A. C. BUELL.

PNEUMATIC CLEANER.

APPLICATION FILED MAR. 14, 1908.

949,370. Patented Feb. 15, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

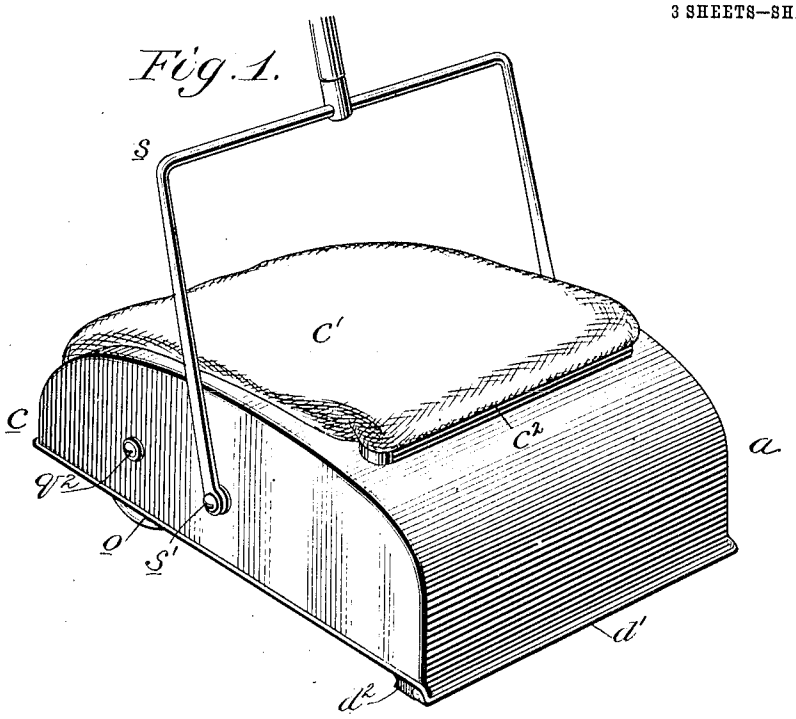
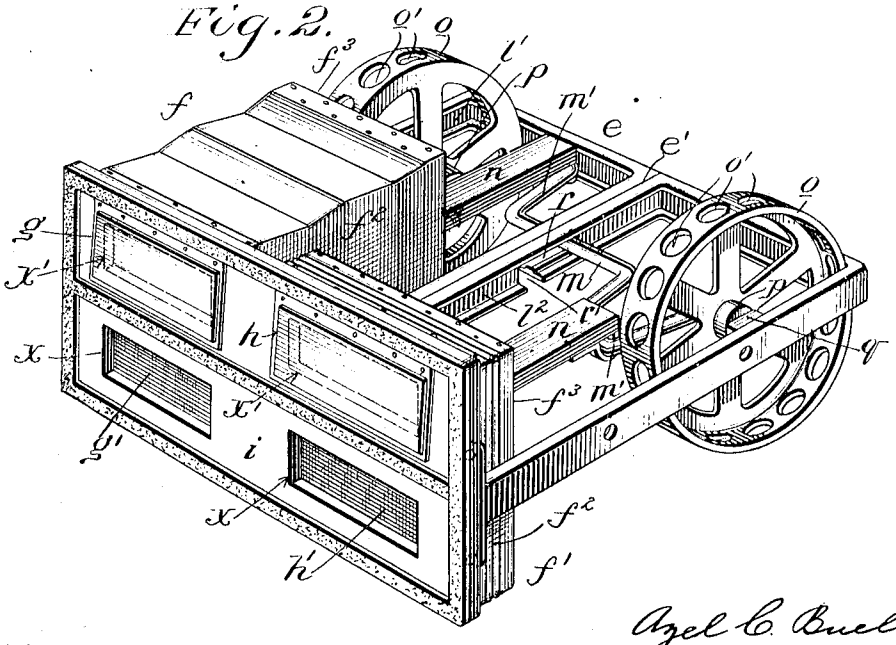


Fig. 2.



Witnesses:

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3 SHEETS—SHEET 2.

Fig. 3.

