

No. 885,011.

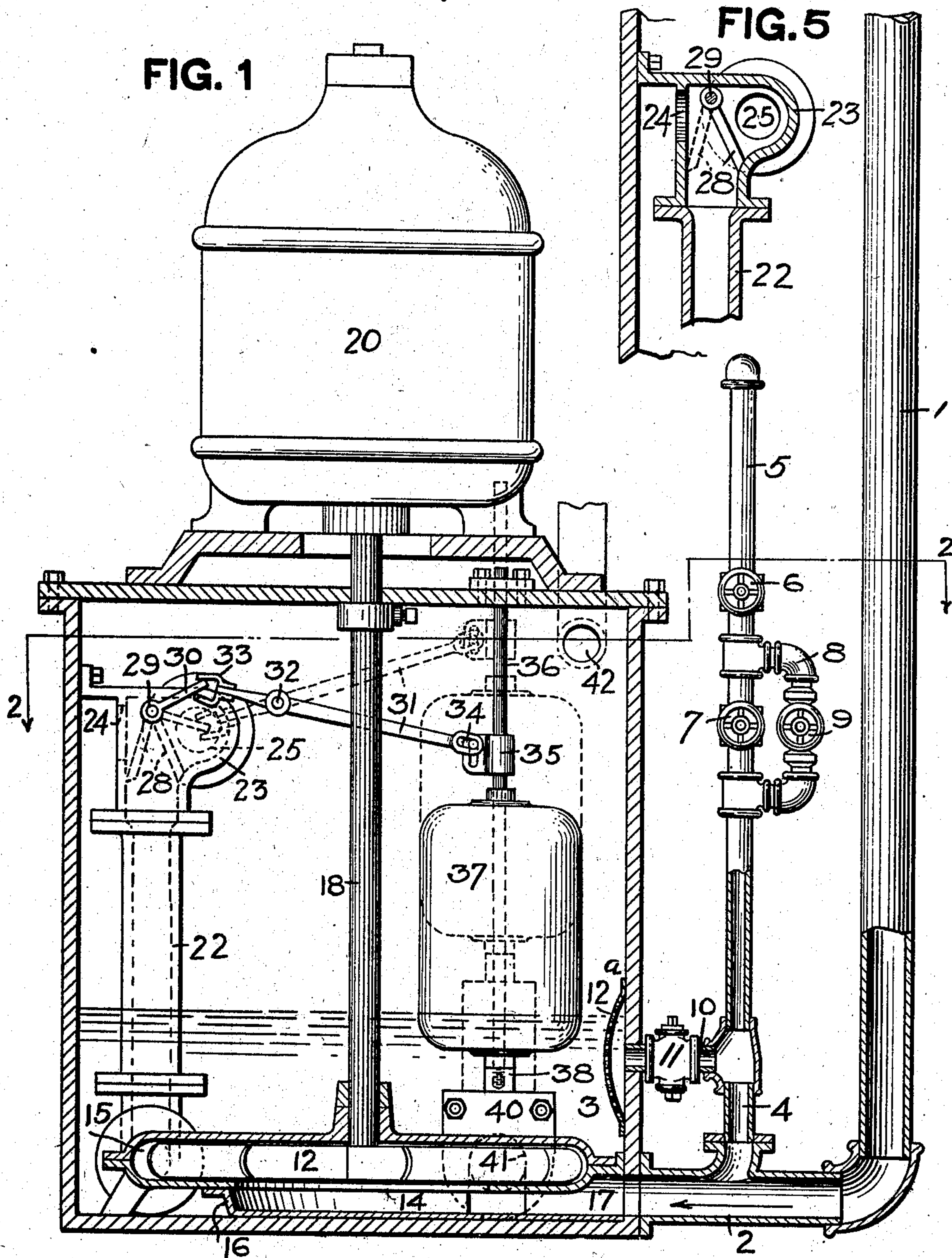
PATENTED APR. 21, 1908.

