

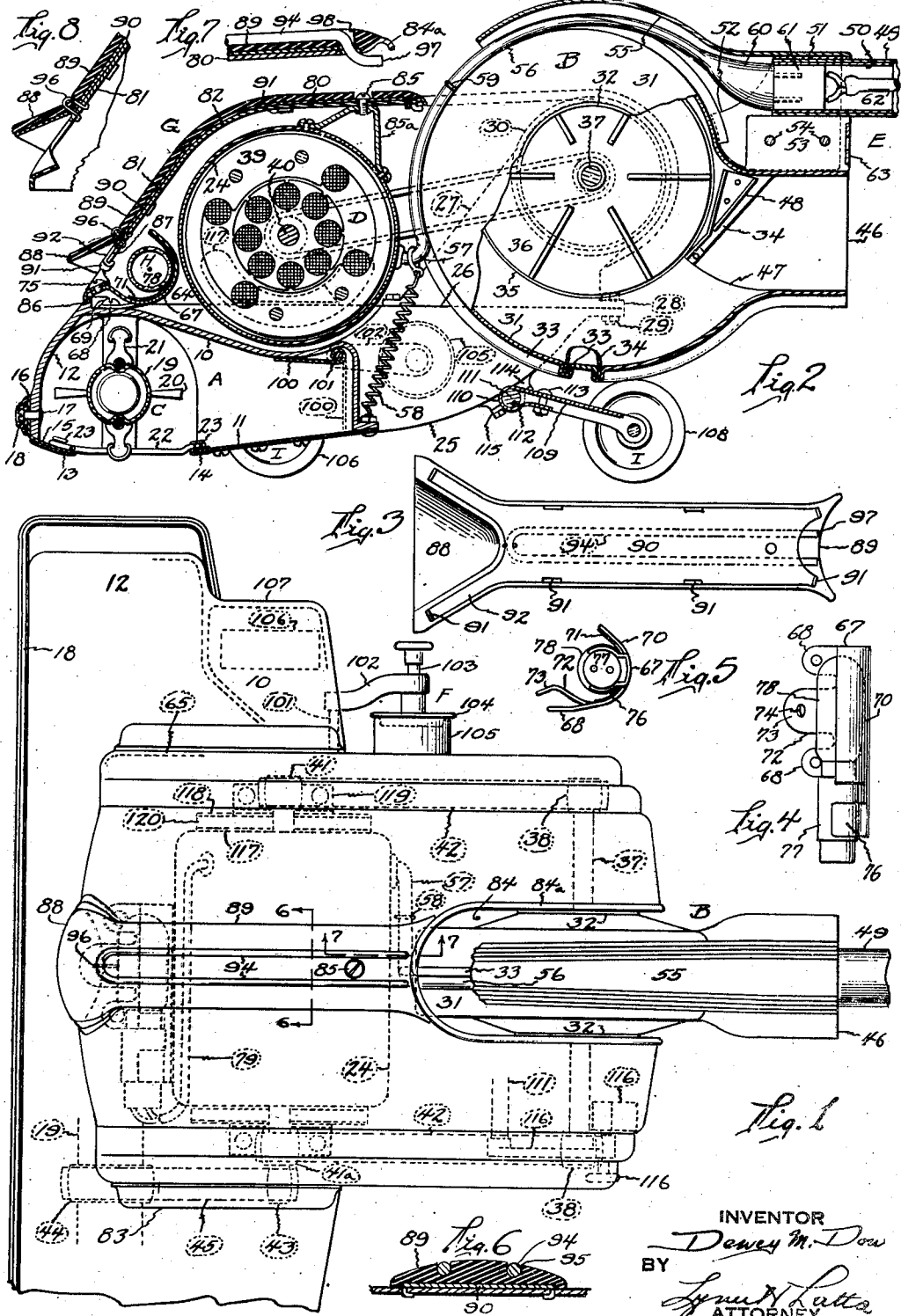
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VACUUM CLEANER

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VACUUM CLEANER

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This invention relates to vacuum cleaners and has as its object to provide a cleaner including a headlight, the arrangement being such that the headlight does not encroach upon the space normally occupied by the motor and the space normally occupied by the suction chamber, and yet does not protrude beyond the normal contour of the cleaner as a whole and does not increase such contour beyond the most compact form in which it could be embodied in the absence of the headlight.

