

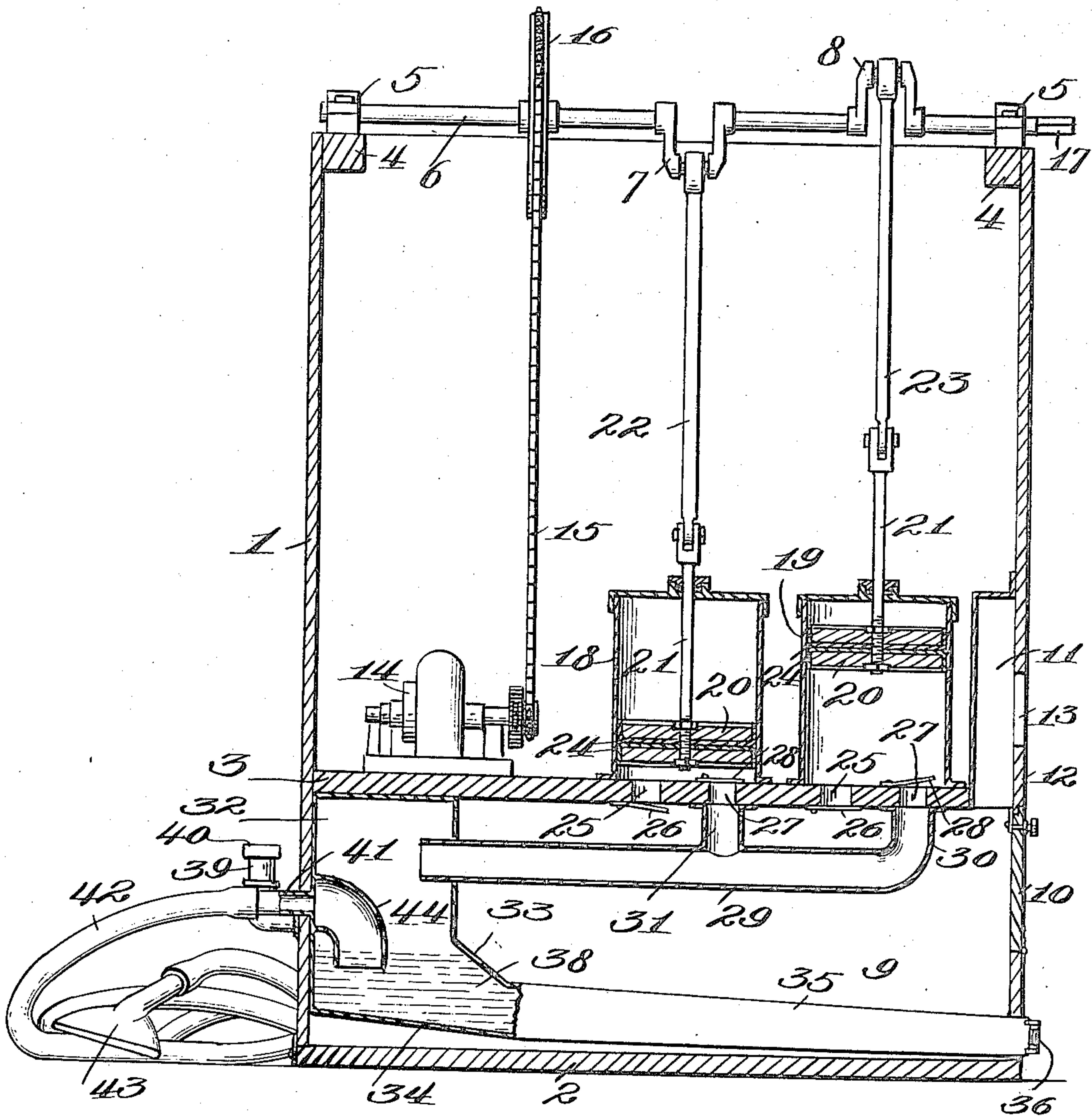
J. GARDNER.
PORTABLE VACUUM CLEANING DEVICE.
APPLICATION FILED JUNE 5, 1909.

