ABSTRACT

A vacuum cleaning machine for cleaning the full width of a bowling alley, including the gutters or channels on either side thereof, is disclosed. The machine comprises a pair of vacuum units each connected through a plenum to a nozzle which is generally in the form of an inverted U-shaped elongated channel designed to extend across the width of the bowling lane. The nozzle carries downwardly-extending brushes which serve to loosen the material that is to be picked up by the vacuum units. Each end of the nozzle is adapted to receive an extension which acts as an auxiliary nozzle, with each auxiliary carrying at its outer end a brush arrangement for cleaning the bowling alley gutters. The extensions are fastened to the upper surface of the main nozzle to form air passages which communicate through an opening in the nozzle so that air and entrained particles from the gutters can be drawn into the vacuum units. A pivoted arm is affixed to the front and back of the channel extension and carries at its outer, free end a curved brush which is adapted to the shape of the alley channel so as to loosen the dust which is to be picked up. The material entrained in the air flow of the vacuum cleaner is carried to a suitable storage bag, in conventional manner.

29 Claims, 7 Drawing Figures
BOWLING LANE VACUUM CLEANER

BACKGROUND OF THE INVENTION

The present invention relates, in general, to vacuum cleaners, and in particular to a vacuum cleaner specifically designed automatically and effectively to clean bowling alleys, including the floor portion forming the bowling lane as well as the gutters formed on either side of the lane.

As is well known, it is essential to carefully maintain bowling alleys so as to produce consistent surface conditions whereby the bowling surface of each lane will be predictable and uniform. A typical bowling lane surface is prepared by finely sanding the wood surface and covering the sanded surface with several coats of lacquer. The lacquer-coated surface is then regularly dressed by applying a light lubricant, mineral oil or other material of appropriate composition. This dressing provides a protective finish over the lacquer which will minimize marking of the lane surfaces and which will facilitate removal of black marks, scuffs and the like. It has been found, however, that over a period of time the heavy bowling balls compress the lacquer finish and form grooves or paths, in the lane surface which catch the balls and guide them, often carrying the balls off course.

Because of the hard usage given a bowling lane surface, it is necessary to periodically remove the finish from the wood and refinish the surface so as to completely remove the grooves and other marks that are formed in the surface. Obviously a bowling alley must be closed during this periodic refinishing, and it is therefore essential that this work be done quickly and efficiently so as to return the alley to service as soon as possible. To accomplish this there has been developed a new and improved sanding machine for bowling alleys which is described and claimed in a copending application of Samuel H. Sharpless, Ser. No. 128,679, filed on Mar. 29, 1971, and entitled Improved Sanding Machine for Bowling Alleys. This sanding machine provides a fast and efficient method of removing old surfaces from a bowling alley, but it will be apparent that in so doing a considerable amount of dust is created.

The samll particles of dust generated by this operation must be completely removed from the surface of the bowling alley before the lacquer finish can be applied, in order to assure a smooth, even, and flat surface.

Prior to the present invention, conventional vacuum cleaners were used to remove the dust and the accumulation of small particles due to the sanding operation, but such prior devices have not been entirely satisfactory. Although the conventional vacuum cleaner is designed for cleaning flat surfaces, and in this regard is relatively satisfactory for the bowling lane surface, such vacuum cleaners generally are not sufficiently large to cover the full width of the lane, and require several passes of the cleaner to cover the whole alley. In so doing, the dust particles are stirred up, and an incomplete job is done. Further, such machines are poorly adapted to remove the dust particles which fall or are blown into the gutters on either side of the bowling lane. These gutters must then either be cleaned by a separate vacuum cleaner machine, or must be manually swept out; in either case, the job is time consuming and does not completely remove the dust particles.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide a bowling alley vacuum cleaner device which will quickly and efficiently remove dust particles from the full width of a bowling alley, including the bowling lane surface and the gutter channels on either side.

It is another object of the present invention to provide a bowling alley vacuum cleaner which is adapted to clean an alley in one pass along the length of the alley.

It is a further object of the present invention to provide a vacuum cleaner having a nozzle which extends across the width of a bowling lane, and which is adapted to receive channel extensions on each end which will clean the ball channels adjacent the lane.

It is another object of the present invention to provide a vacuum machine for bowling alleys which is designed to provide automatic tracking and guidance so that the machine will clean the full width of the alley in one pass along its length.

