June 4, 1940. E. F. MARTINET 2,203,171

SUCTION CLEANER

Filed May 8, 1936 3 Sheets-Sheet 1

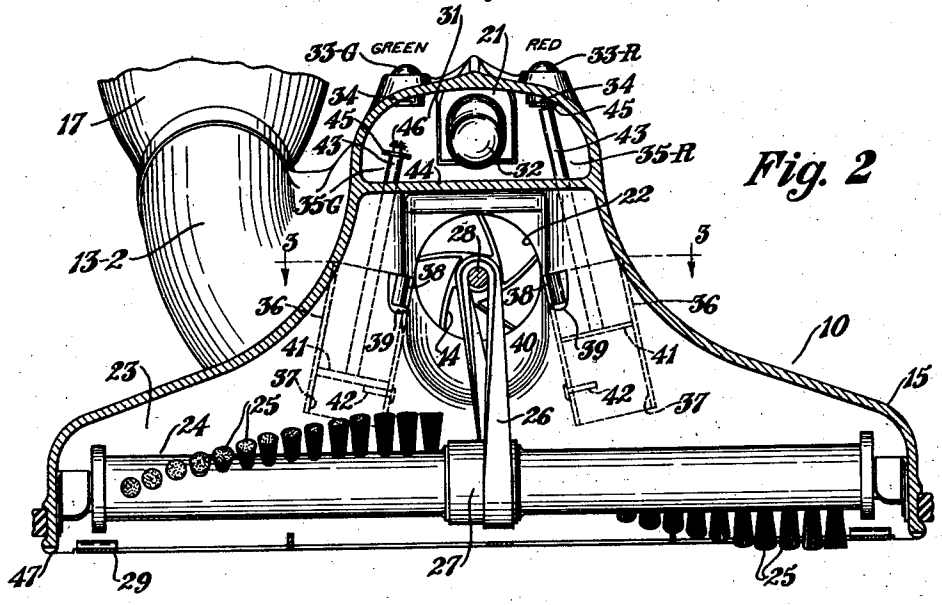



Fig. 2

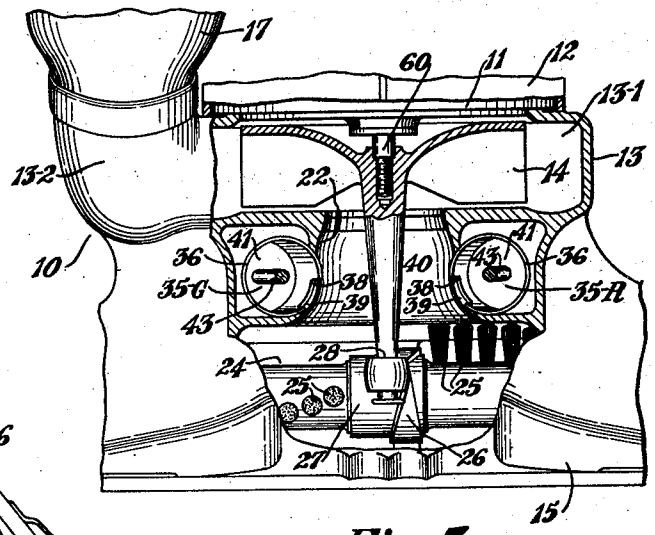



Fig. 3

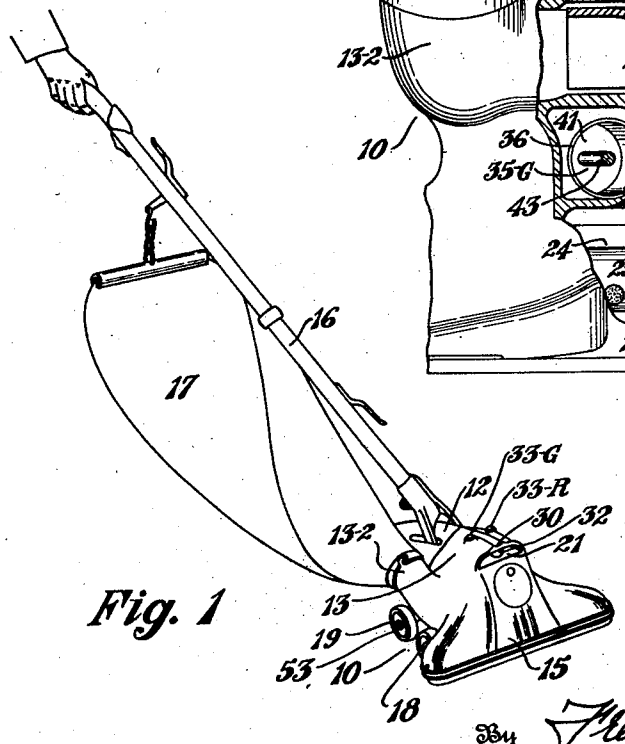



Fig. 1

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SUCTION CLEANER

