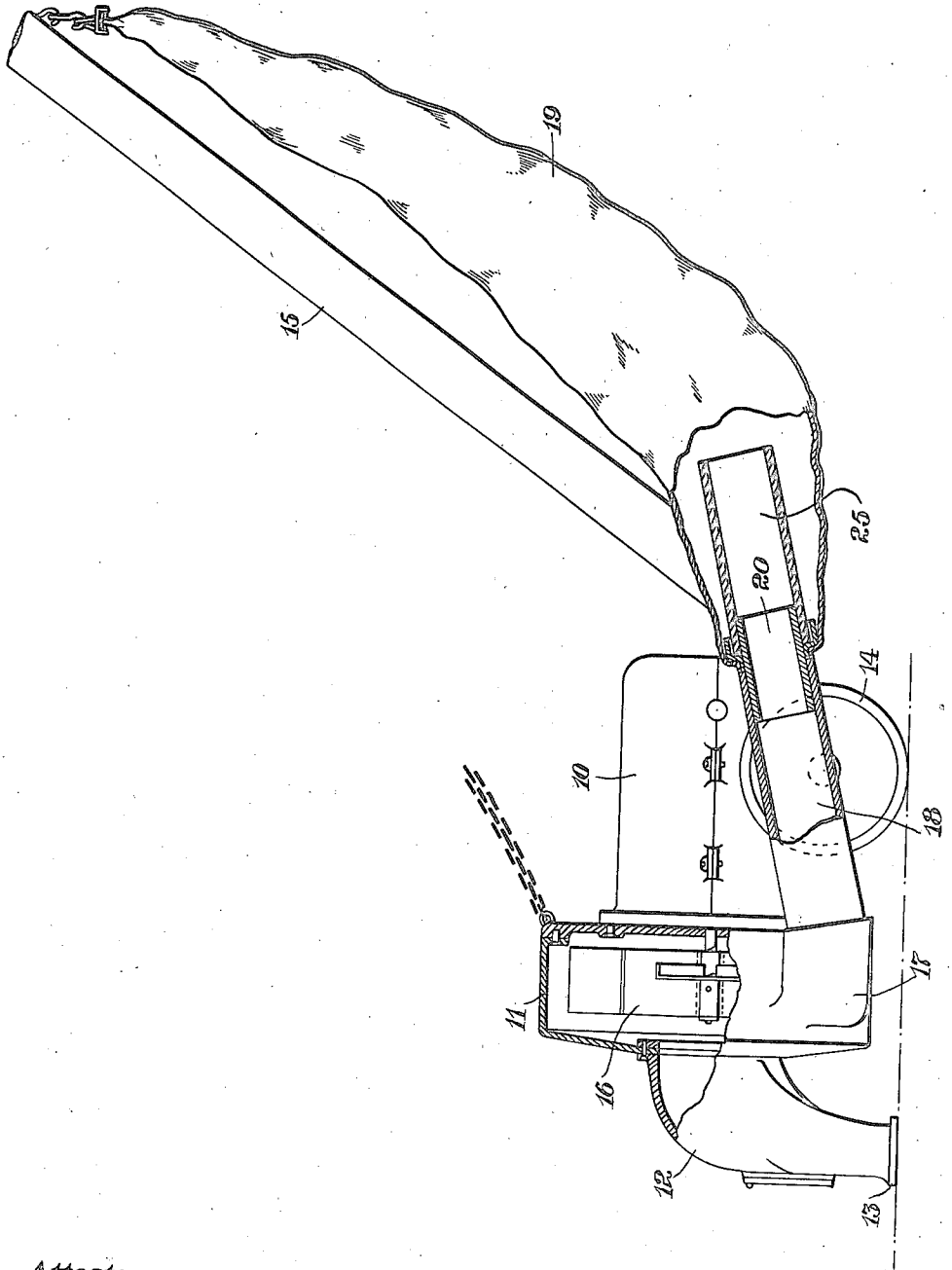
W. W. ROSENFIELD.

SUCTION CLEANER.

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1,253,535.

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SUCTION-CLEANER.

1,253,535. Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed March 20, 1913. Serial No. 755,578.

To all whom it may concern:

Be it known that I, WILLIAM W. ROSENFIELD, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Suction-Cleaners, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a sound muffling device for suction cleaners. The invention has been made especially with the idea of providing means for muffling the sound produced by electrically driven suction cleaners of the self-contained type in which the motor, fan, suction nozzle and dirt receptacle are mounted to move together as the suction nozzle is moved over the surface to be cleaned, although the invention may be found useful and adaptable to other suction cleaners having rapidly rotated suction fans and which discharge directly into a dirt receptacle or otherwise. In such cleaners, and especially the small self-contained cleaners having rotary fans driven by electric motors, the fan is revolved at a very high speed, usually several thousand revolutions per minute, which results in the production of a considerable noise which is probably due largely to the vibrations set up in the discharge pipe leading from the fan chamber. This sound is very considerably reduced by my invention. I have found that by making the discharge tube of a suitable length it is possible to muffle or to avoid intensifying the vibrations of the air discharged through the tube under the action of the fan, such suitable length being a length which will not respond to vibrations corresponding to the operating speed of the fan, and, best and most conveniently for a cleaner of the type shown, a length greater than, but less than twice the length of, the shortest tube which will respond to vibrations set up by the fan, or vibrations corresponding to the operating speed of the fan.