It is another object of the present invention to provide a vacuum machine for bowling alleys which extends laterally across the alley and is adapted to be moved along its length so as to clean the alley and adjacent gutters in one pass, the machine being automatically guided along the alley and automatically adjusting to the changing configuration of the alley along its length.

It is a further object of the present invention to provide a vacuum cleaner having a nozzle adapted to clean a bowling lane, the nozzle being further adapted to receive channel extensions which extend into and clean the channels adjacent the bowling lane, the extensions carrying floating brushes which loosen the particles to be picked up and which adjust to varying configurations of the channels.

Briefly, the bowling lane vacuum cleaner of the present invention comprises an elongated nozzle adapted to extend transversely across a bowling lane. A pair of plenum chambers are formed at the center of the nozzle, each of which leads to and supports a commercial motor-driven vacuum cleaner suction unit. The nozzle is divided in half by suitable baffles so that each vacuum unit draws air from a corresponding portion of the nozzle and deposits dust and particles entrained in the air flow in a collection bag attached to the vacuum unit outlet. Each half of the nozzle carries a brush which is adapted to contact the surface of the alley to loosen the dust particles and permit effective cleaning. The front of the machine is supported by a pair of nylon slides so that the brushes will operate properly, while the rear of the machine is supported by wheels to provide ease of movement.

The nozzle is generally in the shape of an inverted U-shaped channel, with the outermost ends of the nozzle being formed with a stepped down or reduced volume portion which is adapted not only to clean the lane portion of the alley, but to receive corresponding nozzle extensions which reach beyond the edge of the bowling lane and extend across the gutters adjacent the lane. Each extension is bolted to the top of its corresponding reduced portion and mates with the vertical shoulder formed thereby in the nozzle, this vertical shoulder providing an opening or passageway which leads to the
interior of the nozzle. The extension is also in the form of an inverted generally U-shaped channel and when in position forms with the top of the reduced portion of the nozzle a duct leading from the passageway in the vertical shoulder to a vacuum chamber formed at the end of the extension over the gutter portion of the bowling alley. A pair of shaped brush support plates are pivotally connected to the exterior of the nozzle extension, the brush support plates being generally in the shape of the alley gutters and movable to extend therein. Each of these plates carries a bush holder to which is fastened a curved brush which is adapted to contact the surface of the gutter to thereby loosen dust particles, the brush holders being pivotally connected to the support plates to provide accurate contact between the brushes and the surface of the gutter. Also fastened to the nozzle extension is a guide roller assembly which carries a pair of guide wheels. These wheels are adjustably mounted and serve to contact the outer vertical edge of the gutter to maintain the machine properly aligned on the alley.

The machine is provided with suitable covers for the opening formed in the vertical shoulder of the main nozzle so that the vacuum cleaner may be used to clean any flat surface by removing the extensions. However, with the extensions attached, the present machine is capable of vacuum cleaning the full width of a bowling alley, including the gutter sections formed on each side thereof, performing this operation in a single pass.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and additional objects, features and advantages of the present invention may be more clearly seen from a consideration of the following specification, taken in conjunction with the attached drawings, in which:

FIG. 1 is a perspective view of a machine made in accordance with the present invention;
FIG. 2 is a partial top view of the vacuum cleaner of FIG. 1, with the nozzle extensions removed;
FIG. 3 is a bottom view of the vacuum cleaner of FIG. 1, with the cover removed from one of the plenum chambers and with the nozzle extensions removed;
FIG. 4 is a front view in partial section of the machine of FIG. 1, with one of the nozzle extensions removed;
FIG. 5 is a partial perspective view of the reduced end portion of the nozzle of the present invention;
FIG. 6 is an exploded view of a nozzle extension in accordance with the present invention; and
FIG. 7 is a side view in partial section of the device of FIG. 1.

DESCRIPTION OF A PREFERRED EMBODIMENT

Turning now to a more detailed consideration of the invention, reference is made to the perspective view of FIG. 1 wherein there is illustrated at 10 a vacuum cleaner for use on bowling alleys. The vacuum cleaner rests on and moves along the bowling lane 12, and has lateral nozzle extensions (to be described in detail hereinbelow) which serve to clean the gutters, or ball channels 14 and 16 conventionally located on each side of lane 12. The cleaner comprises first and second vacuum units 18 and 20 which rest on and are affixed to corresponding plenum chambers 22 and 24. These two chambers are attached to the back wall of an elongated vacuum nozzle 26 which extends the width of lane 12, the vacuum units 18 and 20 when in operation drawing air through nozzle 26 and plenum chambers 22 and 24, depositing any dust particles entrained in the air stream in corresponding dust bags 28 and 30.