W. J. BERGENS.

AUTOMATIC VACUUM CLEANING APPARATUS.

APPLICATION FILED JULY 5, 1907.

2 SHEETS—SHEET 1.



WITNESSES.

J. R. Keller
Robert C. Fother

INVENTOR.

William J. Bergens
By Mary Fother, Attorney

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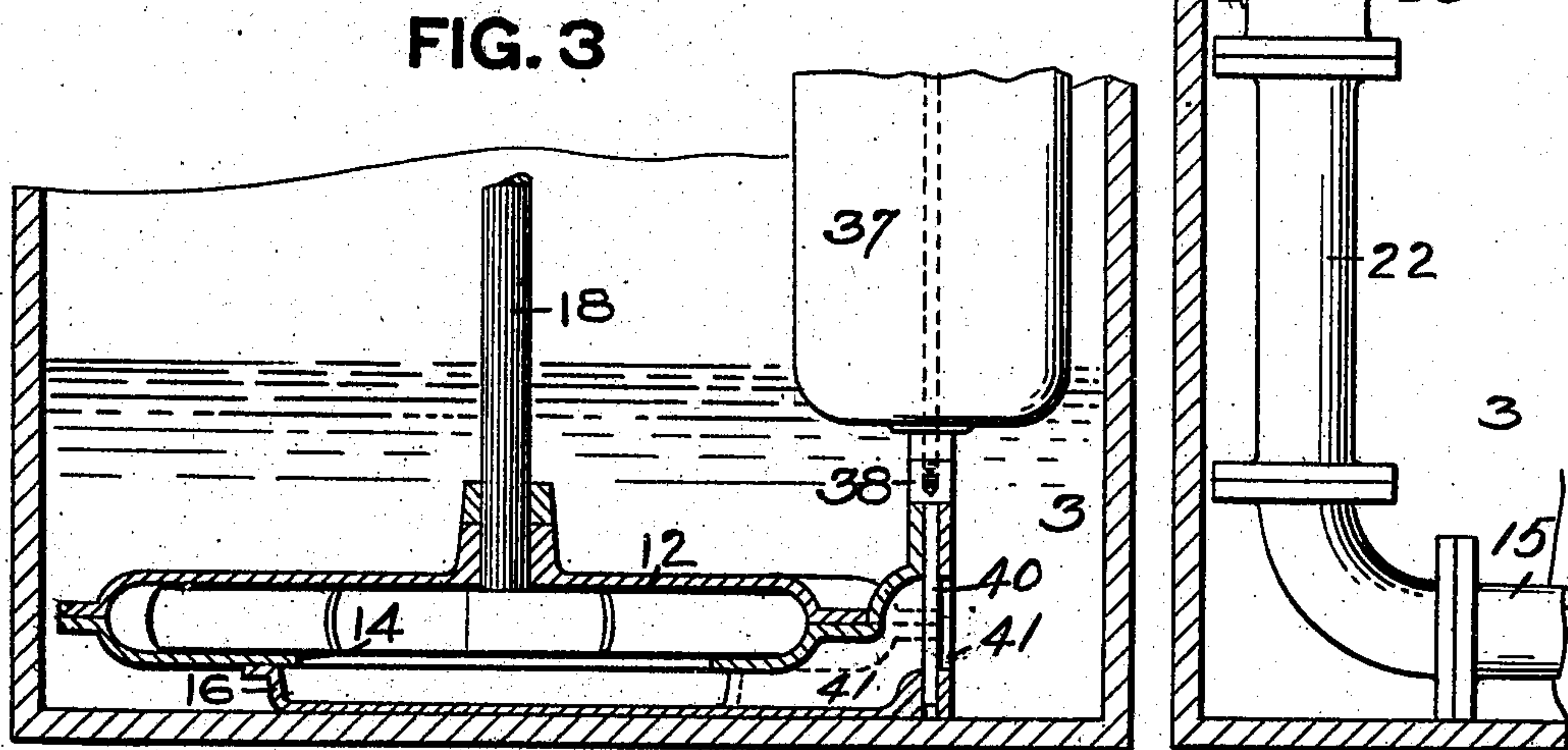
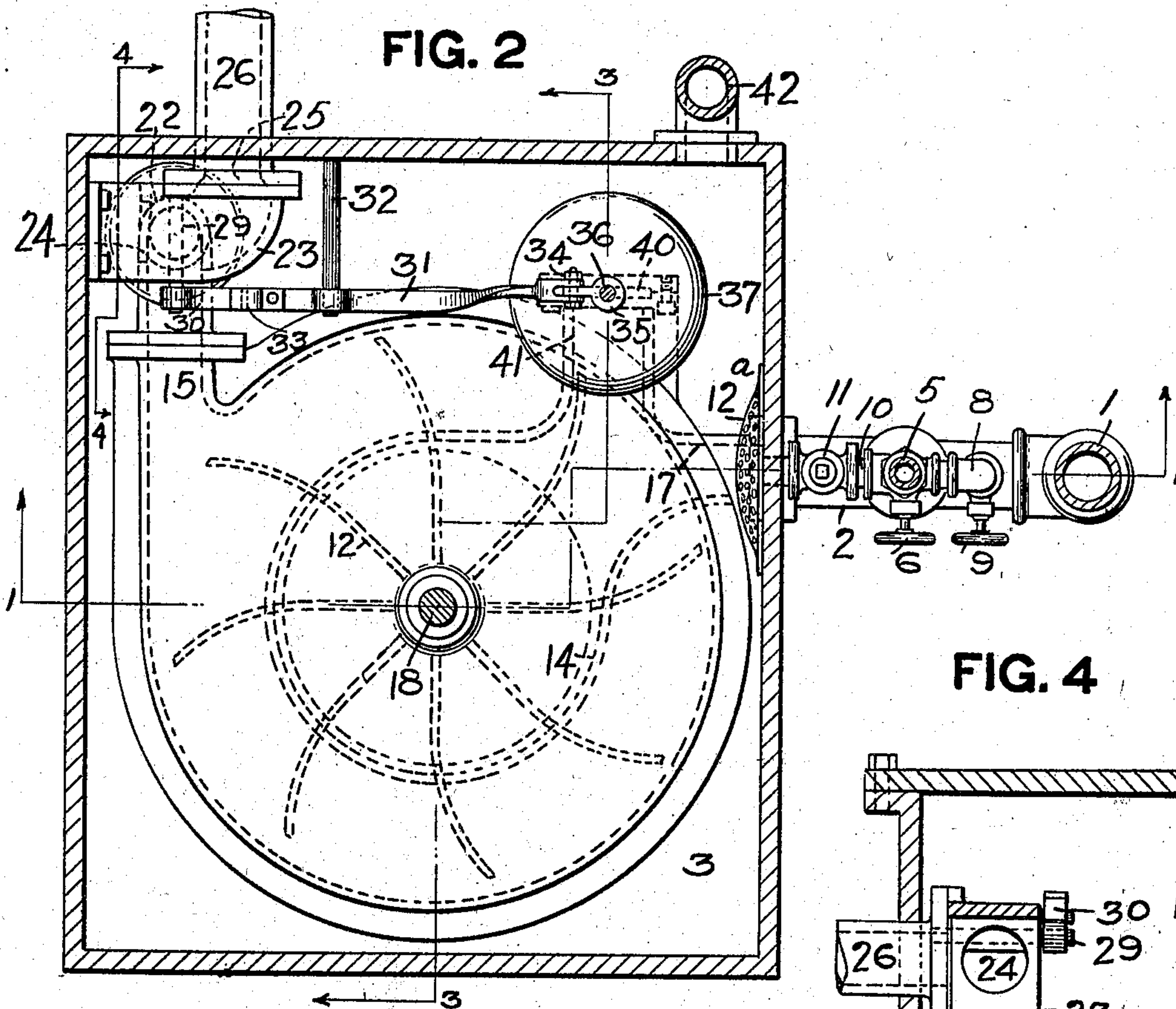
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2 SHEETS—SHEET 2.