952,244.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

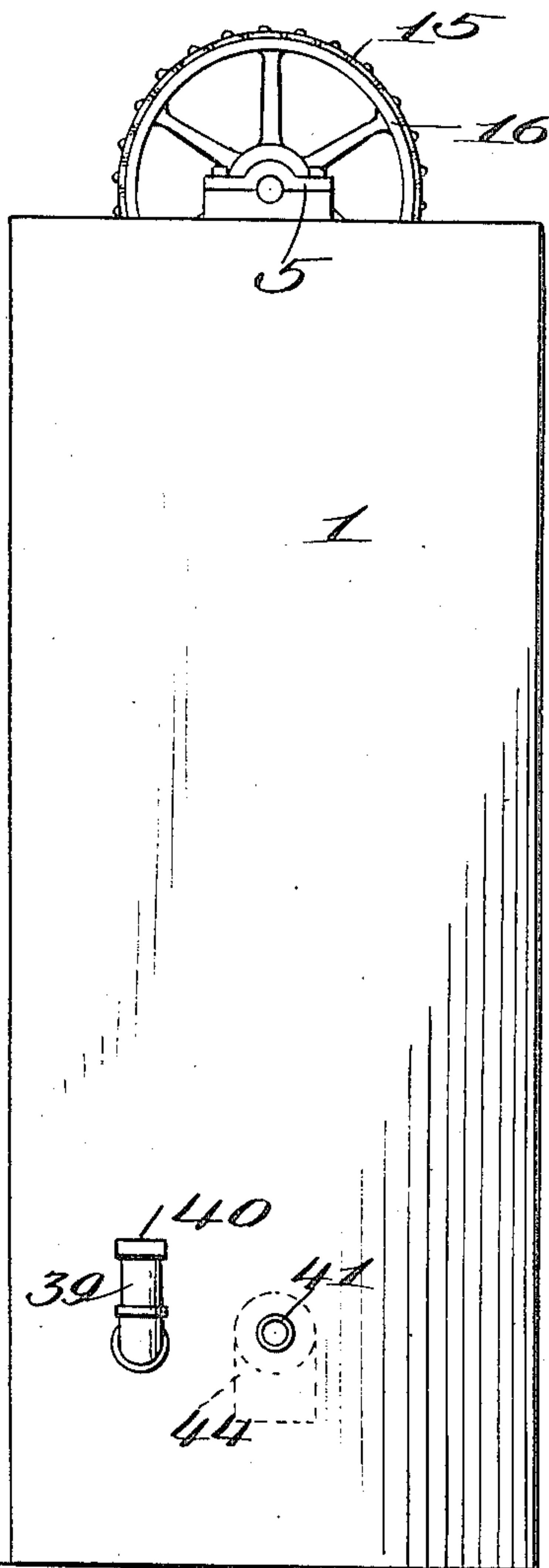
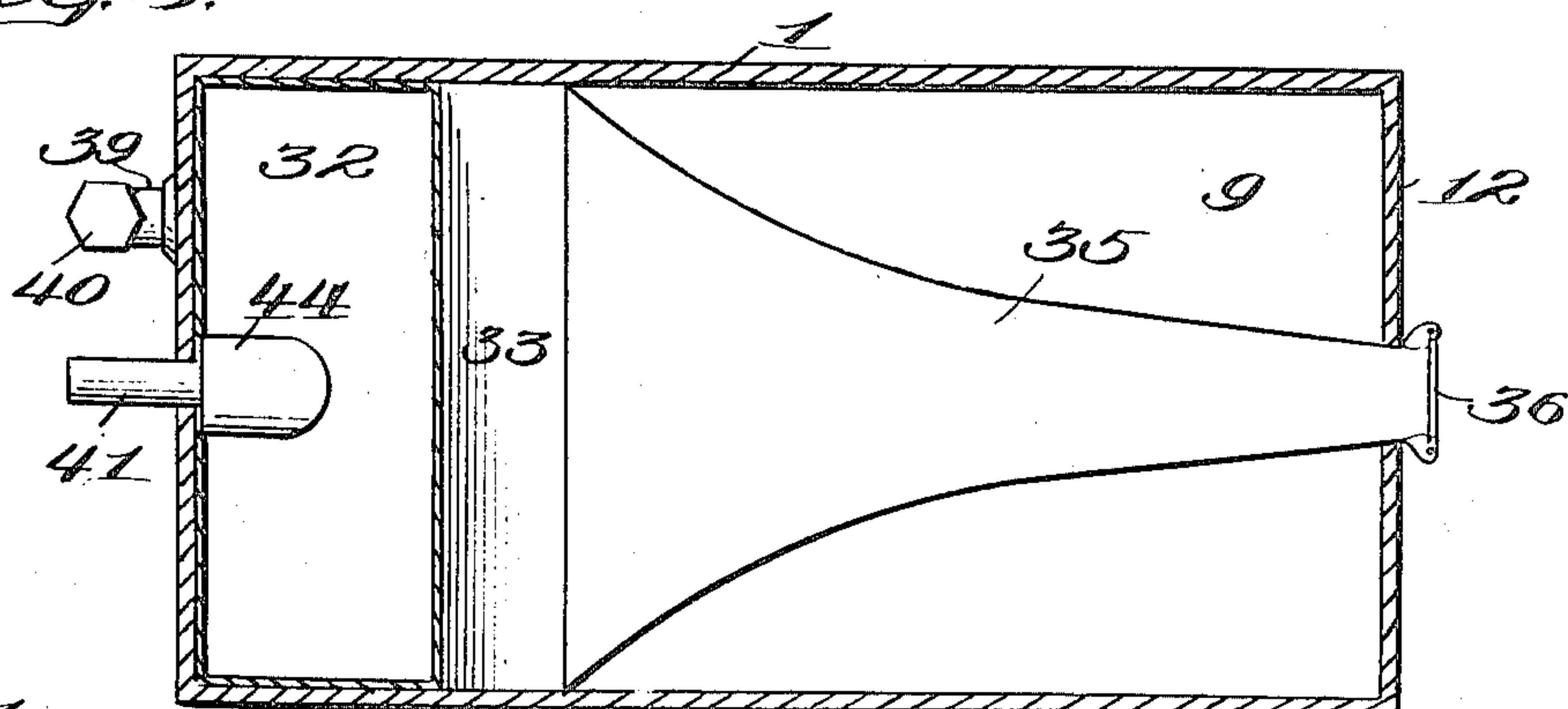


