

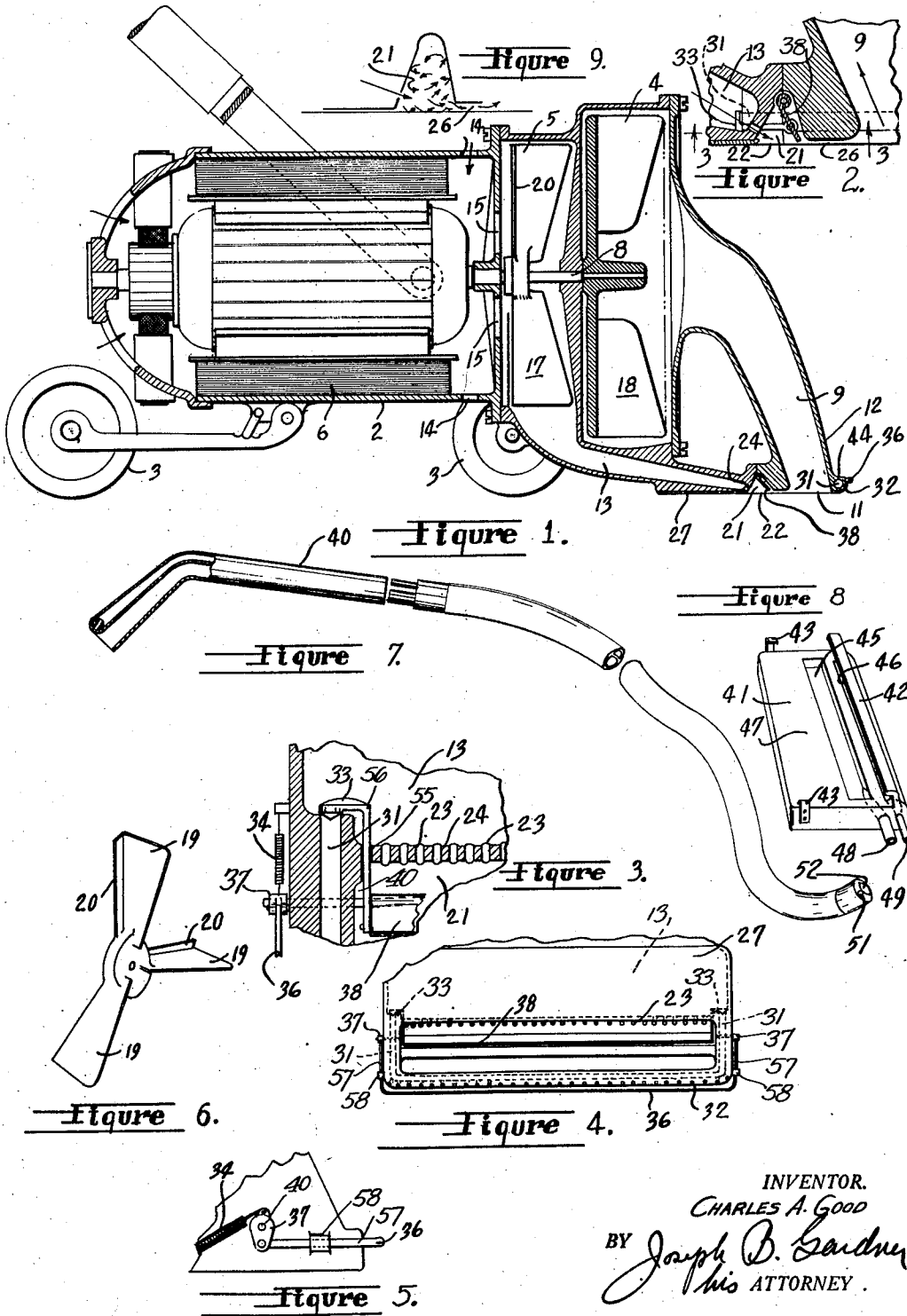
Dec. 15, 1936.

C. A. GOOD

2,064,344

COMBINATION BLOWER AND SUCTION SWEEPER

Filed Aug. 25, 1933



INVENTOR.
CHARLES A. GOOD
BY *Joseph B. Gardner*
his ATTORNEY.

