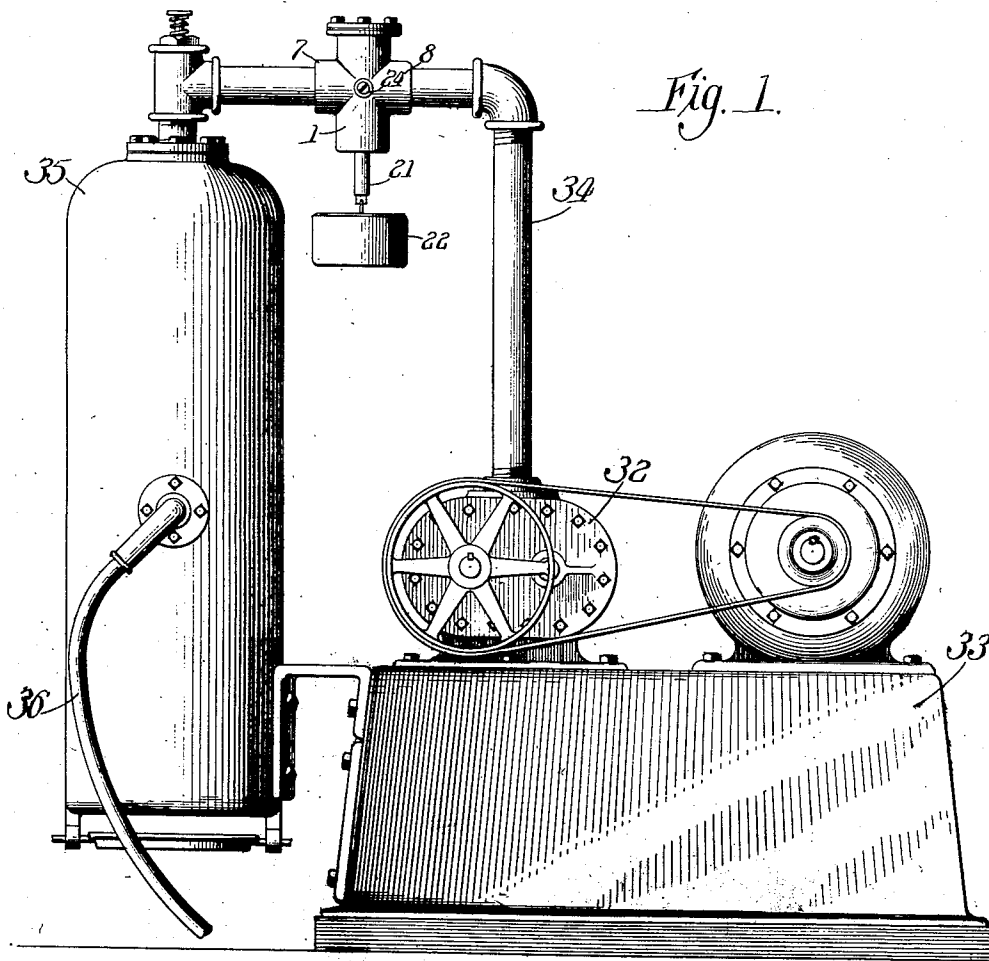


J. T. ATWOOD.
VACUUM CLEANER.
APPLICATION FILED AUG. 30, 1912.

1,060,964.

Patented May 6, 1913.

2 SHEETS-SHEET 1.



Witnesses:

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Gladys Ward

Inventor:

