The invention relates to a cleaning tool for vacuum cleaning systems especially adapted for cleaning floors and rugs. Such vacuum cleaning tools as are now in general use do not achieve nearly all of the cleaning possible from the amount of power expended to produce a vacuum therein.

It is, therefore, a primary object of the invention to provide a vacuum cleaning tool so constructed that it will provide for a maximum of cleaning for the power required to operate the same.

Another important object of the invention is to provide a cleaning tool of the character referred to comprising a substantially flat, elongated body portion having a centrally located outlet neck at its rear side; a longitudinally disposed inlet opening in its top wall near the forward edge thereof; a longitudinally disposed inlet opening in its bottom wall at a point intermediate the front and rear edges thereof; and a V-shaped deflector having the upper edges of its legs in contact with the top wall of the tool and its apex located in the lower inlet opening, whereby air will be drawn through said upper inlet opening into the interior of the tool and will strike the surface being cleaned with considerable force and then pass upward on the other side of the V-shaped deflector, and out through the outlet neck.

Another object of the invention is to provide a tool in which oppositely disposed, spaced angular vanes are provided within the tool, forwardly of the V-shaped deflector, between the upper and lower inlet openings so as to direct air from both ends toward the center of the tool.

A further object of the invention is to provide a tool of the character referred to in which notches are provided in the bottom edges of opposite ends of the tool for permitting a small amount of air to enter the ends thereof to provide for cleaning close to walls and the like.

A still further object of the invention is to provide such a cleaning tool in which a straight, spring-loaded brush is vertically, slidably mounted in the underside of the tool.

Another object of the invention is to provide a tool of this character which is formed of a lower section, preferably formed of aluminum or similar metal, and an upper section, preferably in the form of a molded plastic part.

The above objects, together with others, apparent from the drawings and following description, may be attained, the above described difficulties overcome and the advantages and results obtained, by the apparatus, construction, arrangements and combinations, subcombinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicants have contemplated applying the principle, being set forth in detail in the following description and illustrated in the accompanying drawings.

Referring now to the construction illustrated in the drawings:

FIG. 1 is a top plan view of a cleaning tool embodying the invention, a portion of the upper, or plastic, section thereof being removed to disclose the interior of the tool;

FIG. 2 is a bottom plan view of the tool shown in FIG. 1, a portion of the lower, or metal, section thereof being broken away to disclose the interior of the tool; FIG. 3 is a fragmentary, longitudinal sectional view through one end portion of the tool, taken on the line 3--3, FIG. 1; FIG. 4 is a fragmentary, longitudinal sectional view through one end portion of the tool, taken on the line 4--4, FIG. 1; FIG. 5 is an inverted, perspective view of the V-shaped deflector;

FIG. 6 is a front elevation of the tool;
FIG. 7 is an end elevation of the tool;
FIG. 8 is a longitudinal sectional view through the tool, taken on the line 8--8, FIG. 7 looking in the direction of the arrows;
FIG. 9 is a longitudinal sectional view through the tool, taken on the line 9--9, FIG. 7, looking in the direction of the arrows;

FIG. 10 is a detached, perspective view of the spring for the brush;
FIG. 11 is a transverse sectional view through the tool, taken on the line 11--11, FIG. 11;
FIG. 12 is a transverse sectional view through the tool, taken on the line 12--12, FIG. 1, showing the manner in which air is drawn in through the inlet opening in the top wall of the tool and passes down around the V-shaped deflector and up through the inlet opening in the lower side of the tool;

FIG. 13 is a transverse sectional view through the tool, taken on the line 13--13, FIG. 1;

FIG. 14 is a transverse sectional view through the tool, taken on the line 14--14, FIG. 11;
FIG. 15 is a transverse sectional view through the center of the upper, or plastic, section of the tool;

FIG. 16 is a transverse section through the center of the lower, or metal, section of the tool; and
FIG. 17 is a fragmentary perspective view of the rubber bumper which is located around the tool between the upper and lower sections thereof.

Referring now more particularly to the embodiment of the invention illustrated, in which similar numerals refer to similar parts throughout, the improved cleaning tool is shown as formed of two parts, namely the lower section, indicated generally at 1, which may be formed of aluminum or similar metal, and the upper section, indicated generally at 2, which is preferably formed of synthetic resin or other suitable plastic material.