UNITED STATES PATENT OFFICE

2,064,344

COMBINATION BLOWER AND SUCTION SWEEPER

Charles A. Good, Eureka, Calif.

Application August 25, 1933, Serial No. 686,731

5 Claims. (Cl. 15-14)

The invention relates to hand-controlled power-operated suction sweepers such as commonly used in cleaning households and the like.

An object of the invention is to provide a sweeper of the character described, which has a blower arrangement associated with the suction nozzle whereby a stream of air may be directed against the surface to be cleaned to effect a loosening of the dirt as an initiatory action to sucking the dirt into the nozzle.

Another object of the invention is to provide a combination blower-suction sweeper in which the stream of air for blowing will be so arranged with respect to the suction inlet that a thorough agitating of the dirt may be effected while at the same time insuring against the escape of any of the agitated dirt particles from the desired influence of the suction.

A further object of the invention is to provide a sweeper of the character described which will set up by means of a stream of air, a swirling turbulent action on the dirt particles previous to their coming under the direct influence of the suction opening similar to that produced with the rotary brush commonly associated with the sweeper.

An additional object of the invention is to provide a combination blower-suction sweeper from which may be emitted a stream of air for cleaning inaccessible areas such as flooring along the base of the walls of a room, on the mere engagement of a portion of the sweeper with such walls.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a vertical longitudinal sectional view of a sweeper made in accordance with my invention.

Figure 2 is an enlarged sectional detail view of the sweeper, taken in the same plane as Figure 1, and showing the blower and suction openings at the bottom of the sweeper.

Figure 3 is a horizontal sectional view of an end portion of the sweeper at the blower and suction openings.

Figure 4 is a bottom view of the forward portion of the sweeper.

Figure 5 is a fragmentary front view at an end of the sweeper.

Figure 6 is a perspective view of the fan for creating the blower draft.

Figures 7 and 8 are perspective views of the hose extension and attachment plate that may be used with the sweeper.

Figure 9 is a diagrammatic representation of the blower discharge portion of the sweeper.

The sweeper in the preferred embodiment of the invention comprises a portable unit 2 mounted on wheels 3 and made up of a suction pump 4, a blower pump 5, and an electric motor 6. In the design shown the axis of rotation of the motor as well as that of each of the pumps is horizontally disposed and a common shaft 8 serves for all three members. Preferably the suction pump is located at one end of the unit while the blower pump is interposed between the suction pump and the motor.

The inlet passage 9 for the suction pump is located as here shown at the front of the unit, and the intake orifice 11 thereof is disposed at the underside of a nozzle 12 at the outer end of passage 9. Delivery of air from the blower pump is through a passage 13 which extends in a general way up to the inlet orifice 11 in the nozzle. Intake of air to the blower pump is desirably disassociated from any communication with the suction pump, and an unadulterated supply of fresh air to the blower is afforded through openings 14 and 15 in the motor and blower pump walls. As will be clear from Figure 1, separate fans 17 and 18 as well as compartments are provided for the pumps, and in the instance of the blower fan 17 each blade 19 has provided thereon a flange 20 which extends along the back edge thereof and serves to concentrate the discharge of air radially for direct discharge into the peripheral intake of the delivery passage 13.

As probably most clear from Figure 2, the delivery passage 13 does not lead the blower air directly to the suction inlet, but instead transmits same to what may be conveniently termed an agitating chamber 21 which communicates with the suction inlet and has an open side 22 along the bottom of the nozzle coextensive with the suction orifice 11. Preferably the air enters the chamber 21 from passage 13 by way of a row of openings 23 formed in a partition 24 separating the main passage from the chamber, and said openings are declined whereby the air will