By James T. Atwood
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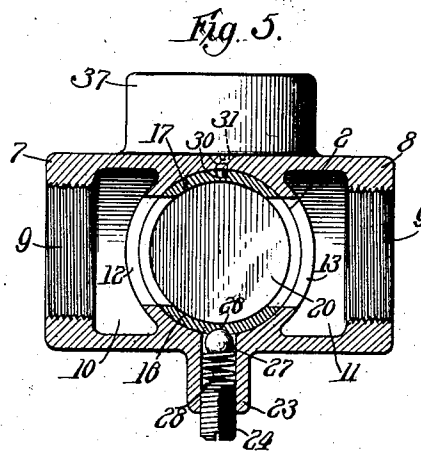
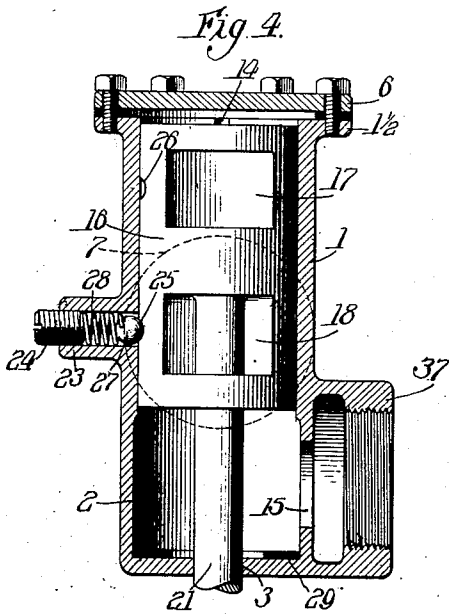
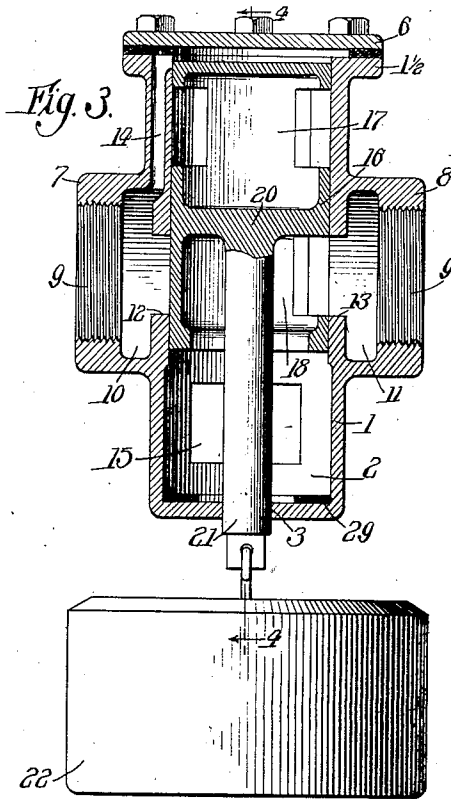
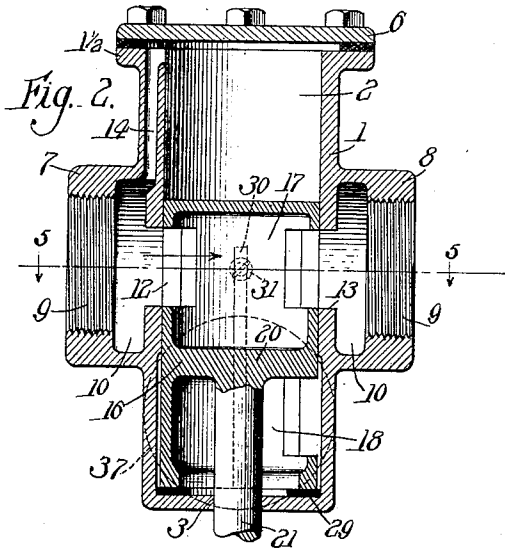
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2 SHEETS—SHEET 2.



Witnesses:
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Cladyo Ward

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UNITED STATES PATENT OFFICE.

JAMES T. ATWOOD, OF ROCKFORD, ILLINOIS.

VACUUM-CLEANER.

1,060,964.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed August 30, 1912. Serial No. 717,903.

To all whom it may concern:

Be it known that I, JAMES T. ATWOOD, a citizen of the United States, residing at Rockford, in the county of Winnebago and the State of Illinois, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification.

This invention relates to a vacuum cleaning outfit in which my improved valve is used to automatically control the maintenance of a vacuum by the suction pump.

In a vacuum cleaning outfit, a suction pump maintains a vacuum in a dust separating tank and distributing pipes are run from this tank to places of use, there being suitable stops at the end of each pipe. When in operation, the cleaning head is attached to one of these distributing pipes and the pump produces a vacuum necessary for its operation. When the cleaning head is disengaged and is being transferred to another distributing pipe, or the operator wishes to discontinue his work for a short time, the pump is still maintaining a partial vacuum in the tank. In devices now in use, a common spring safety-valve is placed in the tank, so that after the vacuum has reached a maximum degree, the safety-valve will open, allowing air to be taken in, thus the pump never produces more vacuum than the maximum, to which the safety-valve is set. It will be seen that with this construction, the pump is producing a partial vacuum at all times while running, either at the normal operating suction or at the maximum suction.

