E. T. S. CLIFFE.

VACUUM CLEANING APPARATUS.

APPLICATION FILED MAR. 31, 1919.

1,345,478. **Patented July 6, 1920.**

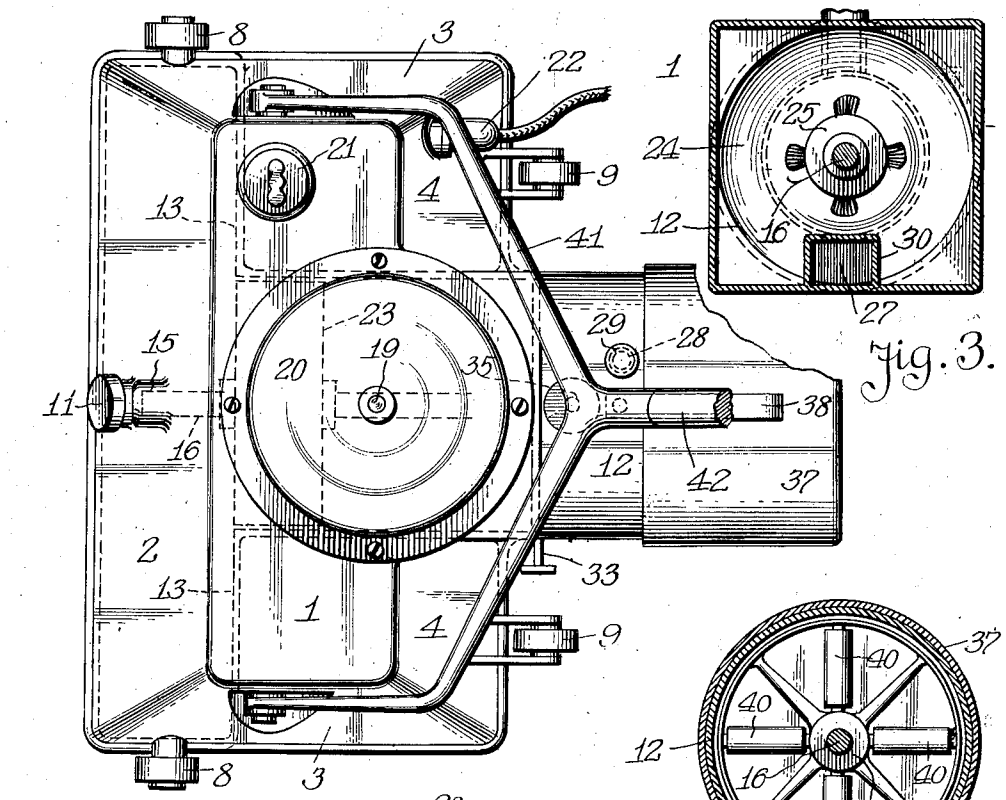


Fig. 1.

Fig. 3.

Fig. 4.

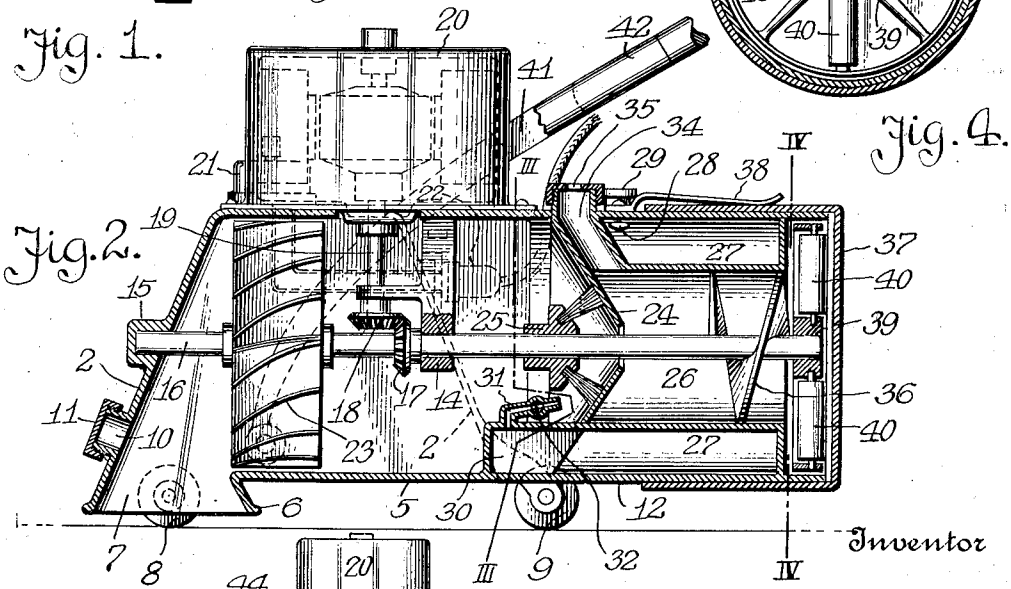


Fig. 2.