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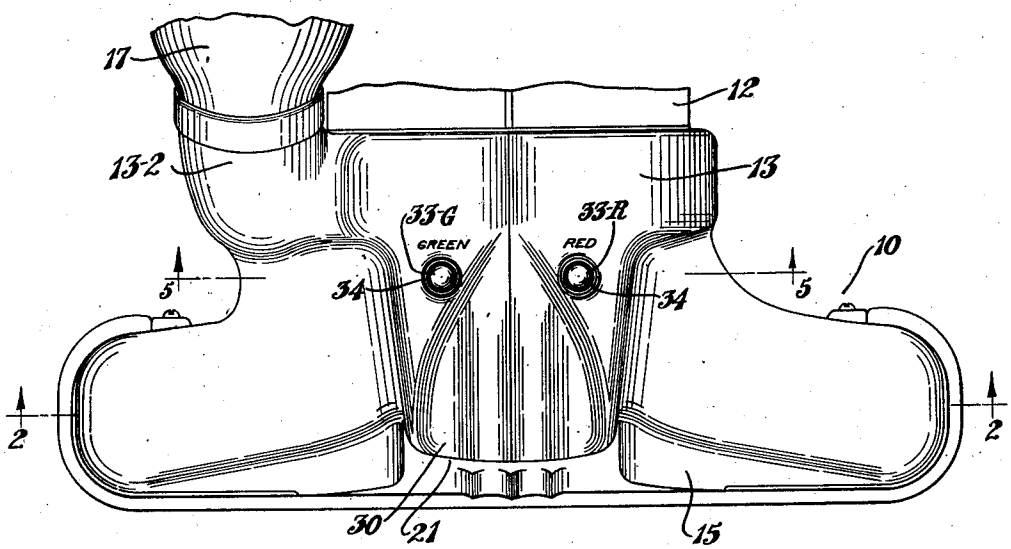
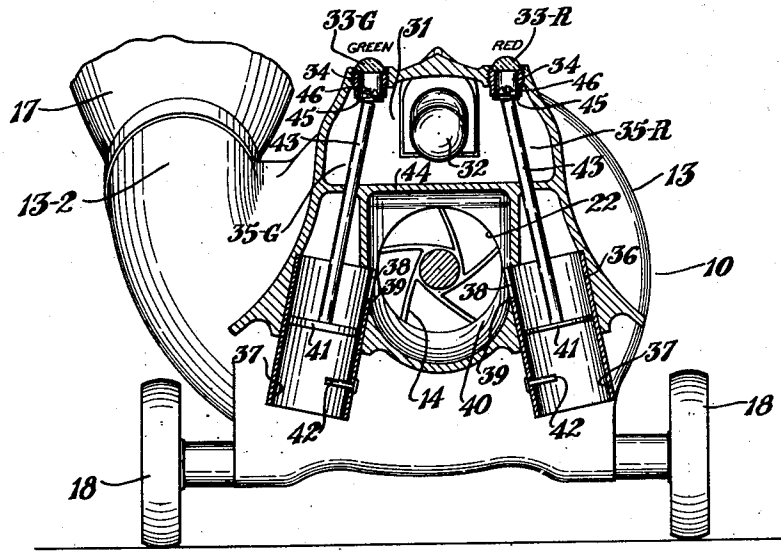



Fig. 4




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Fig. 5

By Pierce and Bishop

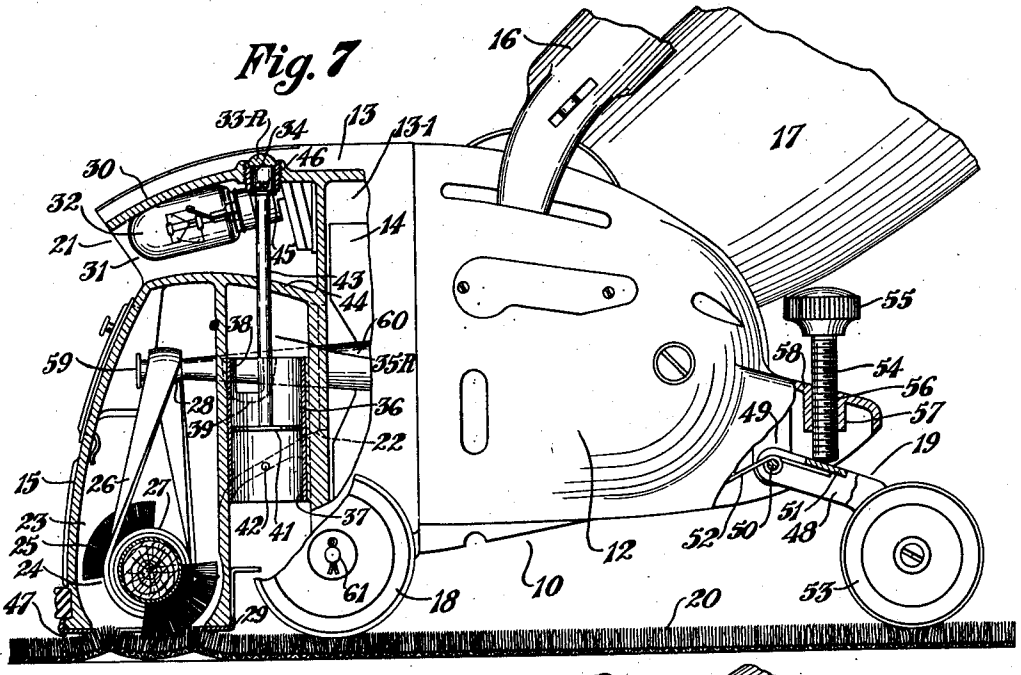
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June 4, 1940. E. F. MARTINET 2,203,171

