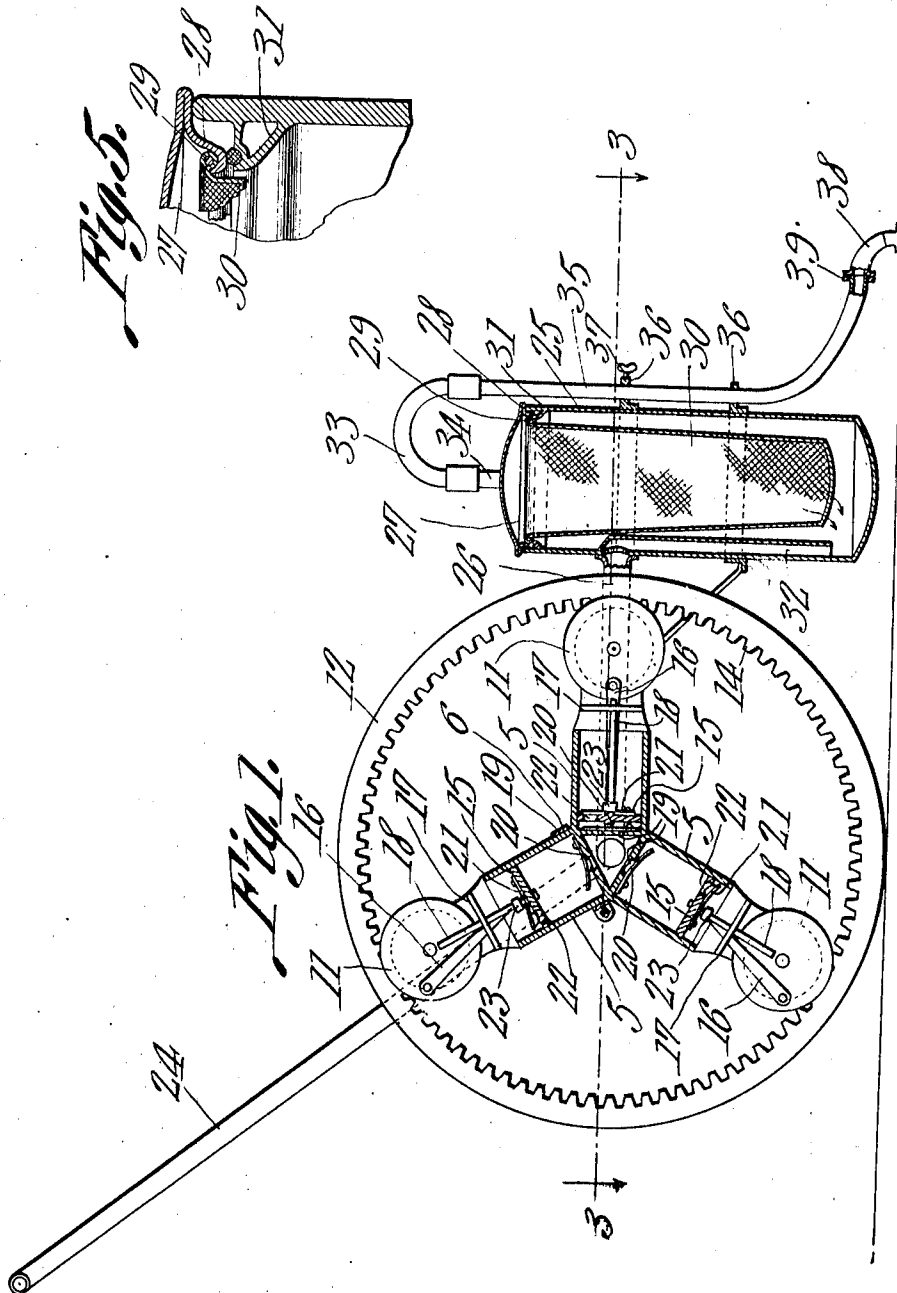


L. VAN NETTE.
VACUUM CLEANER.
APPLICATION FILED JULY 6, 1910.

1,004,504.

Patented Sept. 26, 1911.

