

Aug. 22, 1961

J. W. NOBLE
FLOOR MOPPING APPARATUS

2,996,743

Filed July 22, 1959

3 Sheets-Sheet 1

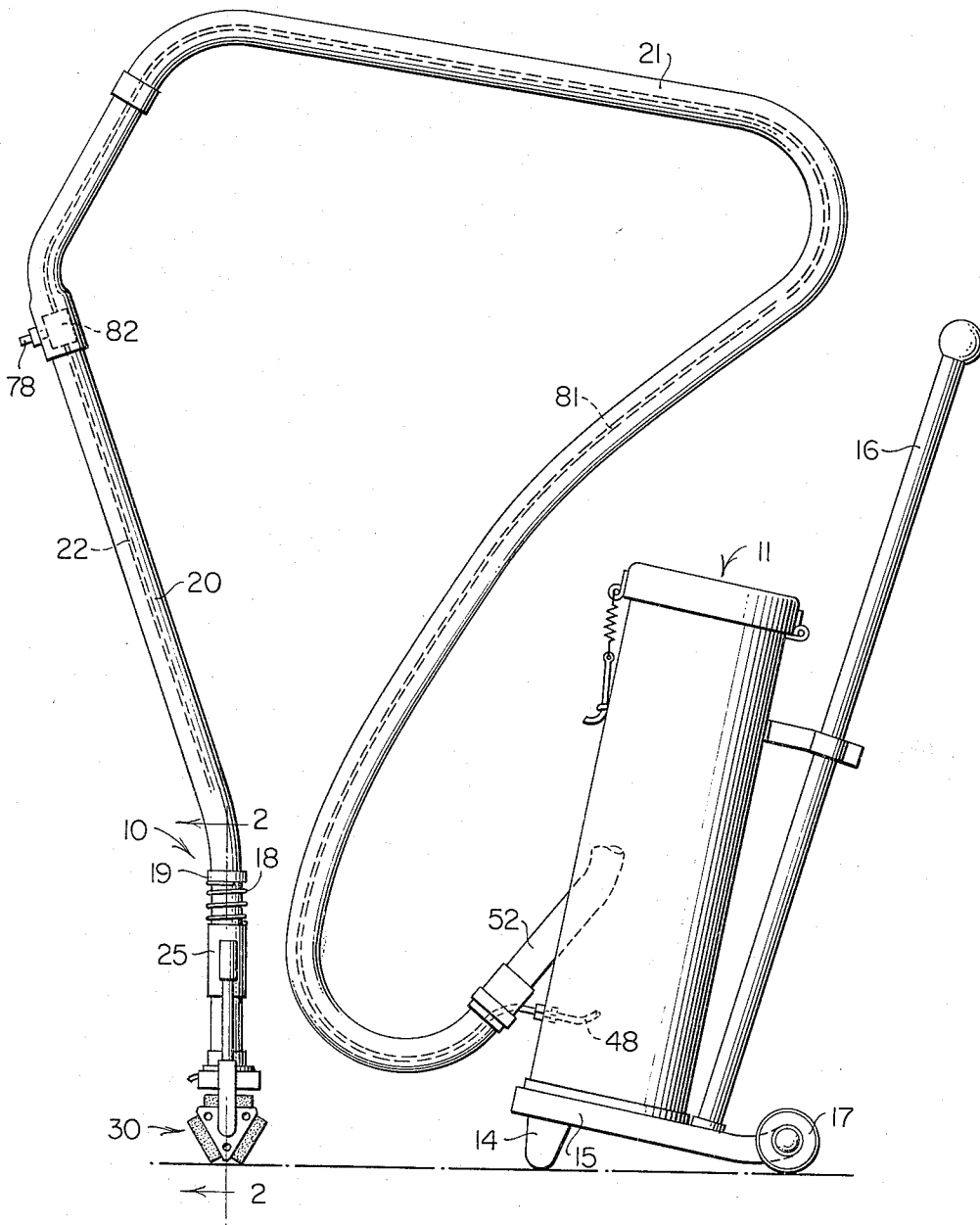


FIG. 1