SUCTION CLEANER

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Fig. 7



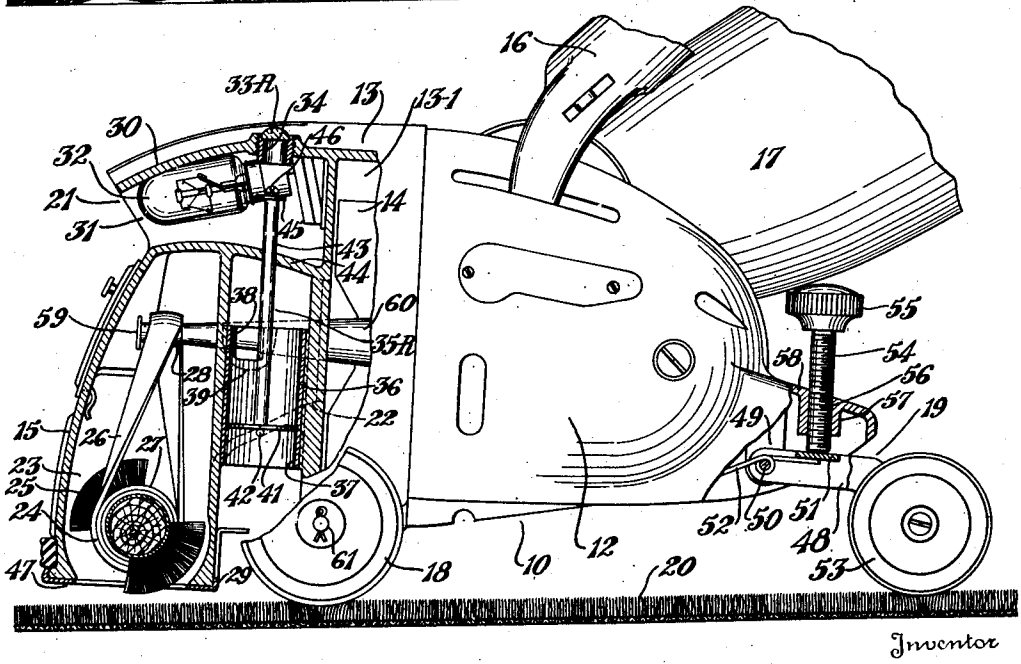




Fig. 6

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Patented June 4, 1940 2,203,171

# UNITED STATES PATENT OFFICE

2,203,171

## SUCTION CLEANER

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Application May 8, 1936, Serial No. 78,624

2 Claims. (Cl. 15—16)

The invention relates to suction cleaners having automatic means for signaling the degree of suction or pressure of the suction air passing through the ducts or passages of the cleaner, and which degree of suction or pressure varies during use of the cleaner because of a number of different conditions, and the present invention includes improvements of the invention set forth in my prior U. S. Letters Patent No. 2,120,011 for Suction cleaners, filed April 11, 1936.

In said Patent No. 2,120,011 is set forth automatic signal means associated with a suction cleaner and operative to indicate to the user the attainment or non-attainment of a particular degree of suction or sub-atmospheric pressure of the suction air associated with a proper adjustment and location of the nozzle mouth of the cleaner with respect to the surface to be cleaned for providing a predetermined proper or optimum cleaning action of the cleaner.

For example, in a usual portable suction cleaner of a type particularly set forth herein and in said application Serial No. 73,868, when the nozzle is wide open and not adjusted in proper location with respect to a surface to be cleaned, the degree of suction or sub-atmospheric pressure in the nozzle passage or duct may be 1" of water, as measurable by a water manometer.