2 SHEETS-SHEET 1.



Witnesses

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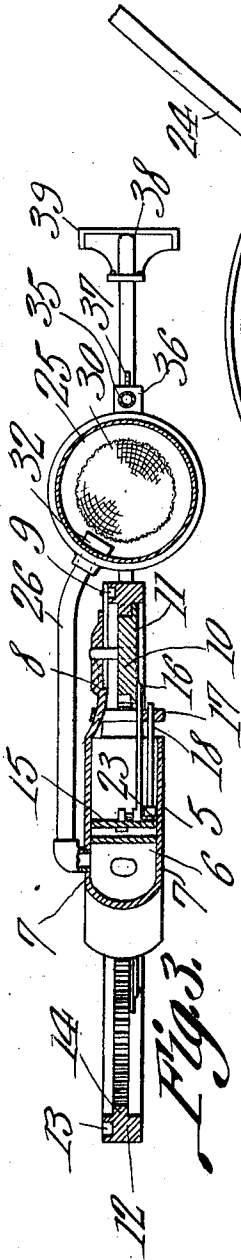


Fig. 3.

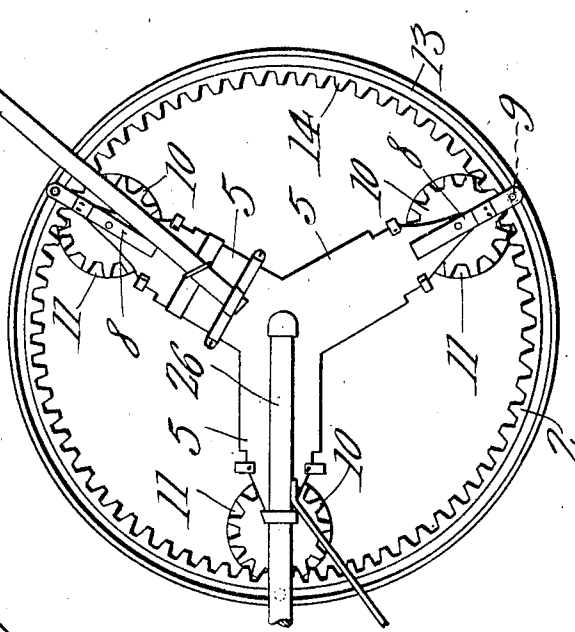


Fig. 2.

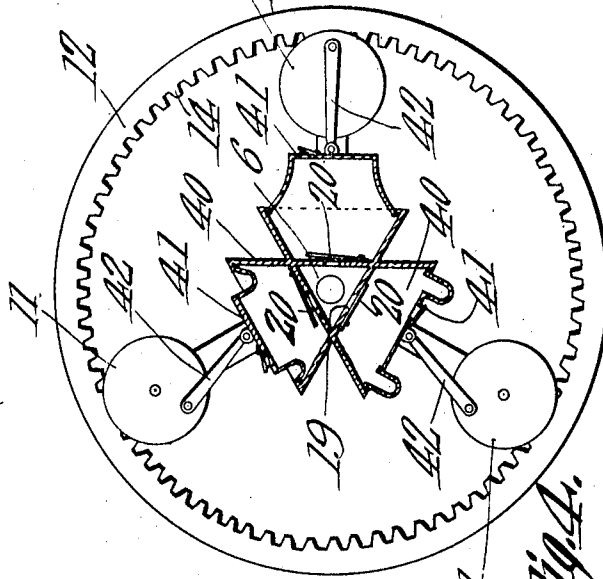


Fig. 4.

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UNITED STATES PATENT OFFICE.

LUTHER VAN NETTE, OF BRADFORD, PENNSYLVANIA.

VACUUM-CLEANER.

1,004,504.

Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed July 6, 1910. Serial No. 570,640.

To all whom it may concern:

Be it known that I, LUTHER VAN NETTE, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented a new and useful Vacuum-Cleaner, of which the following is a specification.

It is the object of the present invention to provide an improved construction of vacuum cleaner and the invention aims primarily to provide a hand propelled cleaner of this type so constructed as to obviate the employment of electric motors, motors of any other type, and hand operated suction devices.