WITNESSES.

J. R. Kellee
Robert C. Foltner

INVENTOR.

William J. Bergens
By Kay Foltner Winter
attorneys

UNITED STATES PATENT OFFICE.

WILLIAM J. BERGENS, OF PITTSBURG, PENNSYLVANIA.

AUTOMATIC VACUUM CLEANING APPARATUS.

No. 885,011.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed July 5, 1907. Serial No. 382,371.

To all whom it may concern:

Be it known that I, WILLIAM J. BERGENS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automatic Vacuum Cleaning Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention relates to vacuum cleaning systems and more especially to the apparatus for producing the suction and disposing of the dirt and dust.

The object of the invention is to provide apparatus for the purpose described which is simple of construction, economical of operation, which is noiseless and requires no oiling, and especially apparatus which automatically flushes or cleans the collecting chamber.

Vacuum cleaning systems for dwellings, hotels, office buildings and other structures, as now installed, have the vacuum or suction pipe to which the cleaning tool is attached connected to apparatus usually located in the basement for producing the suction and moistening and collecting the dust and dirt brought down through the suction pipe. All such apparatus, as far as I am aware, requires considerable personal attention on the part of the attendant and especially in order to flush the same when the water contained in the collecting chamber becomes too dirty for further use. All prior apparatus of this kind is also quite noisy and requires frequent oilings.

The object of this invention is to provide such suction and collecting apparatus which is not noisy and which requires very little personal attention and especially one which is self cleaning or flushing.

The invention comprises the combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings Figure 1 is a vertical section through my apparatus on the line 1—1, Fig. 2; Fig. 2 is a horizontal section on the line 2—2, Fig. 1; Fig. 3 is a detail vertical section on the line 3—3, Fig. 2; Fig. 4 is a detail vertical section on the line 4—4, Fig. 2, and Fig. 5 is a detail view of the flushing valve.

In the drawings the vacuum or suction pipe extending through the building to be cleaned is indicated at 1. To the end of this pipe is connected a fitting 2 leading to a collecting chamber 3 and also having connected thereto a water inlet fitting 4. The water

supply pipe is shown at 5 provided with cut-off valves 6 and 7 and having around valve 7 a by-pass 8 provided with a valve 9 which is so constructed that it can be locked in set position and which regulates the amount of water normally supplied to the suction apparatus when in operation. In use the valve 7 is kept closed and the valve 9 set in such position as to supply the requisite amount of water while the valve 6 is used as the valve for turning the water on and off so that the attendant need not disturb the valve 9. The valve 7 is only opened when a large stream of water is to be admitted to the apparatus to clean it out.

The water inlet fitting 4 is connected to the chamber 3 above its bottom by means of a pipe connection 10 provided with a regulating valve 11, the inner end of the pipe section 10, being screened from the chamber 3 by means of a strainer or screen 12 to prevent the passage of the dirt through the pipe 10. The regulating valve 9 will be set so as to supply only a small quantity of water, it being the design to circulate the water from the chamber 3 back through pipes 10 and 4 into fittings 2 in order to thoroughly moisten the dirt and dust coming down through pipe 1.

The suction is produced by means of a pump 12 which may be of any desired construction and located in any suitable place with its inlet connected to the pipe section 2 and its outlet communicating with chamber 3. It is preferred to locate this pump in the chamber 3 and keep it submerged with water so as to dispense with oil and make a substantially noiseless apparatus. The pump shown is of the centrifugal type having the inlet opening 14 at its center and the discharge opening 15 at the periphery. It is shown as located in horizontal position near the bottom of the chamber 3 with a pan 16 underneath the same having a goose neck 17 communicating with the pipe fitting 2, thereby directing the dirt and dust to the intake opening 14 of the pump. The pump is driven by any suitable means, such as the vertical shaft 18 extending up through the top of the casing and provided with suitable means for driving the same, such as the motor 20.