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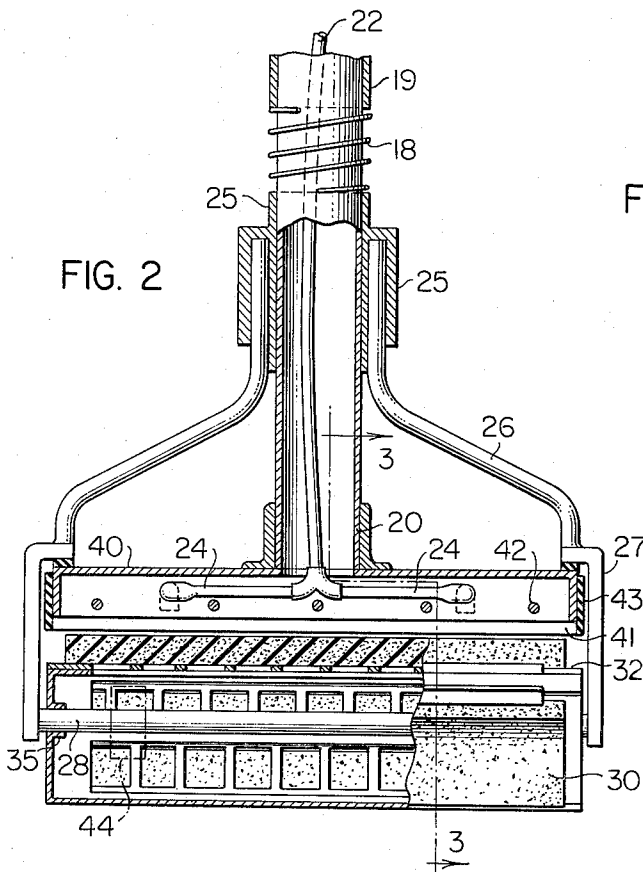
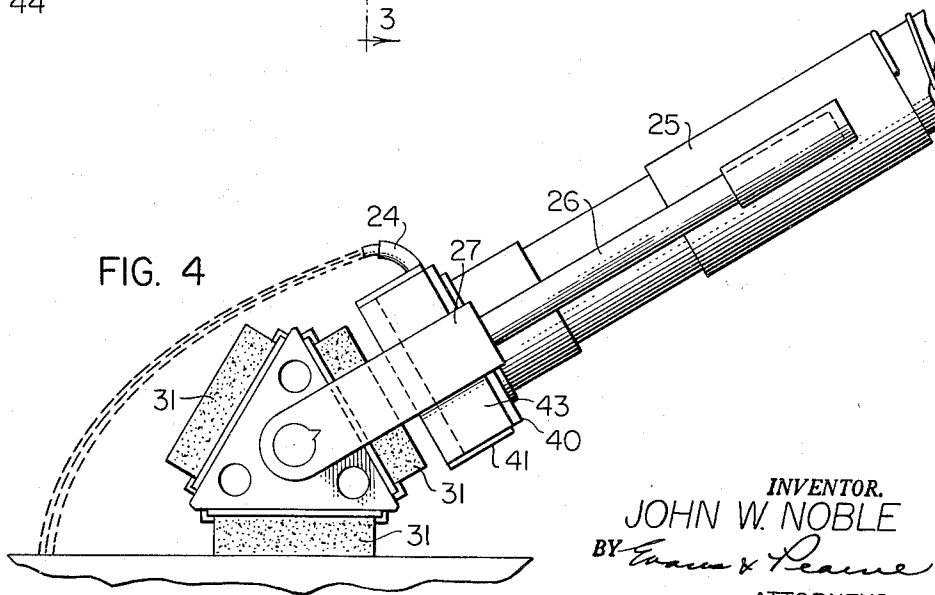
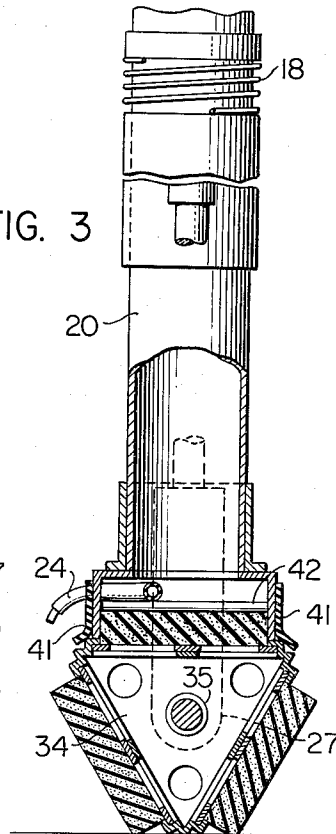


