

May 17, 1938.

W. D. SELLERS

2,117,368

SUCTION CLEANER

Filed Nov. 9, 1935

2 Sheets-Sheet 1

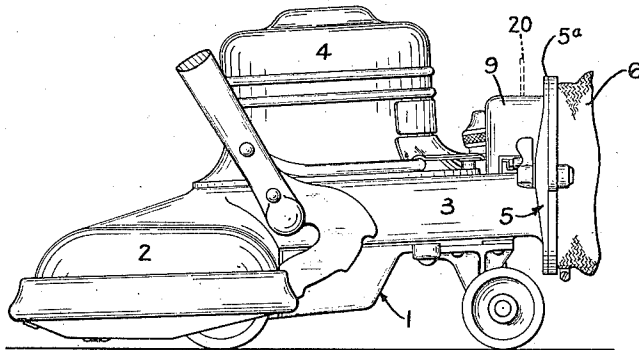


Fig. 1

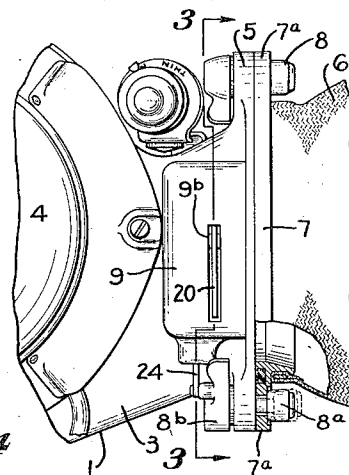


Fig. 2

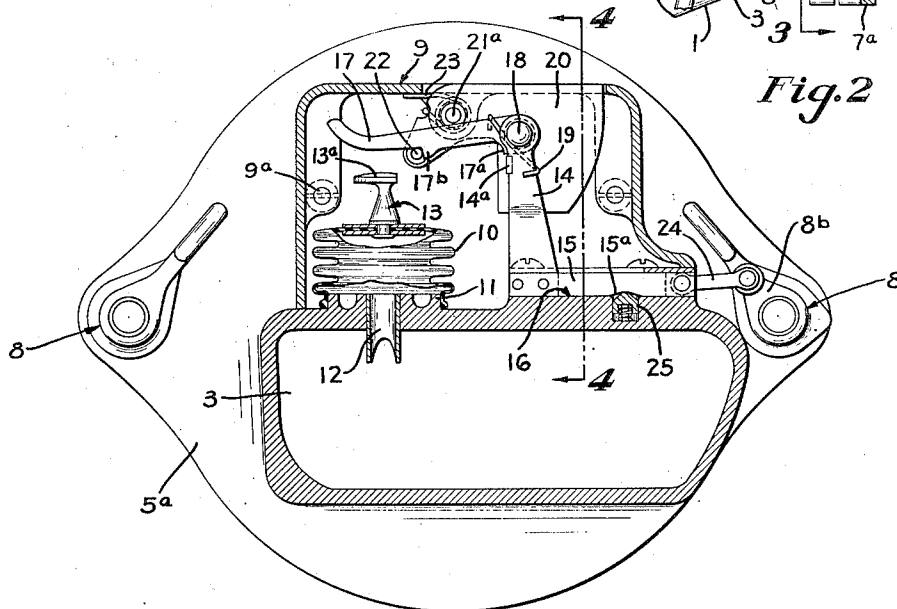


Fig. 3

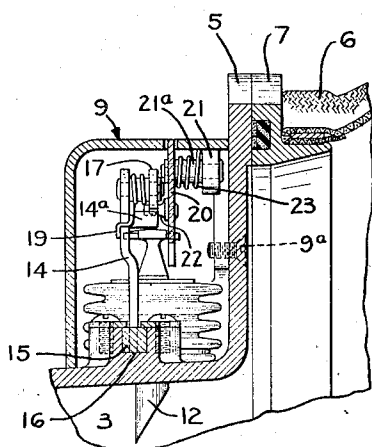


Fig. 4

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2 Sheets-Sheet 2

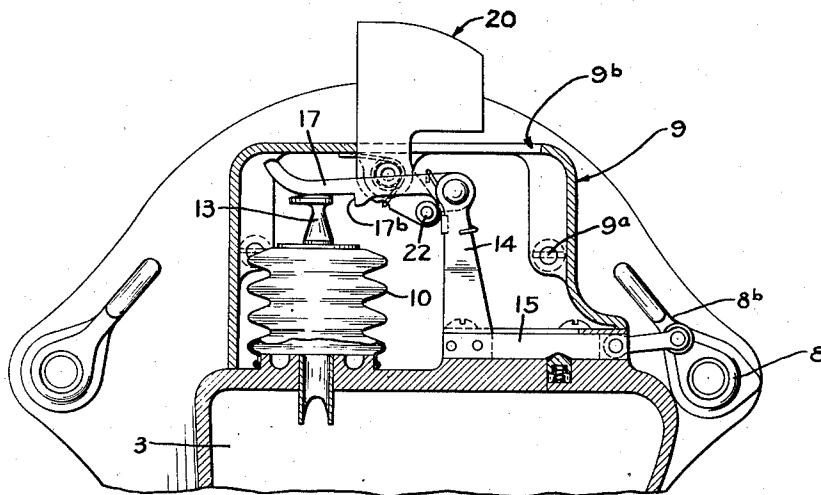


Fig. 5

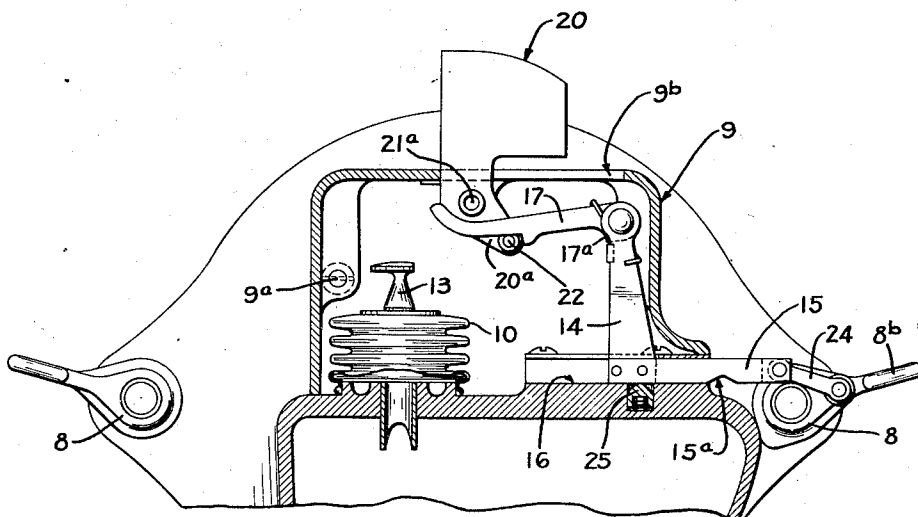


Fig. 6

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SUCTION CLEANER

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Application November 9, 1935, Serial No. 48,973

5 Claims. (Cl. 257—136)

This invention relates to improvements in suction cleaners and more particularly to a novel signal device applicable to suction cleaners for warning the operator when the dust receptacle or bag has become so filled with dirt and litter as to require emptying.

As is well known in the art of suction cleaning a common type of dust receptacle is a fabric bag permeable to the air entering under pressure but retaining the dirt particles therein. Thus, so long as the bag does not become filled with dirt beyond a predetermined limit little or no resistance is offered to the escape of the air from the bag. It follows therefore, that if the bag is not emptied regularly, it will become filled with an excess of dirt with the result that a back pressure is created within the bag which is detrimental to the proper operation and efficient performance of the cleaner and, notwithstanding the fact that the dust bag is quickly and easily detached from the body of the cleaner for this purpose, users of suction cleaners frequently neglect to empty the bag and consequently the cleaner will be operated for long periods of time under inefficient conditions of operation and hence the object of the present invention is to provide an effective and quick acting signal device, responsive to the pressure in the dust bag and which will warn the operator when the dust bag should be emptied.

A further object of the invention provides a type of indicating or signal device of the so called "pop-up" type, namely, a device characterized by a spring actuated target or flag normally held in non-operative and concealed position and which when released springs up suddenly into a visible and warning position, thereby impressing upon the operator the need for emptying the dust bag without further delay.

The novel features of the invention, including the means for automatically resetting the signal member after the bag has been emptied, will now be described in connection with the accompanying drawings in which:

Figure 1 is a general view in side elevation of a suction cleaner in which the signal device of the present disclosure has been embodied.

Figure 2 is an enlarged fragmentary top plan view of the rear portion of the cleaner casing including the signal device.