The outlet 15 of the pump is connected to a vertical pipe 22 extending upwardly in the chamber 3 and provided at its upper end with a fitting 23 provided with two openings, one opening 24 communicating with the chamber

3 and the other opening 25 communicating with a pipe section 26 leading to the sewer or other point of deposit.

In the fitting 23 is a valve 28 arranged to close either the opening 24 or opening 25, but not both at the same time, said valve being shown as of the flap type pivoted at 29 and provided with an arm 30 for operating the same. Normally the valve will be in the position shown in full lines in Fig. 5 so as to maintain the outlet opening 25 closed but is arranged to be periodically thrown to dotted line position shown in Fig. 5 so as to close the opening 24 and open the outlet 25 to the sewer in order to flush the chamber 3. This valve is moved periodically to these positions by automatic mechanism, that shown comprising a lever 31 pivoted at 32 and provided with fork 33 engaging the arm 30 of the valve and having its opposite end connected by a slot and pin connection 34 to a member 35 secured to a rod 36 mounted in the casing for vertical movement.

Slidably mounted on the rod 36 is a float 37 which can travel idly between the member 35 above the float and another member 38 on the rod below the float.

Normally the valve 28 is in position to keep the outlet 25 closed. The water supplied through the valve 9 gradually fills the chamber 3, thereby raising the float 37 until it strikes the member 35 on rod 36 and then causes the float to raise said rod and through the lever 31 throw the valve 28 to the dotted line position shown in Fig. 5. Connected to the lower end of the rod 36 is a suitable valve 40, shown as of the gate type, and which controls an opening 41 affording a communication between the chamber 3 and the pan 16 underneath the pump, thus enabling the pump to draw out the contents of the tank and eject the same through outlet opening 25. 42 is a vent pipe for chamber 3.

The operation of the apparatus described is as follows: The valve 9 will be set and locked in position to supply the requisite amount of water, it being the design to fill the chamber 3 about once an hour when in use, as it is found that ordinarily in about an hour's time the water becomes so dirty that it should be flushed out. This periodic flushing of the tank, however, may be varied to suit conditions so as to flush more or less frequently than once in an hour. This may be accomplished by merely adjusting the valve 9. The attendant need only open the valve 6 fully as the valve 9 regulates the flow of the water. The attendant will also close the switch to the motor 20 setting the pump in operation. This produces the necessary suction in the pipe 1, drawing the dirt and dust down through the same and through the pump. The water coming through the supply pipe 4 mingles with the dirt and dust and moistens the same. Normally the valve 40

is closed and the valve 28 in position to close the outlet 25 so that the dirt and water are forced by the pump up through the pipe 22 passing out through opening 24 into the chamber 3. In this manner the water is constantly agitated and the dirt and dust thoroughly moistened. The water from the tank 3 circulates back through the pipe 10 and is used over and over. As the operation continues the level of water in the chamber 3 gradually rises, thus raising the float 37 and eventually through the float operating the valve 28, throwing the same over to the dotted line position shown in Fig. 5. In normal operation the pressure of water coming up through pipe 22 bears against the outer face of the valve 28 and holds the same to its seat. Consequently the float 27 meets with considerable resistance so that it becomes fairly well submerged before its buoyancy is sufficient to overcome the pressure on valve 28. Consequently, when it does overcome such pressure the float moves rapidly upward moving the valve 28 rapidly over to the opposite position and also drawing up the valve 40. The chamber 3 now has a direct communication with the inlet of the pump while the outlet of the pump is connected to the sewer outlet 25. Consequently, the chamber is quickly emptied and the water and dirt contained therein forced by the pump through the opening 25 to the sewer. As soon as emptied, the float 37 drops, striking the fitting 38 and by its weight forces the valve 40 closed and also draws down on the rod 36 and through the lever 31 moves the valve 28 back to its normal position. The apparatus will then continue to operate in the normal manner. When it is desired to thoroughly clean the chamber 3 the valve 7 is opened so as to allow a large quantity of water to flow into the chamber 3, thus quickly filling the same and getting frequent flushings in quick succession.