Attached to the left and right hand ends of the nozzle 26, as viewed in FIG. 1, are the lateral nozzle extensions, or auxiliary nozzles, 32 and 34, respectively. Each extension is adapted to be securely fastened to nozzle 26 and to form therewith ducts or air passageways which lead to the gutters 14 and 16, respectively, whereby the vacuum units 18 and 20 will draw air and entrained particles into the nozzle from the surface of the bowling lane and into the extensions from the gutters. The air drawn into the extensions flows through the ducts into the nozzle, and thence through the plenum chambers to bags 28 and 30. Both the nozzle 26 and the extensions 32 and 34 are provided with suitable brushes for scrubbing the surface of the alley and gutters as the machine is moved to thereby loosen the particles and permit effective cleaning of the alley.

The cleaner is supported at the back on suitable wheels fastened to the main frame of the machine, with the front resting on adjustable slides so that the device may be easily moved along the alley by means of a handle 36. Since the machine extends the full width of the alley, it is effective to clean it thoroughly and efficiently in just one pass, thereby effecting a considerable savings in the time required to perform this task. It will be noted that the arrangement of the brushes with respect to the nozzles is such that the machine may be moved either forwardly or backwardly along the alley to clean it. Although the device is particularly useful for cleaning the alley after it has been sanded, and in preparation for refinishing, it will be apparent that the present machine can readily be used for normal day-to-day maintenance of an alley, if desired.

The main framework of the machine of FIG. 1 preferably consists of an aluminum casting which is designed to provide the duct work for the vacuum cleaning process while at the same time serving as a base to which the remaining components of the machine may be connected. This main framework includes the plenum chambers 22 and 24 and the main nozzle 26, as illustrated in FIGS. 2 and 3 of the drawings, to which reference is now made. In FIG. 2 there is illustrated a top view of the machine with the vacuum motors and the nozzle extensions removed. As illustrated, main nozzle 26 comprises an elongated channel generally U-shaped in cross-section and having its open end facing downwardly. The plenum chambers 22 and 24, which preferably are formed as a unitary part of the nozzle 26 but which may be separately formed and secured to the nozzle in a suitable manner, are connected to the back wall 38 of the nozzle, with an opening being formed therein to permit free flow of air from within the nozzle to the interiors of the respective plenum chambers. These openings are illustrated at 40 and 42 in FIG. 4. The plenum chamber 22 is formed to provide a raised platform 44 which is adapted to receive the vacuum unit 18. To secure the vacuum unit in place, the raised platform is formed with a locking cam ring 46 which receives a mating cam (not shown)
on the bottom of the vacuum unit 18, the cam being provided with a pair of lugs which fit into the corresponding notches on cam ring 46. The vacuum unit 18 is a standard industrial type which may be fitted on the platform 44 with the lugs passing through the notches on the cam ring so that a slight turn of the unit will cause the lugs to pass under the ring and lock the unit in position. The vacuum unit 18 rests on three rubber mounts 48 spaced around platform 44 to prevent vibration of the frame and to reduce noise. In similar manner, the plenum chamber 24 is formed with a raised platform portion 50 having a cam ring 52 adapted to receive and hold the vacuum unit 20. Again, rubber mounts 54 are provided to reduce vibration and noise. It will be seen that the locking cam rings 46 and 52 surround centrally located apertures 56 and 58 which provide access to the interior of the plenum chambers from their corresponding vacuum units.

The mainframe casting is also formed with a wiring compartment 60 which is connected between plenum chambers 22 and 24. Compartment 60 is generally parallel to nozzle 26 and spaced therewith, preferably being located at the back of chambers 22 and 24 to provide not only an enclosure for the wiring, but to provide additional structural strength to the mainframe. This compartment opens upwardly, with the opening providing access to the wiring and being closed by a suitable cover 62 held in place by suitable fastening means such as screws 64. Mounted on the front wall of compartment 60 is an inlet electrical connector 66 adapted to receive a corresponding plug connected to the main power supply line 68. Power is supplied to the vacuum units by way of line 68, which passes into handle 36 by way of aperture 70, and extends up the handle and out the top end thereof for connection to a suitable power source. Control means such as an on-off switch may be interposed in line 68, and preferably will be located at the upper end of handle 36 for convenient regulation of the operation of the vacuum units. Also connected to the front wall of compartment 60 are a pair of outlet connectors 72 and 74 which are electrically interconnected within the compartment with connector 66 to receive power therefrom, and which are adapted to receive corresponding plugs on power lines 76 and 78 which lead to vacuum units 18 and 20, respectively (see FIG. 4).