FIG. 3



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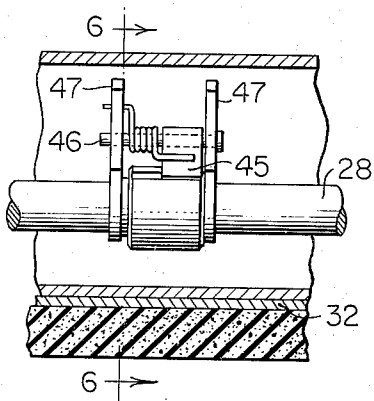


FIG. 5

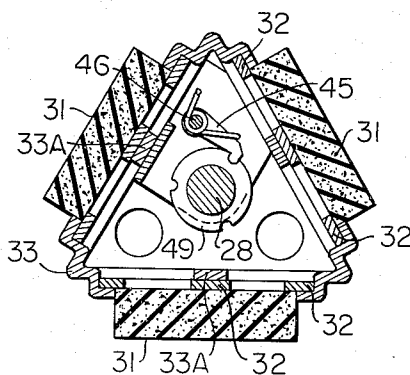


FIG. 6

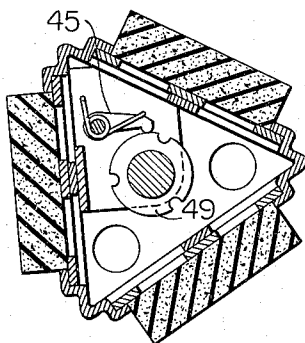


FIG. 7

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FLOOR MOPPING APPARATUS

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4 Claims. (Cl. 15—98)

This invention relates to means for cleaning floors and particularly to floor mopping means which may be most advantageously used in cleaning hard surfaced floors. The invention pertains to that type of powered floor cleaner wherein wash water and vacuum are alternately applied to a floor sponge or the like.

A broad purpose of the present invention is to provide an improved floor mopping means of the above type.

A more specific object of the invention is to provide an improved means of mopping a floor with a wet sponge from which dirty water is intermittently removed.

Another object of the invention is to provide a powered mop which may be manipulated and controlled with facility, which is foolproof in operation, which is economical to manufacture and to use, and above all which is effective in mopping soiled floor surfaces.

The present invention constitutes an improvement in some of the broader aspects of the invention disclosed and claimed in my copending patent application, Serial No. 637,017, filed January 29, 1957, now Patent No. 2,949,620, although in other aspects the present invention is a departure from that of the aforesaid application in that in the present invention wash water is not circulated through the sponge from the interior to the exterior thereof in flushing dirt from the sponge.

In the accompanying drawings:

FIGURE 1 is an elevation of apparatus in which the present invention is embodied.

FIGURE 2 is an enlarged detail view, largely broken away, taken from line 2—2 in FIGURE 1.

FIGURE 3 is a view taken generally along the planes of line 3—3 in FIGURE 2.

FIGURE 4 is a side elevation of the device shown in FIGURE 2 illustrating an alternate position thereof.

FIGURE 5 is a fragmentary detail view of a portion of the apparatus indicated only diagrammatically in FIGURE 2.