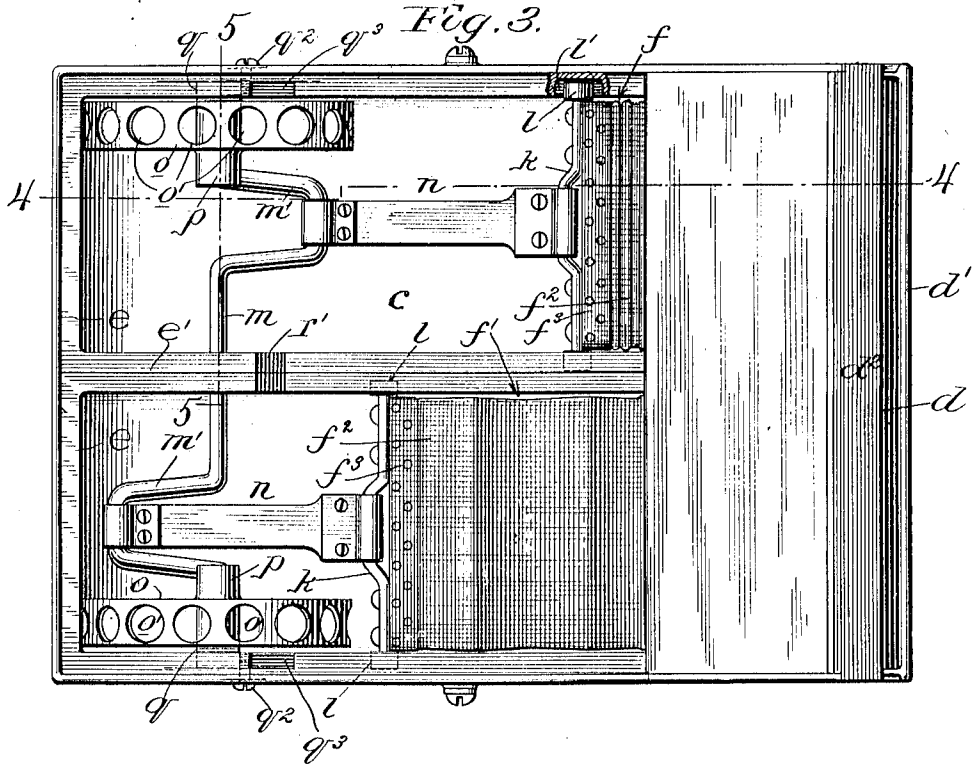
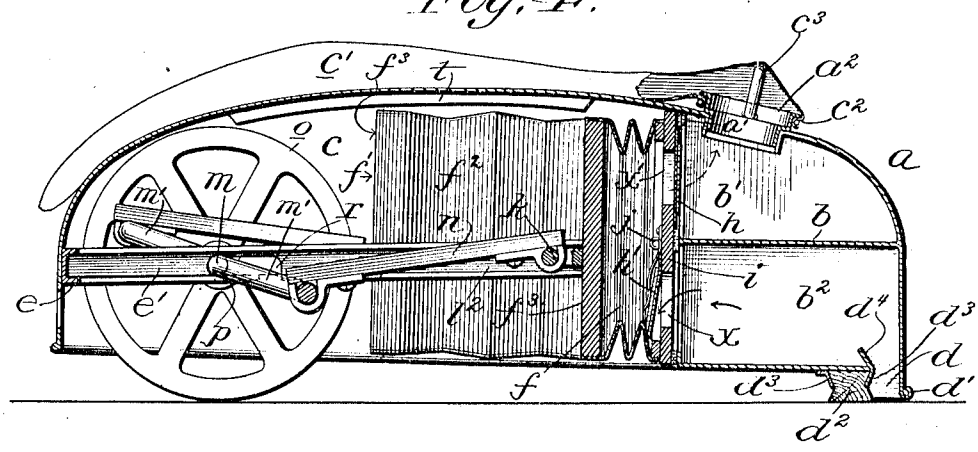


Fig. 4.



Witnesses:

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3 SHEETS—SHEET 3.

Fig. 5.