To be more specific, the invention provides an arrangement in which the motor is positioned above a suction chamber with its axis parallel to the axis of the suction chamber; i. e., in which both axes lie transverse of the cleaner as a whole. The cleaner embodies a casing member which extends generally tangent to both motor and suction chamber. The adjacent regions of motor and suction chamber being of cylindrical or substantially cylindrical formation a roughly prismatic space is thus formed between the adjacent wall regions of suction chamber, motor, and cover casing, which space accommodates the headlight and its reflecting and mounting mechanism.

Another object of the invention is to provide an arrangement wherein the headlight is readily accessible without providing for it a separate detachable cover or grill. This is accomplished by making the cover casing readily detachable, such detachability serving to provide access not only to the headlight and its mounting but also to the power transmitting mechanism connecting the motor to the rotary agitator with which the cleaner is equipped. It also serves to provide access to the power transmitting mechanism for connecting the motor to the fan, which is mounted on an axis separate to that of the motor.

Another object of the invention is to provide a reflecting visor for directing the light rays from the headlight downwardly upon a carpet being cleaned without providing a separate member for such purpose. To this end the reflecting visor is made integrally with the lower end of the bumper which protects the cover casing against damage from impact with furniture, etc.

Other objects will appear during the perusal of the following detailed description of the invention in connection with the accompanying drawing in which—

Fig. 1 is a plan view of a vacuum cleaner embodying the invention,

Fig. 2 is a center longitudinal sectional view through the cleaner,

Fig. 3 is an inverted plan view of the combined bumper and head light visor,

Fig. 4 is a plan view of the headlight lamp and its reflector,

Fig. 5 is an end view of the same,

Fig. 6 is a transverse sectional view through the bumper taken on the line 6-6 of Fig. 1,

Fig. 7 is a detailed sectional view of the bumper taken on the line 7-7 of Fig. 1, and

Fig. 8 is a detailed sectional view of a modification of the visor construction.

The invention comprises a suction cleaner which embodies generally a suction chamber A, a suction producing unit B, swivelled with relation to the suction chamber A, a rotary agitator unit C mounted in the suction chamber A, an electric motor and power transmitting mechanism D for driving the fan and rotary agitator, a handle assembly E rigidly attached to the suction mechanism B, an air filtering and dust collecting unit (not illustrated), conversion mechanism F Fig. 1 for changing the cleaner from on-floor to off-floor operation, a removable cover unit G including bumper mechanism, the headlight assembly H, and floor wheel mechanism I for supporting the entire assembly for travelling over the surface to be cleaned.

The suction chamber A is formed between the casting 10 and a removable sheet metal bottom plate 11. The forward region of the casting 10 comprises a roughly semicylindrical agitator chamber 12, opening downwardly. The inlet mouth of the suction chamber is formed between stainless steel lips 13 and 14, the latter in the form of a channel embracing the forward edge region of the bottom plate 11 and secured thereto, and the former in the form of a sheath secured to a plain steel lip member 15 having at its forward extremity an upward bent flange 16 by means of which it is riveted at 17 to the forward wall of the agitator chamber 12. The rivets also serve to secure a peripheral bumper 18 to the agitator chamber 12.

In the chamber 12 is mounted the rotary agitator C which comprises a hollow spindle 19 with brush elements 20 and flexible beater elements 21 mounted therein. A guard 22 has two spaced members projected across the mouth of the suction chamber and is sprung into hooking engagement with buttons 23 in the respective lips 15 and 14.

The upper wall of the suction chamber casting 10 is depressed in a region intermediate its ends to accommodate the motor housing 24.

Rearwardly of the motor housing 24 the suc-

tion chamber is bifurcated to form two tubular portions 25 integral with the upper wall portion 10 and terminating in a horizontal plane 26 in upwardly facing openings. A pair of ducts 27 are secured to the bifurcated portions 25 of the suction chamber in the plane 26 as by coacting flanges 28 bolted together at 29. The ducts 27 extend upwardly and rearwardly and terminate in elbows 30 directed toward each other. The suction mechanism B includes a fan housing 31 having dual opposed inlets 32 in swivelling connection with the elbows 30. The housing 31 is made of stamped sheet metal in two halves which are secured together by interlocking peripheral flanges 33. A partition wall 34 divides the housing 31 into two fan chambers. The partition 34 is peripherally secured between the interlocking flanges 33 and has a central opening 35 in which is mounted the double impeller 36 providing air driving means in each of the two fan chambers. The impeller 36 is mounted on a shaft 37 which is journaled in the respective ducts 27 and which extends through and beyond said ducts and is there provided with pulleys 38-38.