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PORTABLE VACUUM CLEANING DEVICE.

952,244.

Specification of Letters Patent. Patented Mar. 15, 1910.

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To all whom it may concern:

Be it known that I, JAMES GARDNER, a citizen of the United States, residing at Baltimore city, State of Maryland, have invented 5 new and useful Improvements in Portable Vacuum Cleaning Devices, of which the following is a specification.

This invention relates to a portable suction cleaning device for household purposes 10 of comparatively small dimensions and embodying sanitary characteristics.

The primary object of the invention is to provide a machine of this class that may be operated either by hand or electric motive 15 power and readily movable from one place to another for cleaning the interior of a building or the several compartments of the latter, and effective in temporarily storing dust and dirt that are gathered up thereby and 20 advantageous in thoroughly cleaning hallways or other compartments without flying dust or dirt incident to the ordinary cleaning methods.

With these and other objects and advantages in view the invention consists in the 25 construction and arrangement of the several parts which will be more fully hereinafter specified.

In the drawings: Figure 1 is a longitudinal vertical section of a machine embodying 30 the features of the invention. Fig. 2 is an end elevation of the same. Fig. 3 is a horizontal section.

The numeral 1 designates the casing constructed of suitable light material and having a bottom 2, an intermediate horizontal 35 partition 3, and top supporting means 4 for bearings 5 in which a drive shaft 6 is rotatably mounted and provided with reversely projecting cranks 7 and 8. The horizontal 40 partition 3 forms with the bottom 2 a compartment 9 which is accessible through the medium of a rear hinged door 10, this door permitting the compartment to be cleaned or 45 repairs made to devices located therein when necessary. The compartment 9 has an escape duct 11 communicating with the upper rear portion thereof and in the rear wall 12 of the casing any number of outlet openings 50 13 are formed and communicate with the escape duct, as clearly shown by Fig. 1.

On the horizontal partition 3 an electric motor 14 is mounted and driven by a chain 55 belt 15 trained over a sprocket wheel 16 on the shaft 6. The motor 14, however, may be of any type, but it is preferred that it be

operated by electricity from any suitable source. In some constructions, however, the shaft 6 may be operated by hand, the one end of the shaft, as at 17, being extended 60 and squared for the reception of a crank handle. On the partition 3 two pumping cylinders or air pumps 18 and 19 are mounted and preferably constructed of light cast iron, each cylinder having therein a piston 65 20 with a piston rod 21, the said piston rods being respectively connected to the cranks 7 and 8 of the shaft 6 by link rods 22 and 23, the said link rods 23 being movably 70 attached to the piston rods for obvious reasons. The pistons 20 have specially formed rubber cups 24 engaging the same to insure an air-tight fitting of the pistons relatively 75 to the walls of the cylinders of the pumps. The air pumps work in alternation or the pistons 20 therein are reciprocated in such manner, through the medium of the cranks 7 and 8, that when one piston, for instance 80 that in the pump 19 is elevated, the remaining piston in the pump 18 will be depressed.