Figure 3 is an enlarged detailed view in vertical section taken on line 3—3 of Figure 2.

Figure 4 is a detailed view in vertical section as taken on line 4—4 of Figure 3.

Figure 5 is a view similar to Figure 3 showing the signal member in warning position, and

Figure 6 is also a view similar to Figure 3 showing the position of the parts after the dust bag has been removed for cleaning and before the signal member has been reset.

Referring to Figures 1 and 2 the cleaner to which the present invention is especially adapted, consists of a main body or casing 1 having a transversely extending nozzle portion 2 at its forward end communicating with a rearwardly extending duct or passage 3 in which is mounted a fan driven by a motor housed within its casing 4. Rearwardly beyond the fan, the passage or duct 3 terminates in an exhaust outlet connection 5 and to which is removably attached the fabric dust bag 6, said outlet connection being surrounded by an annular flange 5a and the bag having at its attaching end, a solid metal ring 7 adapted to have flush sealing contact with the face of the flange 5a and to be removably attached thereto by means of a pair of clamping bolts 8, 8 engaging a pair of oppositely disposed notched ears 7a, 7a on the edge of the bag ring 7.

As clearly shown in Figures 3 and 4, the duct or air passage 3 is generally rectangular in cross-section but extended somewhat horizontally. Moreover, its rear end section meets the flange 5a surrounding the outlet connection 5 at an abrupt right angle providing ample space on its top surface and between the outlet connection and the motor casing 4 for the mounting of the signal device which is preferably housed within an auxiliary casing 9 immediately forward of the flange 5a and removably attached thereto as by screws 9a, so that the moving parts of the signal may be accessible.

The space enclosed by the housing 9 is extended transversely of the top wall of the air passage 3 and referring now to the parts housed within said casing the same comprise a pressure responsive element 10 in the form of a bellows member of a suitable flexible material and cylindrical in form with the usual corrugated side wall construction. The bellows is mounted in a vertical position with its open end surrounding and attached to a boss 11 integral with the top wall of the duct 3 and supporting centrally thereof a depending tube 12 connecting the duct 3 with the interior of the bellows 10. The lower end of the tube 12 is preferably cut at an angle to form an opening facing rearwardly toward the entrance to the bag 6, as clearly shown in Figure 4, and for the purpose of avoiding so far as possible the entrance of dirt particles into the bellows 10. And forming an integral part of the bellows 10 is a short stem 13 mounted at the center of the

stiffened top end wall of the bellows 10 and having a flat head 13a flattened along one side as clearly shown in Figure 3. This stem 13 is the bellows actuated contact member which trips the

5 signal member as will presently be described.
As clearly shown in Figure 3, the bellows 10 is offset toward one side of the housing 9, and in the space opposite (to the right as shown in Figure 3) is a vertical arm or standard 14 mounted
10 at the forward or inner end of a horizontal endwise sliding bar 15 supported within a guideway 16, preferably formed integral with the top wall of the passage 3. Carried at the upper end of the standard 14 is a trigger arm 17 extending at
15 right angles thereto and toward the bellows 10 with its outer end terminating immediately above the contact member 13 carried thereby. Although pivotally mounted on the standard 14, the arm 17 has but a limited swinging movement
20 about the pin 18 on which it is journaled, this movement being a slight upward swinging movement or displacement from its normal position shown in Figure 3, wherein a lug 17a on the underside and adjacent the pivoted end of the arm bears against a stop member 14a at the upper
25 end of the standard 14. And lastly, a coil spring 19 surrounds the pivot pin 18 with one end hooked around the arm 17 and the other around the standard 14, thus holding the arm in its normal depressed position.

Now, coacting with the trigger arm 17, but having no direct connection with it, is the signal member 20, the same being a flat metal panel or target having somewhat the shape of the flag, said target being supported by the housing 9 through
35 the medium of an integral lug 21 depending from the top wall inside said housing 9 and supporting a pivot pin 21a, at the outer end of which is journaled the target or signal member 20, the latter assuming a position in a vertical plane offset a short distance inwardly from the vertical plane of the pawl 17 but in register with a slot
40 9b formed in the top wall of the casing 9. However, as clearly shown in Figure 6, the signal member 20 has a short lever arm 20a extending inwardly from its pivotal mounting on the pin 21a, said lever arm 20a carrying at its end a laterally projecting contact pin 22, normally in bearing contact with the lower edge of the arm
50 17 and against a shoulder 17b substantially midway the inner and outer ends thereof and facing toward the latter.

