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PNEUMATIC, OR FLUID, CLEANING DEVICE.

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1,199,201. Patented Sept. 26, 1916.

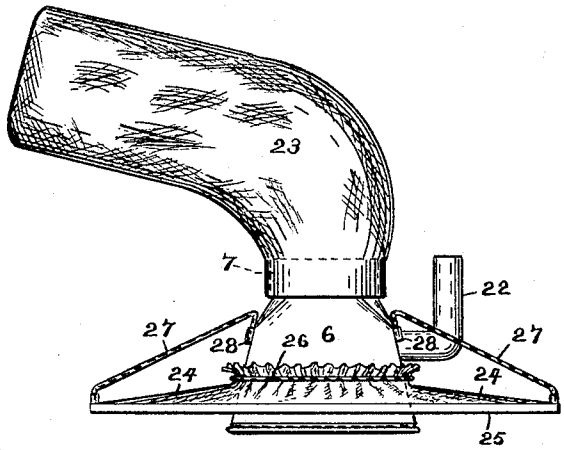


Fig. 1.

Fig. 2.

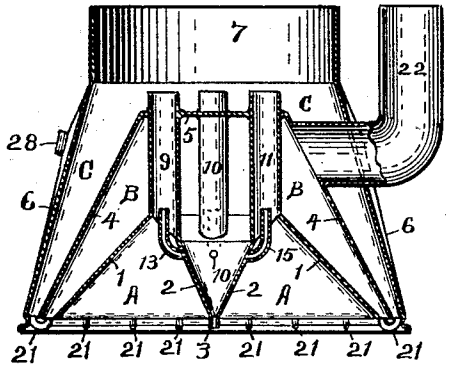
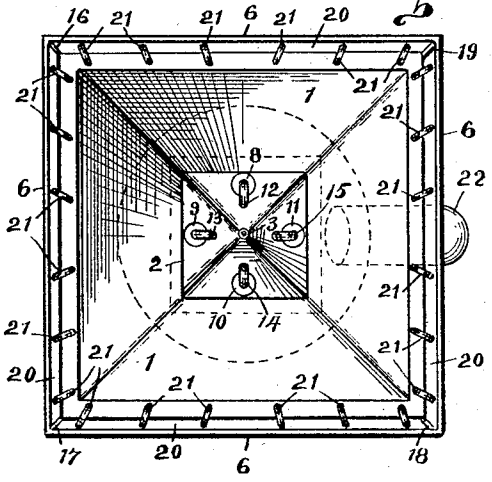


Fig. 3.



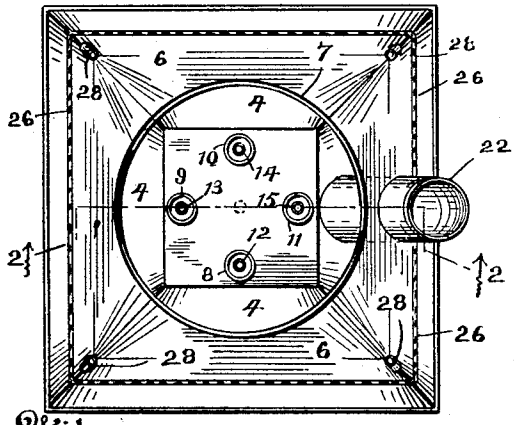


Fig. 4.

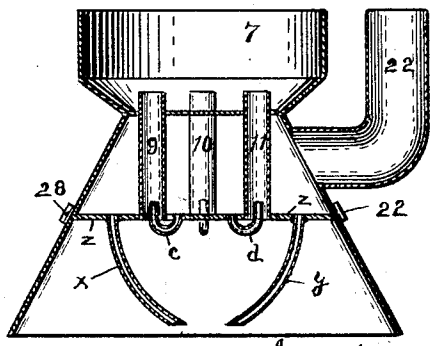


Fig. 5

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UNITED STATES PATENT OFFICE.

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PNEUMATIC, OR FLUID, CLEANING DEVICE.

1,199,201. Specification of Letters Patent. Patented Sept. 26, 1916.

Application filed January 30, 1915. Serial No. 5,198.

To all whom it may concern:

Be it known that we, JOHN EDGAR MOTE, a citizen of the United States, residing in the city of Indianapolis, in the county of Marion and State of Indiana, and LEWIS C. KING, a citizen of the United States, residing in the city of Richmond, in the county of Wayne and State of Indiana, have invented a new and useful Improvement in Pneumatic, or Fluid, Cleaning Devices, of which the following is a full, clear, and comprehensive specification and exposition, the same being such as will enable others to make and use the same with exactitude.

This invention relates to pneumatic, or fluid, cleaning devices of the kind known as the "blower and suction" type, wherein a current of compressed-air, or fluid, is conducted into the device and distributed from small nozzles, forming jets of great intensity, and then forming suction as the air escapes from the device into the dust retaining receptacle connected therewith.