When using such a cleaner having nozzle adjusting means such as particularly set forth herein and in said Patent No. 2,120,011, the design of the cleaner may be such that when, by manipulation of the nozzle adjusting means the degree of suction or sub-atmospheric pressure becomes 3" of water in the nozzle passage or duct, the suction will then be sufficient so that if the cleaner is operating over a rug, the portion of the rug immediately below the nozzle entrance mouth will be partially sucked up into the entrance mouth, whereupon if the cleaner is new and the dust bag is new and clean the degree of suction or sub-atmospheric pressure in the nozzle passage or duct may become for example 6" of water.

A similar change in the degree of suction or sub-atmospheric pressure in the nozzle passage occurs during adjustment of the nozzle when operating over other types of surfaces, such as wood, linoleum, tile, or the like.

When such a cleaner as particularly set forth herein and in said Patent No. 2,120,011 is provided with automatic means for signaling the attainment or non-attainment of a particular degree of suction or sub-atmospheric pressure of the suction air associated with a proper adjustment of the nozzle mouth of the cleaner with resect to the surface to be cleaned, the signaling means may be arranged to operate, for example to indicate the attainment or non-attainment of a sub-atmospheric pressure of 3" of water in the nozzle passage or duct which as above indicated is sufficient to permit sucking up of portions of a rug or carpet being cleaned partially into the nozzle entrance mouth so that the degree of suction or sub-atmospheric pressure in the nozzle mouth may then immediately become 6" of water as aforesaid.

In addition to changes in the degree of suction or sub-atmospheric pressure in the ducts of the cleaner, due to changes in the relative position of the nozzle entrance mouth with respect to the surface to be cleaned, the degree of suction or sub-atmospheric pressure in the ducts varies, in a cleaner having a dust bag for receiving the dust and dirt laden air discharged by the cleaner, as the dust bag becomes filled with an accumulation of dust, dirt, and foreign matter during use of the cleaner.

Upon first placing a new cleaner into use, the interstices of the dust bag become partially filled with a certain quantity of fine dust which remains there during the life of the cleaner, and consequently the maximum suction or lowest sub-atmospheric pressure coincident with a dust bag in use, after being cleaned in the usual manner by emptying the contents thereof and with proper nozzle adjustment, may be about 5" of water in the nozzle passage or duct.

Filling up of the dust bag with dust, dirt, and foreign matter during use of the cleaner obviously gradually increases the back pressure of the dust bag and gradually reduces the suction or raises the sub-atmospheric pressure in the nozzle finally to a condition at which no cleaning may be effected.

It is accordingly desirable that a suction cleaner having a dust bag be provided with automatic signal means for indicating the attainment or non-attainment or in other words the existence or non-existence of a particular degree of reduced suction or increase in sub-atmospheric pressure in the nozzle passage caused by the accumulation of dust and dirt in the dust bag, and the attainment of which calls for a cleaning out of the dust bag.

It is also desirable that a cleaner having automatic signal means for indicating when the dust bag should be cleaned, may likewise have independent automatic signal means for indicating the attainment of proper adjustment of the noz-

zle with respect to the surface to be cleaned and more generally that the indications of the two signal means shall in combination indicate different suction conditions preferably in the nozzle.

The objects of the present invention include in general the provision of suction cleaning apparatus having a suction passage or duct communicatingly connected with a dust bag or similar filtering means for receiving the dust and dirt laden air discharged by the cleaner, and in which when the dust bag is properly cleaned the degree of suction or sub-atmospheric pressure in the suction passage may attain a predetermined range such as from 6" to 4" of water, which suction range may be termed the optimum cleaning suction of the cleaner, and the cleaner also having automatic signal means indicating when the degree of suction or sub-atmospheric pressure in the suction passage becomes for example less than 4" of water or in other words varies a predetermined amount from the optimum cleaning suction.

From another standpoint the objects of the present invention include the provision of suction cleaning apparatus in which automatic signal means are arranged to indicate the existence or non-existence of two separate particular degrees of suction or pressure of the air passing through the ducts or passages of the cleaner, one of which signal means operates for example to indicate in a cleaner having a dust bag when the dust bay should be cleaned, and the other signal means being arranged to operate for example in a cleaner having an adjustable nozzle when the proper adjustment of the nozzle has been attained.

The foregoing and other objects are attained by the suction cleaner, apparatus, parts, improvements, combinations, and sub-combinations, which comprise the present invention; and the nature of which is set forth in the following general statements; and preferred embodiments of which, together with their mode of use are set forth in the following description; and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improvements of the present invention may be described in general terms as including preferably in a portable suction cleaner having nozzle adjusting means, ducts communicating with each other and preferably including a nozzle and a discharge neck and a fan chamber between the nozzle and the discharge neck, a fan operative in the fan chamber for causing a flow of suction air into the nozzle through the fan chamber and out of the discharge neck, a dust bag connected with the discharge neck so as to filter the dust and dirt laden air discharged by the cleaner, the cleaner being arranged for optimum cleaning action at a predetermined particular degree of suction in the nozzle passage.