be directed forwardly and downwardly against the surface to be cleaned. It will be noted that the chamber extends considerably upwardly and the walls thereof are so designed that when air strikes the forward wall it will be deflected upwardly and backwardly to set up in the chamber a swirling air current which subjects the dirt particles on the surface aforesaid to an action similar to that produced by the use of the rotary brush as commonly provided on a sweeper. The motion of the stream in the chamber is diagrammatically illustrated in Figure 9. It will be observed that communication between the chamber and suction inlet is through means of a space 26 on the under side of the nozzle, and it is through this space that the air stream, together with the dirt raised by the stream, is passed from the chamber to the inlet for conveyance to the dirt collecting bag or other device associated with the sweeper. The space 26 is created by reason of engagement of a shoe 27 or the like with the surface to be cleaned. The shoe, as will be clear from Figure 2, is positioned up against the under surface of the sweeper immediately to the rear and ends of chamber 23 and for this reason the air and dirt in the chamber will be prevented from escaping anywhere except through the space 26.

One of the features of the sweeper of the present invention is the incorporation of means for cleaning out normally inaccessible corners as between the floor and walls of a room and the like by use of a special blower arrangement which is operatively connected to the blower and suction nozzles first described. This blower means is provided at the extreme forward edge of the sweeper at the front of the suction nozzle 12 so that on advancing the sweeper into a corner streams of air may be discharged directly into the corner for loosening the dirt or dust therein, whereby the latter may be easily drawn into the suction passage of the sweeper. As will be clear from Figures 1 and 4, there is provided across the forward edge of the nozzle 12 an air passage 31 which, adjacent the sides of the sweeper, is extended rearwardly and communicates with the blower passage 13. The portion of the passage 31 across the front of the sweeper is provided with a series of jet openings 32 which slope downwardly and forwardly so that the air discharging therefrom will be directed directly into the corner and against the floor surface to be cleaned. Normally, the passage 31 is closed from communication with the blower passage 13 so that when cleaning a portion of the floor away from the walls, the full force of the pump means will be directed through the jet 23 and into the turbulence chamber 21, and on the other hand means is provided for closing off this latter discharge when the blower 31 is put into operation. Also, this change of the blower output from behind the suction nozzle to the front of the sweeper and vice versa, is arranged to be effected automatically as the sweeper is advanced to or withdrawn from a wall. As will perhaps be best seen from Figures 3 and 4, there is mounted directly in the turbulence chamber 21, a flap valve 38 which is fixed at its upper end to a shaft 40 rotatably carried by the sweeper casing across the top of the turbulence chamber. Pivoted to the ends of the valve 38 and extended through guides 55 in the partition 24 are the stems 56 of a pair of valves 33, which are disposed in the blower passage 13 and are movable together with the flap valve 38 into and from a closed position

in the ends of the passage 31. It will thus be understood that upon turning of the shaft 40 to move the valve 38 against the partition 24 and thereby close the passages 23, the valve 33 will be similarly displaced to open the passage 31 to the passage 13, and conversely a movement of the flap valve away from the partition 24 and the openings 23 will be accompanied by a movement of the valve 33 into a closed position in the ends of the passage 31. The means for so controlling and regulating the aforesaid valve movements is provided in part by a buffer rail 36 extending across the front of the sweeper and which is provided with right-angular extended end portions 57 which are slidably carried in guides 58 and are connected at their ends to a pair of crank arms 37 mounted on the ends of the shaft 40 at the outer sides of the sweeper case. Thus, on movement of the sweeper to engage the rail 36 against a wall or the like, the rail will be displaced to rotate the shaft 40 and operate the valve mechanisms. In order that the valves 38 and 33 will be normally held respectively open and closed, a pair of springs 34 are mounted at the opposite sides of the sweeper and connected to the crank arms 37 at a side opposite from the ends 57 with respect to the shaft 40. In this manner, the springs 34 will normally maintain the shaft 40 in a rotated position holding the valve 38 open and the valve 33 closed and the buffer rail 36 extended in spaced position forwardly of the sweeper and will resiliently resist an inward displacement of the rail 36, for operating the valves as aforesaid and serve to return the valves to their normal position on release of the rail.

As will be clear from Figure 1, the buffer rail 36 is positioned above the discharge openings 32 and thus when moved against a side wall and displaced to against the end of the sweeper, the same will restrict the upward escape of the dust particles loosened in the corner and will form sort of a pocket for directing the movement of such particles into the field of the suction nozzle.