The invention aims further to provide a vacuum cleaner which will only require to be manually propelled over the surface to be cleaned and will embody traction operated suction means. In this respect, the cleaner of the present invention possesses marked advantages over such cleaners as require to be operated by electricity or which embody suction pumps or bellows which require to be actuated manually.

A still further aim of the invention is to provide a vacuum cleaner embodying traction operated suction means which will be simple in construction and in which the suction chambers will constitute the frame of the machine, the traction means of the machine being embodied in a single traction rim which actuates the suction creating devices in the suction chambers. By providing but a single traction rim and arranging or mounting it in the manner illustrated in the drawings and to be hereinafter described, the operator of the machine is able to work close to a wall or other like obstruction and furthermore the machine is rendered less cumbersome.

It is a further aim of the invention to provide, in connection with the suction chambers and the single traction rim above mentioned, a receiving chamber which is supported from and is in communication with a vacuum chamber which is common to all of the suction chambers, the pipe establishing communication between the receiving chamber and the vacuum chamber constituting the means for supporting the said receiving chamber.

It is a further aim of the invention to provide, in a vacuum cleaner embodying a rigid dust conveying tube, a connection between the tube and the suction nozzle of such

character as to insure of proper contact of the suction nozzle with the surface being cleaned, regardless of the position assumed by the machine as a whole or by the rigid dust conveying tube. In other words, the invention aims to provide a connection between the elements mentioned, of such character that the suction nozzle will remain flat upon the surface being cleaned whether or not the machine as a whole is in upright position.

With the above and other objects in view, the invention consists in the general construction and arrangement of parts shown in the accompanying drawings, in which,

Figure 1 is a view partly in side elevation and partly in longitudinal section of a cleaner constructed in accordance with the present invention. Fig. 2 is a view looking at the opposite side of a portion of the structure shown in Fig. 1. Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 1. Fig. 4 is a view similar to Fig. 2 illustrating a slight modification of the invention. Fig. 5 is a detail vertical section through the upper end of the receiving tank.

In the drawings, and particularly in Figs. 1, 2 and 3 thereof, the frame of the invention is illustrated as embodied in the suction chambers of the cleaner mechanism and these chambers are indicated by the numeral 5 and while they are here shown as three in number, they may be of greater or less number if desired. These chambers, in this form of the invention, are in the nature of cylinders closed at their inner ends and open at their outer ends, they being arranged about a common center and radially thereabout. Before proceeding to a specific description of the cylinders it will be observed at this point that the inner ends of all of the cylinders constitute three walls of a vacuum chamber 6 which is thus located between the inner ends of all of the cylinders. In addition to the walls consisting of the inner ends or bottoms of the cylinders 5, the said vacuum chamber of course embodies two side walls indicated by the numeral 7. Each of the suction chambers embodied in the cylinders 5 has at its outer end an extension indicated by the numeral 8 and this extension carries at its outer end a roller 9 the function of which will be presently explained. Furthermore, there is mounted upon the extension 8, a pinion 10 and upon this pinion a disk indicated by the numeral

11 and of a diameter slightly greater than the diameter of the pinion or at least as great as its greatest diameter. The traction means of the machine is embodied in an annulus or traction rim 12 formed in one side with a groove 13 extending continuously there-
 5 around and formed upon its inner periphery with a toothed flange 14. The rim is of such diameter that when properly assembled upon the frame of the machine consisting
 10 of the cylinders 5, the rollers 9 of the three cylinders, supposing this number to be employed, will seat in the groove 13 in the side of the rim 12 and the teeth of the several
 15 pinions 10 will mesh with the teeth of the flange 14, the peripheral portion of the disk 11 resting against that side of the flange 14 opposite the side at which the extension 8 is
 20 located. The engagement of the peripheral portion of the disk 11 with the flange 14 and the engagement of the rollers 9 in the groove 13, as well as the meshing of the pinion 10
 25 with the flange teeth 14, results in the rim 12 being supported for rotation about the several cylinders 5 and their associated parts above described. It will be understood that as the rim 12 rotates in the manner stated, the pinion 11 will be rotated.