Two different signaling means are preferably provided, the first signal means being operative for indicating the attainment of a first particular degree of suction or optimum cleaning suction in the nozzle passage by proper nozzle adjustment and the non-attainment of such first particular degree of suction, and the second signal means being operative for indicating the existence or non-existence of a second particular degree of suction in the nozzle passage different from the first particular degree of suction, the second particular degree of suction being established so that when its signal means indicates its non-existence, there is an accumulation of dust and dirt in the dust bay, and there is indicated to the user that the dust bag should be cleaned.

Each signal means may preferably include light emitting means, the light from the one being a different color than the light from the other, and each signal may indicate the existence of its particular degree of suction or sub-atmospheric pressure by having the light emission shut off during operation of the sweeper, with proper adjustment of the nozzle thereof, and with a sufficiently clean dust bag.

Light may be emitted by both signaling means during adjustment of the nozzle, and after proper adjustment of the nozzle the emission of light by either signal means may indicate a new condition of improper adjustment for the nozzle on the one hand, and the necessity of cleaning the dust bag on the other hand.

By way of example, one embodiment of the present improvements is illustrated in the accompanying drawings forming part hereof, in which

Figure 1 is a perspective view of an electric motor operated, portable suction cleaner with nozzle adjusting means and having a fan for creating the suction and a power driven rotary brush, and including one embodiment of the present improvements in the form of two separate visual signal means each automatically operated by variations from its own particular degree of suction or sub-atmospheric pressure existing in the nozzle of the cleaner;

Fig. 2, a fragmentary sectional view thereof transversely of the nozzle as on line 2—2, Fig. 4, showing the parts of one of the signal means and the operating means therefor in their relative positions when emitting and indicating colored light, as shown for the purpose of indicating that the dust bag should be cleaned;

Fig. 3, a fragmentary plan sectional view thereof as on line 3—3, Fig. 2;

Fig. 4, a fragmentary top plan view of the cleaner;

Fig. 5, another fragmentary transverse sectional view of the cleaner as on line 5—5, Fig. 4, showing the relative positions of the two signal means and the operating means therefor when in the sweeper shown the dust bag is properly cleaned, and the nozzle has proper adjustment;

Fig. 6, an enlarged fragmentary side elevation of the cleaner, with portions broken away to illustrate the nozzle adjustment signal means and operating means therefor, the nozzle mouth of the cleaner and other parts being shown in their relative positions when the nozzle mouth is not properly adjusted with respect for example to the surface of the nap rug to be cleaned shown in the figure, the signal means and signal operating means likewise being shown in their relative positions for indicating that the suction of the air passing through the cleaner is not that which is associated with the proper adjustment of the nozzle mouth thereof; and

Fig. 7, a view similar to Fig. 6, and in which the nozzle mouth adjusting means of the cleaner have been properly adjusted so that a maximum or optimum cleaning action will occur by the nozzle mouth on the surface of the nap rug shown in the figure, and the signal operating means being shown in their relative positions which they attain instantly upon the effecting of the proper adjustment of the nozzle mouth.

Similar numerals refer to similar parts throughout the several figures of the drawings.

An electrically operated portable suction cleaner with a power driven rotary brush in the nozzle chamber thereof and with a headlight, and provided with one embodiment of the present improvements is shown in the drawings and is indicated generally by 10.

The suction cleaner 10 includes a motor 11 in a motor housing 12, associated with a fan housing 13 having a fan 14 secured on the motor shaft in the fan chamber 13—1 of the fan housing 13, and a suction nozzle 15 communicates with the fan housing. An operating handle 16, and a dust bag 17 connected with the exhaust opening or neck 13—2 of the fan housing 13 also are provided for the cleaner; and the motor housing 12, the fan housing 13, and nozzle 15 are mounted on front casters 18 and preferably on adjustable double rear caster means 19 for ambulant motion over a surface to be cleaned, as shown a nap rug 20. The cleaner 10 also is provided with headlight means indicated generally by 21.

The nozzle 15 includes walls forming a tubular neck 22 leading to the fan chamber 13—1, and a transversely elongated brush housing suction mouth 23. A rotary brush indicated generally by 24 and provided with bristles 25 is detachably and adjustably rotatably mounted in the suction mouth 23, as by means such as set forth in detail in my copending application Serial No. 692,482.

The brush 24 is preferably motor driven, as shown in the drawings, and for this purpose an endless preferably flat band rubber belt 26 passes over the brush pulley surface 27 and the end 28 of the motor shaft.

As shown, the nozzle 15 is provided at the entrance to its mouth with a nozzle lip plate 29.

The headlight means indicated generally by 21, as shown include in the nozzle housing, an upper centrally located forwardly opening headlight shield 30 within the chamber 31 of which is operatively mounted an electric headlight 32 which is associated with the source of power for the motor, the headlight 32 being lighted when the motor and fan are in operation.