There is more or less difference in the speeds of revolution of the fans in different suction cleaners of the same make and style, and even in any particular cleaner the fan will be driven at different speeds under varying operating conditions; and I have noticed that with intendedly identical cleaners having discharge conduits of the same length, the noise due, apparently, to vibrations in the discharge conduit is much greater in some than in others. In order to meet the conditions resulting from such differences and variations in operating speed of the suction fans, I find it best that the total length of the discharge tube should be greater than that of the shortest tube which will respond to vibrations of the air corresponding to the lowest normal operating speed of revolution of the fan and less than twice the length of the shortest tube which will respond to vibrations corresponding to the highest normal operating speed of revolution of the fan.

To provide a discharge tube of suitable length to serve the purpose of the invention, I preferably attach to the rigid discharge tube or conduit leading from the fan chamber, a muffler formed of a short piece of tube, preferably of flexible rubber fabric tubing, which extends into the porous receptacle or dust collecting bag. There is an additional advantage in having the tube project into the bag in that a space is thus provided around the muffler tube in which dust discharged into the bag may collect.

In the accompanying drawing I have shown in side elevation partly broken away a self-contained suction cleaner provided with muffling means in accordance with the present invention.

Referring to the drawing, the suction cleaner shown has a body formed by a motor casing 10 and a fan casing 11 joined one to the other and each being of cylindrical form and set horizontal. Secured to the front of the fan casing is a downwardly extending casing 12 providing an intake passage and which communicates through a central opening with the interior of the fan casing, the lower end of the casing 12 being contracted in the direction longitudinal of the machine and extended transversely of the machine to form a suction or cleaning nozzle 13 having its bottom edge or face formed with an elongated intake slot. The machine is supported by the suction nozzle and by a pair of running wheels 14 and is operated by means of a pivoted handle 15. A rotary fan 16 mounted within the fan casing is driven by an electric motor mounted within the motor casing 10. A discharge passage 17 leads off tangentially from the bottom of the fan chamber and communicates through a backwardly leading discharge conduit or tube 18 with a receptacle

19 for the dirt and dust discharged from the fan chamber. The dirt receptacle 19 may be a bag or suitable close woven fabric as shown, one end being connected to the discharge conduit as by being secured to a short length of tubing 20 adapted to slip into the end of the conduit 18, and the other end of the bag being suitably supported from the operating handle and being formed with an opening for cleaning out the bag which is normally closed; or any other suitable receptacle of a porous nature to permit the air to escape while retaining the dirt, dust, scraps, etc. received from the fan, might be provided. When the machine is in use, the suction fan rotating at high speed draws the air in strongly through the intake passage and forces it out through the discharge passage, the dirt and dust from the carpet or rug or other material or surface over which the cleaner is moved being thus drawn in through the nozzle and intake passage to the fan chamber and discharged into the receiving bag 19 where the dirt and dust are retained while the air escapes through.

The muffling device for lessening the sound produced by the air discharged through the tube 18 under the action of the rapidly revolving fan, consists in the example shown in the figure of a short piece of tube 25, preferably, though not necessarily, of flexible rubber fabric tubing, which forms an extension of the discharge conduit 18 into the dust collecting bag 19, being in the particular construction shown secured to the connecting pipe 20. The effect of this muffler tube 25 is to make the whole discharge tube of a suitable length to muffle or to avoid intensifying the sound produced by the vibrations of the air discharged through the tube under the action of the fan. The result might be obtained by simply lengthening the tube or conduit 18, but this would, with the bag connected to the tube in the manner shown in the drawings, bring the lower end of the bag 19 too far in the rear of the machine for convenience, and, furthermore, there is, as before pointed out, an important advantage in having the tube project into the bag since the dust discharged into the bag may thus collect around the muffler tube instead of falling back into the tube, and a clear passage for the discharge of air and dust from the fan chamber into the bag is maintained at all times. For this purpose the tube so projecting into the bag should, as shown, be self-supporting or normally non-collapsing, but also flexible so as to readily bend upward with the bag when the pivoted handle is thrown up to vertical position.

For best results, as before stated, the total length of the discharge tube including the muffler extension should be greater than that of a tube which will respond to vibrations of the air corresponding to the lowest normal speed of revolution of the fan and less than twice the length of the shortest tube which will respond to vibrations corresponding to the highest normal speed of revolution of the fan.

What is claimed is:

1. In a suction cleaner, the combination with a rotary suction fan and a porous receptacle into which a discharge conduit leads from the fan casing, of means for muffling the sound produced by the air passing through the discharge conduit under the action of the fan comprising a piece of flexible self-sustaining tubing forming an extension of the discharge conduit and extending a substantial distance into the porous receptacle.

2. In a suction cleaner, the combination with a rotary suction fan and a porous receptacle into the bottom of which a conduit leads from the fan casing, of a self-sustaining sound muffling discharge pipe of flexible rubber fabric tubing arranged to extend a substantial distance into the porous receptacle so as to leave a space for dirt to collect about the end of said pipe.

3. In a suction cleaner, the combination with a rotary suction fan and a porous receptacle into which a discharge conduit leads from the fan casing, of a self-sustaining discharge tube, the discharge end of which extends a substantial distance into the porous receptacle and which is of a length greater than that of a tube which will respond to vibrations of the air corresponding to the lowest normal operating speed of the fan and less than twice the length of the shortest tube which will respond to vibrations corresponding to the highest normal operating speed of the fan.

4. In a suction cleaner, the combination with a rotary suction fan and a dust receptacle of porous flexible material supported from a vertically swinging pivoted handle rod and connected at its lower end to the discharge conduit leading from the fan casing, of a flexible and normally non-collapsing discharge tube extending from the discharge conduit into the dust receptacle so as to leave space for dirt to collect about said tube.

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

WILLIAM W. ROSENFIELD.

Witnesses:
EMIL W. OPPENHEIM,
C. A. CORNELL.