A pair of support wheels 80 and 82 for the machine are carried on corresponding shafts 84 and 86 which may be journalled in the back portion of the plenum chambers 22 and 24, respectively. These shafts may be independently mounted or may form a part of a single axle 88 which passes through suitable bearings in the main frame, and which may extend through the plenum chambers and the wiring compartment 60, as illustrated in FIG. 3. Also supported by shafts 84 and 86 is a handle bracket 90 which is in the form of a yoke. The handle bracket includes first and second spaced legs 92 and 94 carried by shafts 84 and 86, respectively, and a centrally located tongue portion 96. The tongue portion of the bracket is formed with a groove or channel in its upper surface which is adapted to receive handle 36. The handle is held in position within the groove by means of a cover plate 98 which may be securely fastened by means of studs threaded into the tongue portion of the yoke and wing nuts 100. The end of han-

dle 36 may carry a locator shaft 102 which is spring biased outwardly to contact the curved upper surface of a locator block 104. The upper surface of the locator block carries a plurality of depressions which are adapted to receive the end of shaft 102 so that when the locator shaft is engaged in one of the depressions, the handle will be supported at a corresponding angular position. The spring bias on the locator shaft may be adjusted to permit the handle to be pivoted about shafts 84 and 86 but to be held in the selected position when no vertical force is exerted on the upper end of the handle; alternatively, a mechanical latching mechanism may be used to provide a positive engagement between the locator shaft and a selected one of the depressions in the locator block, whereby the handle is firmly held in position.

In FIG. 3 it will be seen that the bottom of the plenum chambers 22 and 24 are closed by means of cover plates, this figure showing the cover plate 110 in place for plenum chamber 24, while the cover plate for chamber 22 has been removed to illustrate the interior of this chamber. In order to provide additional stability and strength to the machine, a support bar 112 is provided, this bar extending between the nozzle 26 and compartment 60 and being spaced equally between the plenum chambers.

The nozzle 26, which is formed as a part of or is attached to the forward end of the plenum chambers 22 and 24, is generally U-shaped in cross section, forming a channel with the open portion of the channel facing downwardly toward the surface which is to be cleaned. At the central portion of the nozzle where it is interconnected with the plenum chambers, it is approximately square in cross section, the height and width dimensions being about the same, this central portion forming a collection chamber 114. The collection chamber is defined by the back wall 38 of the nozzle, a top wall 116 and a front wall 118, as illustrated in FIGS. 2, 3 and 4. Both ends of nozzle 26 are stepped down to form a nozzle area of reduced cross section which is adapted to receive and engage a laterally extending nozzle extension. The height of the reduced nozzle portion is substantially less than that of the central portion of the nozzle in this embodiment, while the width thereof remains constant. FIGS. 2 and 4 illustrate the reduced portion 120 at the left-hand end of the nozzle as being formed by the back wall 38 and the front wall 118 of the main nozzle, while the top of the reduced area portion is formed by a top wall portion 122 and the end is closed by an end wall 124. At the juncture between the collection chamber 114 and the reduced nozzle chamber 120 the upper surface of the nozzle is discontinuous and the front and back walls are notched to form a vertical shoulder having a passageway 126 leading to the exterior of the nozzle. This passageway is illustrated in the perspective view of FIG. 5.

The upper surface 122 of portion 120 serves as a base for receiving and supporting the nozzle extension 32, the notches formed in back and front walls 38 and 118 providing the shoulder against which the end of the nozzle extension abuts to connect the interior of the extension to the collection chamber 114 by way of passageway 126. A stud 128 is mounted on the upper wall 122 by means of which the extension is secured to the nozzle 26. In order to permit the machine to be
used without extension 32, a cover 130 is provided for passageway 126. This cover is pivotally mounted by means of bracket arms 132 and 134 to a pin 136 which is secured to the upper surface 116 of the nozzle by means of upstanding lugs 138 and 140.