FIGURE 6 is a view taken from the plane of line 6—6 in FIGURE 5.

FIGURE 7 is a view similar to FIGURE 6 showing the parts in another condition.

The apparatus illustrated in the accompanying drawings comprises a floor tool generally indicated at 10 and a portable floor stand generally indicated at 11. The stand and its contents may be identical to the floor stand and its contents shown and described at length in the aforesaid copending patent application Serial No. 637,017.

The floor tool comprises a metal tube 20 similar to the ordinary vacuum cleaner handle, the upper end of which is connected to a hose 21. Inside this metal tube 20 is a water-carrying tube 22. The tube 22 is connected at the lower portion of the handle to branch conduits 24 through a T-connection as shown in FIGURE 2 and each of the branch conduits 24 extends to the exterior of the structure. Thus it will be understood that the lines 22 and 24 comprise line means which open from the lower end of the handle 20 to the vicinity of the sponge to supply water in the vicinity of the sponge and on the surface to be cleaned, as seen most clearly in FIGURES 3 and 4. It will be understood that each or any of these conduits may comprise one-piece tubes or may comprise flexible fittings and rigid pipe sections therebetween. Surrounding the metal tube 20 is a sliding collar 25 which has a limited sliding movement longitudinally of the tube 20. The collar is biased down-

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wardly by a spring 18 which reacts against a collar 19 which is fixed to the tube 20.

Fixed in the sliding collar 25 are a pair of bracket tubes 26 which have rigidly affixed thereto yoke members 27, the outer or lower ends of which are fixed to a shaft 28.

Supported at the lower end of the handle 20 and on the shaft 28 is a sponge assembly including a composite sponge generally designated by the reference numeral 30 and made up of three sponge sections 31 which are supported in assembled condition on a frame including perforate plates or supports 32 (FIGURES 2, 5 and 6) which are in turn engaged on corner members 33. Supporting the corner members 33 in spaced relation are a pair of end plates 34 which may be perforated as shown and which are formed with center bushing sections 35 rotatably mounted on the shaft 28. Supplemental members 33A also extend between the end plates 34. As shown, the arrangement may be such that each plate 32 and its associated sponge section 31 is slidable endwise from between a pair of the corner members 33 for ready removal and replacement of each sponge section. A degree of friction in such sliding movement is involved which is sufficient to retain the sponge sections in operating position but insufficient to make removal unduly difficult.

Provided at the lower end of the handle 20 is a hollow shoe 40, the interior of which communicates with the interior of the handle 20 as seen most clearly in FIGURES 2 and 3. The shoe has a perforate face in apposite relationship with the sponge 30 and successively or alternately with the several sections 31 of the sponge. In the illustrated example, the perforate face is substantially open and comprises only perforations or, as shown, equivalent large reticular openings defined by cross wires 42. It will be seen that the sponge 30 depends below the shoe 40 and is mounted by means of the members 25—28 and 32—35 for sliding movement with respect to the handle 20 toward and away from suction-applying contact with the shoe. The suction-applying contact is illustrated in FIGURE 3 and in the limiting end position of such suction-applying contact, the section 31 of the sponge which is received within the shoe may be engaged against the cross members 42 to accomplish a degree of squeezing thereof. It will be understood that the shoe and sponge are brought into suction-applying contact by bearing down on the handle 20 against the biasing force of the spring 18 to compress this spring as illustrated in FIGURE 3. The aspect of the tool is not necessarily that illustrated in FIGURE 3 when such suction-applying contact is established. However, suction-applying contact may be conveniently established with the tool positioned vertically as indicated in FIGURE 3. Alternatively, the tool may be tilted to one side or the other as illustrated in FIGURE 4.

It will be seen that the axis of rotation defined by the bearing relationship between the shaft 28 and the central bushing sections 35 is transverse to the handle 20 and below the end thereof. It will be understood that the faces of the sponge sections 31 are equidistant from such axis.

