Oct. 31, 1939. J. D. KELLY 2,177,987.

CLEANING APPARATUS

Filed Jan. 31, 1936 2 Sheets-Sheet 1

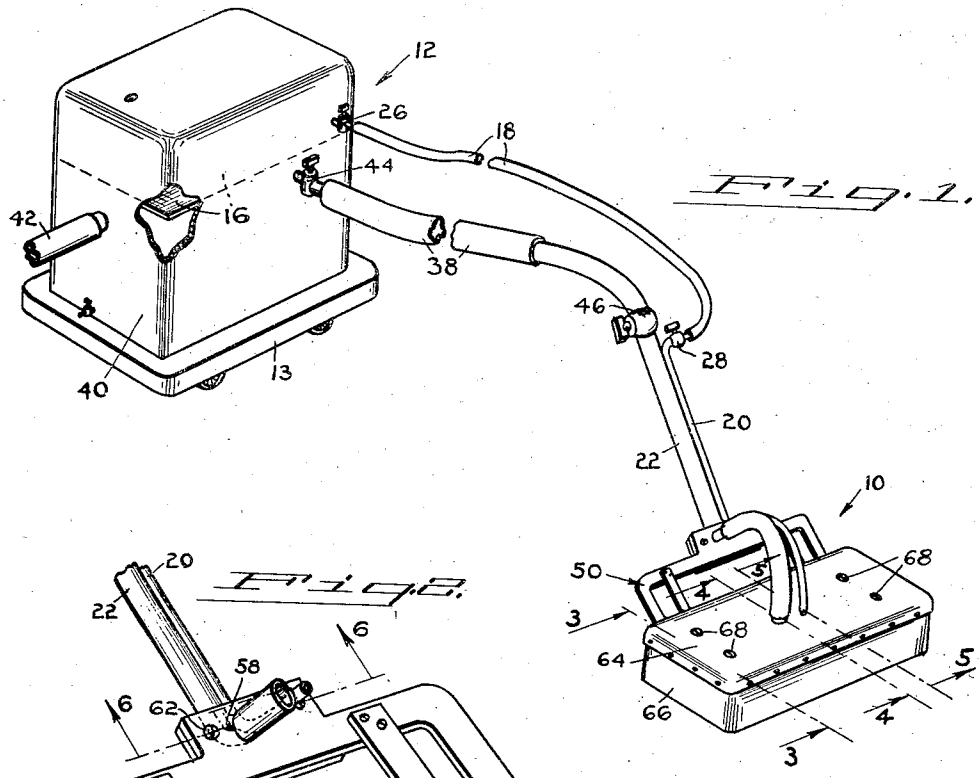


Fig. 1.

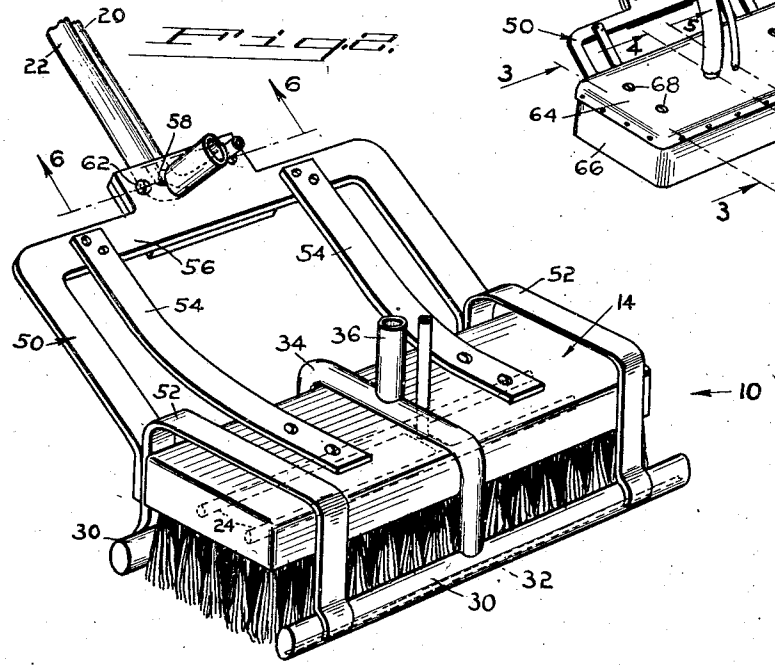


Fig. 3.

