5, Fig. 3, showing one of the adjustable arms of the brush-carrying frame. Fig. 6 is a perspective view of the cleaner, partly in section. Fig. 7 is a vertical central section of a modified form of the cleaner. Fig. 8 is a top plan view thereof.

Similar letters of reference indicate corresponding parts throughout the several views.

Referring to the construction shown in Figs. 1-6, inclusive, A is a horizontal motor-case forming the body of the cleaner, the same being closed at its bottom and sides and provided in its top with a removable cover A¹. It is supported upon rollers a, so that it can be easily moved back and forth like a carpet sweeper. Two rollers are preferably arranged under the front portion of the case and two under its rear portion, as shown in the drawings. B is a motor wheel arranged horizontally in the case A and preferably composed of upper and lower disks b, b¹ and curved vanes or buckets b² secured between the disks. In the construction shown, the vanes are alternately long and short and all extend inwardly from the periphery of the disks but terminate short of the hub of the wheel. This wheel is secured

to a vertical shaft B¹ journaled at its lower end in a bearing carried by a removable gear case C secured to the underside of the case A, and at its upper end in a bearing arranged in an externally threaded sleeve D secured by a nut d and a central opening of the cover A¹. Ball bearings are preferably employed, as shown. The upper end of the sleeve D is closed by a screw plug d¹ which is removed when it is desired to lubricate the upper shaft-bearing. In the lower portion of the motor-case is arranged a longitudinal suction passage chamber or conduit E which extends rearwardly from the central portion of the case to the rear wall thereof where it terminates in an internally screw threaded socket or nipple e. To this nipple, the lower end of a hollow handle or tube F is attached, as shown in Fig. 6, the upper end of this handle being in practice connected by a hose with a vacuum tank or pump (not shown) of any suitable or well-known construction. As shown in Fig. 1, the lower disk b¹ of the motor wheel is provided axially with an opening bounded by a depending tube or collar g which fits closely in an opening in the top of the suction conduit E, thus placing the central portion of the motor wheel in communication with said conduit. In order to prevent the entrance of air into this conduit through the gear case C, so far as possible, the opening in the bottom of the conduit through which the motor-shaft B¹ passes is surrounded by an upwardly-extending collar h which is inclosed by an annular hood or shield h¹ mounted on the hub of the motor-wheel, as shown in Fig. 1.

I is a comparatively narrow suction nozzle which is arranged transversely at the front end of the device and through which the dust, dirt and water are drawn upwardly and thence discharged rearwardly through the suction conduit E, as hereinafter described. This nozzle extends throughout the width of the cleaner and its upper end is connected with a transverse trough or channel J which extends across the front side of the motor case A, the front wall of the latter forming the rear wall of said trough, as shown in Figs. 1, 2 and 4.

K is a horizontal inlet tube projecting rearwardly from the trough J and having its rear end arranged in close proximity to the periphery of the motor wheel and tangentially thereto, so that the suction current induced through said tube impinges

against the vanes of the wheel and rapidly rotates it.

To facilitate access to the interior of the nozzle I and the tube K for cleaning the parts when necessary, the front wall of the nozzle is preferably hinged at its upper edge to the motor-case A, as shown at *i*, in Figs. 3 and 6. This hinged wall or cover is normally secured in place by screws or other suitable fastenings. The suction tends to draw the nozzle I against the floor and in order to prevent marring of a polished floor or similar surface the front wall of the nozzle is provided at its lower edge with a buffer or cushion *l* of rubber or other suitable material.

M indicates a cleaner, preferably consisting of a rotary cylindrical brush arranged transversely on the rear side of the suction nozzle I, underneath the front portion of the motor-case A, and adapted to detach the dust, etc., from the floor, carpet or other surface to be cleaned. In the construction shown in the drawings, this brush is journaled in the free front end of a vertically swinging frame N, the side bars or arms of which are hinged at their rear ends to the underside of the case A, as shown at *n*. The front portion of this brush-carrying frame is supported at the proper height by a spring catch *n*¹ secured to the underside of the case and engaging with a cross bar of the frame. The brush is covered or inclosed at its ends by downward extensions A² of the side walls of the motor case.

Motion is transmitted from the motor-wheel B to the brush by any suitable means. In the preferred construction shown in the drawings, the brush is driven from a countershaft *o* by a sprocket chain *o*¹ running around sprocket wheels on said shaft and the brush shaft, and the countershaft is in turn driven from the motor-shaft B¹ by a worm *p* secured to the latter and meshing with a worm wheel *p*¹ mounted on the countershaft. This worm gearing is inclosed by the gear-case C, and the countershaft is supported at its inner end by said case.