These lower and upper sections 1 and 2 are of generally elongated, rectangular outline, as best shown in FIGS. 1 and 2, and have the opposed marginal edge portions 3 and 4 between which the internal T-flange 5, of the resilient bumper 6, is received. The sections 1 and 2 of the tool are clamped together upon the T-flange of the bumper by screws 7 located through bosses 8 and 9 in the lower and upper sections respectively.

The lower section 1 has a bottom wall 10 with a longitudinal slot 11 therein. To the rear of the slot 11, the bottom wall is inclined upwardly and rearwardly, as at 10a. From the upper end of the inclined portion 10b, a spaced pair of longitudinal flanges 12 depend from the bottom wall, between which flanges is vertically slidably mounted a straight brush 13.

A curved leaf spring 14 is located between the flanges 12, interposed between the top of the brush and the horizontal portion 106 of the bottom wall 10, which together with the flanges 12 forms a housing for the slidably mounted brush 13.

At the rear center of the lower section 1, the bottom wall is arched downward, as at 16c, and terminates in the semi-cylindrical lower half 15 of the outlet neck for the tool. At opposite ends of the tool spaced, transversely
disposed bearing flanges 16 extend up from the bottom wall 10, upon each side of the transverse slot 17 therein and meet depending bearing flanges 18 extending down from the top wall 19. A wheel 20 is located through each slot 17 and jour-nalled upon an axle 21 mounted between the bearing flanges 16 and 18 for movably supporting the tool for movement to and fro upon a floor or the like to be cleaned.

The top wall 19 of the upper section is inclined up-
wardly from both ends toward the center, as best shown in FIGS. 6, 8, and 9, and is inclined upwardly and rear-
wardly, as shown in FIGS. 11 to 15. At the rear central portion this top wall 19 terminates in the semi-cylindrical half 15a of the outlet neck for the tool.

The two halves 15a and 15b, as shown in FIGS. 7 and 11, form a cylindrical outlet neck for the tool. Each half 15a and 15b of the outlet neck is internally grooved, as shown at 22, so that a coupling 23 may be swiveled therein, whereby the tool may be connected to a conven-
tional wand and flexible hose leading to a vacuum cleaning system or apparatus.

A longitudinally disposed rib 24 depends from the top wall 19 of the upper section 2, the lower edge thereof terminating in the slot 11 in the bottom wall of the lower section 1. A V-shaped deflector 25, which may be formed of sheet metal or the like, is located around the rib 24, within the interior of the hollow tool, the lower edge of the rib 24 being received in the apex of the V-
shaped deflector and the upper ends of the legs of the deflector 25 engaging the top wall 19 of the upper section 2 on opposite sides of the rib 24.

The V-shaped deflector 25 is notched at opposite ends, as shown at 26, and the bottom wall of the lower section 1 is inclined upwardly at each end of the slot 11 as best shown at 27 in FIG. 3. The rib 24 depending from the top wall 19 of the upper section 2 is also cut away at each end, as indicated at 28, in FIG. 3.

When the two sections 1 and 2 are connected together, the V-shaped deflector 25 will thus be retained in position by engagement of the edges of the upwardly inclined section 27 of the bottom wall in the corresponding notches 26 of the deflector, at each end thereof.

End slots 29 are provided at opposite ends of the lower section 1 to permit a small amount of air to enter each end of the tool so as to provide for cleaning near walls and the like. Elongated, aligned openings 30 are pro-
vided in the top wall 19 of the upper section 2, just for-
ward of the point of contact of the plurality of the V-
shaped deflectors 25 therewith, and suitable grillwork, as indicated at 31, is provided in each opening 30 to prevent large objects from entering the interior of the tool through these openings.

A plurality of spaced vanes 32 extend upward from the bottom wall 10 of the lower section 1, the upper edges of said vanes contacting the top wall 19 of the upper section 2, in the vicinity of the elongated openings 30 therein and the rear edges of said vanes contacting the front leg of the V-shaped deflector 25.

These vanes, as best shown in FIGS. 1 and 2, are angularly disposed being inclined from each end of the tool toward the center thereof. Oppositely tapered ribs 33 depend from the top wall 19 of the upper section 2, the lower edges thereof contacting the upper closed end 10b of the brush housing. The inner ends of the ribs 33 are curved rearwardly as shown at 33a in FIG. 2.