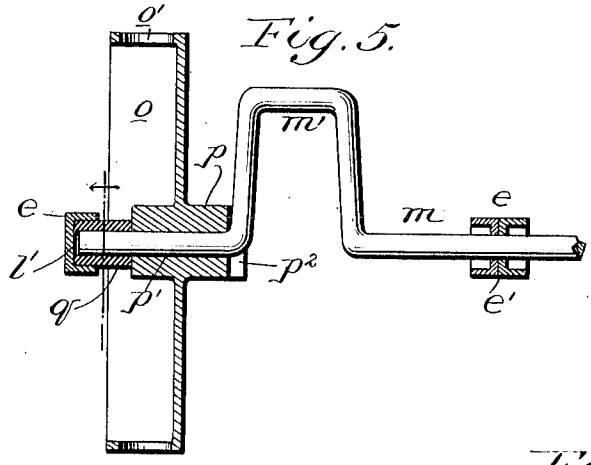


Fig. 6.

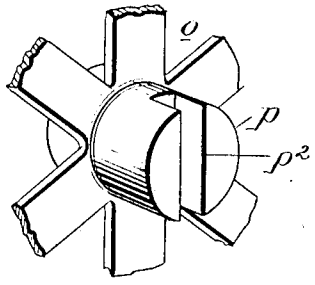


Fig. 8.

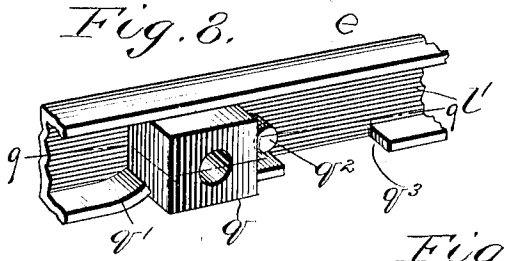
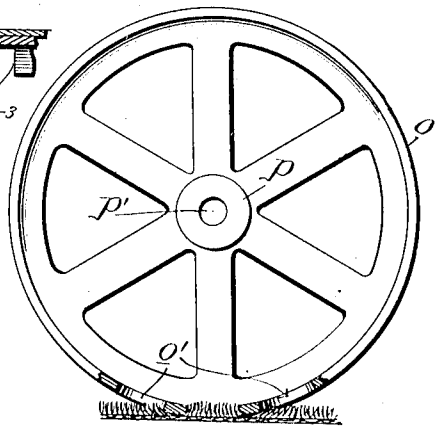


Fig. 7.



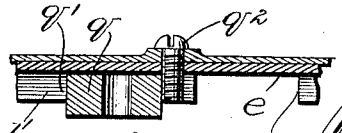


Fig. 9.

Witnesses:

Alvie B. King

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UNITED STATES PATENT OFFICE.

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PNEUMATIC CLEANER.

949,370. Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed March 14, 1908. Serial No. 421,259.

To all whom it may concern:

Be it known that I, AZEL C. BUELL, a citizen of the United States, residing at New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Pneumatic Cleaners, of which the following is a specification.

The present invention relates to pneumatic cleaners such as are used for cleaning carpets, floors, rugs or other flat surfaces to be cleaned, and the objects of the invention are to provide a pneumatic cleaner which is practical, economical and substantial, which is composed of comparatively few mechanical parts, and which may be readily taken apart for the purpose of repair and the parts again assembled.

These being some of the objects in view, the invention consists of certain features of construction and combinations of parts to be hereinafter described and then claimed with reference to the accompanying drawings showing a desirable form of the invention, and in which,

Figure 1 is a perspective view of the improved pneumatic cleaner; Fig. 2 is a perspective view of the interior mechanism, the parts of which may be conveniently assembled as one unit; Fig. 3 is an under side view of the cleaner; Fig. 4 is a longitudinal section on the line 4—4, Fig. 3; Fig. 5 is a detail transverse section on the line 5—5, Fig. 3, showing the traction wheel and crank shaft construction; Fig. 6 is a perspective view of the hub portion of one of the traction wheels; Fig. 7 is a sectional side elevation of one of the traction wheels, showing its action on a pile carpet or rug; and Figs. 8 and 9 are respectively a perspective view and a section on the line 9—9, Fig. 8, of portions of the frame of the cleaner, illustrating the manner of mounting the driving or crank shaft on the frame.

