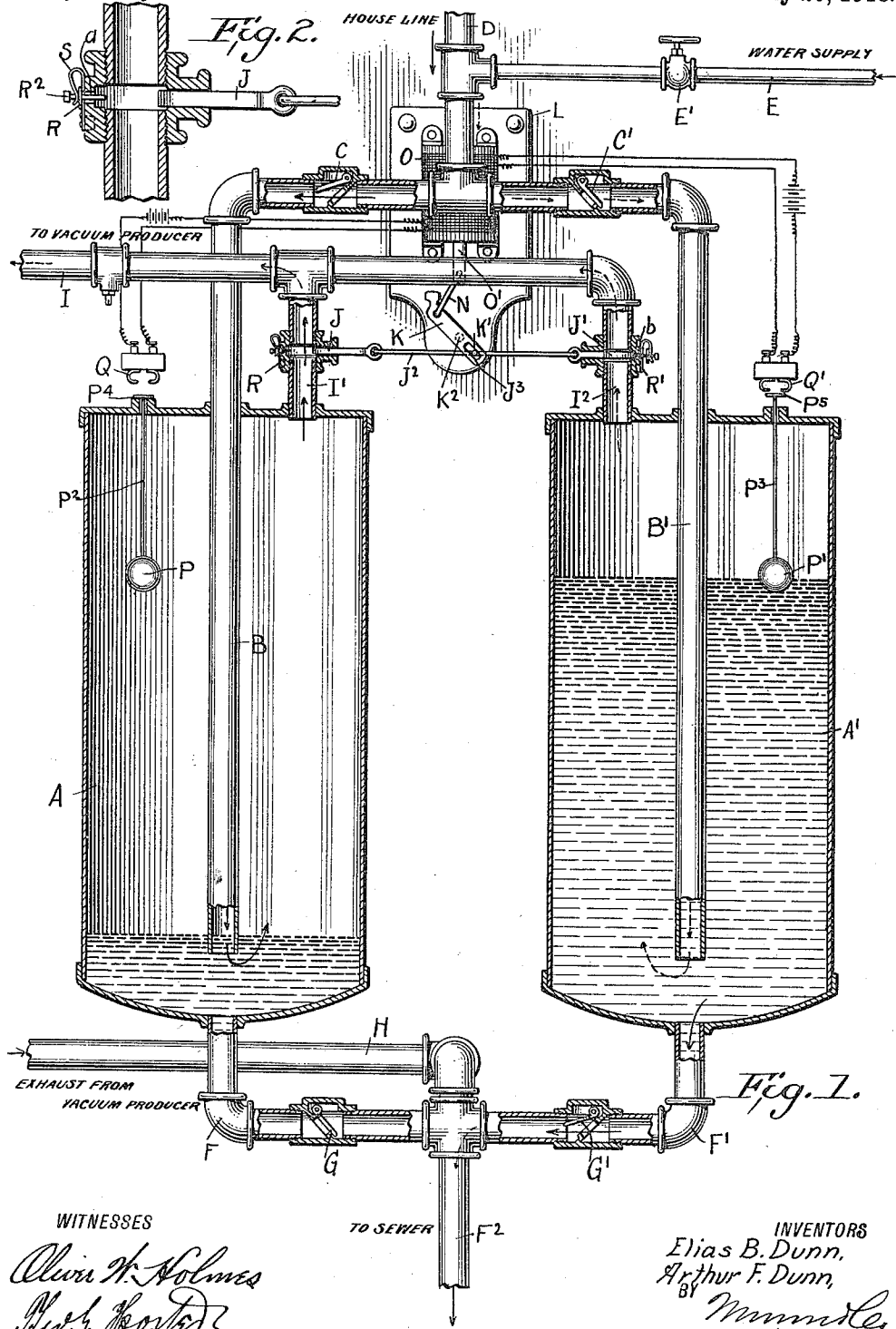


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 VACUUM CLEANING APPARATUS.  
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Patented July 29, 1913.



