I. H. SPENCER.

CLEANING TOOL.

APPLICATION FILED NOV. 3, 1908.

982,640.

Patented Jan. 24, 1911.

Fig. 1.

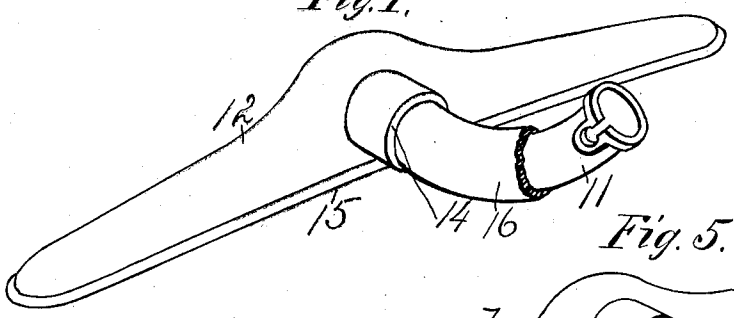



Fig. 5.

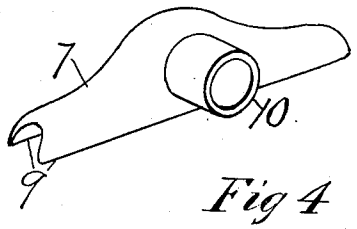



Fig. 2.

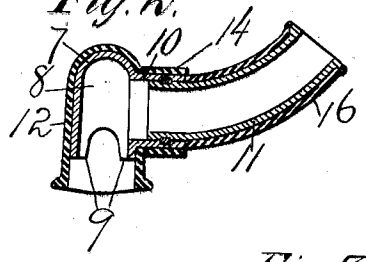



Fig 4

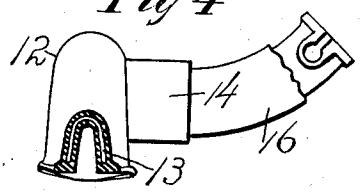



Fig. 3.

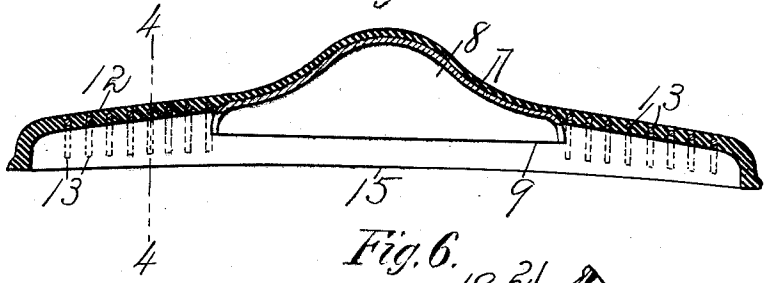



Fig. 6.

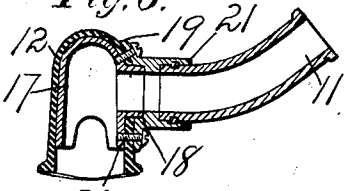
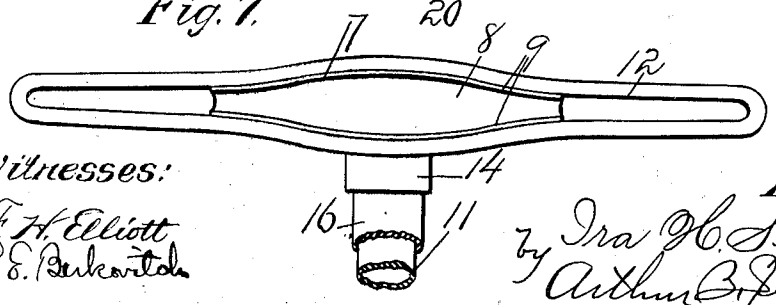



Fig. 7.

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# UNITED STATES PATENT OFFICE.

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## CLEANING-TOOL.

982,640. Specification of Letters Patent. Patented Jan. 24, 1911.

Application filed November 3, 1908. Serial No. 460,933.