In the illustrated embodiment of the present improvements, the headlight 32 and its shield 30 comprise part of two visual signal means which also include light transmitting elements or lenses 33—R and 33—G, each of which as shown is contained in the upper end of a mounting tube 34 which is screwed in a suitable aperture in the top of the headlight shield 30.

The present improvements also include separate means for automatically operating each signal means and actuated by variations in the suction or pressure existing in the cleaner air passages.

As shown, the signal operating means are indicated generally by 35—R and 35—G, and each includes a cylinder tube 36 arranged in a suitable bore formed in some of the walls of the nozzle 15, the lower end of the bore 37 of each cylinder sleeve 36 opening to the atmosphere and the upper end of each cylinder sleeve 36 having a notch 38 therein which registers with an opening 39 in one of the walls of the nozzle and provides a communication between the upper end of the bore 37 of each cylinder sleeve with the upper portion 40 of the nozzle, as shown at the forward end of the tubular neck 22 of the nozzle which communicates with the fan chamber 13.

A piston disk 41 is arranged for reciprocation in the bore 37 of each cylinder sleeve 36 and means such as a stop pin 42 prevent each piston disk 41 from dropping out of its cylinder sleeve 36.

A signal operating piston rod 43 has its lower end connected to each piston disk 41 and extends upwardly through a suitable aperture formed in the bottom wall 44 of the headlight shield 30, said bottom wall 44 comprising a top wall of the nozzle 15.

Upon the upper end of each piston rod 43 is loosely mounted a shutter disk 45 as by a screw 46, the shank of which passes through an enlarged central opening in the shutter disk 45 and is screwed in a suitable threaded aperture in the upper end of its piston rod 43.

The lower transversely elongated extremity of the nozzle 15 may be termed the entrance mouth 47 of the nozzle, and the cleaner 10 is provided with the adjustable double rear caster means 19 for adjusting the relative location of the nozzle entrance mouth with respect to the surface being cleaned such as the nap rug 20; and as shown, the rear caster adjusting means includes arm members 48 pivotally secured at one end to rear end portions 49 of the motor housing 12, as by the transverse pin 50.

The arm members 48 also include a transverse bar 51 and as shown spring means 52 are wrapped around the pivot pin 50, and the ends of the spring means 52 cooperate respectively against portions of the motor housing 12 and against the transverse bar 51 for urging, the arm members 48 upwardly.

The adjustable caster means 19 furthermore include casters 53 mounted upon suitable shaft means at the outer end of the arm members 48, and an adjusting screw 54 is provided at its upper end with a knurled head 55 and is screwed into a suitably threaded aperture 56 formed in a boss 57 provided in an upper rear end wall 58 of the motor housing 12.

The lower end of the screw 54 abuts against the bar 51 of the arm members 48, and accordingly screwing the screw 54 downwardly serves to increase the angulation of the arm members 48 with respect to the axis 59 of the motor shaft 60 and thereby serves to lower the entrance mouth 47 of the nozzle towards the surface 20 to be cleaned, with the reverse action of the adjusting means when the screw 54 is screwed upwardly.

In the operation of the adjustable caster means 19 all the sweeper parts, with the exception of the front casters 18 and their axle 61, swing one way or the other on the axle 61.

For the purposes of the present improvements in the signal operating means 35—G, the piston disk 41, the rod 43 thereof, and the shutter disk 45, and screw 46 thereon, are heavier than the similar parts of the signal operating means 35—R.

Also as indicated on the drawings, the light transmitting lens 33—R is made of red glass, and the light transmitting lens 33—G is made of green glass.

The operation of the improved suction cleaner 10 may be described as follows:

The manufacturer of a cleaner, such as the cleaner 10, determines and establishes, in designing the same, a first particular degree of suction or sub-atmospheric pressure, or in other words, a drop from atmospheric pressure of the air ex-

isting in the cleaner nozzle 13 or other passages on the low pressure side of the fan, which is coincident with the correct adjustment of the entrance mouth 47 of the nozzle with respect to the surface to be cleaned, which is in the drawings the nap rug 20; so that a maximum or predetermined or optimum cleaning action will occur in using such particular design of cleaner with its nozzle mouth correctly adjusted.

In Fig. 7 the relationship of the nap rug 20 when the nozzle entrance mouth 47 is properly adjusted, is shown, the adjusting means 19 having been manually manipulated to attain the correct position of the nozzle entrance mouth 47 as shown.

In Fig. 6 the adjusting means 19 are shown in a position in which there is no proper relationship of the nozzle entrance mouth 47 with the nap rug 20 to accomplish any effective cleaning.