The driving mechanism D includes the motor 39 built into the housing 24 and having a shaft 40 projecting from both ends of the housing and provided with pulleys 41 and 41a which are connected by belts 42-42 to the respective pulleys 38-38. Formed integrally with the pulley 41a is a smaller pulley 43 which drives the pulley 44 on the agitator spindle 19 by means of a belt 45.

The discharge outlet 46 of the fan housing 31 is formed in two halves integral with the two halves of the housing. The partition 34 is cut away at 47 in the discharge outlet 46 to allow the two air streams to come together. To secure an efficient design of discharge outlet and air cut-off I provide a cut-off wedge 48 formed of sheet metal welded or riveted to the partition 34.

The handle assembly E comprises a tubular handle 49 which is preferably of aluminum with inner and outer steel ferrules 50 and 51 respectively reinforcing its lower ends. The outer reinforcing ferrule 51 is formed integrally with a pair of skirt members 52 projecting downwardly and spaced just sufficiently to receive a pair of ears 53 formed integrally with the respective halves of the fan housing outlet 46 and projecting upwardly. Bolts 54 project through the skirt members 52 and ears 53 and secure them together. Engagement of the skirt members 52 with the periphery of the fan housing 31 aids in bracing the handle in its engagement with the fan housing.

A cord shield 55 embraces the entire assembly of ferrule 51, skirt 52 and ears 53, and projects forwardly around a portion of the periphery of the fan housing 31 on an arc concentric with the axis of the shaft 37. Current is conveyed to the motor 39 through a short motor cord 56 extended partially around the fan housing 31 and supported against the periphery thereof which acts as a reel. To a laterally extending portion of the cord 57, extending from the point where it enters the motor housing 24, may be secured one end of a spring 58 the other end of which is secured to the casting 10 of the suction chamber A. As the handle is lifted, the section 57 of the cord will loop downwardly being pulled taut by the spring 58 if a spring is used or simply hanging under its own weight if a spring is not used. Either method may be employed successfully. An intermediate region of the cord is secured to the fan housing by a staple 59 which

holds it in engagement with the fan housing and the opposite end of the cord is provided with a separable connector plug 60 which is plugged into a socket or female element 61 mounted in the lower end of the ferrule 50.

Current is conveyed to the element 61 by a cord 62 connected thereto and extended through the handle.

Sockets 63 for receiving the lower ends of the bag supporting rods (not shown) are formed integrally with the ears 53 and project laterally therefrom.

According to the herein claimed invention, a roughly prismatic space 64 is formed between the motor housing 24, the suction chamber casting 10 and the cover G, such space extending transversely between a side wall 65 of the cover G and a partition 66 (Fig. 1) which separates the space in which the belt 45 is housed from the motor compartment. In the space 64 is secured the headlight mounting 67 which is formed of sheet metal and includes a pair of feet 68 screwed down upon the top of the suction chamber casting 10 by screws 69, and a semi-cylindrical hood portion 70 in which is secured the reflector 71. The latter is formed of a thin sheet of stainless steel welded to the hood portion 70. Formed integrally with the mounting 67 and projecting upwardly between the feet 68 is a bracket 72 terminating in a downwardly inclined ear having a threaded opening 74 to receive a securing screw 75 for securing the forward end of the cover G.

Also formed integrally with the mounting 67, spaced from one end of the hood 70, is a clip 76 in which is held the socket 77 of the headlight lamp 78. The socket 77 may be either welded or soldered to the clip 76 or simply held frictionally. Spot welding is preferred. The lamp 78 is threaded into the socket 77 in the conventional manner and the socket 77 receives current from a conductor attached to the brush terminals of the motor 59 and held preferably by the same binding posts that secure the wires of the conduit 57. These brush terminal binding posts are not shown, but are of a conventional construction.

The cover G is formed of drawn sheet metal and includes a top wall 80, a forward inclined wall 81, a curved wall portion 82 joining the portions 80 and 81 and curved on the same radius as the periphery of the motor case 24, and end wall portions 65. The latter are stepped for decorative purposes and to form belt housing which does not require the height of space that is required by the motor housing 24. The end wall region 65 on one side of the cover is cut away opposite the upper region of the agitator belt 45 and is provided with a detachable belt cover 83 which allows access to that belt without detaching the cover G.