Should it be desired to use a cleaning extension 40 with the sweeper, an attachment plate 41 such as illustrated in Figure 8 is secured to the nozzle. The plate is arranged to fit over the underside of the nozzle and is secured in position by hooks 42 and 43, the hook 42 fitting over the front flange 44 of the nozzle while the hooks 43 snap over and engage end portions of the nozzle. In the plate are provided openings 45 and 46 which register respectively with suction inlet and front blower openings 33, a blank portion 47 being provided on the plate for closing the chamber 21. Retention of the rail in inward position when the attachment plate is on the nozzle, is afforded by engagement of the front hook 43 therewith. Pipes 48 and 49 connect with the openings 45 and 46, and such pipes are designed for insertion in the blower and suction passages 51 and 52 of the extension 40.

I claim:

1. In a sweeper of the character described, an air suction nozzle arranged for movement over and to withdraw dust from a surface to be cleaned, and an air blower nozzle movable together with and in advance of said suction nozzle and having a discharge orifice above the intake orifice of said suction nozzle and opening downward adjacent the forward edge of said sweeper, a valve normally preventing discharge from said blower nozzle, and valve actuating means positioned at the front of said sweeper and operable

on being moved against a wall or the like to open said valve and permit discharge of air from said nozzle downwardly into the corner defined between the wall and surface for movement of dust particles in the corner into the field of said suction nozzle.

2. In a sweeper of the character described, an air suction nozzle movable over a surface to be cleaned, an air blower nozzle movable in advance of said suction nozzle and opening downward adjacent the front edge of the sweeper whereby on movement of the sweeper to an edge of the surface adjoining a wall the blower nozzle will discharge air downwardly into the corner between the wall and surface to loosen the dust therein for movement into the field of said suction nozzle, and means extending along the forward side of said sweeper for engagement with said wall for defining therewith a pocket for preventing the upward deflection of dust from said corner.

3. In a sweeper of the character described, an air suction nozzle movable over a surface to be cleaned, an air blower nozzle movable together with and in advance of said suction nozzle and opening downwardly adjacent the forward bottom edge of said sweeper whereby on movement of the sweeper to an edge of the surface adjoining a wall said blower nozzle will be positioned for discharging air downwardly into the corner between the wall and surface to loosen the dust therein for movement into the field of said suction nozzle, means extending along the forward side of said sweeper for engagement with said wall for defining therewith a pocket for preventing the upward deflection of dust from said corner, valve means for controlling the air passage to said blower nozzle, and means connecting said valve means and said first means and being operative on engagement of the latter with said wall to actuate said valve means to permit air passage to said blower nozzle.

4. In a sweeper of the character described, an air suction nozzle arranged for movement over and to withdraw dust from a surface to be cleaned, an air blower nozzle at the rear of said suction nozzle arranged to blow air over said surface and into said suction nozzle, an air blower nozzle movable together with and in advance of said suction nozzle and opening downward adjacent the forward edge of the sweeper whereby on movement of the sweeper to an edge of said surface adjoining a wall said last named nozzle will blow air downwardly into the corner defined between the wall and surface for movement of dust particles therein into the field of said suction nozzle, valves for controlling the flow of air to said blower nozzles, a buffer mounted along the forward side of said sweeper and arranged on engagement with the wall to define with said forward side and said corner a pocket preventing the escape of dust particles from the suction nozzle, and connecting means between said valves and buffer arranged normally to maintain the passages of said first and second blower nozzles respectively open and stopped and serving on engagement of said buffer and wall to stop said first blower passage and open the second.

5. In a sweeper of the character described, an air suction passage opening to the bottom of the sweeper and movable over a surface to be cleaned, a downwardly opening chamber provided in the sweeper bottom adjacent and communicating with said suction passage, a plurality of jet inlets opening to a side of said chamber, and a source of air under pressure communicating with said inlets, said jet inlets being formed to direct air downwardly and angularly through said chamber to a point on said surface adjacent the opposite side of said chamber whereby a swirling and turbulence of air will be set up in said chamber tending to loosen dust on said surface.

CHARLES A. GOOD.