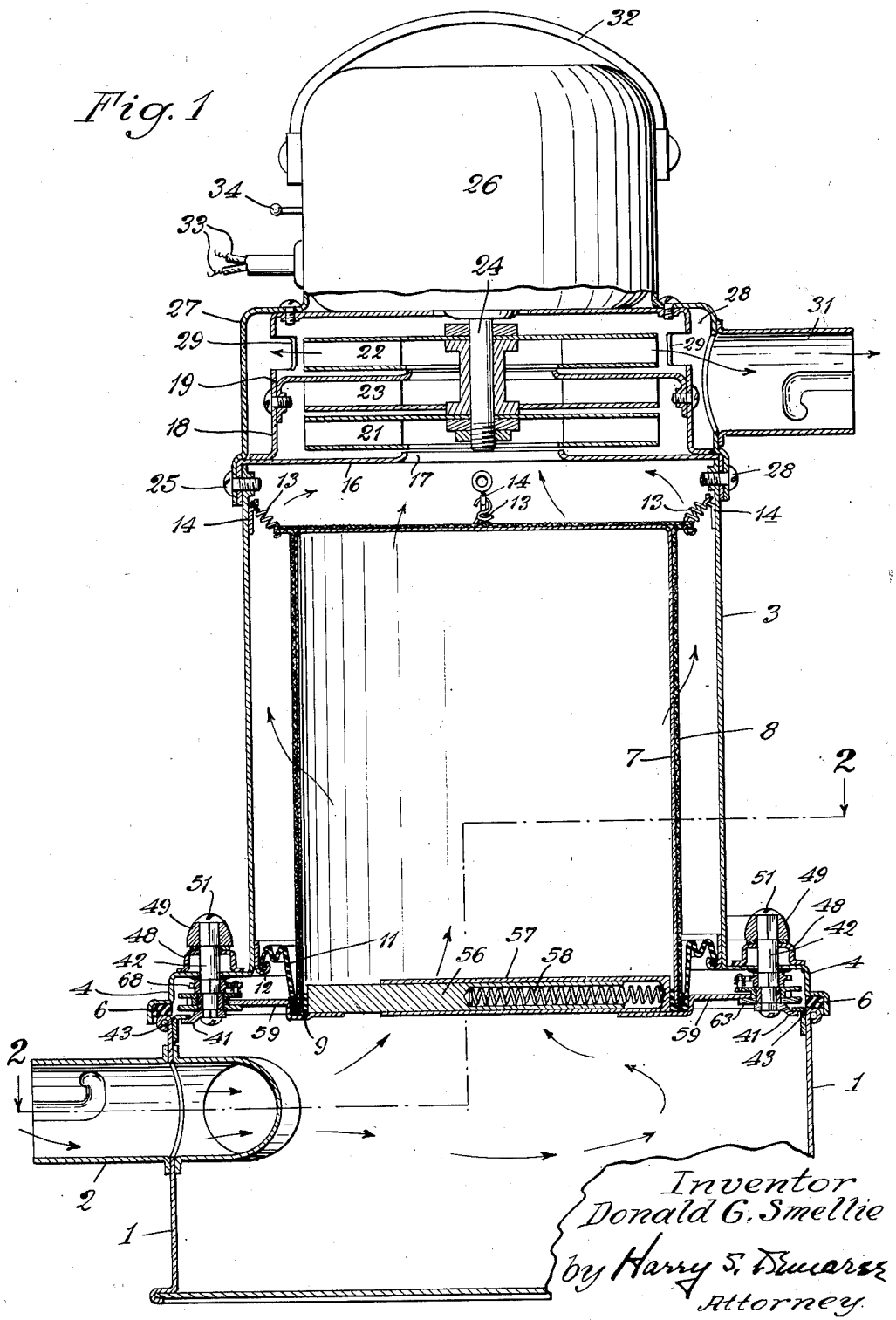
March 1, 1949. D. G. SMELLIE 2,463,435

SUCTION CLEANER

Filed April 26, 1945 2 Sheets-Sheet 1

Fig. 1



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SUCTION CLEANER

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Fig. 2

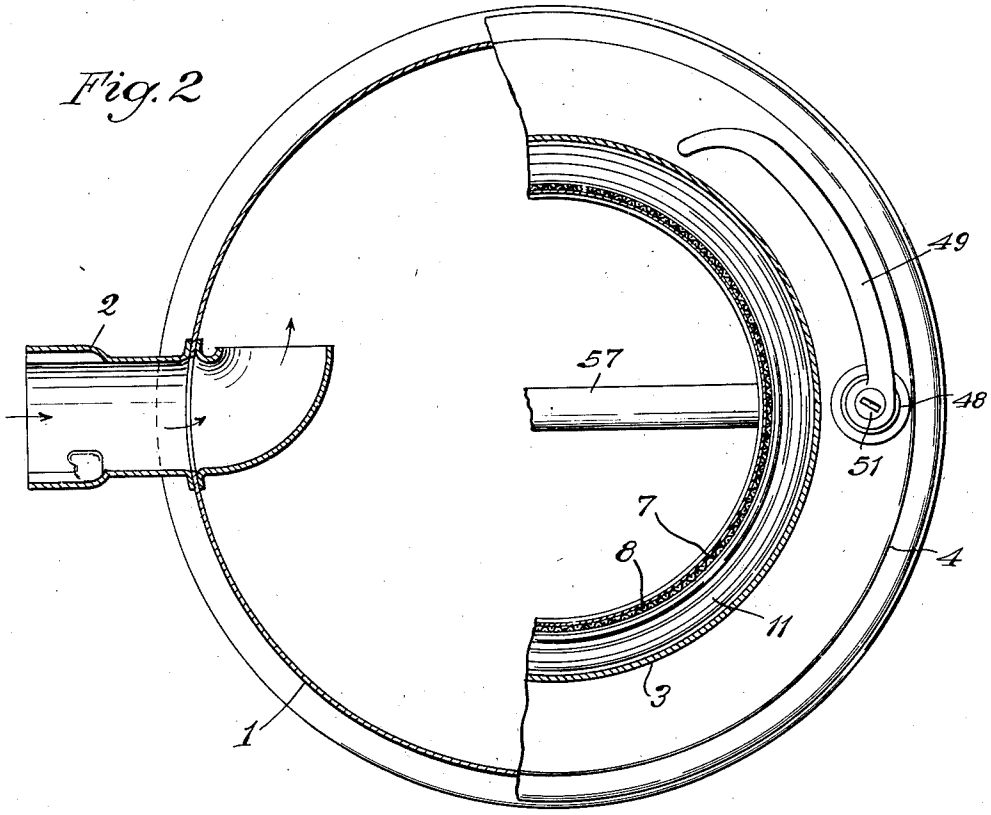


Fig. 3

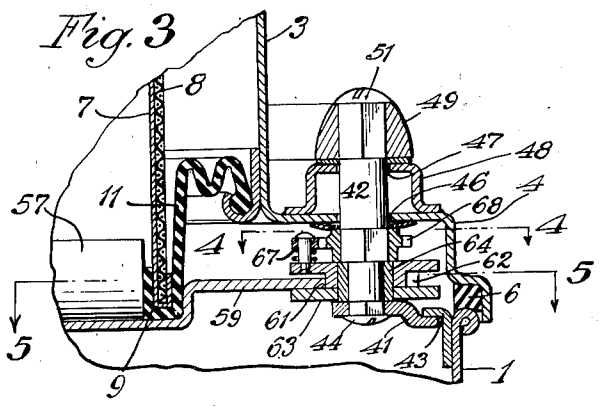


Fig. 4

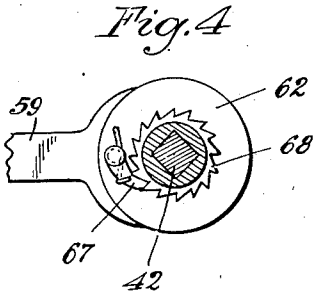
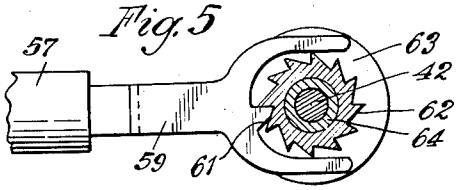


Fig. 5



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UNITED STATES PATENT OFFICE

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SUCTION CLEANER

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Application April 26, 1945, Serial No. 590,392