The apparatus described is simple of construction and requires a minimum amount of attention. The pump is submerged in the water, requires no oiling and operates practically without noise. The attendant need operate only the valve 6 and occasionally the valve 7, and the switch for the motor 20. The apparatus then operates entirely automatically to flush itself periodically. The water is circulated by means of the pump so as to require only a small amount of water to thoroughly moisten the dirt and dust and the pump also serves to agitate this water so as to insure the thorough wetting of the dirt and dust.

It will be understood that various modifications in construction and arrangement of the parts may be made without departing from the spirit of the invention, and I therefore wish it understood that no limitations are to be imposed upon the terms of the

claims hereinafter made either by the specific illustration or the specific description in the specification.

What I claim is:

5 1. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber into which it discharges, a connection for supplying water continuously to said chamber, and automatic mechanism for periodic-
10 ally flushing said chamber.

2. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber into which it discharges, a connection for supplying a stream of water to said chamber, and mechanism controlled by the height of the water in said chamber for periodically flushing the same.

3. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber into which it discharges, a connection for supplying a stream of water to said chamber, a flushing valve for said chamber, and a float in the chamber arranged to be actuated by the water and controlling said valve.

4. In vacuum cleaning apparatus, the combination of a chamber, a suction pipe, a pump connected to said pipe and discharging in the said chamber, a water supply connected to the inlet of the pump, and mechanism controlled by the height of the water in said chamber for periodically flushing the same.

5. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a pump connected to the suction pipe and discharging into the chamber, and a water supply connected to the inlet of the pump.

6. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a pump connected to the suction pipe, a water supply to the inlet of the pump, and a vertical pipe connected to the outlet of the pump and discharging into the chamber.

7. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a pump connected to the suction pipe and discharging into the chamber, a water supply, and a circulating connection between the chamber and inlet of the pump.

8. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a pump connected to the suction pipe, a vertical pipe connected to the outlet opening of the pump and discharging into said chamber, a water supply, and a circulating connection between the chamber and inlet of the pump.

9. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a pump connected to the suction pipe and dis-

charging into the chamber, a water supply, a flushing valve, a valve controlling communication between the chamber and the in-take of the pump, and means for simultaneously opening said valves.

10. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a water supply, a pump connected to the suction pipe and discharging into the chamber, a flushing valve, a valve controlling communication between the chamber and intake of the pump, and automatic means for periodically and simultaneously opening said valves.

11. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a water supply, a pump connected to the suction pipe and discharging into the chamber, a flushing valve controlling the outlet from the pump, a valve controlling communication between the chamber and the pump intake, and means controlled by the height of the water in the chamber for operating said valves.

12. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a water supply, a pump connected to the suction pipe, a pipe connected to the outlet of the pump and provided with two openings, one communicating with the chamber and the other with a flushing outlet, a valve arranged to close either of said openings while maintaining the other opening, and automatic mechanism for periodically operating said valve.

13. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a water supply, a pump connected to the suction pipe, a pipe connected with the outlet of the pump and provided with two openings, one communicating with the chamber and the other with an outlet, a valve arranged to keep one of said openings closed and the other open, a valve controlling communication between the chamber and the pump inlet, and automatic mechanism for periodically and simultaneously operating the valves.

14. In vacuum cleaning apparatus, the combination of a suction pipe, a chamber, a water supply, and a pump located in said chamber below the water level and having its inlet connected to the suction pipe and its outlet communicating with the chamber.

In testimony whereof, I the said WILLIAM J. BERGENS have hereunto set my hand.

WILLIAM J. BERGENS.

Witnesses:

ROBERT C. TOTTEN,
F. W. WINTER.