*To all whom it may concern:*

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented a new and Improved Cleaning-Tool, of which the following is a specification.

My invention relates to the class of tools more especially employed in the removal of dirt, dust and the like by means of a current of fluid passed through the opening at the mouth of the tool, and the object of my invention is to provide a device of this class having novel features of advantage and utility. A form of tool in the use of which these objects may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a tool embodying my invention. Fig. 2 is a view in central cross-section through the same. Fig. 3 is a view in central longitudinal section through the tool. Fig. 4 is a view in cross-section through the tool at a point between its center and the end. Fig. 5 is a detail view showing the metallic shell. Fig. 6 is a detail view in central cross-section through a modified form of the device. Fig. 7 is a bottom view of the tool.

My improved tool forming the subject-matter of this invention is more especially designed in connection with apparatus in which a current of fluid, usually air, is employed for dislodging the dust and other matter to be removed in the cleaning operation, the preferred method consisting in causing a flow of air or other fluid inward at the mouth of the tool. In order to attain the best results the tool should be of considerable length, and in use as upon a floor around articles of furniture it is desirable that this tool shall have more or less flexibility. This will be apparent when its use in connection with the cleaning of a school-room for instance is considered, as the tool must be moved in and out between the legs of the seats and desks, and as it is liable to catch upon these obstacles a flexibility of a greater or lesser degree will enable the tool to be readily disengaged from such articles of furniture. The tool herein shown and described is especially constructed for such uses, it being so made that it will yield to a considerable degree to enable it to be disengaged from any obstacle or to pass between obstacles located at a distance apart less than the length of the tool.

In the accompanying drawings the numeral 7 denotes a shell made of any preferred kind of metal, this shell having a chamber 8, the entrance to this shell terminating in lips 9. A hub 10 projects from this shell and is properly constructed for attachment thereto of a nipple 11, this nipple being constructed to receive a handle, hose or other proper conductor for a current of fluid. The tool herein shown is especially designed for attachment of a rigid handle to which the hose or other conductor is secured.

The body part of the tool or casing 12 is constructed, as to its greater portion, of rubber, and in order to give this rubber the proper qualities as to stiffness it is reinforced throughout its walls in any suitable manner. This body part completely incloses the shell 7, said body part having an opening snugly fitting about the hub 10 and through which said hub projects.

In the preferred form of construction the casing is reinforced by cross-braces 13 of U-form. These braces are preferably composed of pieces of wire embedded in the wall of the casing and extending downward on opposite sides to a proper distance from the edge. While this form of bracing or reinforcing the rubber casing is preferred, any means of accomplishing this result and that will allow proper flexibility in the required directions will be considered as coming within the scope and intent of the invention. That part of the hub 10 projecting beyond the casing may be covered by a sleeve 14 of rubber or like comparatively soft material, if desired.

The lower edge of the tool is curved lengthwise, as plainly shown in Figs. 1 and 3 of the drawing. As hereinbefore stated, it is desired that a tool of considerable length shall be employed in order to obtain the best results as to efficiency.

This tool will also be of little depth merely sufficient to provide a chamber to accommodate a sufficient volume of air. The mouth 25 of the tool extends for practically its whole length and is enlarged or widened at that portion underlying the outlet from the chamber in the tool, preferably midway of the length, as shown herein.

This provides means whereby the tool will handle the comparatively larger pieces of dirt or litter without such undue enlargement of the mouth as to impair the efficiency of the tool at the extreme ends of the slot to do the work for which it is intended.

It frequently happens that floors even in the most approved forms of construction of fireproof buildings, owing to warping or other causes, are uneven.

In order to obtain the best results in cleaning it is desirable that the edges of the tool shall be brought into contact with the floor at all points about the opening into the tool. The edge of the tool is therefore curved as at 15 as above described and shown in the drawings. When a rolling surface is encountered the curved edges of the tool will accommodate such rolling surface. When the tool is operating upon a flat surface of the floor, or should a depressed portion be encountered, the suction, owing to the flexibility of the tool, will cause the edges of the tool to assume close contact with the surface all around the inlet opening, and it will thus be seen that the tool, owing to such flexibility, has superior advantages in the cleaning of surfaces of more or less irregularity or unevenness, and this without necessarily involving a curved edge.