The object of our invention, broadly speaking, is to produce a pneumatic or fluid cleaning device to be actuated by compressed air, gas or fluid, which will be strong and durable in construction, easily handled, operated and controlled, and which can be manufactured and sold at a comparatively low price.

More particularly stated our object is to provide a pneumatic or fluid cleaning device wherein one or more jets of air or fluid are provided to loosen up and agitate the dust; having means whereby the dust is collected partly by suction; and having means for conveying the dust to a receptacle connected with the device.

Other minor objects and particular advantages of our invention will be brought out in the course of the following description, and that which is new will be correlated in the appended claims.

The essential features of our invention comprise a construction having a cleaning chamber; pneumatic means for lifting the dust into the cleaning chamber; means to produce a central suction from said chamber; means to form a passageway surrounding the first named chamber, with a peripheral slot connecting the base of the cleaning chamber with the passageway; means for creating suction through the said slot into the passageway; and a compressed air chamber located between the cleaning chamber and said passageway.

The preferred means for carrying out the principles of our invention in a practical manner is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the entire device. Fig. 2 is a vertical central section, as taken on the line 2—2 of Fig. 4. Fig. 3 is a bottom plan view of the device. Fig. 4 is a top plan view of the device, and Fig. 5 shows a slightly modified arrangement of the construction.

Similar indices denote like parts throughout the several views.

As shown in the drawings the body of our invention is in the nature of a head, formed square at the bottom and tapering upward and terminating in a round portion at the top, and this head is divided, interiorly, into three substantially equal chambers: The lower cleaning chamber A; the central or compressed air chamber B; and the outer and upper outlet passageway C, all of which are shown most clearly in Fig. 2, and they are formed concentric with relation to each other, substantially as indicated.

The cleaning chamber A is entirely open at the bottom, and its top is formed by the upwardly and inwardly disposed inner partition 1, which extends to the downwardly tapering, funnel-like spout 2, which terminates at its lower end in the downwardly directed nozzle 3. The space between the partition 1 and around the spout 2 forms the cleaning chamber A.

Extending upward and inward from the lower edge of the partition 1, and secured thereto, is the partition 4, which extends upward higher than the partition 1, its upper edge being connected to the horizontal top 5, the latter being located directly above the spout 2. The space between the partition 1, the partition 4, the top 5, and the spout 2 forms the compressed air chamber B.

Extending around the partition 4, spaced therefrom, and extending upward and inward from near the lower edge of the partition 4, is the jacket 6, with its upper end merging into the round collar 7, which is directly above and concentric with the top

5 and the spout 2. The space between the partition 4 and the jacket 6 and above the top 5, forms the suction passageway C.

Extending up vertically from the juncture of the partition 1 with the spout 2 are the four comparatively large conduits 8, 9, 10 and 11, whose lower ends open into the cleaning chamber A below the partition 1, passing upwardly through the compressed air chamber B, and through the top 5, with their upper ends opening into the passageway C, as shown in Fig. 2.

In the lower end of each of the conduits is located a discharge nozzle, 12, 13, 14 and 15, respectively. The said nozzles extend out from the sides of the spout 2, and then curve upwardly, with their ends opening into the lower portions of the respective conduits and centrally thereof, thereby establishing communication from the interior of the chamber B, through the interior of the conduits, with the interior of the passageway C.

The corners of the lower edges of the partition 4 and the jacket 6 are connected by the bars 16, 17, 18 and 19, the lower edges of the partition 4 and the jacket 6 being spaced apart forming a slot 20 thereabout, thereby connecting the lower parts of the chamber A with the passageway C, as shown in Fig. 3.

Extending from the junction of the partitions 1 and 4 are a plurality of equispaced U-shaped nozzles 21, which connect the interior of the chamber B with the interior of the passageway C, the said nozzles being adapted to discharge upwardly through the slot 20, substantially as indicated in Fig. 2.

Numeral 22 denotes the inlet pipe for the compressed air, gas or fluid, and it is disposed through the jacket 6 and it opens through the partition 4 into the interior of the chamber B, the outer end of said pipe being adapted to be connected by a flexible tube, or otherwise, with a supply of compressed air, gas or fluid. Fitting onto the collar 7 is the pervious dust-bag forming the collection chamber 23.

Operation: It will be apparent that if compressed-air, or its equivalent be admitted through the pipe 22 that a jet of air will be directed downward from the nozzle 3, which will blow the dust loose from the bottom of a box, case, or other receptacle, or from the floor or carpet, or from whatever the device may be resting upon, or disposed over, thereby causing the dust to be agitated in the cleaning chamber. The upwardly directed jets from the nozzles 12, 13, 14 and 15 will form primary jets which will draw with them, by suction, air from around the lower ends of the conduits, and force the dust laden air upward through the conduits and deliver it into the upper part of the passageway C as secondary jets of great volume. The discharge of the secondary jets from the conduits will produce suction from around the conduits and from the passageway C, thereby carrying the dust laden air from the upper portion of said passageway and from the cleaning chamber and directing it upward into the bag 23, which latter will retain the dust and allow the air to pass out therethrough.