10 Claims. (Cl. 183—59)

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The present invention relates to suction cleaners in general and more particularly to a new and novel improved filter-cleaning device in a suction cleaner. More specifically the invention comprises a suction cleaner of the tank type in which the operation of emptying the dirt container automatically cleans the dirt filter.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a cleaner having new and improved filter-cleaning means. A still further object of the invention is to provide a tank type cleaner in which the operation of removing the dirt-collecting receptacle automatically results in the cleaning of the dirt filter. A still further object of the invention is to provide a suction cleaner in which the dirt receptacle is retained by manually operable latch means which, in being actuated to release the dirt receptacle, automatically effect the dirt-dislodging vibration of the dust bag. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which a preferred embodiment of the invention is disclosed, and in which the same reference character refers to the same part throughout:

Figure 1 is a vertical section through a suction cleaner constructed in accordance with a preferred embodiment of the present invention; and

Figure 2 is a section taken upon the broken line 2—2 of Figure 1; and

Figure 3 is an enlargement of the vertical section through the latch mechanism shown in Figure 1; and

Figure 4 is an enlarged view of the pawl and ratchet arrangement which enables the manually operable latch to actuate the bag-vibrating mechanism in rotating in one direction only; and

Figure 5 is an enlarged showing of the latch-rotated cam which actuates the filter shaker.

In suction cleaners of the tank type it is possible to provide a metallic dirt receptacle in which the dirt collects and from which it can be readily displaced upon the removal of the receptacle from the cleaner. If the receptacle only is removed and cleaned, the cleaner filter remaining in place, the means are necessary to dislodge collected foreign material on the filter in order to prevent an undue resistance to the flow of air therethrough. In the suction cleaner constructed in accordance with the present in-

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vention means are provided which automatically effect the cleaning of the cleaner filter as the operator releases the dirt receptacle.

Returning now to the drawings a tank type cleaner of the vertical type is shown although the invention is fully applicable to a cleaner which has its major axis horizontally arranged. The cleaner is seen to comprise a base 1 which is formed as a dirt receptacle having an open top and into which extends the inlet port 2. A cylindrical casing 3 having a flanged or shouldered lower end 4 seats upon the open mouth of the receptacle 1, a rubber seal element 6 providing an air-tight joint. Within the casing 3 is a filter 7 which may be of suitable filtering material, such as cloth or paper, and which is preferably provided with an outer surrounding supporting screen which may be metal, or its equivalent, and which is indicated by the reference character 8. The filter 7 is formed as a bag and its mouth opens downwardly into the receptacle 1 and is seated in an inner peripheral channel or groove 9 formed in a flexible bellows-like seal 11, the outer peripheral edge of which is carried by a grooved ring 12 carried by the inner face of the casing 3. The upper end of the filter-supporting element 8 is resiliently carried by the upper end of the casing 3 by a plurality of spaced coil springs 13 each of which is secured to a bracket element 14 on the inner surface of 3.

The upper end of casing 3 is closed by a plate or wall 16 having a central aperture 17 which forms the eye of a fan unit 18 and which includes a casing 19 and spaced fans 21 and 22 which are separated by a guide vane element 23. The fans 21 and 22 are mounted upon the rotatable shaft 24 of a motor 26 which is positioned immediately above the fan unit and the casing 27 of which extends down and around the fan unit casing 19 to seat upon the upper end of the casing 3, being secured in place by screws 25. The casing 27 forms an exhaust chamber 28 around the fan chamber 19 into which air is exhausted from the fan unit through the exhaust ports 29. An exhaust port 31 is provided in the casing 27 and through this port the air makes its way from the exhaust chamber to atmosphere.

As in the usual cleaner a carrying handle 32 is provided, being connected in this case to the upper end of the motor 26. Incoming power leads to the motor, here indicated as 33, extend into the motor 26, being controlled by a manually operable switch 34.