The sponge sections 31 may be referred to as planar-faced sections in the sense that their outer faces are relatively flat as distinguished from being arcuate sections of a one-piece cylindrical sponge. It will be understood, however, that such planar-faced sponge sections are not absolutely flat and they may be ribbed or formed with somewhat curved surfaces or the like.

Detent means is provided within the sponge 30 in the illustrated embodiment and its location is indicated schematically in FIGURE 2 by the area 44. As shown in FIGURES 5—7, the detent means comprises a spring-

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loaded pawl 45 pivoted on a pivot bolt 46 which in turn extends between a pair of mounting plates 47 each of which are fixed to the members 33A. Fixed to the shaft 28 is a detent boss 49 having depressions therein adapted to releasably receive the detent 45. The relative positions of these depressions and notches and the pawl or detent 45 are such that one or the other of the sponge sections 31 are releasably maintained in direct facing relationship with the shoe 40, a relationship which obtains in the showing of FIGURES 1-4 in the drawings.

The portable stand comprises cylindrical tanks adapted to apply vacuum to the tool and express water thereto by appropriate means which may be identical to that described in the aforesaid copending patent application. The description therein of a portable stand is hereby adapted by reference in full. It will be understood, however, that the therein-described details of the type of portable stand are not necessarily critical to the invention.

The tanks and other elements are supported in suitable frame members 15. The stand may be provided with a handle 16 and with wheels 17 which may be supported substantially upright or at a slight tilt by the supporting bar or leg 14. The stand 11 applies vacuum to a vacuum tube 52 and supplies water under adequate delivery pressure to a line 48, as described in the aforesaid copending application.

A vacuum conduit 21 is connected between the vacuum tube 52 and the rigid metal tube or handle 20. Extending entirely along the conduit 21 is an inner flexible line 81 which is coupled at the stand to the tube or line 48. The opposite end of the water line 81 is connected to a valve 78 carried within the upper portion of the tube or handle 20. The output side of the valve 78 is connected to the water-carrying tube 22 which extends downwardly within the handle 20.

If desired, the tube or handle 20 and water-carrying tube 22 may be divided lengthwise at their upper portions by a suitable slip coupling indicated at 82 to enable the apparatus to be used as a vacuum cleaner with a conventional vacuum cleaner and nozzle. The floor to be mopped can then be vacuumed by uncoupling the floor tool at the coupling 82 and substituting a conventional vacuum cleaner handle and nozzle. During such conventional vacuuming, the valve 78 remains off at all times.

In the illustrated apparatus, the sponge comprising the sponge sections 31 and associated frame members 32-35 are mounted for restricted rotation around the transverse shaft, the restriction being imposed by the detents 45. It will be understood however that such restricted angular movement need not necessarily be rotative and that it is obviously within the contemplation of the invention to provide only for oscillation back and forth between several angular positions, rotation through a complete circle being prevented by stops or by interference of parts or the like. However, in both the above alternatives, it will be understood that a provision is made for restricted angular movement of the sponge assembly around its central axis, whether such movement is rotative or oscillatory.

The tip of the pawl 45 and the cooperating notches may be changed in shape in an obvious manner to make the elements act as a one-way ratchet if desired.

In operation of the apparatus as a mop, water is applied to the floor through the outlet 24 by depressing or actuating the valve 78. The water is supplied through the lines 48, 81 and 22.

Dirty water is exhausted from the mop 30 by shifting the handle tube 20 downwardly against the urging of the spring 18 to bring the shoe 40 into contact with one of the sections 31 of the sponge mop 30. Air and water are thereby drawn up the tube 20 and then through the flexible tube 21 into the vacuum tube 52. The water is collected within the stand 11 and air is exhausted therefrom as fully described in the aforesaid copending patent application.

When water is to be spread on the floor, the valve 78

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is depressed and the sponge mop is moved backward and forward over the areas desired to be wetted. During the floor wiping operation, the water which is deposited on the floor and which has picked up dirt and other deposits is absorbed back into the sponge mop 30. The step which corresponds to wringing out of the dirty water from the sponge mop is accomplished by bearing down on the handle 20 against the bias of the spring 18 to bring the shoe 40 into contact with one of the sponge sections 31.

