

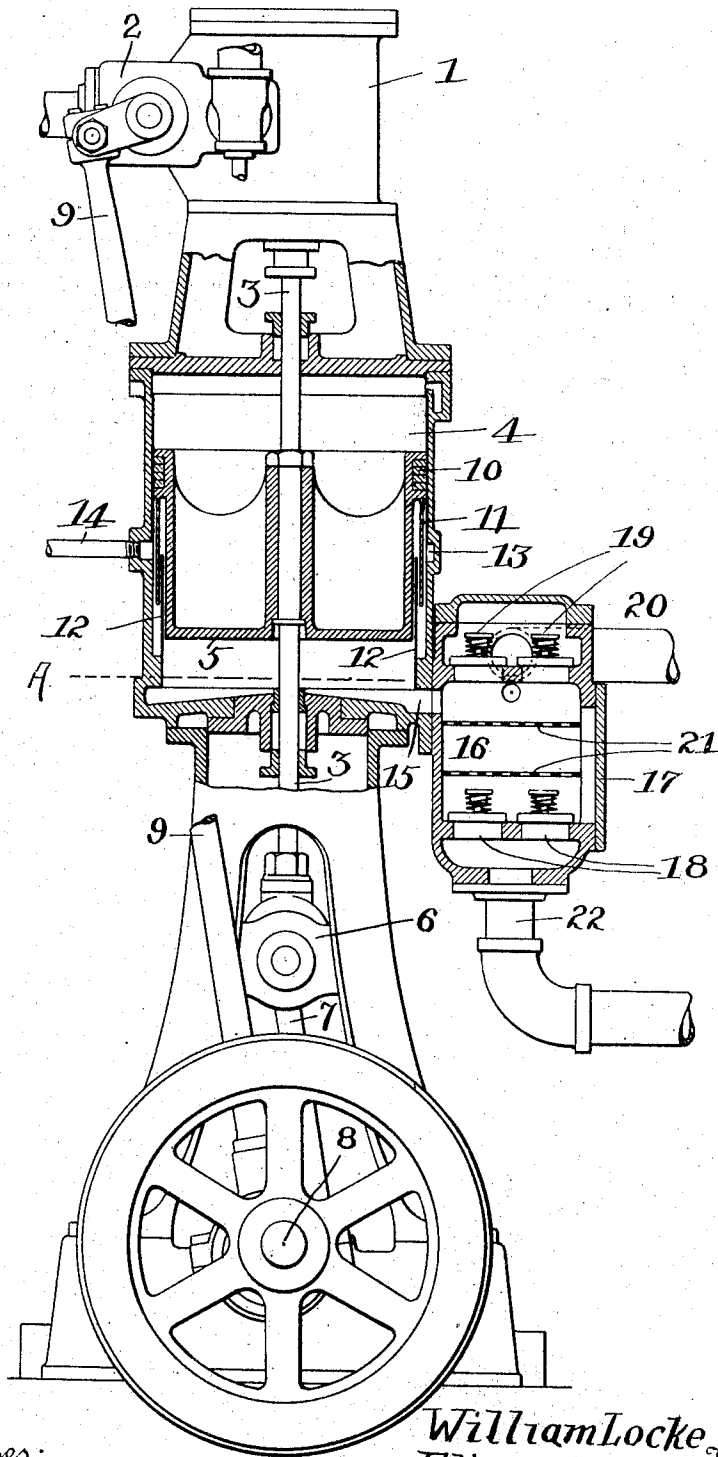
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PATENTED JULY 21, 1908.

W. LOCKE & E. B. DUNN.

SUCTION APPARATUS FOR PNEUMATIC CLEANING SYSTEMS.

APPLICATION FILED SEPT. 28, 1907.



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# UNITED STATES PATENT OFFICE.

WILLIAM LOCKE, OF WESTFIELD, AND ELIAS B. DUNN, OF EAST ORANGE, NEW JERSEY,  
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## SUCTION APPARATUS FOR PNEUMATIC CLEANING SYSTEMS

No. 893,854.

Specification of Letters Patent.

Patented July 21, 1908.

Application filed September 28, 1907. Serial No. 395,038.

*To all whom it may concern:*

Be it known that we, WILLIAM LOCKE, a citizen of the United States, and a resident of Westfield, county of Union, State of New Jersey, and ELIAS B. DUNN, a citizen of the United States, and a resident of East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Suction Apparatus for Pneumatic Cleaning Systems, of which the following is a full, clear, and complete disclosure.

Briefly stated, this form of our invention relates to improvements in apparatus for producing a pneumatic suction for use in connection with systems of removing dirt and dust through a partial vacuum or pneumatic suction, and comprises a device in the nature of a pump that is provided with such a construction that the parts thereof are completely protected from the action of dirt or dust passing through the same, and whereby the dust-laden air may be taken directly into the apparatus, thus avoiding the necessity of using costly and undesirable separating apparatus for extracting the dust and dirt from the air.

The further object of our invention involving the construction referred to, is to prevent the possibility of serious explosion by the ignition of fine particles of dust in rapid motion, and is obtained by thoroughly absorbing the dust and dirt in a suitable liquid. The construction of this form of our device embodies a reciprocating plunger or piston located in a piston chamber above the body of the liquid, such as water, through which the air is drawn by the plunger or piston; also means for completely protecting the piston, said means being in the form of aprons, the spaces around which are provided with a supply of liquid, such as water, so that said spaces are continually flushed and all dirt that might come in contact with the piston is completely carried away. The construction also embodies a certain arrangement of parts, hereinafter to be more fully pointed out, whereby the arrangement of the suction apparatus is greatly simplified and its efficiency increased.