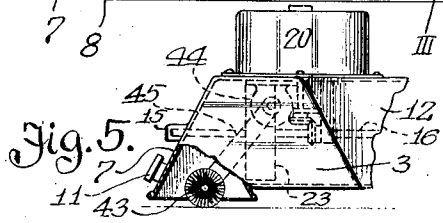


Fig. 5.

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UNITED STATES PATENT OFFICE.

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VACUUM CLEANING APPARATUS.

1,345,478. Specification of Letters Patent. Patented July 6, 1920.

Application filed March 31, 1919. Serial No. 286,526.

To all whom it may concern:

Be it known that I, ELZA T. S. CLIFFE, a citizen of the United States of America, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Vacuum Cleaning Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a vacuum cleaning apparatus, and has special reference to that type of apparatus which is manually shifted over a surface to be cleaned and electrically operated to produce a suction or reduction of atmospheric pressure in the apparatus to remove dirt and other matter from surfaces, and convey the same to a suitable receptacle.

The primary object of my invention is to provide a vacuum cleaning apparatus of the above type with positive and reliable means, in a manner as hereinafter set forth, for collecting, conveying and compressing dirt and other matter into briquets or other forms so that the same may be conveniently removed from the apparatus.

Another object of my invention is to furnish a vacuum cleaning apparatus with a novel self-adjusting container for dust and other matter in which the dust and matter may be packed so as to occupy a comparatively small space and be easily removed from the container. Such an addition to the apparatus obviates the necessity of using a bag or similar receptacle.

A further object of my invention is to provide a vacuum cleaning apparatus with simple and effective means for compressing dust and other matter within the apparatus, without any danger of the apparatus being clogged or rendered inoperative due to the accumulation of dirt in the movable parts thereof.

The above and other objects are attained by a mechanical construction that will be hereinafter considered, and reference will now be had to the drawing, wherein—

Figure 1 is a plan of the vacuum cleaning apparatus, partly broken away;

Fig. 2 is a longitudinal sectional view of the same;

Fig. 3 is a cross sectional view taken on the line III—III of Fig. 2, and

Fig. 4 is a similar view taken on the line IV—IV of Fig. 2, and

Fig. 5 is a detail view of a modified form of my invention.

In the drawing, the reference numeral 1 denotes a casing having an inclined front wall 2, inclined end walls 3 and inclined rear walls 4, said casing being somewhat frusto-pyramidical shaped adjacent its end and said casing includes a bottom plate or base 5 which at its front edge has an inclined rearwardly extending wall 6 coöperating with the lower edges of the walls 2 and 3 providing a nozzle 7 adapted to be moved over a surface, as a carpet.

The end walls 3, adjacent the front wall 2, have casters 8 and the rear walls 4 are provided with casters 9 adapted to coöperate with the casters 8 in supporting the apparatus above a floor with the nozzle 7 in proximity thereto, so that when a partial vacuum is produced within the nozzle 7, dust, dirt and other matter will be drawn therein. In order that the same nozzle may serve another source for producing the suction in the nozzle, the front wall 2, intermediate the ends thereof has a connection 10 normally closed by a cap 11.

Intermediate the ends of the casing 1 is a cylindrical shell or cam housing 12 which has its axis at a right angle to the casing 1 and extends rearwardly from said casing, the front end of said shell communicating with an opening in a longitudinal partition 13 in the casing 1, said partition forming the rear wall of the nozzle 7.

The shell 12 is provided with a bearing 14 coöperating with the bearing 15 of the front wall 2 in supporting a motor driven shaft 16 which extends longitudinally of the shell 12 and is provided with a beveled gear wheel 17 meshing with a beveled gear wheel 18 on the lower end of the armature shaft 19 of an electric motor 20, said motor being mounted on top of the casing 1. The top of the casing 1 also supports a suitable switch 21 which is in circuit with the electric motor 20 and a plug 22 carried by the rear wall 4 of the casing. The plug 22 is adapted for a circuit including a suitable source of electrical energy, such as may be furnished by an ordinary electric light circuit and with the electric motor of a conventional form the shaft 16 may be driven and controlled by the switch 21.

On the shaft 16 at the forward end of the shell 12 is a fan 23 adapted to produce

a suction or partial vacuum in the nozzle 7 to direct dust, dirt and other matter collected by said nozzle toward the rear end of the shell.