Changing-over of the angular position of the sponge 30 with respect to the handle 20 will ordinarily be accomplished when the tool is initially in the position of FIGURE 4, although it can also be accomplished when the tool is initially in the general position of FIGURE 3 (but without the spring 18 being fully compressed as in FIGURE 3). When the tool is initially in the position of FIGURE 4 and such change is to be accomplished, the sponge section 31 then in contact with the floor is maintained in such contact while the handle 20 is swept through an arc from right to left as seen in FIGURE 4 to release the detent from one detent notch and to cause it to latch into a succeeding detent. When the initial position is that shown in FIGURE 3, the common corner between the two sponge sections 31 which are closest to the floor is maintained in such position by a light pressure on the floor and the handle 20 is moved axially sideways in one direction or the other and the bottom of the handle is then caused to translate sideways in the same general direction so that the detent is moved one notch and then the device assumes the aspect illustrated in FIGURE 4. Combinations of these motions may be provided, such, for example, as lifting up the handle 20 slightly to allow the spring 18 to expand, and then pulling back to turn the head.

During any of the above adjustments, the downward pressure on the handle 20 should be less than that required to fully overcome the biasing of the spring 18 in order to avoid interference of the several sponge sections 31 with the vacuum shoe 40. However, to wholly or partially eliminate this problem, the sides of the vacuum shoe may comprise flexible sealing flaps 41 adapted to cooperate with sponge sections 31 in vacuum-defining relationship but also adapted to be moved aside as one or the other of the sponge sections 31 are angularly moved to or away from directly facing relationship with the shoe 40. Corresponding flexible side flaps 43 may also be provided.

Obviously, all the several steps or phases described above may not be well defined in the actual use of the tool since other manipulative procedures may be found preferable by the user. At any rate, however, the operation of the apparatus is such that dirty water picked up from the floor is drawn outwardly from the same face which it initially contacts so that drawing of dirty water through any portion of the sponge or any of the sponge sections and consequent filtering out and clogging due to dirt particles and the like is minimized.

An example of the invention is described above in some detail. It should be apparent that the scope of the invention is not reasonably to be limited to all the specific details set forth in such description, since many of such details are given merely by way of example. The scope of the invention is defined in the following claims.

What is claimed is:

1. Floor cleaning apparatus comprising a handle, water-supplying means, first line means leading to the lower end of the handle and in communication with the water-supplying means, a vacuum source, second line means leading to the lower end of the handle and in communication with the vacuum source, a sponge supported at the lower end of the handle, a hollow shoe supported at the lower end of the handle and having a perforate face in apposite relationship with the sponge means, said perforate face being surrounded by an edge perimeter, the first line means opening from the lower end of the

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handle to the vicinity of the sponge means for supplying water in the vicinity of the sponge means, the second line means leading to and communicating with the shoe, means for turning the water-supplying means on and off, the shoe being fixed to the handle, the sponge depending below the shoe, means mounting the sponge for limited sliding movement with respect to the handle and toward and away from suction-applying contact with the shoe, and means for normally biasing the sponge means away from contact with the shoe, whereby the shoe and sponge means are brought into suction-applying contact by bearing down on the handle against the biasing means, said sponge means comprising a plurality of planar-faced sponge sections on a supporting frame the angular position of which is adjustable to bring the planar faces of one and then another of said sponge sections into directly facing relationship with said shoe, the dimensions of said sponge sections being such as to define for each said sponge section an edge perimeter which is smaller than said edge perimeter of the perforate face of said hollow shoe.