The manufacturer, having determined the first particular degree of suction coincident with the proper adjustment of the nozzle entrance mouth to effect a maximum predetermined cleaning action, then so designs the signal operating means that it will operate a signal the instant that the first particular degree of suction or pressure has been obtained in the cleaner passage with which the signal operating means communicates, to indicate when proper adjustment of the nozzle entrance mouth has been obtained.

Thus, in the embodiments shown in the drawings, in the signal operating means 35—R the weight and area of the signal operating piston disk 41 fitting and reciprocating in the bore 37 of the cylinder sleeve 36 is so established or determined by the particular characteristics of the cleaner on which it is mounted, that when the proper adjustment of the nozzle entrance mouth 47 is effected with respect to any surface to be cleaned to obtain a maximum or optimum predetermined cleaning effect, the suction within the chamber of the nozzle will have been increased to such a first particular degree that atmospheric pressure on the piston disk 41 will elevate the same and the piston rod 43 to their positions shown in Fig. 7, with respect to the lens 33—R.

As above stated the cleaner 10 is of the headlight type, and the headlight 32 is at all times illuminated when the cleaner is in operation. When there is no proper adjustment of the nozzle entrance mouth 47, the piston disk 41 and rod 43 are dropped in the positions shown in Fig. 6 in which case light from the headlights 32 is transmitted through the red light transmitting signal lens 33—R which appears illuminated to the user of the cleaner 10 at all times when there is no proper adjustment of the cleaner nozzle entrance mouth 47.

At the instant however that proper adjustment of the nozzle entrance mouth 47 is effected as shown in Fig. 7 the shutter disk 45 for the lens 33—R on the upper end of its piston rod 43 closes off the lower end of the lens mounting tube 34 and thus obstructs the passage of light through the lens 33—R.

In other words the light passing through the lens 33—R is shut off at the instant of obtaining proper adjustment of the nozzle mouth 47.

The improved cleaner 10 operates automatically to provide instantaneous signaling of the attainment of a first particular degree of suction in the nozzle associated with a proper adjustment or location of the nozzle with relation to any surface to be cleaned to obtain the maximum or optimum predetermined cleaning effect.

When the user is adjusting the location of the nozzle mouth for any particular surface, the screw 54 is manipulated with one hand so as to swing the sweeper parts about the front caster axle 61 to a position of too great displacement of the nozzle entrance mouth 47 above the surface to be cleaned (Fig. 6).

The screw is then manipulated in the other direction to lower the nozzle entrance mouth 47, in order to effect a proper adjustment (Fig. 7).

The instant the light emitting from the signal lens 33—R shuts off, the user knows that proper adjustment of the nozzle entrance mouth 47 has been effected.

The design of the sweeper 10 may be such that when using the sweeper over a rug 20, the attainment of a sub-atmospheric pressure of approximately 3" of water in the duct of the nozzle by the above described manipulation of the screw 54 of the adjustable caster means 19 for properly locating the nozzle entrance mouth 47 above the surface of the rug 20, causes the portion of the rug immediately beneath the nozzle entrance mouth 47 to be partially sucked up into the nozzle entrance mouth 47 as shown in Fig. 7, whereupon the sub-atmospheric pressure in the duct of the nozzle may immediately drop to approximately 6" of water when the cleaner is new and has a new bag 17, and which drop may be to approximately 5" of water after the interstices of the new bag 17 receive the permanent quantity of very fine dust, after being put into use.

Accordingly for such a cleaner, the signal operating means 35—R may be arranged so that the piston disk 41 raises so its shutter disk 45 shuts off the light passing through the red lens 33—R when the sub-atmospheric pressure drops to approximately 3" of water in the duct of the nozzle, with the opposite action causing a dropping of the piston disk 41 and a dropping away of the shutter disk 45 from light obstructing position with respect to the red lens 33—R, when the sub-atmospheric pressure becomes greater than approximately 3" of water.

As above stated, the signal operating means 35—G is provided with a heavier piston disk 41, rod 43, shutter 45, and screw 46 than those of the means 35—R, so that for example it may require a sub-atmospheric pressure of as low as approximately 4" of water to permit elevation of the piston disk 41 of the signal operating means 35—G to shut off the passage of light through the green lens 33—G.

Accordingly there will be no light passing through the green lens 33—G during an optimum suction or sub-atmospheric pressure range of approximately 6" to 4" of water, in the duct of the nozzle, but when by reason of an accumulation of dust and dirt in the dust bag 17, the sub-atmospheric pressure in the duct of the nozzle increases to greater than approximately 4" of water, the signal operating means 35—G will operate to drop its shutter 45 from light obstructing position below the lens 33—G, which will then light up indicating that the dust bag should be cleaned, if the nozzle adjustment is correct.

In other words, when the cleaner has proper nozzle adjustment and is operating on a rug, the signals indicated by the two signal means are the same, no light emitting from either signal lens 33—R or 33—G, since the suction existing in the nozzle is greater than each of the two different prescribed or particular degrees of suction, the existence or non-existence of which is indicated by the two signal means.