A piston indicated by the numeral 15 is
 30 mounted to reciprocate in each cylinder 5 and there is pivoted to each piston 15 at the center thereof, one end of a pitman 16 connected to the corresponding crank disk 11. Each extension 8 is provided with a bracket
 35 indicated by the numeral 17 and each piston 15 is provided with a guide stem 18 which is slidably fitted through the bracket 17 upon the corresponding extension 8, the piston being in this manner guided in its reciprocatory movement in the cylinders. It will
 40 be observed that the inner end of each cylinder 5 is formed with an opening indicated by the numeral 19 and a flap valve 20 is secured upon the said end of each cylinder
 45 and normally seats in the corresponding opening 19 although it will be readily understood that the piston 15 in any of the three cylinders here shown is moving toward the open or outer end of the cylinder, the
 50 suction created by this movement of the piston will serve to move the valve 20 away from its seat and exhaust to a greater or less extent its vacuum chamber 6. In a like manner, each piston 15 has secured upon it
 55 a flap valve 21 which normally closes an opening 22 formed through the said piston, the movements of the valve away from the piston being limited by an abutment 23 secured upon the guide stem 18. It will thus
 60 be readily understood that when the piston is moving in the direction of the open end of the cylinder, the valve 21 will be closed and the valve 20 will open and that when the piston is moving toward the closed end
 65 of the cylinder, the valve 20 will close and

the valve 21 will be automatically opened. Thus, at each stroke of the piston, air is exhausted to a greater or less degree from the vacuum chamber 6. Furthermore it will be
 70 observed that such reciprocation of the pistons is accomplished through rotation of the crank disk and that these disks are in turn rotated by the traction rim 12 and that such reciprocation of the pistons will result
 75 whether the machine is run backwardly or forwardly.

As heretofore stated, the cylinders 5 constitute the frame of the machine and to one of these cylinders are connected handle bars indicated by the numeral 24. In addition to
 80 the suction chambers, the machine embodies a receiving chamber which is indicated by the numeral 25. In supporting the container 25 upon the machine, a pipe 26 is secured at one end to the vertical wall of the
 85 said container and opens thereinto. At its rear end, the pipe 26 is secured through one side wall 7 of the vacuum chamber 6. Thus, communication is established between the receiving chamber 25 and the vacuum cham-
 90 ber 6 and as the pumps exhaust air from the vacuum chamber 6, it is exhausted also from the receiving chamber 25. The receiving chamber 25 is provided with a closure indicated by the numeral 27 and this closure is
 95 formed upon its under side and adjacent its periphery with a depending flange indicated by the numeral 28. A split ring 29 is adapted to be sprung into engagement with this
 100 flange 28 and when thus sprung is intended to support a bag 30 of fine mesh, this bag being provided with a hem in which the ring 29 is slipped or otherwise held. The flange 28, when the cover is fitted upon the receiv-
 105 ing chamber, bears upon a packing head indicated by the numeral 31 and the engagement between this gasket and the flange is an air tight one. In this manner, the bag 30 is removably supported by the cover and after it becomes filled to a greater or less de-
 110 gree with dust and other dirt accumulations, its ring may be sprung out of engagement with the flange and the bag then removed and emptied. A pipe indicated by the numeral 32 is secured upon the inner face of
 115 the wall of the receiving chamber 25 and at its upper end communicates with the pipe 26, the lower end of the pipe 32 terminating immediately short of the bottom of the said receiving chamber. A short length of flexi-
 120 ble hose 33 is attached at one end to a nipple 34 upon the top 27 of the receiving chamber and at its other end this hose connects to the upper end of a rigid tube 35 which is fitted through brackets 36 upon the
 125 said chamber, the tube being held in raised or lowered adjustment by means of a set screw 37 threaded through one of the brackets and bearing against the said tube. The lower end portion of the tube is bent to ex-
 130

tend forwardly. A suction nozzle indicated by the numeral 38 is swiveled as at 39 to the lower forward end of the tube 35 so that it will at all times rest flat upon the surface over which the machine is being moved regardless of whether the machine as a whole is solely upright. As a consequence, but a single traction rim is needed and the operator need not be careful to hold the machine in upright position, strictly speaking. It will be understood, moreover, that by loosening the set screw 37, the tubes 35 may be raised or lowered and that its lower end may be also swung around at an angle if desired, this being done when it is necessary to have the suction nozzle of the machine pass over a surface in the angle between two walls.