In order to permit the sprocket chain *o*¹ to be tightened, when necessary, the side bars of the frame N are composed of longitudinally adjustable sections which are secured together by clamping screws *n*² carried by one section of each bar and passing through a longitudinal slot *n*³ in the other section, as illustrated in Figs. 3 and 5.

q is a water delivery pipe or conduit supported on the rear side of the nozzle I at or near its base and provided on the side facing the cleaning brush with one or more rows of perforations *q*¹ through which the water is sprayed upon the floor in front of the brush, when the cleaner is used for scrubbing purposes. As best shown in Fig. 3, this pipe is connected at one end with a

branch pipe *q*² which extends along the underside of the case A to the rear end of the latter where a water supply pipe or hose *q*³ is attached to it.

r indicates one or more water discharge openings formed in the sides of the suction conduit E and through which the soiled water drawn through the nozzle I into the motor case is discharged into said suction conduit and thence through the hollow handle F into the vacuum tank from which it is drained into the sewer from time to time. The discharge openings *r* extend to the bottom of the case A and are preferably arranged near the rear end thereof, as shown.

To enable the force of the suction through the nozzle I to be weakened under certain conditions, the same is provided with an air inlet S which is normally closed by a movable cap, valve or plug *s*. A hinged cap is shown for this purpose, which remains closed by gravity and the atmospheric pressure against its outer side when the cleaner is in use.

In the operation of the cleaner, when the same is to be used for scrubbing purposes, a suitable quantity of water is supplied to the spray pipe *q* and the air inlet cap *s* is closed. Upon now connecting the hollow handle F with a vacuum tank or pump, a powerful suction current is induced through the suction conduit E, the motor case A, the inlet tube K and the nozzle I. The air current passing rearwardly through the tube K exerts its force against the vanes of the motor-wheel at or near their outer ends, passes toward the center of the wheel and finally escapes through the central tube *g* thereof into the suction conduit and through the hollow handle. The motor-wheel is thus rotated at a high speed and caused to drive the brush M which latter is turned in the proper direction to sweep the detached dirt and the soiled water forwardly toward the inlet of the nozzle I. At the same time a strong upward current is induced through the nozzle, sucking up the dirt and water from the floor and carrying the same with the air through the inlet tube K, the air passing through the motor-wheel and the suction conduit, as just described, while the water drops from the end of said inlet tube into the motor-case, whence it is drawn through the discharge openings *r* into said suction conduit and discharged with the air through the hollow handle. The trough J receives any surplus water which has not passed through the inlet tube K at the time the cleaner is stopped, preventing such water from flowing back through the nozzle and again wetting the floor. Should it be desired to keep the water upon the floor for a time to more effectually scrub the same, the air inlet cap *s* is opened, whereupon the suction current will be weakened to such an

extent that it will not elevate the water, but will still have sufficient power to drive the brush. When the soiled water is to be taken up, the cap *s* is again closed.

5 It is apparent from the foregoing that the same suction current is utilized for driving the brush and carrying off the dirt and water, producing a very effective device of simple construction by which large areas, 10 such as the floors of office buildings, schools, factories, stores, hospitals, &c., can be quickly and thoroughly cleaned.

When the device is to be used for sweeping or renovating carpets or similar dry 15 cleaning, the water supply to the apparatus is simply shut off, the dust being in that case drawn through the inlet tube *K*, motor-wheel and suction conduit *E* and finally discharged as hereinbefore described.

20 Figs. 7 and 8 illustrate a modified form of the device designed to be used as a hand-brush for dusting furniture and cleaning clothes, shoes, &c. In this modification, the water-supplying feature is omitted, and the 25 motor-wheel *B*² is preferably located directly above the rotary brush *M*¹ which is circular instead of cylindrical and secured directly to the lower end of the upright motor-shaft *B*³. The main casing *A*³ is circular to conform to the brush and the suction nozzle *I*¹ encircles the brush and communicates by an ascending passage *t* with 30 the rear side of the motor-case. In this embodiment of the invention, the axial tube *g*¹ of the motor-wheel projects upwardly through an opening in the bottom of a suction passage or conduit *E*¹ which surmounts the motor-case and communicates with a passage *u* extending through the handle *F*¹ 40 of the cleaner and terminating in a nipple to which the suction hose *u*¹ is attached. In addition to the slit forming the mouth of the suction nozzle, the latter is preferably provided in its inner wall with suction apertures *v*. In operation, this modified cleaner, 45 like that previously described, is placed against and passed over the article to be dusted, cleaned or polished, the motor rapidly rotating the brush and the suction picking up the detached dust and discharging it through the motor-case and the hollow handle of the device.