For example a degree of suction of 5" of water coincident with a normally clean dust bag and when the cleaner with proper nozzle adjustment is operating on a rug, is greater than a degree of suction of 4" of water which is the aforesaid second particular degree of suction, the existence or non-existence of which is indicated by the signal means with which the lens 33—G is associated, and a degree of suction of 5" of water is also greater than 3" of water, the first prescribed or particular degree of or minimum suction coincident with proper nozzle adjustment for optimum cleaning.

On the other hand, if light is emitted from the lens 33—G and no light is emitted from the lens 33—R, then the operator is signaled that the dust bag should be cleaned, but that the nozzle is in proper adjustment.

When light is emitted from both lenses 33—G and 33—R, the operator is signaled that there is not proper nozzle adjustment, and that there may be a clogged dust bag. To determine the dust bag condition however, it is necessary to adjust the nozzle so that no light is emitted from the lens 33—R, after which, if light still is emitted from the lens 33—G, then the dust bag should be cleaned.

In other words, any particular condition of suction in the nozzle of the cleaner 10 is always indicated by the combined indications of both signal means, even though these indications may be sometimes the same in each signal means, that is each lens emitting light, or each not emitting light.

In some cases, either of the signal operating piston rods 43 may be arranged to switch on and off other types of signal means, as by having a piston rod operate a switch in an electric circuit, controlling a light, a bell, or similar signal means.

Also either signal operating rod may be arranged to actuate movable signal members, or the upper end of either rod 43 may in itself be used as a signaling indicator.

It is to be understood that while suction or sub-atmospheric pressures in the amount of 1", 3", 4" and 6" of water have been referred to in describing the present invention; the invention is not limited to such particular suctions or sub-atmospheric pressures, because the same are dependent upon the particular design of suction cleaner.

The present improvements as above described by way of example thus provide a suction cleaner in which different variations in the suction or pressure of the air existing in the cleaner passages are utilized to actuate different means, such as signal means, for example for automatically indicating to the user two separate degrees of suction or sub-atmospheric pressure of the cleaning air, one of which may be utilized to indicate the proper adjustment of the nozzle mouth of the cleaner, and the other of which may be utilized to indicate that the dust bag of the cleaner should be emptied.

The scope of the invention is not limited to an adjustment of the nozzle by manipulating an adjustable caster, because the nozzle adjustment may be effected by other suitable means or by hand.

Accordingly the present improvements provide in a simple, compact, and automatically operating manner, a signal which indicates when the nozzle mouth of a cleaning apparatus has been located or adjusted to a proper position with respect to the surface to be cleaned, and also in which preferably in combination with the nozzle adjustment signal, there is another signal which indicates for example when the dust bag of the cleaner should be emptied.

Having now described the features of the invention, the construction, adjustment, and use of preferred forms of the invention, and the advantages of the results obtained thereby; the new and useful parts, elements, devices, combinations and constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. In suction cleaning apparatus, a fan housing, a fan in said housing, a nozzle mounted on the fan housing having lips forming an entrance mouth in which the suction becomes increased to a first predetermined proper cleaning suction when the nozzle lips are located at a correct position with respect to the surface being cleaned, a dust bag connected with the fan housing so as to filter the dust and dirt laden air discharged by the cleaner, first signal means, first suction operated means operatively associated with the first signal means, second signal means, second suction operated means operatively associated with the second signal means, means communicating with the first suction operated means and with the suction side of the fan above said nozzle lips, means communicating with the second suction operated means and with the suction side of the fan above said nozzle lips, said first suction operated means and communicating means being so constructed and arranged that the first signal means is operated by the first suction operated means the instant that the first predetermined proper cleaning suction exists in the nozzle, said second suction operated means and communicating means being so constructed and arranged that the second signal means is operated by the second suction operated means the instant that a second particular degree of suction exists in said entrance mouth greater than said first predetermined proper cleaning suction, said second particular degree of suction being that established as coincident with an undesirable accumulation of dust and dirt in the dust bag, whereby the signals indicate in combination the several conditions of cleaner operation.

2. In suction cleaning apparatus, a nozzle having a passage for the suction air, the suction in the passage varying during use of the apparatus, first signal means for indicating the existence or non-existence of one particular suction range in the passage coincident with a predetermined nozzle adjustment with respect to a surface being cleaned, and second signal means for indicating the existence or non-existence of another particular suction range in the passage greater than the first and coincident with a predetermined dust bag condition, suction actuated means associated with the passage and with the first signal means for operating the first signal means, and suction actuated means associated with the passage and with the second signal means for operating the second signal means, the signal operating means being actuated by different suctions in the passage whereby the signal means conjointly indicate the several conditions of cleaner operation.

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