The object of this invention is to provide a valve to be located in the connection between the pump and tank that will automatically shut off the connection between said pump and tank, when a maximum vacuum has been reached in the tank, and allow the pump to work idly, that is, draw in simply free air. Also when the vacuum in the tank falls to a certain point below the maximum, that is, when the vacuum is being used again, said connection will be shut off.

In the accompanying drawings: Figure 1 is a side elevation of a vacuum cleaning outfit, the valve being located on the connection between the pump and tank. Fig. 2 is a central vertical sectional view through the valve, showing the normal position of the piston, with a clear passage from the pump to the tank. Fig. 3 is a similar section, the

piston being shown raised. Fig. 4 is a section on the line 4-4 of Fig. 3, the piston being shown in elevation. Fig. 5 is a horizontal section on the line 5-5 of Fig. 2.

The valve may be applied to any vacuum cleaning outfit, and I have shown such an outfit comprising, a suction pump 32 having suitable driving means, said pump discharging into the receptacle 33, a connection 34 leading from the pump to a dust separating tank 35, having a distributing pipe 36 to which may be attached a plurality of branch pipes with which connection may be made to a cleaning head, and the valve mounted on the connection 34 as shown.

The valve is formed of a vertical cylindrical body 1 inclosing the piston chamber 2, having a bottom with an opening 3, and a flanged upper portion 1½ on which is placed a gasket, and a top plate 6 adapted to be bolted to said flange portion. Two laterally extending and oppositely located coupling extensions 7 and 8 are formed with the body 1, and have internally threaded portions 9 forming compartments 10 and 11 respectively.

Oppositely located rectangular ports 12 and 13 connect compartments 10 and 11 with the piston chamber 2. The vertical passage 14 extends from the compartment 10 and communicates with the upper portion of the chamber 2.

Located below and at right angles to extensions 7 and 8, is the lateral extension 37 having an internally threaded portion and an opening 15 into the chamber 2.

The piston 16 is adapted to fit in the piston chamber, has an upper compartment 17 having ports registering with ports 12 and 13; a lower compartment 18 having an open bottom and a port to register with port 13, and has extending from the dividing wall 20, a piston rod 21 which passes through opening 3, and has attached at its lower end, a weight 22. A boss 23 is formed on the side of the body 1 and carries an adjusting screw 24. Notches 25 and 26 are cut in the sides of the piston opposite the upper and lower chambers 17 and 18, and a ball 25 is adapted to be held in engagement therein by the spring 28 resting against the screw 24.

The gasket 29, of a resilient material, serves to absorb the shock when the piston falls to its lower position.

Formed in one side of the piston 16, is the longitudinal key-way 30, which is adapted to engage a key 31 screwed through the body 1, said key preventing the piston from turning.

The operation of the valve will be seen from the following: When the use of the vacuum from the tank is discontinued for any reason, the vacuum in said tank will increase above the normal until a maximum vacuum is reached, which will, through passage 14, lift the piston against the action of the weight 22 and the ball located in the notch 26, until the ball 27 engages in notch 25 as in Fig. 3. Communication between the ports 12 and 13, (the pump and tank) is now cut off and a passage opened through port 13, lower compartment 18 and port 15 leading to the outer air, (the pump and the outer air) thus allowing the pump to work idly, drawing in unobstructed air. The vacuum in the tank may fall a few degrees according to the adjusted pressure of the ball 27 in the notch 25, but when for any reason, the vacuum falls below this point, the weight causes the piston to drop, thereby allowing the pump to produce its normal vacuum in the tank. The action of the ball 27 when the piston is raised, serves to hold the piston until the vacuum in the tank decreases a few points below the maximum, or about its normal vacuum, before the piston will fall. It will be seen that if it were not for this holding means, the piston would fall at the least decrease in the maximum vacuum, also in rising, without any such holding means, the piston would work very irregularly and often remain in a neutral position.

I claim as my invention:

1. The combination of an air-suction pump, a separating tank, a distributing pipe leading therefrom, a connection between the pump and tank, a valve located in said connection, an air-opening leading from the valve, said valve adapted to close the connection between the pump and tank when a maximum vacuum has been reached in said tank, and simultaneously open said air-opening, thereby allowing the pump to draw in free air.

2. The combination of an air-suction pump, a separating tank, a distributing pipe leading therefrom, a connection between the pump and tank, a valve located in said connection, said pump adapted to maintain a normal vacuum in said tank, said valve adapted to automatically close the connection between the tank and pump when a maximum vacuum is produced in the tank.