Intermediate the ends of the shell 12 is a conical partition 24 having a central opening providing clearance for the motor driven shaft 16, and on said shaft adjacent the partition is a circular brush 25 adapted to wipe or brush the partition 14 and prevent the accumulation of dust and dirt on said partition. This partition serves as a deflector and causes the dust and dirt to pass through the central opening thereof, around the shaft 16 into a cylindrical passage 26 formed by a circular reservoir 27 in the rear end of the shell 12. The reservoir 27 has a filling spout 28 extending out of the top of the shell 12 and normally closed by a cap 29. The forward end of the reservoir, at the bottom thereof has an extension 30 provided with a rearwardly extending jet 31 adapted to direct a stream or spray of water against the partition 24, so as to dampen the dust and dirt and cause it to gather in particles that are laden with moisture and may be compressed or packed, as will hereinafter appear. The water within the reservoir 27 is adapted to flow by gravity to the jet 31 and said jet has a conventional form of valve 32 with its stem 33 extending outside of the shell, as shown in Fig. 1, so that the valve 32 may be regulated or closed to render this portion of the apparatus inoperative.

The forward end of the passage 26 has a vent spout 34 extending through the top of the shell 12 and provided with an apertured cap 35, said vent spout permitting air to escape from the apparatus after having produced a partial vacuum in the nozzle 7 to serve as a vehicle for carrying dust and dirt to the partition 24.

On the motor driven shaft 16, within the passage 26, is a spiral conveyer 36 engaging the inner wall of the reservoir 27 and adapted to convey dirt toward the rear end of the shell 12; the moistened laden dirt being blown through the opening of the partition 24 against the conveyer.

Telescoping the rear end of the shell 12 is a container 37 which is slidable on the shell and frictionally held by a spring 38 mounted on said shell, said spring preventing accidental displacement of the container, but permitting of said container shifting outwardly as dust and dirt is packed against the end wall thereof.

The rear end of the motor driven shaft 16 is provided with a spider 39 supporting a plurality of radially disposed rollers 40 which are adapted to revolve against the end wall 37 or on dust and dirt packed against said wall. The rollers 40 constitute a member for compressing and packing dirt and other matter in the container 37 and as this container fills it slides from the shell 12 and just before becoming detached it may be removed and emptied. Since the dust and dirt is moistened and packed to cake form it is obvious that the capacity of the container 37 is such as to serve a long while before it is necessary to empty the container and this may be accomplished without any danger of spilling the contents of the container or again liberating dust to the atmosphere.

Connected to the end walls 3 of the casing 1 is a yoke or the forked end 41 of a handle bar 42 which may be manually manipulated to move the apparatus over a floor. It is possible to place the switch 21 on the handle bar 42 and arrange the electric conductors to the apparatus so that the same will be supported by the handle bar 42 while the apparatus is moved from one place to another.

In some instances it may not be necessary to use water or other liquid for moistening the dirt, and when necessary I reserve the right to use oil or any liquid that will cause the dirt and dust to solidify or pack.

In Fig. 5, the nozzle 7 of the casing is provided with a rotary brush 43 and within one end of the casing is a small electric motor 44 which may have a suitable transmission device 45, as a belt, for transmitting power to the rotary brush 43. The rotary brush will agitate the surface over which the apparatus moves and as dirt, dust and other matter are operated by the brush, the suction within the nozzle 7 will draw the matter into the apparatus. Suitable provision may be made for controlling the operation of the motor 44, similar to the large motor 20, and in same instances, the rotary brush 43 may have movement imparted thereto by simply moving the apparatus over a surface.

It is thought that the operation and utility of the vacuum cleaning apparatus will be apparent without further description, and while in the drawing, there is illustrated a preferred embodiment of my invention, it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:—

1. A vacuum cleaning apparatus comprising a casing adapted to receive dirt, a container slidable on said casing, a partition in said casing having an axial opening through which dirt passes from said casing to said container, and means adapted for compressing the dirt in said container, and means extending through the opening of said partition for operating said compressing means.

2. An apparatus as characterized in claim 1, wherein said compressing means is in the form of radially disposed rollers adapted to pack the dirt against the end wall of said container.

3. An apparatus as characterized in claim 1, wherein additional means moistens dirt at said partition.

4. The combination of a vacuum cleaning apparatus, a casing, and a dirt container slidable on the casing adapted to automatically slide relative to said casing as said casing is filled.

5. The combination set forth in claim 4, wherein the container telescopes the rear end of said casing and is adapted to have dirt packed against the end wall thereof.

6. A vacuum cleaning apparatus comprising a casing adapted to receive dirt, a motor driven shaft longitudinally of said casing, a container communicating with said casing, radially disposed means operated by said shaft in a plane parallel to a wall of said container and adapted to pack dirt against the wall of said container, and a reservoir adapted to supply water for moistening the dirt prior to being packed in said container.

7. An apparatus as characterized in claim 6, wherein the container has rigid walls movable relative to said casing as the dirt is packed therein.

In testimony whereof I affix my signature in the presence of two witnesses.

ELZA T. S. CLIFFE.

Witnesses:
G. W. STATLER,
E. REMY.