Air will be drawn through the inlet openings 30 in the top wall 19, downwardly between the inclined vanes 32, which will direct the air from each end toward the center of the tool, at the same time that the air is drawn down-
wardly with considerable force, striking the opened-up nap of the carpet, indicated at C in FIG. 12. The inclined vanes 32, assisted by the notches 29, will cause the air to travel continuously in semi-spiral paths as it passes downward deep into the opened-up nap of the carpet, and then around the apex of the V-shaped de-

As the tool is moved back and forth over the carpet, or the like, the brush 13 will be frictionally held in con-
tact with the carpet by means of the spring 14, tending to open the pile or nap of the carpet so that the air may be more thoroughly passed therethrough by the above-
described action of the tool.

The end notches 29 permit air to be drawn into the ends of the tool, so that when moving the tool close to a wall or other obstruction, the carpet or the like may be section cleaned entirely up to the wall.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no un-
necessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiment of the improved construction illustrated and described herein are by way of ex-
ample, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of a preferred embodi-
ment thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

We claim:

1. A hollow vacuum cleaning tool including spaced bottom and top walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool; a V-shaped deflector located within the hollow tool, the apex thereof being located in said inlet slot in-

2. A hollow vacuum cleaning tool including spaced bottom and top walls and end walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool, a V-shaped deflector located within the hollow tool, the apex thereof being located in said inlet slot in-

3. A hollow vacuum cleaning tool including spaced bottom and top walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool, a V-shaped deflector located within the hollow tool, the apex thereof being located in said inlet slot in-
hollow tool, the apex thereof being located in said inlet slot intermediate the front and rear edges of said slot and the legs thereof contacting said top wall, there being an elongated inlet opening in said top wall forward of said V-shaped deflector, a spaced plurality of vanes located in the hollow tool extending from the bottom wall to the top wall and from the front of the tool to said V-shaped deflector, said vanes being angularly disposed from each end of the tool toward the center thereof, a downwardly open straight narrow brush casing located in said tool in rear of said inlet slot, and a straight spring-loaded brush vertically slidably mounted in said brush casing.

4. A hollow vacuum cleaning tool including spaced bottom and top walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool, a rib depending from said top wall, the lower edge of said rib being located in said inlet slot intermediate the front and rear edges of said inlet slot, a V-shaped deflector located within said hollow tool around said rib, the lower edge of said rib being received in the apex of said V-shaped deflector and the legs of the V-shaped deflector contacting said top wall on opposite sides of said rib, there being an elongated inlet opening in said top wall forward of said V-shaped deflector, and a spaced plurality of vanes located in the hollow tool extending from the bottom wall to the top wall and from the front of the tool to said V-shaped deflector, said vanes being angularly disposed from each end of the tool toward the center thereof.

5. A hollow vacuum cleaning tool including spaced bottom and top walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool, a rib depending from said top wall, the lower edge of said rib being located in said inlet slot intermediate the front and rear edges of said inlet slot, a V-shaped deflector located within said hollow tool around said rib, the lower edge of said rib being received in the apex of said V-shaped deflector and the legs of the V-shaped deflector contacting said top wall on opposite sides of said rib, there being an elongated inlet opening in said top wall forward of said V-shaped deflector, and a spaced plurality of vanes located in the hollow tool extending from the bottom wall to the top wall and from the front of the tool to said V-shaped deflector, said vanes being angularly disposed from each end of the tool toward the center thereof.

6. A hollow vacuum cleaning tool including spaced bottom and top walls, an outlet at the rear portion of said tool, means for connecting said outlet to vacuum producing means, there being an elongated inlet slot in said bottom wall at a point intermediate the front and rear of the tool, a rib depending from said top wall, the lower edge of said rib being located in said inlet slot intermediate the front and rear edges of said inlet slot, a V-shaped deflector located within said hollow tool around said rib, the lower edge of said rib being received in the apex of said V-shaped deflector and the legs of the V-shaped deflector contacting said top wall on opposite sides of said rib, there being an elongated inlet opening in said top wall forward of said V-shaped deflector, and a spaced plurality of vanes located in the hollow tool extending from the bottom wall to the top wall and from the front of the tool to said V-shaped deflector, said vanes being angularly disposed from each end of the tool toward the center thereof.

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