Mounted within the channel formed by the portions 114 and 120 of nozzle 26 is a brush 142 supported by a brush holder 144 which extends along about one half the length of the nozzle. As illustrated in FIG. 3, the brush holder is formed with a pair of lugs 146 and 148 which are adapted for use in securing the brush holder to the nozzle. As may be seen in FIG. 4, the lug 146 is adapted to receive a threaded stud 150 which extends upwardly through a corresponding aperture in the upper wall 122 of the nozzle where it may be secured by a suitable wing nut 152. In similar manner, the lug 148 is adapted to receive a stud which passes through a corresponding aperture in top wall 116 where it is secured by a wing nut or the like.

The right-hand side of nozzle 26 is constructed in substantially the same manner as the left-hand side just described, and thus includes the right-hand portion of collection chamber 114 which is defined, as before, by back wall 38, top wall 116 and front wall 118. The right-hand end of the nozzle is formed with a stepped down portion 120 of reduced cross-sectional area, this portion being defined by the back wall 38, a top wall portion 122, the front wall 118 and an end wall (not shown) Again, the front and back walls of the nozzle are notched to provide vertical shoulders against which the nozzle extension 34 (FIG. 4) abuts, the nozzle extension resting on top wall 122 to define an extension duct which leads from the passageway 126 formed in nozzle 26. The reduced nozzle portion 120 carries an upstanding stud 128 which is adapted to pass through an aperture in extension 34, the extension being secured to the nozzle, by means of a wing nut or the like on this stud.

Located within the right-hand half of nozzle 26 is a second cleaner brush 142' which is carried by a brush holder 144'. A pair of lugs 146' and 148' are provided on holder 144' by means of which brush holder 144' is secured in the right-hand portion of the nozzle. It will be noted that the lugs extend up to the top wall of the nozzle and thus also serve as spacers to insure that the brush is properly located. Again, the brush is held in place by suitable studs and wing nuts, by bolts, or by other fasteners. When the extension 34 is removed from nozzle 26, the passageway 126' may be closed by a cover 130' in the manner previously described.

In order to support the front end of the machine while it is being moved along the surface to be cleaned, a pair of adjustable slides 160 and 162 are provided. These slides are threadedly mounted in the end portions 120 and 120', respectively, of the nozzle and extend down below the lower edge of nozzle 26 (see FIG. 4) to provide the required spacing between the nozzle and the surface to be cleaned. The slides are preferably made of nylon and after adjustment may be secured into position by a locking nut 164. Also formed within the nozzle is a pair of flange plates 166 and 168 which serve generally to divide the nozzle chamber and to direct the air flow from the right-hand side of the nozzle into the corresponding right-hand vacuum unit and to direct the air flow from the left-hand side of the nozzle generally into the left-hand vacuum unit.

Turning now to a more detailed consideration of the nozzle extensions, reference is made to FIG. 6 wherein the extension 34 is illustrated in an exploded view and to FIG. 7 wherein the extension is illustrated in a sectional end view, the section being taken along line 7-7 of FIG. 4. The extension comprises an elongated channel generally U-shaped in cross section which has a reduced duct portion 173 and an enlarged vacuum chamber portion 174, both of which are formed by front and back walls 176 and 178 (FIG. 7) and a top wall 180. The front and back walls are notched to form the reduced portion 173 which is adapted to receive the end portion 120' of nozzle 26. When the vacuum chamber is attached to the nozzle 26, the notched walls 176 and 178, together with the top wall 180, form with the top wall 122' of the reduced nozzle chamber 120'a duct 182 which leads from passageway 126' into the vacuum chamber. When the chamber is so positioned, the front and back walls of the nozzle 26 and the extension 34 are flush, as are the top walls 116 and 180, with the vacuum chamber portion 174 extending laterally beyond the end of nozzle 26 and over the area of the bowling alley gutter which are to be cleaned, (see FIG. 4). The ends of the vacuum chamber 174 are closed by end walls 184 and 186 (FIGS. 4 and 6, respectively) so that the vacuum chamber opens downwardly toward the surface to be cleaned. The upper wall 180 of the vacuum chamber is provided with a first aperture 188 which receives the threaded stud 128' whereby the extension is secured to nozzle 26 and is further provided with a threaded aperture 190 which receives a bolt for securing the guide assembly to be described.