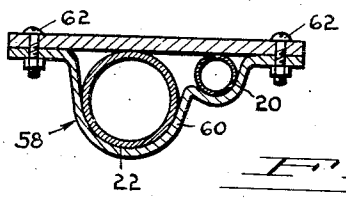


Fig. 6.

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CLEANING APPARATUS

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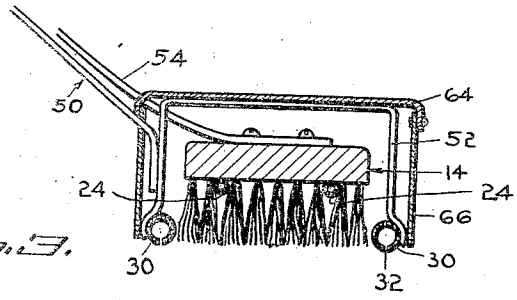


Fig. 3.

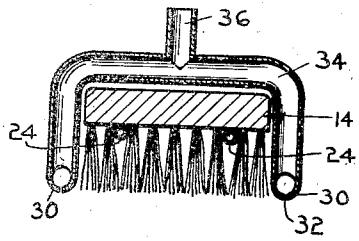


Fig. 4.

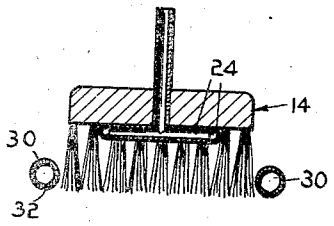


Fig. 5.

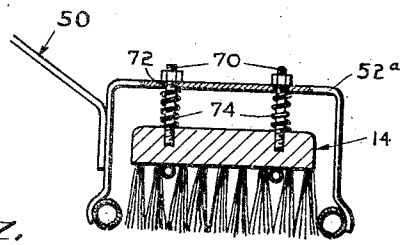


Fig. 7.

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Patented Oct. 31, 1939

2,177,987

UNITED STATES PATENT OFFICE

2,177,987

CLEANING APPARATUS

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Application January 31, 1936, Serial No. 61,670

5 Claims. (Cl. 15—123)

The present invention relates to cleaning apparatus and more particularly to such apparatus intended primarily for cleaning carpets and other floor coverings.

One object of the invention is the provision of a cleaning apparatus including means for distributing the cleaning fluid over the surface to be cleaned and for scrubbing said surface, together with means for withdrawing the used cleaning fluid.

Another object of the invention is the provision in a cleaning apparatus in which a cleaning liquid is utilized of suction means for withdrawing the used cleaning liquid from the surface in order to hasten the drying thereof and to improve the cleaning action of the apparatus.

A further object of the invention is to provide a cleaning apparatus including brush and suction elements organized in relation to each other on a frame in such manner that a vacuum tight engagement is obtained between the suction elements and the surface to be cleaned, which engagement is maintained during the movement of the brush in cleaning the surface.

A yet further object of the invention is generally to provide, at low cost, a cleaning apparatus of the class described which is simple in construction and effective in operation.

The above objects of the invention, and other objects which might hereinafter appear, are attained by the construction and organization of parts hereinafter described with reference to the accompanying drawings forming a part of the present specification.

In the drawings:

Fig. 1 is a perspective view of the cleaning apparatus embodying the present invention;

Fig. 2 is a perspective view of the brush and suction elements mounted on the frame, with the housing removed;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view on the line 6—6 of Fig. 2;

Fig. 7 is a transverse sectional view of brush and associated suction elements, illustrating a modification.