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# UNITED STATES PATENT OFFICE.

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## VACUUM CLEANING APPARATUS.

1,068,635.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that we, ELIAS B. DUNN and ARTHUR F. DUNN, citizens of the United States, and residents of East Orange, in the county of Essex and State of New Jersey, have invented a new and Improved Vacuum Cleaning Apparatus, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved vacuum cleaning apparatus, arranged to automatically insure a continuous operation with a view to draw in the dust from the house line, to slime the same and to discharge the slimed dust.

In order to produce the desired result, use is made of two vessels each having a valved connection with a house line, and each is provided with a valved outlet connected with a sewer or other place of discharge, means for sliming the dust and allowing the slimed dust to accumulate and rise in one of the vessels while the previously accumulated slimed dust discharges from the other vessel, and automatic means for controlling the valves of the connection between the vessels and the vacuum producer so as to produce alternately a vacuum in the vessels and to thus direct the dust from the house pipe into the corresponding vessel and to allow the accumulated slimed dust to discharge from the other vessel.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a sectional side elevation of the vacuum cleaning apparatus; and Fig. 2 is an enlarged sectional side elevation of the valved connection connecting one of the vessels with the vacuum producer.

The vacuum cleaning apparatus is provided with two vessels A and A' into which extend delivery pipes B, B' reaching at their lower ends to within a short distance of the bottoms of the vessels, as plainly indicated in Fig. 1. The delivery pipes B and B' extend through the tops of the vessels A and A' and are provided with check valves C, C' and connected with the house line D provided with a water supply pipe E to slime the dust previously to its discharge into the delivery pipes B and B'. The water supply pipe E is connected with

a suitable source of water supply and is provided with a valve E' for regulating the amount of water passing into the house line D so as to properly slime the dust.

The bottoms of the vessels A and A' are provided with discharge pipes F and F' having check valves G, G' and connected with a pipe F<sup>2</sup> discharging into a sewer or other suitable place of discharge. The pipe F<sup>2</sup> is also connected with the exhaust pipe H of a vacuum producer of any approved construction (not shown) and which vacuum producer has a suction pipe I connected by branch pipes I', I<sup>2</sup> with the upper ends of the vessels A and A'. In the branch pipes I' and I<sup>2</sup> are arranged slide valves J, J' for alternately opening and closing the said branch pipes to alternately connect the vessels A and A' with the vacuum producer with a view to produce a vacuum in the corresponding vessel. The valves J and J' are connected with each other by a link J<sup>2</sup> provided with a pin J<sup>3</sup> projecting into the slot K' of a lever K fulcrumed at K<sup>2</sup> on a bracket or other support L attached to a wall or the like. The lever K is adapted to be actuated by a suitable mechanism so as to alternately open and close the valves J and J'. As shown in Fig. 1, the lever K is connected by a link N with the core O' of a solenoid O or similar actuating device. When the core O' is actuated then a swinging motion is given to the lever K to move the valve J into closed position and the valve J' into open position so that the vessel A is disconnected from the suction pipe I while the vessel A' is connected with the said suction pipe. When the core O' is next actuated another swinging motion is given to the lever K in an opposite direction, so that the valve J moves into open position while the valve J' moves into closed position, as shown in Fig. 1, to disconnect the vessel A' from the vacuum producer and to connect the vessel A with the vacuum producer by way of the suction pipe I.