In the normal position of the target 20, as shown in Figure 3, the same assumes a horizontal position with its leading edge flush with the slot 9b in the housing 9 and hence is completely concealed within the casing 9, being held by the contact of the contact pin 22 with the shoulder 17b on the arm 17. At the same time, however,
60 the target 20 is acted upon by a spring 23 which is coiled around the pin 21a on which the target is journaled with one end bearing against the wall of the housing 9 immediately above and its other end hooked around the edge of the target 20 adjacent the pivot pin 21a. This spring acts to constantly urge the target 20 upwardly and in a counter-clockwise direction, although this movement is normally prevented by the engagement of the contact pin 22, with the shoulder on
70 the arm 17.

Referring again to Figure 3, the moving parts of the signal device occupy the positions shown therein, while the cleaner is operating under normal conditions. However, should the bag 6 become filled with dirt beyond the predetermined

maximum, the following succession of events will take place. In the first place, an increased pressure would be created in the dust bag and this would be transmitted to the bellows 10, whereupon the same would expand or be elongated axially, bringing its contact member 13 against the underside of the arm 17 as shown in Figure 5, the latter being thereby lifted sufficiently to release the contact pin 22 on the target 20, allowing the same to swing upwardly into vertical position, exposed to full view of the operator, this target being preferably painted in a bright or contrasting color in order to attract the attention of the operator.

The trigger arm 17 having been tripped and the pin 22 released, the flag or target will remain in a signalling position until it is reset, but as presently will be seen the resetting operation cannot be carried out until the bag 6 has been removed, emptied and replaced.

Referring now to the trigger resetting arrangement, attention is again directed to the sliding support 15 for the standard 14 carrying the arm 17. In the first place, it will be observed that the guideway 16 in which the bar 15 is slidably mounted is open at its outer end, permitting the bar to slide endwise therefrom. Now connected with the outer end of the bar 15 is a short link 24 connecting said bar with the adjacent clamping bolt 8, said bolt being of a special type used for this purpose and consisting generally of a shank having a head 8a at its end as shown in Figure 2, said shank being engaged by the ear 7a on the bag ring 7 and thence extending through the flange 5a at the outlet from the cleaner casing 1. On the free end of the shank portion of each bolt 8 is a bolt-tightening member 8b which ordinarily would correspond to the nut on an ordinary bolt, but in this particular instance the bolt-tightening member is provided with handle which when rotated in an outward direction from the position shown in Figure 3 to that in Figure 6 the bolt is loosened, that is to say, the shank portion is shifted endwise and toward the bag 6 as shown in dotted line in Figure 2, thus permitting the entire bag 6 together with its ring 7 to be detached from the cleaner. And reversely, by swinging the members 8b inwardly from the position shown in Figure 6 to the position shown in Figure 3, each bolt is again tightened, thus clamping ring 7 to the outlet connection 5 of the cleaner. Thus, it will be seen that by connecting the sliding support 15 to the adjacent clamping bolt tightening member 8b, that in the act of loosening these bolts for the purpose of removing the bag from the cleaner the entire trigger assembly is shifted laterally and to the right from the position shown in Figure 3 to the position shown in Figure 6, the endwise sliding movement of the bar 15 being controlled by a spring plunger 25 mounted in the recess below the bar and bearing against the underside thereof and more particularly registering with a notch 15a in the bottom edge of said bar to hold the same in its normal retracted position as shown in Figure 3.

Now assuming that the clamping bolts 8, 8 have been released to permit the dust bag to be removed for emptying, it follows that in this act the trigger arm 17 is shifted bodily to the right as shown in Figure 6, whereupon the contact pin 22 on the target 20, which previously has swung to the right to a position below the inner end of the pawl as in Figure 5, remains stationary while the arm moves endwise until the shoulder 17b again engages the same, and preparatory to