The invention described and claimed herein relates more particularly to a suction machine, but it will be obvious throughout that certain features may be used in other types of machines, as for instance, a compressed air machine. The machine shown is a suction machine, and the description will relate to a machine of that type.

The improved cleaner comprises a hood or casing c in which are mounted a pair of bellows f, f'. Communicating with said bellows are inlet and outlet chambers b^2, b', shown as being formed by the front end portion a of said casing, a partition b, and the front bellows board i, which is fixed against a flange a', extending around the interior of said casing. A dirt-collecting bag c' is preferably employed, the same being of suitable flexible material and provided with an oblong mouth-piece c^2 of suitable metal, which is inserted like the cover of a milk can into the flanged top exit opening a^2 of the upper air chamber b'. There may be used in connection with the flexible collecting bag an arched bridge-piece or handle c^3, which extends across the mouth-piece c^2, and upon which a side portion of the bag rests, but this handle may be dispensed with.

The lower forward end of the inlet-chamber b is provided with a dirt inlet mouth d extending from side to side of the cleaner, said mouth being bounded on the front side by a downwardly projecting lip d' and on the rear side by a wear-strip or lip d^2, which is preferably dovetailed in cross section so as to fit into the dovetail formed by the converging flanges d^3 on the under side of the portion a of casing c. The plane of the under friction surface of the wear-strip d^2 is preferably slightly below that of the front lip d', so as to take all the wear. For this purpose the said wear-strip is preferably formed of some non-metallic material, as wood of a sufficient degree of hardness to stand the usual amount of wear, the same being removable and therefore renewable. Just behind the dirt inlet mouth d and extending upwardly into the lower air chamber b^2 is a baffle or guard d^4. This acts to throw the incoming dust or dirt laden air current upwardly and prevents any of the particles which might drop onto the bottom of the said air chamber because of the presence of the horizontal partition from falling again out of the mouth d.

The main or skeleton frame e, Figs. 2, 3 and 4, of the cleaner is preferably formed of channel bars as shown, and consists of two U-shaped sections of channel bars arranged with the inner legs thereof together to form a middle longitudinal bar e'. The said U-sections are riveted or otherwise suitably secured together, and the metallic frame composed therefrom conforms to and fits in the upper hood or casing c, it being re-

movably applied thereto in a manner hereinafter made apparent.

The bellows f, f' are composed of flexible sides f^2 and a movable suction and compression board f^3. It will be noted that this board is not hinged at one edge. The bellows are provided with upper flap valves g, h, and with lower flap valves g', h', the said valves controlling suitable openings x, x' in front bellows board i and leading into and out of the bellows, the lower openings x leading from the lower air chamber b^2, and the upper openings x' leading from the bellows into the upper air chamber b'. To prevent the inwardly opening valves g, h from moving or dropping to such position as that they might accidentally be injured by the movable bellows boards f^3, the said valves are spring pressed toward the openings x by means of suitable springs. j.

The mechanism for actuating the movable bellows boards f^3 is preferably operated from suitable means actuated as the cleaner is propelled forwardly or backwardly, to which end the said means is mounted on the frame e of the cleaner. Applied to the outer sides of the movable bellows boards f^3 are cross bars k, on the projecting ends of which turn rollers l, which rollers run in the outer-channels l' and the inner channels l^2 formed by the channel bars of the frame e. The bellows are arranged for alternate operation, whether there be two or more than two. Two are shown. A shaft m is suitably mounted in the frame and is provided with oppositely extending cranks or crank portions m', which have a hinge connection with pitmen n, which are in turn hinge connected with the cross bars k.