The cleaner above the dirt receptacle 1 removably seats thereon and is releasable there-

from by virtue of the presence of one or more manually rotatable latches 41 each of which is rotatably carried upon a pin 42 which is adapted to extend under a fixed shoulder 43 upon the side wall of the receptacle 1. The latch cooperates with the shoulder to draw the casing 3 against the receptacle 1 and compresses the air seal 6. The pin 42 extends upwardly from the latch 41, which is secured thereto by a screw 44, through an aperture 46 in the casing 3, through an aperture 47 in a mounting bracket 48 rigidly carried upon the upper surface thereof, to be provided at its upper end with a manually movable latch handle 49 which is non-rotatably mounted thereon and secured in place by a screw 51. A handle 49 is shown in the locking position in Figure 2 and to release the casing from the receptacle it is pivoted in a clockwise direction, as illustrated in Figure 2, and results in the movement of the latch 41 from under the bracket shoulder 43 thereby permitting of the lifting of the cleaner from its receptacle base.

To effect the cleaning of the filter 7 means are provided which effect the vibration of the filter simultaneously with the release of the latch 41. Specifically the mechanism includes a filter shaker having an inner member 56 and outer telescopically arranged element 57 which is urged therefrom by a coil spring 58. The opposite ends of members 56 and 57 abut the inner surfaces of the filter and support unit 7, 8 and are connected to arms 59 which are bifurcated and which include a cam follower 61 adapted to ride in contact with a ratchet cam 62 under the urging of the coil spring 58. Each cam 62 is mounted rotatably upon a latch pin 42 and is supported longitudinally on the pin 42 by an underlying disc 63 positioned immediately above the latch 41 which also serves to support the bifurcated ends of the arm shaker 59. A bearing 64 between the cam 62 and the shaft 42 makes easier the rotation of the cam. The cam teeth are so shaped that upon the rotation of the cam in one direction, clockwise as viewed in Figure 5, the cam follower 61 and so the arm 59 will be reciprocated as the cam follower 61 slips over each tooth. The resulting movement will be transferred to the lower end of the bag, which, as is illustrated in Figure 1, has its lower edge positioned between shaker elements 56 and 57 and the arms 59. In the illustrated embodiment there is a pair of latches and the actuation of each effects the vibration of the bag, the slip joint permitting independent shaking operations by the two latch mechanisms.

It is desired that the bag should be vibrated and foreign material dislodged therefrom only at the time of emptying the receptacle, that is, only in the rotation of the latch handle 49 and the shaft 42 in one direction. To insure this result the shaker-actuating ratchet cam 62 carries at its upper side a spring-pressed pawl 67 which rides upon a ratchet 68 non-rotatably seated upon an irregular cross-sectioned length of the pin 42. The arrangement is such that with the rotation of the pin 42, and so the ratchet 68, in one direction the pawl 67, together with the shaker-actuating cam 62, will be rotated as a unit. In the rotation of the shaft 42 and the ratchet 68 in the opposite direction, however, the teeth of the ratchet 68 will slide past the pawl 67 and no rotation of the shaker-actuating cam 62 will be effected.

In the drawing, and in Figure 2 in particular, a latch mechanism is illustrated at diametrically

opposite sides of the receptacle. These mechanisms are identical and obviously the bag unit will be vibrated as each latch is actuated, the bag-supporting screen being vibrated in addition to the filter proper.

After extended cleaner use, it being desired to remove the dirt from the dirt receptacle 1, the operator releases the upper part of the cleaner from its supporting receptacle base by pivoting the latch handles 49. Thereupon automatically and independent of any judgment on the part of the operator, the aforedescribed bag-shaking mechanism effects the vibration of the filter 7 and dislodgment therefrom of collected foreign material which falls downwardly into the receptacle 1. Upon lifting off of the upper part of the cleaner by the use of a handle 32 the operator is enabled to remove and empty the collected foreign material from the bag 1.

It is to be understood that the protection herein applied for is not confined to the particular combinations of features or elements set out in the following claims. Protection is herein applied for for any one or more of the features or elements referred to in the following claims, or described in the foregoing specification or shown in the accompanying drawing, either independently or in combination.

I claim:

1. In a suction cleaner, a casing having a removable dirt receptacle, a filter in said casing positioned above said receptacle, resilient means mounting said filter for limited movement in said casing, said resilient means including a flexible annular bellows-like seal, securing means retaining said receptacle in place relative to said casing, and means actuated by said securing means in their movement to release said receptacle to vibrate said filter by substantially radial deformation of the open end of said filter to dislodge collected foreign material therefrom.