resetting the trigger mechanism. However, the target 20 continues to remain in its upright and exposed position until the bag 6 is replaced and the clamping bolts 8 re-tightened, this being done by swinging the bolt members 8b upwardly and inwardly toward the body of the cleaner from the position of Figure 6 to that of Figure 3 there being a corresponding shifting to the left of the trigger assembly and by virtue of the contact of the pin 22 with the shoulder 17b, the signal target 20 is swung about its pivot in a clockwise direction and through an angle of 90 degrees into its normal or concealed position within its housing 9. It perhaps should be added that once the bag has been emptied that the pressure conditions are restored therein as well as in the outlet connection from the cleaner, the bellows 10 will collapse and resume its normal position in which the contact member 13 drops below and out of the path of the arm 17, thus permitting the resetting operation to proceed without interference from the bellows or its contact member 13. However, attention is called to the fact that the outer end of the arm 17 is preferably curved upwardly throughout its free end portion, thus making it possible to force the target 20 downwardly by hand during the resetting operation, if so desired. In any case the target will not remain in its concealed position within the housing 9 unless the bag has been fastened to the cleaner and is in a clean condition for obviously the target will be tripped into signalling position immediately upon starting the cleaner, if proper conditions do not exist.

The novelty of the particular type of signal device herein disclosed, resides primarily in the adaptation of the so-called "pop-up" type of signal to a suction cleaner for the purpose of warning the operator that the dust bag should be emptied. The advantage of this type of signal is that the sudden appearance of a colored target is calculated to arrest the attention of the operator more forcefully than other types of signal devices which merely display markings indicating the existing conditions within the dust bag and hence more likely to be disregarded by the operator.

And a further advantage of the present type of pressure indicator is the particular arrangement of the resetting mechanism which makes it imperative to remove, empty and replace the bag before the signal can be reset.

Having set forth a preferred embodiment of the invention, I claim:

1. In a suction cleaner, the combination with a dust bag adapted to be detachably clamped to the outlet connection of said cleaner, of a spring actuated signal member mounted on said cleaner adjacent said outlet connection, trigger mechanism including an arm adapted to normally retain said signal member in non-signalling position, pressure responsive means for actuating said trigger arm to release said signal member and signal resetting mechanism comprising a shiftable support for said trigger, a clamping member for fastening said bag to said outlet connection and means connecting said trigger support with said clamping member, the latter being operative in the removal and replacement of the bag to reset said signal member in its non-signalling position.

2. In a suction cleaner, the combination with a

dust bag adapted to be detachably clamped to the outlet connection of said cleaner, of a spring actuated signal member mounted on said cleaner adjacent said outlet connection, trigger mechanism including an arm having a detent adapted to contact a projection on said signal member for normally retaining the same in non-signalling position, pressure responsive means for tripping said trigger arm to release said signal member, a sliding support for said trigger arm, a clamping bolt for fastening said bag to said outlet connection and having a manually rotative handle and a link connecting said sliding support with the handle of said clamping bolt whereby in the turning of the latter to detach and replace said bag in emptying the same, said trigger arm is displaced to reset the signal member.

3. In a suction cleaner, the combination with a dust receptacle having manually operative fastening members for detachably connecting the same to said cleaner, of a signal member pivotally mounted to swing to and from a signalling position, a trigger member pivotally mounted adjacent said signal member and normally holding the same in non-signalling position, pressure responsive means operative under predetermined pressure conditions in said bag to trip said trigger member and release said signal member and means for automatically resetting said signal member including a shiftable support for said trigger member operatively connected with said fastening member.

4. In a suction cleaner, the combination with a dust receptacle having manually operative fastening members for detachably connecting the same to the exhaust outlet of said cleaner, a signal member pivotally mounted to swing to and from a signalling position, a trigger member pivotally mounted adjacent said signal member, said members having coacting parts for normally holding said signal member in non-signalling position, pressure responsive means operative under predetermined pressure conditions within said receptacle to trip said trigger member whereby said signal member is released to shift into signalling position and means for facilitating the resetting of said signal member, including a slidable support for said trigger member operatively connected with said fastening member to shift toward and from signal member engaging position in the operation of attaching said receptacle to the cleaner.

5. In a suction cleaner, the combination with a dust bag adapted to be clamped to the outlet connection of said cleaner and manually operative pivoted clamping members for securing said bag to said cleaner outlet, of a spring actuated signal member mounted on said cleaner, trigger mechanism including an arm having a shoulder adapted to contact a projection on said signal arm for normally retaining the latter in non-signalling position, pressure responsive means for tripping said trigger arm to release said signal member and means for automatically resetting said trigger mechanism, comprising a slidable support for said trigger arm having operative connection with one of said clamping members, whereby the operation thereof in the replacement of said bag after removal and emptying, permits said signal member to be reset upon being depressed into its non-signalling position.

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