Referring to the drawings in detail, the cleaning apparatus comprises a cleaning device 10 and a liquid tank 12 which is preferably mounted, as here shown, on a wheeled base or truck 13. The cleaning device 10 includes a scrubbing brush 14 to which cleaning liquid is supplied from the compartment 16 of the tank 12 through a flexible tube 18 of suitable length, connected to a pipe 20 which extends longitudinally of a hollow handle 22 and projects through the head of the brush in communication with perforated tubes 24 arranged on the under surface of the brush head between tufts of the brush bristles. The flow of cleaning liquid from the compartment 16 to the brush 14 may be controlled by valves 26 and 28 on the tank 12 and pipe 20, respectively.

In cleaning floor carpets, especially in hotels, stores and office buildings, quick drying of the carpets is of great importance in order to avoid as much as possible interference with the normal use of the floors which are covered with said carpets. For this reason, among others, it is desirable to remove the used cleaning fluid from the carpets after the same has been applied by the brush and distributed over the surface to be cleaned. Also, better results are obtained and the cleaning action is improved by the constant removal of used cleaning liquid while new liquid is supplied during the process of the cleaning. This is accomplished, in accordance with the present invention, by providing the cleaning device 10 with suction members 30 comprising elongated suction nozzles here shown as tubular members positioned adjacent the brush 14 on opposite sides and extending longitudinally for substantially the full length thereof. The suction members 30 are provided with narrow inlet slots 32 through which the moisture is withdrawn from the carpet, and said members are connected to a header tube 34 which is connected by a pipe 36 to the hollow handle 22, the latter being connected by a flexible tube 38 of suitable length to the compartment 40 of the tank 12. A vacuum is maintained in the compartment 40 in any suitable manner, preferably by connecting said compartment by means of a conduit 42 to a vacuum pump (not shown) or, especially when the apparatus is used in hotels, to the vacuum system with which hotels are usually equipped and provided with couplings or outlets on various floors and sections thereof. The vacuum connection between the cleaning device 10 and the vacuum tank 40 may be controlled by means of valves 44 and 46 on said tank and on the handle 22, respectively. By the arrangement of the suction members or nozzles 30 and the brush 14, cleaning liquid can be supplied to the brush and applied to the carpet or other surface to be cleaned and constantly removed from said surface during the manipulation of the brush during the progressive cleaning action of the latter. In this manner used cleaning fluid, carrying dirt and other foreign material removed or loosened by the brush and cleaning fluid, is constantly withdrawn by the suction members 30 thereby greatly improving the cleaning action of the apparatus and hastening the drying of the carpet.

An important feature of the present invention resides in providing means for maintaining a substantial vacuum tight engagement of the suction nozzles **30** with the surface to be cleaned during the movement of the brush in scrubbing or cleaning said surface. For this purpose provision is made for permitting movement of the brush in relation to suction nozzles **32** in a direction at right angles to the surface under treatment. As here shown said brush is movable in a direction away from said surface without correspondingly moving said suction elements out of said vacuum tight engagement, the brush, however, being held against the surface to be cleaned with a varying degree of pressure depending upon the condition and character of the carpet on the floor. The arrangement provided for accomplishing this purpose comprises a rigid metal frame including a U-shaped member **50** having its ends bolted or riveted to U-shaped metal straps **52** which straddle the brush **14** and have downturned end portions rigidly fastened to the suction members **30**, preferably by being welded or brazed thereto. The brush **14** is carried by the frame by means of flat metal springs **54** secured at their ends to the cross member **56** of the U-shaped frame and to the head of the brush, respectively, in spaced relation, said springs being accessible externally of the frame. The frame member **50** is directed upwardly toward the handle **22** and is provided with a socket **58** in which said handle **22** and the liquid supply pipe **20** are secured. Said handle and pipe are preferably removably secured in the socket **58** by means of a clamping plate **60** fastened to the socket in any suitable manner as by bolts **62**. The brush and suction elements **30** may be enclosed within a housing which may comprise a top metal plate **64** and a dependent peripheral skirt portion **66** of any suitable material which is preferably flexible, such as canvas. Said housing is secured in position by fastening the plate **64** to the straps **52** as by screws **68**.