3. The combination of an air-suction pump, a separating tank, a distributing pipe leading therefrom, a connection between the pump and tank, a valve located in said connection, said pump adapted to maintain a

normal vacuum in said tank, said valve adapted to automatically close the connection between the tank and pump when a maximum is produced in the tank, an air-opening leading from the valve adapted to be simultaneously connected with the pump when said connection is closed, thereby allowing the pump to run idly, drawing in unobstructed air.

4. The combination of an air-suction pump, a separating tank, a distributing pipe leading therefrom, a connection between the pump and tank, the pump adapted to create a partial vacuum in said tank, a valve suitably located so that should the vacuum in said tank reach a predetermined point, said valve would automatically close the connection between the pump and tank, and simultaneously cause the pump to draw in free air, thus running with little exertion.

5. The combination of an air-suction pump, a valve having a suitable exhaust passage communicating therewith, suction and air intakes, said valve adapted to automatically close said suction exhaust passage and connect said air-intake with the pump, thereby allowing the pump to take in free air.

6. The combination of an air-suction pump, a separating tank, a valve having a port communicating with the suction pump, a port communicating with the tank, and an air-intake port, means for opening and closing a passage between the ports communicating with the pump and tank, and means for opening and closing a passage between the ports communicating with the pump and the air-intake.

7. The combination of an air-suction pump, suction means leading thereto, the pump adapted to maintain a partial vacuum in said suction means, a valve located on said suction means, an air-opening leading from the valve, said valve adapted to automatically close the passage between the pump and suction means when the vacuum in the suction means has reached a predetermined point, and simultaneously open a passage between said air-opening and pump.

8. The combination of an air-suction pump, a suction connection leading thereto, the pump adapted to maintain a partial vacuum therein, and a valve located on said suction connection comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the suction and pump ports, and means for automatically operating said piston, thereby closing said suction and pump passage and simultaneously forming a passage between the air-intake port and pump.

9. The combination of an air-suction pump, a suction connection, a valve located

thereon, comprised of a casing having ports communicating with the pump and suction connection, an air-intake port, a piston located in the casing and having an upper and lower compartment, the upper compartment having ports opening into said pump and suction connection ports, and the lower compartment having a port adapted to open into said pump port, and an opening in its base.

10. The combination of an air-suction pump, a valve comprised of a casing forming a piston chamber having leading thereto, a suction-intake port, a suction-exhaust port having a connection leading to the pump, an air-intake port, a by-pass communicating with the suction-intake and piston chamber, a piston located in the piston-chamber and forming a passage for said suction-intake and exhaust ports, the piston adapted to be raised by the suction through said by-pass, whereby said suction-intake and exhaust ports are closed and a passage formed by the piston connecting the suction-exhaust and air-intake ports, and a connection between the pump and valve.

11. The combination of an air-suction pump, a suction connection leading thereto, a valve located therein, comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the suction and pump ports, yieldable means engaging the piston, and means for automatically raising the piston whereby the yieldable means are disengaged from the piston and said passage closed.

12. The combination of an air-suction pump, a suction connection leading thereto, a valve located therein, comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the suction and pump ports, means for automatically raising the piston, and yieldable means adapted to engage the piston when in its raised position, the piston when in this

position forming a passage between the pump and air-intake ports.

13. The combination of an air-suction pump, a suction connection leading thereto, a valve located therein, comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the pump and suction ports, a weight secured to the piston, yieldable means engaging the piston, and means for automatically raising the piston against the action of the weight and engaging means.

14. The combination of an air-suction pump, a suction connection leading thereto, a valve located therein, comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the pump and suction ports, a weight secured to the piston, means for automatically raising the piston, and yieldable means adapted to engage the piston when in its raised position.

15. The combination of an air-suction pump, a suction connection leading thereto, a valve located therein, comprising, a body portion having ports communicating with the pump and suction connection, and an air-intake port, a piston located in the valve and adapted to form a passage connecting the pump and suction ports, a weight secured to the piston, means for automatically raising the piston, and yieldable means adapted to engage the piston when in its raised position, the piston adapted to fall when the power of said raising means has decreased sufficiently to allow the weight to overcome said yielding means engaging the piston.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES T. ATWOOD.

Witnesses:

A. O. BEHEL,

SETH B. ATWOOD.