The rear region of the cover G is cut away to form a central longitudinal slot 84 through which the fan housing 31 projects. The edge region of the cover wall 80 defining the slot 84 is beaded as at 84a. The bifurcated portions of the cover thus formed cover the ducts 30.

The lower marginal edges of the cover G lie in the plane 26 in engagement with the marginal region of the casting 10 surrounding the depression in which the motor housing 24 is accommodated, which latter marginal region also lies in the plane 26. A portion at least of this marginal region of the casting 10 is provided with an upstanding flange 86 around which the edge region 75

of the cover fits. The cover is fastened down against this marginal region by a screw 85 extended through the central region of the top wall 80 and threaded into a bracket 85a secured to the motor housing 24. The forward region of the cover may be held down by the screw 75 threaded through a region of the cover lying just below the light opening 87 and into the ear of the lamp mounting 67.

The light opening 87 is partially shielded by a visor 88 which is formed integrally with the lower end of a rubber bumper member 89 extending longitudinally along the central region of the cover from the light opening around the curved brow portion 82 and back to the fan housing slot 84. The bumper 89 is vulcanized to a metal backing strip 90 which in turn is secured to the wall portions 80, 81, and 82 of the cover by means of a tongue 91 formed on the edges of the strip 90, projected through slots in the cover, and bent flat against the under surface of the cover.

The plate 90 may cover the entire underface of the visor 88 as shown in Fig. 8 in which case it would be formed as a conic section arched upwardly, or it may be cut away so as to leave just two fingers 92 vulcanized to the edge regions of the visor 88 as shown in Fig. 3, which shows in inverted plan view of the visor shown in Fig. 2. The visor in this case is preformed with the upwardly arched conic section shape and all metal portions are in direct contact with the cover wall 80, 81, and 82. This form of the invention has the advantage over that shown in Fig. 8 in that a softer and thinner metal may be used for the backing strip without danger of deformation of the visor. Should the cleaner be run against a piece of furniture in such a position as to impose the impact against the visor the latter would simply collapse to the plane of the cover and would spring back to its normal position as soon as the contact was severed.

The inner face of the visor Figs. 2 and 3 is finished with a white or aluminum paint so as to reflect the light from the lamp 78 downwardly upon the surface being cleaned. In the form shown in Fig. 8 the reflecting surface, of course, is provided on the metal strip 90.

For decorative purposes it is desirable to provide longitudinal stripes in the bumper G. The latter is finished in a common black rubber finish and stripes are desirable of a contrasting bright metallic finish. To avoid striping with a paint brush and to give a sharper contrast I provide a metal wire insert 94, embedded in grooves 95 in the bumper 89. The insert 94 is U shaped and is held in place by a staple 96 extended through its return bend portion and through the backing plate 90 and the cover wall 81 and its ends bent over. The ends of the insert 94 have downwardly hooked portions 97 (Fig. 7) which are extended through openings 98 in the bumper and cover wall 80 and hooked under the latter.

The conversion mechanism F although not claimed herein will be briefly described. It comprises a flat valve 100 secured to a shaft 101 extended through the side walls of the casting 10 just forwardly of the region where the latter branches into two forked portions 25. To the outer end of the shaft 101 is secured an arm 102 in which is slidably mounted a pin 103 carrying a cover plate 104 which normally is spring-pressed against and into the mouth of the cylindrical auxiliary inlet 105 communicating with one of the forked regions 25 of the suction chamber.

By pulling the pin 103 outwardly the cover 104 is disengaged from the mouth of the inlet 105 and the lever 102 may thence be moved upwardly so as to bring the valve 100 downwardly to the dotted line position shown and simultaneously to allow the coupling of an auxiliary tool hose to the inlet 105. When in this position, the cover 104 may be allowed to move into engagement with a suitable depression in the end wall 65 of the cover G to hold the valve in the dotted line position, or the cover may be held in such position by the auxiliary tool hose. The suction is thereby cut off from the agitator chamber 12 and a narrow communicating passage is established between the forks 25 whereby the suction of both fans is applied to the inlet 105.

In a modified form of the invention which is not illustrated in the drawings the valve 100 is positioned to completely cut off one of the forks 25 so that the suction applied to the auxiliary tool hose is only that of one fan. This has the advantage of cutting down the suction of the machine when the auxiliary tools are employed. Since the invention contemplates the provision of a much higher suction for carpet cleaning purposes than is customarily achieved in conventional vacuum cleaners of the rotating agitator type, it may be desirable in some instances of auxiliary cleaning to reduce the suction particularly where curtains or similar light fabrics are being cleaned.