At the inner end of the vacuum chamber where it abuts the passageway 126' there is formed a support bracket 192 having front and back legs 194 and 196 extending downwardly outside the front and back walls of the nozzle 26. At the lower ends of these legs are located apertures for receiving pivot pins 198 and 200, respectively. These pivot pins may take the form of bolts which may be threaded into the apertures in legs 194 and 196, or may be pins having a friction fit in the apertures. Mounted on pins 198 and 200 are a pair of brush support plates 202 and 204 having arms 206 and 208, respectively, carrying apertures through which the pivot pins pass and which extend along and adjacent the front and back walls 176 and 178, respectively, of the vacuum chamber 174. The outer ends of the brush support plates are enlarged and curved as at 210 and 212 to generally conform to the shape of a bowling alley gutter, the arms 206 and 208 being sufficiently long to position the curved portions 210 and 212 adjacent the downwardly facing opening in the vacuum chamber 174. The curved enlarged portions 210 and 212 of these brush support plates serve as baffles to guide the flow of air into the vacuum chamber during operation of the machine.

A generally U-shaped stop or bar 214 is secured to the brush support plates 202 and 204, the bar 214 extending over the top wall 180 of vacuum chamber 174 in order to limit the downward pivotal motion of the brush support plates while allowing free upward motion thereof.

The brush support plates 202 and 204 are adapted to carry curved brush holders 216 and 218, respectively, the brush holders being attached to their respective support plates by means of pivot pins 220 and 222.
respectively. The pivot pins are adapted to pass through apertures 224 and 226 of the brush holders to threadedly engage apertures 228 and 230 in the brush support plates 202 and 204. The brush holders 216 and 218 carry corresponding gutter brushes 232 and 234, respectively, the brushes being removably held in downwardly facing grooves 233 and 235 formed in the brush holders, the brushes being secured by means of fasteners 236. The pivotal arrangement of the brush holders and of the brush support plates enables the brushes 232 and 234 to conform to the depth and configuration of the bowling alley gutters being cleaned, the brushes automatically adjusting to variations in depth and curvature of the gutter.

A guide assembly 240 comprising a wheel support bracket 242 and two depending guide wheels 244 and 246. The guide wheels are mounted on vertical axes which are journaled in the support bracket 242, with the whole assembly being adjustably attached to the top of vacuum chamber 174 by means of a bolt 248 adapted to pass through an elongated opening 250 in the wheel support bracket and into the threaded aperture 190 in the top surface of vacuum chamber 174. The guide wheel support bracket 242 is curved to fit over the top of the vacuum chamber so that when the bolt 248 is tightened, the bracket will be held firmly in place. The elongated opening 250 permits the guide wheels to be adjusted inwardly or outwardly from the end of the vacuum chamber so that the guide wheels will contact the outside edge of the gutter to thereby insure that the machine remains centered on the alley, as illustrated in FIG. 1.

FIG. 7 shows an end view of extension 34 with the end wall 184 removed. This Figure also shows the manner in which vacuum unit 20 is supported by plenum chamber 24. It will be understood that the vacuum unit is of conventional design, and includes an electric motor 252 secured by means of a fastener plate 254 to a circular blade housing 256 which encloses a rotary fan driven by the motor. The rotation of this fan is in a direction to draw air through the nozzle into the plenum chamber 24 up through the central opening aperture 58 into the blades, and thence to an exhaust outlet 258 which is connected to the dust collection bag 30. The machine may be pushed by means of handle 36 in either a forward or reverse direction, with the air flow carrying entrained dust and other particles from the surfaces through the nozzle and nozzle extension and thence into the dust bag for disposal.