In order to alternately energize and de-energize the solenoid O, the following arrangement is made: Within the vessels A and A' are arranged floats P and P' having stems P<sup>2</sup>, P<sup>3</sup> mounted to slide in the tops of the vessels A and A', and the upper ends of the stems P<sup>2</sup> and P<sup>3</sup> are provided with contact plates P<sup>4</sup>, P<sup>5</sup> adapted to make contacts

with sets of contact points Q and Q' electrically connected with a source of electrical energy and with the solenoid O. Now when the slimed dust rises to a predetermined level, say in the vessel A, the float P is lifted and in doing so the contact plate P<sup>4</sup> makes contact with the set of contact plates Q to close the circuit and thus energize the solenoid O to cause the core O' to move upward. When this takes place the valves J, J' are shifted, that is the valve J' is moved into open position while the valve J moves into closed position, thus cutting off the vessel A from the vacuum producer and connecting the vessel A' with the vacuum producer.

In order to admit air into the upper ends of the vessels A and A' to insure a proper discharge of the accumulated slimed dust, use is made of air inlet valves R and R' controlled by the valves J and J' and controlling ports a and b connecting the atmosphere with the inside of the branch pipes I' and I<sup>2</sup> below the valves J and J'. Each valve R and R' is pressed on by a spring S to normally hold the valve R or R' closed, and the stem R<sup>2</sup> of each valve projects into the path of the corresponding valve J or J' so that when the valve J or J' is moved into closed position, as above explained, then it engages the stem R<sup>2</sup> of the corresponding valve R or R' to move the valve into open position against the tension of its spring S. When the valve R or R' is opened air passes into the corresponding branch pipe I' or I<sup>2</sup> and into the upper end of the vessel A or A' to break the vacuum therein and to allow the accumulated slimed dust to pass through the discharge pipe F or F' into the pipe F<sup>2</sup> leading to the sewer. It is understood that when the valve J or J' moves into open position, the spring S immediately closes the valve R or R'.

When a vacuum is produced in the vessel A or A' the corresponding valve G or G' is held closed by atmospheric pressure, but when the suction is cut off from the vessel A or A' and air is admitted to the upper end thereof then the corresponding valve G or G' opens to allow the accumulated slimed dust to flow out of the vessel into the pipe F<sup>2</sup> and to the sewer or other place of discharge.

The operation is as follows: When the several parts are in the position shown in Fig. 1, a suction is produced in the vessel A by the vacuum producer so that the dust is drawn through the house line D and delivery pipe B into the vessel A together with the water discharged into the house line D from the pipe E, so that the slimed dust readily accumulates in the vessel A. The accumulated dust in the other vessel A' discharges therefrom by way of the pipe F', valve G' and pipe F<sup>2</sup> during the time

the vessel A is filling, and when the accumulated slimed dust in the vessel A lifts the float P and the plate P<sup>4</sup> thereof makes connection with the sets of contact plates Q then the solenoid is actuated and the valve J is closed while the valve J' is opened and the valve R is opened to allow air to pass into the upper end of the vessel A. It is understood that when the valve J closes the vessel A is cut off from the vacuum producer and the accumulated dust now readily discharges from the vessel A by way of the pipe F, valve G and pipe F<sup>2</sup>. Suction is now had in the vessel A' so that the slimed dust passes from the house line D by way of the delivery pipe B' into the vessel A' to accumulate therein, the valve G' now being held closed by atmospheric pressure. When the accumulated slimed dust in the vessel A' lifts the float P' then the contact plate P<sup>5</sup> makes contacts with the contacts Q' so that the solenoid is energized to cause the valve J' to move into closed position while the valve J moves into open position. The valve J' in moving into closed position opens the valve R' so that air is admitted to the vessel A' to allow the accumulated slimed dust to flow out of the same by way of the pipe F', the valve G' and the pipe F<sup>2</sup>. The above described operation is then repeated, that is, the vessel A fills with slimed dust while the accumulated slimed dust in the vessel A' discharges.

From the foregoing, it will be seen that by the arrangement described, a continuous operation is had with a view to continually draw in the dust from the house line to slime the dust and to alternately discharge the accumulated slimed dust from the vessels A and A'.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A vacuum cleaning apparatus, comprising two vessels provided with valved discharge pipes at the bottom, a suction pipe for dust laden air and terminating in valved delivery pipes extending into the said vessels, means for supplying water to the said suction pipe to slime the dust, suction pipes connected with the said vessels, valves in the said suction pipes, and automatic means controlled by the rise and fall of the water in the vessels for alternately opening and closing the said valves.