The apparatus above referred to produces a vacuum or partial vacuum which is transmitted to suitable conduits or pipes through a suction nozzle, which is adapted to be passed over the surface to be cleaned, so

that the dust and air, or dust, air and water 55 that are thereby caused to enter the nozzle are carried through the conduits to the suction device, where they become mixed with liquid, the mixture then being ejected therefrom and discharged into the sewer or other waste pipe. For a full, clear and exact description of this form of the invention, reference may be had to the following specification, together with the accompanying drawings forming a part thereof, in which 65 the figure shown is a vertical sectional view of the suction apparatus taken substantially on the axial line of the piston chamber. This form of the invention is a modification of the suction apparatus described and 70 claimed in our prior application Serial No. 305,015.

Referring to the drawing, the numeral 1 indicates a suitable cylinder for driving the suction apparatus and may be operated by 75 steam or other suitable fluid, said cylinder 1 being connected with suitable valves 2 for operating the piston within the cylinder 1. The said piston is attached to a piston rod 3, which extends through the suction of pump 80 chamber 4 and carries the pump piston 5. The piston rod 3 extends below the suction chamber and is connected with the usual cross-head 6 which carries the connecting rod 7, acting upon the transverse shaft 8, by 85 means of a crank (not shown), carried by said shaft 8 in the well known manner. The valve rod 9 for operating the valves 2 is also connected with said shaft 8 by means of the usual eccentric or other similar device. The 90 pump piston 5 is provided at its upper end with any suitable packing such as shown at 10, the lower portion of said piston 5 being somewhat smaller than the interior dimensions of the pump chamber 4, so as to provide 95 space for an apron or cylindrical guard 11. The apron 11 extends downwardly from the portion of the piston carrying the packing 10 and is substantially concentric with the lower portion of the piston 5. The lower portion 100 of the pump cylinder 4 is provided with a corresponding upwardly extending apron 12, which works in the space between the apron 11 and the lower portion of the piston 5. About the central portion of the cylinder 4 is 105 provided a circular groove or channel 13 which is connected at one point with a water inlet pipe, as indicated at 14. At the lower

end of the cylinder 14 is an opening 15 which communicates with the saturation chamber 16 formed within the casing 17. In the lower portion of the chamber 16 are placed suitable inlet valves 18 and in the upper portion of said chamber 16 are placed suitable outlet valves 19. A discharge pipe 20 communicates with the saturation chamber 16 above the level of the outlet valves 19. Within the saturation chamber 16 are provided suitable baffle plates 21 located so as to be below the surface of the liquid in said chamber. The lower portion of the suction chamber 16 is connected with a suitable inlet conduit 22 which communicates with the pipes or tubes to which the suction cleaning instruments are attached.

When the device is in operation, water is admitted through the pipe 14 and fills the space between the apron 12 and the walls of the cylinder 4, thereby providing a water-seal into which the apron 11 extends. The constant supply of water through the pipe 14 causes the same to overflow the upper edge of the apron 12 and run downward into the lower portion of the suction chamber 4. The water level in the suction chamber 4 and consequently in the saturation chamber 16 is maintained substantially at the point indicated by the dotted line A, said saturation chamber 16 thereby being filled with water up to a point slightly below the end of the discharge pipe 20. The constant flow of the water through the inlet 14 and around the aprons 11 and 12 constantly flushes out the spaces around and between said apron, thereby keeping them clean and free from dirt and grit which are drawn into the suction chamber 16 and into the lower portion of the pump chamber 4. As the pump piston 5 reciprocates, air and dirt, or air, dirt and water, are periodically drawn into and expelled from the pipes 22 and 20, respectively, the dirt being thoroughly mixed with the water in the saturation chamber 16 by a discharge through the baffle plates 21. The mixture of dirt, water and air is expelled through the discharge pipe 20 and passes off directly to the sewer or through a muffler, as described in connection with the previous form of this device. It should be noted that the main differences between this form of the invention and the form previously described is that the saturation chamber

is situated at one side of the pump instead of immediately below the latter, and that the automatic inlet and outlet valves for the water have been omitted, while the outlet valves for the mixture are placed in the saturation chamber instead of in the piston. It is obvious that this form of the suction apparatus may be operated by other means than a steam driven piston, such as by an electric motor as shown in connection with the previous form of the apparatus.

Having particularly described this form of our invention, what we claim and desire to protect by Letters Patent is:

1. In a pneumatic suction cleaning apparatus, the combination of a saturating chamber and piston chamber, a non-submerged reciprocating piston therein, an apron inclosed between the saturating chamber and the piston chamber, means for providing a supply of fresh water to the space around said apron, and means for reciprocating the piston.

2. In a pneumatic suction cleaning apparatus, the combination of a saturating chamber, a piston chamber, a non-submerged reciprocating piston therein, an apron carried by said piston, a second apron attached to the interior of the piston chamber, means for providing a supply of fresh water to the space between said second apron and the surface of said piston chamber, and means for reciprocating the piston.

3. In a pneumatic suction cleaning apparatus, the combination of a piston chamber, a saturating chamber communicating with the lower portion of said piston chamber, a non-submerged reciprocating piston in said piston chamber, a downwardly extending apron carried thereby, an upwardly extending apron attached to the interior of the piston chamber and overlapping said downwardly extending apron, means for providing a supply of fresh water to the spaces exterior of said aprons, means for maintaining a definite level of water in said piston chamber and in said saturating chamber, and means for reciprocating the piston.

Dated, this 27th day of September, 1907.

WILLIAM LOCKE.  
ELIAS B. DUNN.

Signed in the presence of—  
WALTER S. JONES,  
EDW. W. VAILL, Jr.