Thus there has been provided a new and improved vacuum cleaner for use on bowling alleys and other flat surfaces and which is capable of cleaning both the alley and the adjacent gutters in a single pass. The machine is simple, and because it is formed from aluminum castings, is relatively lightweight for easy handling both in cleaning and in transporting. The machine may be easily dismantled if necessary for transportation, and the brushes may easily be removed for replacement when they are worn. The machine is provided with guide assemblies which align it with the alley so that the lane and gutter brushes will travel effortlessly along the surfaces to be cleaned. The adjustable slides for the main nozzle and the pivotal connections for the gutter brushes insure that there will be sufficient pressure exerted by these brushes on the respective surfaces to ensure thorough cleaning. Since the gutters adjacent a bowling lane will normally change in cross sectional configuration, the pivotal mounting of the gutter brushes further insures automatic adjustment of the machine to the surfaces being cleaned. Although the invention has been described with respect to a specific embodiment thereof, it will be apparent that numerous variations and modifications in the particulars thereof can be made without departing from the true spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. A bowling alley vacuum cleaner for cleaning the lane and both gutters of an alley simultaneously, comprising:
   a nozzle extending across the width of said lane, said nozzle having a downwardly-facing opening for cleaning said alley, said nozzle including a first stepped portion defining a first passageway spaced inwardly from one end and including a second stepped portion defining a second passageway spaced inwardly from the other end of the nozzle; and first and second lateral nozzle extensions;
   means for releasably fastening said first extension to said one end of said nozzle in engagement with said first passageway;
   means for releasably fastening said second extension to said other end of said nozzle in engagement with said second passageway;
   closure means at each passageway for closing said passageway upon removal of a corresponding nozzle extension; and
   at least one vacuum unit for drawing air into said nozzle through said downward-facing opening and through said first and second passageways from corresponding extensions and feeding said air to a collection bag, whereby particles entrained by said air are deposited in said collection bag.

2. The vacuum cleaner of claim 1, wherein said first and second extensions extend across and are shaped to generally conform to the shape of corresponding ones of said gutters.

3. The vacuum cleaner of claim 1, wherein each of said lateral nozzle extensions forms a vacuum chamber which extends across a corresponding one of said gutters, and duct means for connecting each of said vacuum chambers to said nozzle.

4. The vacuum cleaner of claim 3, wherein each of said lateral nozzle extensions includes front, back and top walls cooperating with a wall portion of said nozzle to form said duct means, said front, back and top walls being further shaped to form said vacuum chamber.

5. The vacuum cleaner of claim 3, further including brush means adjustably mounted on each of said nozzle extensions, said brush means being adapted to contact the surfaces of said gutters as said bowling alley is cleaned.

6. The vacuum cleaner of claim 5, wherein each said brush means includes at least one brush support plate pivotally mounted on each of said nozzle extensions, and a gutter cleaning brush carried by each of said brush support plates.

7. The vacuum cleaner of claim 6, wherein said gutter cleaning brush is removably mounted in a brush holder, said holder being pivotally mounted on said brush support plate.
8. The vacuum cleaner of claim 5, further including a guide roller assembly adjustably mounted on each of said nozzle extensions, said guide roller assembly being adapted to contact the side wall of a gutter to guide said vacuum cleaner along said bowling alley.

9. The vacuum cleaner of claim 8, wherein said guide roller assembly includes a roller support bracket, means for attaching said bracket to said nozzle extension, and roller means mounted on said roller support bracket.

10. The vacuum cleaner of claim 1, wherein said nozzle comprises an elongated channel, generally U-shaped in cross-section and opening downwardly, said channel defining a central collection chamber and said first and second stepped portions of said nozzle defining a reduced nozzle chamber at each end, said vacuum unit being connected to said central collection chamber.

11. The vacuum cleaner of claim 10, further including brush means mounted in said nozzle for contacting the surface of said bowling lane.

12. The vacuum cleaner of claim 10, further including adjustable slider means fastened to said nozzle for supporting said vacuum cleaner during a cleaning operation.

13. The vacuum cleaner of claim 10, wherein said channel is formed by a front wall, a back wall, a first top wall portion for said central collection chamber, and second and third top wall portions for said reduced nozzle chambers, said front and back walls being notched at the junctions of said reduced nozzle chambers with said central collection chamber thereby to define said stepped portion at each end of said collection chamber and wherein said first and second passageways lead from the interior to the exterior of said nozzle.

14. The vacuum cleaner of claim 13, wherein each said lateral nozzle extension is fastened to a corresponding said reduced nozzle chamber and in communication with a corresponding one of said passageways.

15. The vacuum cleaner of claim 14, wherein each said lateral nozzle extension forms a vacuum chamber which extends across a corresponding one of said gutters and duct means which cooperates with the top wall portion of said reduced nozzle chamber to connect said vacuum chamber with said passageway.

16. The vacuum cleaner of claim 15, wherein said nozzle extension includes brush means adjustably mounted for contacting the surface of a gutter while said cleaner is in operation.