Beneath each air pump the partition 3 is 85 formed with a vent opening 25 with a downwardly opening valve 26 coöperating therewith and adjacent to the vent is an inlet opening 27 with an upwardly opening valve 85 28 disposed thereover. The vent openings 25 communicate with the compartment 9, and the air drawn into the pumps in creating a suction or vacuum, as will be more 90 fully hereinafter explained, is driven into said compartment and escapes through the duct 11 and openings 13 to the exterior of the machine. The inlet openings 27 of the 95 pumps respectively communicate with a suction pipe 29 extending horizontally through the upper portion of the compartment 9 and having an elbow 30 at one terminal with 100 which the inlet opening 27 of the pump 19 has communication and a branch pipe 31 into which the inlet 27 of the pump 18 fully opens. The free extremity of the suction 105 pipe 27 opens into the upper part of a suction or vacuum chamber 32. The lower portion of the suction or vacuum chamber 32 is enlarged as at 33 and has a bottom 34 gradually inclining downwardly to the back 110 of the machine and forming part of a converging neck 35. The rear reduced end of the neck 35 extends through the back of the machine below the door 10 and is provided with an air-tight fitting closure or cleaning-out door 36 which is hinged thereto and nor-

5 mally held closed by suitable fastening means. The lower enlarged portion 33 of the chamber 32 and the neck 35 are formed without obstructing shoulders or inner pro-
 10 jections so as to prevent lodgment of dirt within the lower portion of the chamber. The said chamber and neck will also be formed of suitable non-corrosive metal, such as galvanized iron or copper, and will be
 15 so arranged and constructed that it may be removed for cleaning or repair; and to facilitate the removal of the same the bottom 2 of the machine is detachable; the said bottom being held by readily removable fastenings.

The water as at 38, is held in the lower portion 33 of the chamber 32 and is supplied through the medium of an inlet 39, the upper surface of the water being a consider-
 20 able distance below the free extremity of the suction pipe 29. The inlet or feed pipe 39 has a suitable removable cap 40 which is tightly fitted over the upper end of the said inlet pipe to prevent the ingress of air
 25 therethrough to the suction chamber, and said pipe may extend any distance vertically exteriorly of the machine. Extending through the front wall of the casing 1 is a hose connection 41 to which is attached
 30 a hose 42 of any suitable length and provided with a nozzle 43 of such form that it may be readily applied closely to a floor or other surface for gathering dust and dirt therefrom. The hose connection 41 is se-
 35 cured to an enlarged dirt pipe or expansion duct 44 within the chamber 32, the said pipe or duct being projected downwardly and normally having its lower outlet ex-
 40 tremity submerged in the water within the lower enlarged portion 33 of the said chamber. The dirt pipe or expansion duct 44 is fixed over the hose connection 41 and has an unobstructed lower outlet end which is dis-
 45 posed far enough below the surface of the water to prevent any of the dust escaping from the water with the air. When the dust-laden air enters the duct 44 it expands sufficiently to prevent undue agitation of the water and a positive downward deflec-
 50 tion of the dust-laden air and separation of the dust and dirt from the air are insured so that the air may be drawn off clean through the suction pipe above the column of water. The dust and dirt settling in the
 55 water deposit on the inclined bottom 34 of the vacuum chamber 32, and in fact the dust and dirt are driven directly toward and against said bottom by reason of the unob-
 60 structed enlarged outlet at the lower depending end of the said duct 44 and the dust and dirt are deposited so far below the upper surface of the column of water in the chamber 32 that any tendency of any por-
 65 tion of the dust or dirt to pass off from the water with the air into the suction pipe 29

will be averted. In the present construc-
 tion also there are no movable parts in the least affected by the dust-laden air, and hence clogging or impairment of movable parts is entirely avoided. Furthermore, the
 70 connection with the upper part of the chamber 32 of the suction pipe 29 and the communication of said latter pipe with the suction creating means at a distance from
 75 said chamber, together with the tight closure of the chamber at all points except the bottom outlet, which is normally closed, and the inlet of the said suction pipe render it practically impossible for any of the dust
 80 or dirt to escape from the chamber 32 without first having come into contact with the water.

To render the machine readily portable it will be mounted on rollers or small wheels, which have been omitted from the drawings
 85 in view of the obvious adaptation of such devices.