Traction or driving wheels o are suitably mounted on or keyed to the crank shaft m, as shown in Figs. 5 and 6, for the purpose of driving the mechanism and alternately operating the bellows as the cleaner is moved in frictional contact with a surface to be cleaned. The wheels o are peculiarly formed to increase their tractive properties, that is to say, they are provided with openings or cut-outs o', which, as the cleaner is passed over a pile carpet or rug, receive in the openings or cut-outs portions of the pile. The said wheels are formed preferably of one piece of metal and are of dished formation, so that the tread of the wheel in which the openings or cut-outs are located extends outwardly from the inner web portion of the wheel. The web portion of the wheel may be of spider formation, so as to lighten the construction. For convenience of assemblage with the crank shaft m, the preferably integral hubs p of the wheels are provided with axial holes p' which open into transverse grooves or recesses p^2 in the inner ends of the hubs. The described construction of hubs enables the ends of the crank shaft m to be applied to the wheels without requiring any separate fastenings, for the ends of the shaft simply receive the hubs and the crank portions of the shaft engage in the cross grooves or recesses p^2.

The entire frame and bellows, together with the operating mechanism, are removable from the hood or casing as a unit, although the invention is not limited to this feature. The valved bellows board i fits in removable contact with the flange a', and the front ends of the frame bars fit in removable contact with the said bellows board, so that by removing the fastenings to be hereinafter described with particular reference to Figs. 3, 8 and 9, the said parts may be removed from the hood or casing. The ends of the crank shaft m turn in removable boxes q which are fitted in fixed position in the rear ends of the channels l' of the frame, and to define the rearward position of the said boxes and the shaft, the same are forced rearwardly against stops q' which are preferably formed integral with the channel bars of the frame by striking up portions of the bars to form burs. The said stops are opposed at the opposite sides of the journal boxes q by confining screws q^2 which engage also with the boxes and which pass through the sides of the hood or casing c and the side bars of the frame e. Recesses q^3, q^3 are formed in the lower flanges of the side channel bars of the frame to permit the boxes q to be moved out and disengaged from the frame when the screws or pins q^2 have been disengaged from them. This enables the crank shaft to be disengaged from the frame of the cleaner for purposes of repair and inspection, and for further enabling the entire interior mechanism to be removed.

The middle portion of the crank shaft bears in the closed end of a longitudinal slot r formed in the middle bar e' of the frame, said slot being provided at its other end with a gap r' to enable the crank shaft to be engaged with the said middle bar and to be disengaged therefrom.

A suitable handle bail or hinged frame s is provided, having a socket to receive the usual handle, and is pivoted to the sides of the hood or casing of the cleaner through the medium of screws s' which pass through the hood and into the frame e. A reinforcing rib t is preferably provided for the roof or top of the hood or casing, as shown in Fig. 4.

There are a number of advantages incident to the construction disclosed herein, among which may be mentioned the fact that the interior mechanism can be readily taken out by simply removing the screws or fastenings which secure the mechanism to the frame and hood or casing of the cleaner, and the interior mechanism can in turn be

as readily dismantled. Another advantage is that ready access can be had to the valves for the purpose of replacement or repair. Likewise ready access can be had to the chambers b^2, b'. The collecting bag holds the dirt and dust, and prevents the same from floating about in the air and again settling. By dividing the front portion a of the casing c horizontally and arranging the bellows in suitable cor-relation thereto the collecting bag need have but one mouth to receive the dust. Such of the particles of dust or dirt as are not blown from the upper chamber b', drop onto the horizontal partition b, from which they can be readily removed when desired.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. In a pneumatic cleaner, the combination of a skeleton channel-bar frame provided with inner channels, suitable bellows mounted thereon and having a movable end board provided with means for guiding it traveling in the channels between the sides of the frame, a casing on said frame having a chambered front portion provided with a suction-mouth, said chambered front portion communicating with the bellows, and traction wheels on which the said parts are supported and which are connected with said bellows-board for reciprocating it, for substantially the purposes set forth.

2. In a pneumatic cleaner, the combination of a frame, cleaning mechanism mounted thereon comprising a bellows removable from the frame, a crank-shaft provided with traction wheels, means for actuating said bellows from said shaft, boxes in which the ends of the shaft are journaled, and means for fixing the boxes removably to the frame, for substantially the purposes set forth.

In witness whereof I have hereunto affixed my signature this 6th day of March, 1908.

AZEL C. BUELL.

Witnesses:
CHAS. S. HEINS,
GEO. L. WHEELOCK.