17. The vacuum cleaner of claim 16, wherein said brush means comprises a pair of brush support plates pivotally mounted on said duct means of each nozzle extension, brush holder means pivotally fastened to each of said support plates, and a gutter brush secured to each of said support plates.

18. The vacuum cleaner of claim 10, wherein each of said lateral nozzle extensions forms a vacuum chamber which extends across a corresponding one of said gutters and duct means for connecting each of said vacuum chambers to said nozzle.

19. The vacuum cleaner of claim 18, further including first and second plenum chambers connected to said central collection chamber of said nozzle, a first vacuum unit mounted on said first plenum chamber and a second vacuum unit mounted on said second plenum chamber, said vacuum units drawing air and entrained particles through said nozzle, said lateral nozzle extensions and their corresponding plenum chambers to effect a cleaning operation.

20. The vacuum cleaner of claim 19, wherein said plenum chambers and said nozzle comprise a main frame member, said cleaner further including support wings and handle means mounted on said main frame.

21. A bowling alley vacuum cleaner for cleaning the lane and both gutters of an alley simultaneously, comprising:

- a nozzle extending across the width of said lane;
- first and second lateral nozzle extensions each forming a vacuum chamber which extends across a corresponding one of said gutters;
- first duct means for fastening said first extension to one end of said nozzle;
- second duct means for fastening said second extension to the other end of said nozzle;
- brush means adjustably mounted on each of said nozzle extensions, each of said brush means comprising a brush support plate pivotally mounted on each side of said nozzle extension, said plates being movable vertically into and out of said gutter to contact the surfaces of said gutters as said bowling alley is cleaned; and
- at least one vacuum unit for drawing air through said first and second extensions and through said nozzle and feeding said air to a collection bag, whereby particles entrained by said air are deposited in said collection bag.

22. The vacuum cleaner of claim 21, wherein each of said brush means further comprises a brush holder pivotally mounted on each of said brush support plates, said brush holders being curved to generally conform to the shape of said gutter, and a gutter brush removably attached to each of said brush holders, said brush being curved to contact the surface of said gutter.

23. The vacuum cleaner of claim 22, wherein said brush means further includes a stop means for limiting the motion of said brush support plates, the pivotal mountings of said brush support plates and brush holders allowing said gutter brushes automatically to conform to the shape of said gutter.

24. The vacuum cleaner of claim 23, wherein each of said brush support plates includes a support arm pivotally mounted at one end to its corresponding said nozzle extension and forming at its other end an enlarged baffle plate portion shaped to conform generally to the shape of said gutter, said baffle plate portion being adjacent said vacuum chamber and serving to guide the flow of air thereto along the surface of the gutter during operation of said cleaner, whereby said gutter will be cleaned.

25. The vacuum cleaner of claim 24, further including a guide roller assembly adjustably fastened to each said nozzle extension, said guide roller assemblies serving to guide said vacuum cleaner along said bowling alley during a cleaning operation.

26. A bowling alley vacuum cleaner having a nozzle extending across the width of a lane of said alley and having at least one vacuum unit for drawing air through said nozzle to carry entrained particles to a collection bag, the improvement comprising:
first and second lateral extensions for said nozzle, each said extension being shaped to extend across and generally conform to the shape of a bowling alley gutter; means for releasably securing said first extension to one end of said nozzle; means for releasably securing said second extension to the other end of said nozzle; and brush means adjustably mounted on each of said nozzle extensions, each said brush means including at least one brush support plate pivotally mounted on said nozzle extension and movable vertically into and out of said gutter, and a gutter cleaning brush carried by said support plate and adapted to contact the surface of a corresponding gutter as said bowling alley is cleaned.

27. The vacuum cleaner of claim 26 wherein said gutter cleaning brush is removably mounted in a brush holder, said brush holder being pivotally mounted on said brush support plate.

28. The vacuum cleaner of claim 26, wherein each said brush means includes a brush support plate pivotally mounted on each side of said nozzle extension, and a gutter cleaning brush carried by each of said brush support plates.

29. The vacuum cleaner of claim 26, wherein each of said brush support plates includes a support arm pivotally mounted at one to its corresponding nozzle extension and forming at its other end an enlarged baffle plate portion shaped to conform generally to the shape of said gutter, said baffle plate portion cooperating with said nozzle extension to form a vacuum chamber for cleaning said gutter.

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