In some instances that portion of passageway C below the collar 7 may be dispensed with, as in Fig. 5; also the nozzles 21, in which instance the upper end of the partition 4 will be connected to the lower edge of the collar 7, thereby employing only the central suction from the collection chamber.

In some instances we provide means for the device to draw from a larger extent of surface than that above described. This is accomplished by the addition of a fabric hood 24, shown in Fig. 1. The edges of this hood are secured to a wire frame 25, which retains the hood in spread-out position, there being a central opening through the hood to receive the head or body of the device as shown.

The inner edge of the hood may be retained tightly in contact with the head by a wire band 26, as shown in Fig. 1.

The frame 25 is supported by the arms 27, which are connected thereto and extend upward and inward, with their inner ends hooked into the eyelets 28, thereby assembling the parts as shown in Fig. 1.

From the above it will be readily seen that when used in either of the ways suggested that the device will be very efficient, as the blast or jet from the nozzle 3 will be such as to agitate and loosen up all of the particles of dust and cause them to rise into the chamber A, from which they will be drawn up into the passageway by powerful suction and by the volume of air discharged from the nozzle 3 which manifestly will accomplish the objects stated.

We have found that this device is most notably efficient in cleaning type-cases in printing offices, as the jet of air from the nozzle 3 will be such as to thoroughly clean each compartment when the jet is directed thereinto.

We desire that it be understood that we are not to be limited to a single agitator, or disturber jet, as the jet from the nozzle 3, as the device may be constructed with a plurality of nozzles, as in Fig. 5, wherein the spout 2 is dispensed with and a plurality of nozzles, x and y, extend down from the bottom z of the chamber B'. These nozzles extend down and then curve inward toward each other and discharge at or near a focal point therebelow, as indicated.

Also in the modified form shown in Fig. 5 the nozzles 12, 13, 14 and 15 are replaced

by the nozzles *c* and *d*, which operate in the same manner as the former, the only difference being that their connection with the compressed air chamber B′ is somewhat different.

We desire that it be understood that various changes may be made in the form and the arrangement of the various details herein set forth without departing from the spirit of our invention and without sacrificing any of the advantages thereof.

Having now fully shown and described the principles and the operations of our invention, what we claim and desire to secure by Letters Patent of the United States, is:—

1. A pneumatic cleaning device having a head containing a cleaning chamber and a suction passageway therearound, a conduit extending from the cleaning chamber and directed into the suction passageway, and a nozzle directed into the open end of said conduit to deliver a jet through said conduit.

2. A pneumatic cleaning device having a body containing a cleaning chamber open at one side and having a suction passageway surrounding the cleaning chamber, centrally located means for directing compressed air to agitate dust and raise the dust laden air into the cleaning chamber, means for producing a central suction from said chamber into said passageway, and means for producing a peripheral suction from said chamber into said passageway.

3. A pneumatic cleaning device comprising a head having a cleaning chamber with one side open to the surface to be cleaned and having a passageway adjoining the cleaning chamber, a nozzle for directing compressed air against the surface to be cleaned, conduits extending up from the cleaning chamber into said passageway, nozzles directed into the conduits for producing suction from the cleaning chamber, there being a peripheral slot extending around the head and communicating with said passageway, and nozzles directed upward to produce suction through said slot into said passageway.

4. A pneumatic cleaning device comprising a head having a cleaning chamber, a collection chamber for receiving dust laden air, and a suction passageway with a plurality of openings connecting the passageway to the cleaning chamber, means for agitating dust on the surface to be cleaned, and means located entirely within the head for creating suction from the cleaning chamber to the collection chamber.

5. A pneumatic cleaning device comprising a head having a cleaning chamber opening downward, a compressed air chamber located above the cleaning chamber, and having a collection chamber located above the compressed air chamber, a plurality of nozzles for forming air jets leading from the compressed air chamber and adapted to produce suction from the cleaning chamber into the collection chamber.

6. A pneumatic cleaner comprising a head having a cleaning chamber opening downward, and a suction passageway in said head, a compressed air chamber adjoining the cleaning chamber, a collection chamber connected to the suction passageway, a plurality of nozzles leading from the compressed air chamber and adapted to produce central suction from the cleaning chamber into said suction passageway, and a plurality of nozzles adapted to produce peripheral suction from the cleaning chamber into the said suction passageway.

7. A pneumatic cleaning device comprising a body having a cleaning chamber therein opening downward, a passageway surrounding the cleaning chamber, a nozzle for forming a downwardly directed jet for raising dust upward into the cleaning chamber, a plurality of upwardly directed nozzles for discharging compressed air into the lower portion of said passageway to create suction from the cleaning chamber upward through said passageway.

In testimony whereof we have hereunto subscribed our names to this specification in the presence of two subscribing witnesses.

JOHN EDGAR MOTE.
LEWIS C. KING.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."