2. A vacuum cleaning apparatus, comprising two vessels provided with valved discharge pipes at the bottom, a suction pipe for dust laden air and terminating in valved delivery pipes extending into the said vessels, means for supplying water to the said suction pipe to slime the dust, suction pipes connected with the said vessels, valves in the said suction pipes, air inlet valves for alternately admitting air to the said ves-

sels, and automatic means controlled by the accumulating slimed dust in the said vessels and controlling the said valves.

3. In a vacuum cleaning apparatus, the combination of a plurality of tanks, a vacuum creating device connected with each of said tanks, piping for conveying dust laden air to each of said tanks, means for supplying water to said dust piping, and means controlled by the level of the water in each of said tanks for shutting off the suction from each of the tanks in succession.

4. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air to both of said tanks, a vacuum producing device connected with both of said tanks, means for supplying water to said tanks, and means controlled by the level of the water for shutting off the vacuum producing device alternately from each of said tanks.

5. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air to both of said tanks, a vacuum producing device connected with both of said tanks, means for supplying water to said tanks, means controlled by the level of the water for shutting off the vacuum producing device alternately from each of said tanks, and means permitting the escape of water from each tank when the vacuum is shut off therefrom.

6. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air to both of said tanks, a vacuum producing device connected with both of said tanks, means for supplying water to said tanks, means controlled by the level of the water for shutting off the vacuum producing device alternately from each of said tanks, and means permitting the escape of water from each tank when the vacuum is shut off therefrom, said means comprising an outwardly opening loaded valve.

7. In a vacuum cleaning apparatus, the combination of two tanks, piping for conducting dust laden air thereto, a water supply for said tanks connected with said piping, a vacuum producing device connected with each of said tanks, valves for shutting off said vacuum producing device from each of said tanks, electric means for operating said valves, and floats in said tanks carrying contacts adapted to operate said electric means.

8. In a vacuum cleaning apparatus, the combination of two tanks, piping for conducting dust laden air thereto, a water supply for said tanks connected with said piping, a vacuum producing device connected with each of said tanks, valves for shutting

of said vacuum producing device from each of said tanks, electric means for operating said valves, and floats in said tanks carrying contacts adapted to operate said electric means, and means permitting the escape of water from each of said tanks when the vacuum is shut off therefrom.

9. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air in said tanks, said piping entering said tanks from above and consisting of a main pipe having a branch entering each of said tanks and extending to the lower portion thereof, water supply piping connected with said main pipe, valves controlling each of said branch pipes, a vacuum producer connected with each of said tanks, and means controlled by the level of the water for alternately shutting off said vacuum producer from each of said tanks.

10. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air to said tanks, said piping entering said tanks from above and consisting of a main pipe having a branch entering each of said tanks and extending to the lower portion thereof, a water supply piping connected with said main pipe, valves controlling each of said branch pipes, a vacuum producer connected with each of said tanks, means controlled by the level of the water for alternately shutting off said vacuum producer from each of said tanks, said means comprising electric valve operating mechanism, and a float in each tank carrying a contact for said electric valve operating mechanism.

11. In a vacuum cleaning apparatus, the combination of two tanks, piping for conveying dust laden air to said tanks, said piping entering said tanks from above and consisting of a main pipe having a branch entering each of said tanks and extending to the lower portion thereof, a water supply piping connected with said main pipe, valves controlling each of said branch pipes, a vacuum producer connected with each of said tanks, means controlled by the level of the water for alternately shutting off said vacuum producer from each of said tanks, and valves permitting the escape of water from the tanks when the vacuum is shut off therefrom.

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

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Witnesses:

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