The form of the invention shown in Fig. 4 of the drawings is identical with that illustrated in the first three figures of the drawings except that in the latter instance the pistons and cylinders are dispensed with and in their stead are employed bellows arranged in a like manner around a common center and forming between them a vacuum chamber. In this instance, the body of the bellows is indicated by the numeral 40 and the bellows head or movable part by the numeral 41, the pitmen indicated in Fig. 4 of the drawings by the numeral 42, being connected to the head 41 in the same manner as is the pitman 16 connected to the piston 15.

From the foregoing description of the invention it will be seen that there is provided a vacuum cleaner in which the suction means is directly traction driven, the employment of motors or hand operated pumps or bellows being in this manner obviated. It will also be seen that there is provided a vacuum cleaner in which the suction chambers constitute the frame of the machine, the traction means being in the nature of ring supported by and rotatable about the said suction chambers. It will furthermore be observed from an inspection of Figs. 1 and 4 of the drawings that the parts are so relatively arranged and geared that the pistons, in the instance of the form of the invention shown in Figs. 1 to 3 and the bellows head 41 in the instance of the form shown in Fig. 4, will be operated successively to exhaust air from the respective vacuum chambers so that a continual suction force is exerted through the tube 35 and as the suction nozzle 38 passes over the surface to be cleaned particles of dust and dirt will be sucked up through the pipe 35 and into the sack or bag 30 from which it may be readily removed after a quantity has been collected. Furthermore, the machine will operate as successfully if run backward as if run forward so that the person using the same can give a backward and forward movement to

the machine as is done with an ordinary carpet sweeper.

What is claimed is:—

1. In a vacuum cleaner, a plurality of suction chambers arranged about a common center, a vacuum chamber common to all of said suction chambers, a receiving chamber in communication with said vacuum chamber, and a traction rim supported by the suction chambers and having operative connection with suction creating means therein.

2. In a vacuum cleaner, a plurality of suction chambers arranged about a common center, a traction rim supported for rotation about the said chambers and by the same, suction creating means operating in the chambers and having operative connection with and driven by the traction rim, a vacuum chamber common to all of the suction chambers, and a receiving chamber in communication with said vacuum chamber.

3. In a vacuum cleaner, a plurality of suction chambers arranged about a common center, suction creating means working in said chambers, a traction rim supported by the chambers for rotation, a crank disk carried by each chamber and driven by the traction rim, operative connection between the crank disk and the suction creating means of each chamber, and a receiving chamber in communication with all of said suction chambers.

4. In a vacuum cleaner, a plurality of suction chambers arranged about a common center, a vacuum chamber common to all of said suction chambers and located therebetween, suction creating means within each suction chamber, a traction rim supported for rotation upon the suction chambers and having operative connection with the suction creating means of all of the chambers, the said suction chambers constituting the frame of the cleaner, a receiving chamber, and a pipe opening into the vacuum chamber and supporting the receiving chamber and in communication therewith.

5. In a vacuum cleaner, a plurality of suction chambers arranged about a common center, a vacuum chamber common to all of said suction chambers and located therebetween, suction creating means within the suction chambers, a traction rim supported for rotation upon the suction chambers and formed with a flange having gear teeth, a crank disk mounted upon each suction chamber and having a flange riding against one side of the toothed flange of the traction rim, each crank disk embodying a gear section meshed with the said flange of the traction rim, operative connection between each crank disk and the relative suction creating means, the said traction rim being formed with a circumscribing guide groove, an arm upon each suction chamber, a roller

journaled upon each arm and traveling in the guide groove of the traction rim, a receiving chamber, and a pipe opening into the vacuum chamber and supporting the receiving chamber and in communication therewith.

In testimony that I claim the foregoing

as my own, I have hereto affixed my signature in the presence of two witnesses.

LUTHER VAN NETTE.

Witnesses:

Jos. B. STEWART,

A. W. BOYD.