A tube 16 of rubber or like soft material may be placed over the nipple 11 if desired.

In the form of construction shown in Fig. 6 the body part of the tool is formed in the same manner as above described, of rubber with the braces disposed throughout the walls of the body part in a manner hereinbefore described for stiffening purposes and at the same time to allow flexibility. The shell 17, however, has only a short hub 18. A plate 19 is secured outside of the body part 12 as by means of screws 20 passing through the plate and into the shell 17. This plate has a tubular extension 21 to which the nipple 11 is pivotally attached as hereinbefore described. In this form of construction the flexible body part of the tool is given added rigidity at the point of location of the inner shell and also connection of the tube 11. The tool is therefore highly efficient in its operation owing to the fact that its edges may be easily brought into contact with the surface of the floor at all times and for the further reason that the flexibility of the tool in other directions enables it to be readily disengaged from obstructions encountered in the cleaning operation.

While the preferred form of construction embodies the edges of the inlet into the tool curved inward, or concaved, I do not limit myself to the edges curved in this direction, as beneficial results will flow from other curved forms of this edge.

While I have shown and described herein the preferred means of embodying my invention in a tool of the class described, such construction may be departed from to a greater or lesser extent without avoiding the invention, and I do not desire to limit myself to the precise means herein shown and described.

I claim—

1. A cleaning tool including a flexible body part of long, narrow proportions as to the part adapted to rest upon a surface to be cleaned, said body part having a chamber of little depth as compared with the length and with an inlet opening to said chamber and an outlet therefrom, and means on said body part for connection of a tubular conductor.

2. A cleaning tool including a flexible body part having a chamber therein with an inlet thereto and an outlet therefrom, and means for preventing collapse of the walls of the casing by reason of the reduced pressure therein.

3. A cleaning tool including a flexible body part having a chamber therein with an inlet opening thereto and an outlet opening therefrom, means for reinforcing the walls of the body part to prevent collapse by reason of suction through the tool, and means on the body part for connection of a tubular conductor.

4. A cleaning tool including a flexible body part having a chamber therein with an inlet thereto and an outlet therefrom, a casing located within said chamber to support the walls against collapse, and means for connection of a tubular conductor to said tool.

5. A cleaning tool including a body part composed of flexible material, a supporting casing within said body part, means projecting from the casing through the body part for attachment of a tubular conductor, and reinforcements disposed in the walls of said body part.

6. A cleaning tool including a body part formed of flexible material and having a supporting wall with a projection extending through the body part for attachment of a tubular conductor, and cross braces of U-shape disposed in the wall of the body part, said body part having a chamber with an inlet thereto and an outlet therefrom.

7. A cleaning tool including a body part formed of flexible material and having a chamber with an inlet thereto and an outlet therefrom, the edges of the inlet being curved lengthwise of the tool, means for attachment of a tubular conductor to said tool, and reinforcing braces disposed in the wall of said flexible body part.

8. A cleaning tool including a chambered body part composed of flexible material, a supporting casing partially filling the body part near the lengthwise center and con-

forming in shape to the chamber therein, means projecting from said casing through the body part for attachment of a tubular conductor, and reinforcing ribs disposed in the walls of said body part.

9. A cleaning tool including a flexible body part having a chamber therein with an inlet opening thereto and an outlet therefrom, means located within the wall of said body part for stiffening said walls, and means on said tool for connection of a tubular conductor.

10. A cleaning tool including a flexible body part having a chamber therein with an outlet opening therefrom and a long, narrow slot forming the mouth to said chamber, said slot being widened underneath said outlet, and means on said tool for connection of a tubular conductor.

11. A cleaning tool including a flexible body part of long, narrow, low dimensions having a chamber therein with an inlet opening thereto and an outlet therefrom, the side edges of the inlet opening being curved in a direction lengthwise of the tool, and means on said body part for connection of a tubular conductor.

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