When the pumps are operated they suck the air from the chamber 32 and create a vacuum in the latter above the column of
 90 water, and this vacuum creates a suction through the hose 42, drawing the dust and dirt rearwardly into the connection 41 and the air which is also forcefully drawn rear-
 95 ward into said connection expands in the enlarged pipe 44, the latter being increased in dimensions for this purpose, and by such expansion agitation of the water is pre-
 100 vented and the pressure on the water due to the incoming air through the hose 42 and connection 41 depresses the water in the lower outlet extremity of the expansion pipe
 105 44 and permits the air to pass or percolate in the form of bubbles upwardly through the water and enter the suction pipe 29 and from the latter be drawn into the alternately
 110 operating air pumps and be finally driven into the compartment 9 and escape to the atmosphere exteriorly of the machine through the outlet openings 13. The dust
 115 and dirt settle at the bottom 34 of the lower enlarged portion 33 of the vacuum chamber and gravitate into the neck 35, and from this neck the dirt or sediment in the lower collecting portion of the vacuum chamber
 120 is drawn off with the water through the outlet door 36. All the parts of the device that are liable to become corroded are constructed of material, preferably metal of a non-corrosive nature, and the entire organization
 125 will be composed of light material so as to render the machine easily movable from one place to another. It will be understood, however, that in assembling the parts of the machine, strength and resistance to vi-
 130 bration and wear will be carefully observed. From time to time the water in the vacuum chamber will be replenished and said chamber may be flushed out when desired to clean the same and the compartment 9 may

be readily cleaned through the medium of the door 10, the latter having a downwardly opening movement and the entrance to the said compartment being sufficiently large to make it convenient in cleaning said compartment.

Changes in the proportions and dimensions may be resorted to, as the operation of the mechanism is not dependent upon any of the exact measurements so long as the relative proportions of the several parts are carried out.

What is claimed is:

1. In a machine of the class specified, the combination of a casing having a closed vacuum chamber therein provided with a lower enlargement to receive water, the said lower enlargement being provided with a closed bottom and an outlet means continuing therefrom toward one side of the casing, means connected to the upper portion of said chamber for creating a vacuum in the latter, and a dust and air entrance means having an enlarged expansion duct extending downwardly within the chamber and provided with a fully open bottom outlet normally covered by the water, the said expansion duct being fixed in the chamber and located at a point below the communication with the chamber of the means for creating a vacuum, the vacuum chamber being free of movable parts.

2. In a machine of the class specified, a casing, a closed vacuum chamber within the casing having a lower water holding extremity provided with an imperforate bottom continuing into a rearwardly projecting downwardly inclined outlet means continuous therewith and extending to one side of the casing, a dust and air inlet to the chamber having an enlarged expansion duct fixed thereover in the chamber and projecting downwardly into and normally covered by the water, the lower end of the expansion duct being fully open, and a vacuum creating means communicating with the upper portion of the chamber above the expansion duct, the water in the chamber being below the point of communication of the vacuum creating means with the said chamber and the latter being free of movable devices therein.

3. In a machine of the class specified, a casing, a closed vacuum chamber in the casing having an inclined imperforate bottom provided with a downwardly and rearwardly inclined conveying outlet pipe, a vacuum creating means having a suction

pipe communicating with the upper portion of said chamber, the lower part of the chamber having water therein, and a dust and air inlet extending through the casing and communicating with the interior of the vacuum chamber, the inlet extremity of the said inlet within the vacuum chamber being covered by an enlarged expansion duct which is directed downwardly into the water and provided with a fully open lower outlet end which is normally covered by the water.

4. In a machine of the class specified, a casing having a lower closed bottom and a horizontal partition above the bottom with openings therein, the partition forming with the bottom a compartment provided with a rear escape duct, alternately operating air pumps on the partition and communicating through a part of said openings with the compartment, means for operating the air pumps, a vacuum chamber within the compartment having a bottom portion continuing into a rearwardly extending and downwardly inclined outlet communicating with said bottom portion, a suction pipe in communication with the air pumps and the upper portion of said chamber, and a dust and air inlet for the vacuum chamber having a hose connection on its exterior and an inner enlarged expansion terminal depending into and normally submerged by the water in the lower part of the expansion chamber.

5. In a machine of the class specified, a casing having a vacuum chamber therein provided with a lower enlargement to receive water, the chamber being also provided with an inclined imperforate bottom continuing into a downwardly inclined outlet extending through and accessible at one side of the casing, means connected to the upper portion of the chamber for creating a vacuum therein, and a dust and air entrance means communicating with the chamber below the point of communication of the vacuum creating means with said chamber, the dust and air entrance means having an enlarged extremity fixed within the chamber and provided with a fully open bottom outlet normally submerged in the water in the lower enlargement of the chamber.

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

JAMES GARDNER.

Witnesses:

THOS. FOLEY WESLEY,
CHAS. C. CONNS ELMAN.