2. Floor cleaning apparatus comprising a handle, water-supplying means, first line means leading to the lower end of the handle and in communication with the water-supplying means, a vacuum source, second line means leading to the lower end of the handle and in communication with the vacuum source, a sponge supported at the lower end of the handle, a hollow shoe supported at the lower end of the handle and having a perforate face in apposite relationship with the sponge means, said perforate face being surrounded by an edge perimeter, the first line means opening from the lower end of the handle to the vicinity of the sponge means for supplying water in the vicinity of the sponge means, the second line means leading to and communicating with the shoe, means for turning the water-supplying means on and off, the shoe being fixed to the handle, the sponge depending below the shoe, means mounting the sponge for limited sliding movement with respect to the handle and toward and away from suction-applying contact with the shoe, and means for normally biasing the sponge means away from contact with the shoe, whereby the shoe and sponge means are brought into suction-applying contact by bearing down on the handle against the biasing means, said sponge means comprising a plurality of planar-faced sponge sections on a supporting frame, the dimensions of said sponge sections being such as to define for each said sponge section an edge perimeter which is smaller than said edge perimeter of the perforate face of said hollow shoe, said aforesaid sponge mounting means including a shaft transverse to said handle and below said hollow shoe, said supporting frame being mounted for restricted angular movement around said transverse shaft with the faces of said planar-faced sponge sections equidistant from said shaft.

3. Floor cleaning apparatus comprising a handle, water-supplying means, first line means leading to the lower end of the handle and in communication with the water-supplying means, a vacuum source, second line means leading to the lower end of the handle and in communication with the vacuum source, a sponge supported at the lower end of the handle, a hollow shoe supported at the lower end of the handle and having a perforate face in apposite relationship with the sponge means, said perforate face being surrounded by an edge perim-

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eter, the first line means opening from the lower end of the handle to the vicinity of the sponge means for supplying water in the vicinity of the sponge means, the second line means leading to and communicating with the shoe, means for turning the water-supplying means on and off, the shoe being fixed to the handle, the sponge depending below the shoe, means mounting the sponge for limited sliding movement with respect to the handle and toward and away from suction-applying contact with the shoe, and means for normally biasing the sponge means away from contact with the shoe, whereby the shoe and sponge means are brought into suction-applying contact by bearing down on the handle against the biasing means, said sponge means comprising a plurality of planar-faced sponge sections on a supporting frame, the dimensions of said sponge sections being such as to define for each said sponge section an edge perimeter which is smaller than said edge perimeter of the perforate face of said hollow shoe, bearing means interconnecting said supporting frame and said aforesaid sponge mounting means for restricted angular movement about an axis transverse to said handle and below said hollow face, the faces of said planar-faced sponge sections being equidistant from said axis.

4. Floor cleaning apparatus comprising a handle, water-supplying means, first line means leading to the lower end of the handle and in communication with the water-supplying means, a vacuum source, second line means leading to the lower end of the handle and in communication with the vacuum source, a sponge supported at the lower end of the handle, a hollow shoe supported at the lower end of the handle and having a perforate face in apposite relationship with the sponge means, said perforate face being surrounded by an edge perimeter, the first line means opening from the lower end of the handle to the vicinity of the sponge means for supplying water in the vicinity of the sponge means, the second line means leading to and communicating with the shoe, means for turning the water-supply means on and off, the shoe being fixed to the handle, the sponge depending below the shoe, means mounting the sponge for limited sliding movement with respect to the handle and toward and away from suction-applying contact with the shoe, and means for normally biasing the sponge means away from contact with the shoe, whereby the shoe and sponge means are brought into suction-applying contact by bearing down on the handle against the biasing means, said sponge means comprising a plurality of planar-faced sponge sections on a supporting frame the angular position of which is adjustable to bring the planar faces of one and then another of said sponge sections into directly facing relationship with said shoe, the dimensions of said sponge sections being such as to define for each said sponge section an edge perimeter which is smaller than said edge perimeter of the perforate face of said hollow shoe, and detent means for releasably maintaining at least several of said adjusted angular positions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,629,965 Ralston ----- May 24, 1927

FOREIGN PATENTS

163,899 Germany ----- Dec. 18, 1905