To avoid defacing furniture or similar articles, the main casing of this cleaner is 55 provided around its lower edge with a buffer or cushion consisting preferably of a row of depending bristles *w*, as shown.

We claim as our invention:

1. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle communicating with the peripheral portion of 60 the motor-case and open to the atmosphere at its lower end, a movable brush arranged adjacent to said nozzle, a motor-wheel arranged in said case and comprising upper

and lower disks and vanes arranged between the same and extending inwardly from the edges thereof, one of said disks having an axial opening, a suction-conduit leading to said opening, and means for operatively connecting the brush with the motor-wheel, substantially as set forth. 70

2. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle communicating with the peripheral portion of 75 the motor-case and open to the atmosphere at its lower end, a movable brush arranged adjacent to said nozzle, a suction-conduit leading to the central portion of the motor-case and having an opening in its top, a 80 motor-wheel arranged in said case and having a lower disk provided with an axial tube which fits the opening of said suction-conduit, and means for operatively connecting the brush with the motor-wheel, substantially as set forth. 85

3. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle connected with the peripheral portion of said case, a movable brush arranged adjacent to 90 said nozzle, a motor-wheel arranged in said case, a suction conduit leading to the central portion of the motor-wheel and having a discharge opening connecting the same with the motor-case, and means for operatively connecting the brush with the motor wheel, substantially as set forth. 95

4. In a pneumatic cleaner, the combination of a motor-case, a motor wheel arranged therein, a suction nozzle open to 100 the atmosphere at its lower end, an inlet tube communicating with the upper portion of said nozzle and terminating adjacent to the periphery of the motor-wheel, a suction-conduit leading to the central portion of the 105 motor-wheel, a movable brush arranged adjacent to said suction nozzle, and means for operatively connecting the brush with the motor-wheel, substantially as set forth.

5. In a pneumatic cleaner, the combination of a motor-case, a motor wheel arranged therein, a suction nozzle open to the atmosphere at its lower end, an inlet tube communicating with the upper portion of 110 said nozzle and terminating adjacent to the periphery of the motor-wheel, a suction-conduit leading to the central portion of the motor-wheel and provided with a water discharge passage connecting the same with 115 the motor-case, a movable brush arranged adjacent to said suction nozzle, and means for operatively connecting the brush with the motor-wheel, substantially as set forth.

6. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle connected with the peripheral portion of said case and having an air inlet above its lower end, means for controlling said inlet, a movable brush arranged adjacent to said nozzle, a motor-wheel arranged in said case, a suc- 125 130

tion conduit leading to the motor-wheel, and means for operatively connecting the brush with the motor-wheel, substantially as set forth.

5 7. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle arranged in front of the same, a trough arranged between the upper portion of said nozzle and the motor case and communicating with the nozzle, a motor-wheel arranged
10 in the case, a suction-conduit leading to the motor-wheel, a movable brush arranged adjacent to the suction nozzle, and means for operatively connecting the brush with the
15 motor-wheel, substantially as set forth.

8. In a pneumatic cleaner, the combination of a motor-case, a suction nozzle arranged in front of the same, a trough arranged between the upper portion of said
20 nozzle and the motor case and communicating with the nozzle, a motor-wheel arranged in the case, an inlet tube communicating with said trough and terminating adjacent to the periphery of the motor-wheel, a suction-conduit leading to the central portion
25 of the motor-wheel, a movable brush arranged adjacent to the suction nozzle, and means for operatively connecting the brush

with the motor-wheel, substantially as set forth.

9. In a pneumatic cleaner, the combination of a motor-case, a motor-wheel arranged therein, a movable brush driven by said motor-wheel, and a suction-nozzle arranged adjacent to the brush and having
35 a fixed rear section and a hinged front wall or section, substantially as set forth.

10. In a pneumatic cleaner, the combination of a horizontal motor-case, a suction-nozzle connected with the front portion
40 thereof, a motor-wheel arranged in said case and mounted on an upright shaft, a horizontal shaft arranged on the underside of the motor case, worm-gearing connecting
45 said shafts, a rotary brush arranged on the rear side of the suction nozzle, and driving means connecting the brush shaft with said horizontal shaft, substantially as set forth.

Witness our hands this 31 day of March, 1906.

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