In the form of the invention illustrated in Fig. 7, the brush **14** is resiliently mounted on the frame by means of rods **70** secured to the brush head and slidably passing through openings **72** in U-shaped straps 52*a* which are similar to the straps **52**. Helical springs **74** encircle said rods **70** and bear on the upper surface of the brush head **14** and on the lower surfaces of said straps to yieldingly press the brush in engagement with the surfaces to be cleaned in permitting the movement of the brush away from said surface so as not to break the vacuum tight engagement between nozzle and surface.

It will be understood that in this construction, as well as in the construction described above in connection with Figs. 1 to 6, inclusive, although the spring pressure under which the brush is held in engagement with the surface to be cleaned is relatively strong, it is not sufficient to overcome the weight of the device as a whole and hence cannot move the vacuum elements out of engagement with said surface, and that moreover, pressure exerted on the handle **22** in manipulating the device causes the suction elements **30** to engage the surface under pressure which may vary in accordance with the pressure exerted on said handle, this being permitted by reason of the resilient mounting of the brush on the frame.

While I have shown and described the preferred embodiments of my invention, it will be understood that the same is capable of other embodiments and that in each of the constructions illustrated, changes may be made without departing from the essential principles of the invention. Therefore, I do not wish to be limited to the precise constructions herein shown or described, except as may be required by the appended claims considered with reference to the prior art.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. Cleaning apparatus comprising a frame, a brush carried by said frame for engagement with a surface to be cleaned, means associated with said brush for supplying a cleaning fluid to said surface, a suction nozzle carried by said frame in position adjacent said brush and extending longitudinally of the latter, said nozzle comprising a slotted tube, said brush being movable in relation to said slotted tube in a direction at right angles to said surface whereby to maintain a substantial vacuum tight engagement between said tube and said surface during the movement of said brush in cleaning said surface and means accessible externally of the frame for supporting the brush in said movable relation.

2. Cleaning apparatus comprising a frame, a brush carried by said frame for engagement with a surface to be cleaned, a plurality of suction nozzles carried by said frame adjacent said brush, said nozzles being positioned on opposite sides of the brush adjacent the latter, said brush being movable in relation to said nozzles in a direction at right angles to the surface whereby to maintain a substantial vacuum tight engagement between nozzles and surface during cleaning movement of the brush, and means for resiliently mounting the brush in said movable relation comprising spring means secured to said brush and frame and accessible externally of the latter.

3. Cleaning apparatus comprising a frame, a brush carried by said frame for engagement with a surface to be cleaned, means associated with said brush for supplying a cleaning fluid to said surface, a plurality of suction nozzles carried by said frame adjacent said brush, said nozzles being positioned on opposite sides of the brush adjacent the latter, said brush being movable in relation to said nozzles in a direction at right angles to the surface whereby to maintain a substantial vacuum tight engagement between nozzles and surface during cleaning movement of the brush, and means for resiliently mounting the brush in said movable relation comprising spring means secured to said brush and frame and accessible externally of the latter.

4. A cleaning device comprising a frame, a brush, flat springs connected to said frame and brush whereby the latter is resiliently carried by said frame, spaced frame members straddling said brush and provided with depending portions, and suction elements carried by said depending portions of the frame members.

5. A cleaning device comprising a frame, a brush, flat springs connected to said frame and brush whereby the latter is resiliently carried by said frame, spaced frame members straddling said brush and provided with depending portions, suction elements carried by said depending portions of the frame members and a handle secured to said frame.

JOHN D. KELLY.