It is also contemplated that the conversion mechanism may be arranged so that the valve 100 has three positions two of which are identical with those shown in Fig. 2 herein and the third of which is an intermediate position for allowing some air to enter through the suction mouth of the agitator chamber so as to reduce the suction applied against the inlet 105. In this way, varying degrees of suction for auxiliary cleaning are obtainable.

The floor wheel mechanism I includes forward wheels 106 journaled in sockets 107 formed integrally with the casting 10, and rear wheels 108 mounted in a sheet metal bracket 109 which has a portion 110 looped around a mounting shaft 111 and secured thereto by tongues 112 struck from the loop 110 and extending into the groove in the shaft 111. The loop 110 is clamped in closed position by a bolt or bolts 113.

The shaft 111 is journaled in bearings 114 formed on the respective forks 25 of the suction chamber and bearing caps detachably secured thereto. The shaft 111 may be rotated to any of several selective positions of adjustment and held in any of such positions by a lever and detent mechanism 116 such as that shown in United States Patent No. 2,102,221. The detent sector is secured to the suction chamber fork 25 opposite that which carries the inlet 105.

The motor housing 24 is mounted upon the suction chamber casting 10 through the medium of resilient rubber sandwich mountings including arc shaped strips of metal 117 and 118 respectively secured to the ends of the motor housing 24 and to brackets 119 which are mounted upon ledges forming part of the hereinbefore mentioned margin region of the casting 10 surrounding the depression in which the motor housing 24 is received. The metal plates 117 and 118 are vulcanized to and connected by rubber cushions 120 carrying the full load of the motor.

I claim as my invention:

1. In a vacuum cleaner, a suction chamber in-

cluding, a transverse agitator chamber, a motor mounted on top of the suction chamber, its axis parallel to that of the agitator chamber, a casing member covering said motor and part of
 5 said suction chamber, said casing member including a forward downwardly inclined wall roughly tangent to the motor and agitator chamber and forming a roughly prismatic space therebetween, a headlight mounted on the top wall
 10 of the suction chamber and disposed in said space, said casing having an opening in its forward wall, a visor fitting over said opening, said visor including a flexible metal element and a rubber bumper fitted over said metal element
 15 and extending centrally over said wall and terminating at the rear edge of the casing member, said opening lying substantially opposite said light such that light may be emitted through said opening.

20 2. In a vacuum cleaner, a suction chamber including a transverse agitator chamber, a motor mounted on top of the suction chamber, its axis parallel to that of the agitator chamber, a casing member covering said motor and part of
 25 said suction chamber, said casing member including a forward downwardly inclined wall roughly tangent to the motor and agitator chamber forming a roughly prismatic space therebetween, a headlight mounted on said chamber in
 30 said space, said casing having an opening in its forward inclined wall through which light is emitted and a visor extending over said opening and secured to the casing, said visor comprising a flexible metal element and a soft rubber bumper element
 35 fitted over a said metal element, said bumper element extending up said inclined wall and over the top of the casing, and terminating at the rear edge of the casing.

3. In a vacuum cleaner, a floor tool, a motor on said floor tool, said floor tool provided with an upwardly projecting motor cover, a bumper secured to the forward central face of said cover and extending rearwardly of the cover, a head-
 5 light visor formed integrally with one end of said bumper, said cover having an opening directly below said visor, said bumper and visor comprising a soft rubber element disposed upon a metallic strip and both secured to said cover, 10 and illuminating means disposed beneath the cover in registry with said opening.

4. In a vacuum cleaner, a floor tool, a motor on said floor tool, said floor tool provided with an upwardly projecting motor cover, a bumper
 15 secured to the forward central face of said cover and extending rearwardly of the cover, a flexible metallic headlight visor formed integrally with one end of said bumper, said cover having an opening directly below said visor and illuminating
 20 means disposed beneath the cover in registry with said opening, said bumper being of soft rubber and said bumper and said visor adapted to collapse against the cover under impact and to spring back to its normal position when freed
 25 from contact with the impacted object.

5. In a vacuum cleaner including a floor tool and a motor and having a cover for the motor and a light source, the combination, a visor extending over an opening in the forward part of
 30 said cover to emit light therethrough, said visor comprising a soft flexible rubber material and a flexible metallic element, supported on a metal strip secured to the cover and both said rubber and said flexible metallic element adjusted to
 35 return to normal position following distortion thereof by impact with a non-yielding object.

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