2. In a suction cleaner, a casing having a removable dirt receptacle, a downwardly opening dirt bag in said casing positioned above said receptacle, resilient means mounting said bag for limited movement in said casing, said resilient means including a flexible annular bellows-like seal, securing means retaining said receptacle in place relative to said casing, and means actuated by said securing means in their movement to release said receptacle to vibrate said bag by substantially radial deformation of the open end of said bag to dislodge collected foreign material therefrom.

3. In a suction cleaner, a casing having a removable dirt receptacle, a filter in said casing positioned above said receptacle, resilient means mounting said filter for limited movement in said casing, a rotatable latch having a manually operable handle to secure said receptacle in place relative to said casing, a rotatable cam connected to said latch and adapted to be rotated by the movement of said latch, a bag shaker, and a cam follower connecting said shaker to said cam to actuate said shaker upon the rotation of said cam.

4. In a suction cleaner, a casing having a removable dirt receptacle, a filter in said casing positioned above said receptacle, resilient means mounting said filter for limited movement in said casing, a plurality of latches having a manually operable handle to secure said receptacle in place relative to said casing, a cam connected to each of said latches adapted to be moved by the move-

ment of that latch, a bag shaker, cam followers connecting said shaker to said cams to impart a shaking movement thereto upon the movement of a cam, said shaker including a slip joint to enable said followers to operate independently.

5. In a suction cleaner, a casing having a removable dirt receptacle, a filter in said casing positioned above said receptacle, resilient means mounting said filter for limited movement in said casing, a rotatable latch having a manually operable handle to secure said receptacle in place relative to said casing, a rotatable cam, means connecting said cam to said handle to rotate said cam in the rotation of said handle in one direction only, a bag shaker, and a cam follower connecting said shaker to said cam to actuate said shaker upon the rotation of said cam.

6. A filter shaker mechanism for a suction cleaner comprising a casing having a removable dirt receptacle and a filter in said casing adapted to discharge dirt into said receptacle upon shaking of said filter, said filter shaker mechanism comprising an inner member and an outer telescopically arranged member, and resilient means tending to separate the aforesaid members, said members arranged to form a shield for the resilient means from the dirt laden air, said mechanism mounted diametrically with respect to the open end of the filter and in the path of the dirt laden air, and means for actuating the shaker mechanism external of the casing and connected to the aforesaid members whereby the filter is vibrated.

7. A filter shaker mechanism for a suction cleaner comprising a casing having a removable dirt receptacle adapted to be latched to the casing and a filter in said casing adapted to discharge dirt into said receptacle upon shaking of said filter, said filter shaker mechanism comprising a plurality of spring actuated members adapted for to and fro movement, said mechanism mounted diametrically with respect to the open end of the filter and connected thereto, means for actuating the shaker mechanism external of the casing and connected to the aforesaid members whereby the filter is adapted to be deformed radially vibrating the filter, means for latching the dirt receptacle to the casing, and said means for actuating the shaker mechanism adapted for unlatching the dirt receptacle.

8. The combination with a suction cleaner comprising a casing having a removable dirt receptacle and a deformable filter in said casing, of a support for the filter, the support comprising a deformable bellows-like annular member adapted to be affixed to the casing and to support the filter at its open end forming a seal between the filter and casing to direct the flow of dirt laden air within the filter, the seal adapted to be deformed whereby the filter may be vibrated discharging the dirt collected on the filter into the dirt receptacle.

9. In a suction cleaner, a casing having a removable dirt receptacle, a filter in said casing positioned above said receptacle, resilient means mounting said filter for limited movement in said casing, securing means retaining said receptacle in place relative to said casing, and filter deforming means automatically actuated by said securing means in their movement to release said receptacle to vibrate said filter to dislodge collected foreign material therefrom.

10. In a suction cleaner, a casing having a removable dirt receptacle, a downwardly opening dirt bag in said casing positioned above said receptacle, resilient means mounting said bag for limited movement in said casing, securing means retaining said receptacle in place relative to said casing, and bag deforming means automatically actuated by said securing means in their movement to release said receptacle to vibrate said bag to dislodge collected foreign material therefrom.

DONALD G. SMELLIE.

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(1st Addition to No. 377,075)