June 21, 1938. A. B. BEITMAN 2,121,649

SCRUBBING MACHINE FOR FLOORS AND FLOOR COVERINGS

Filed Sept. 23, 1935 2 Sheets-Sheet 1

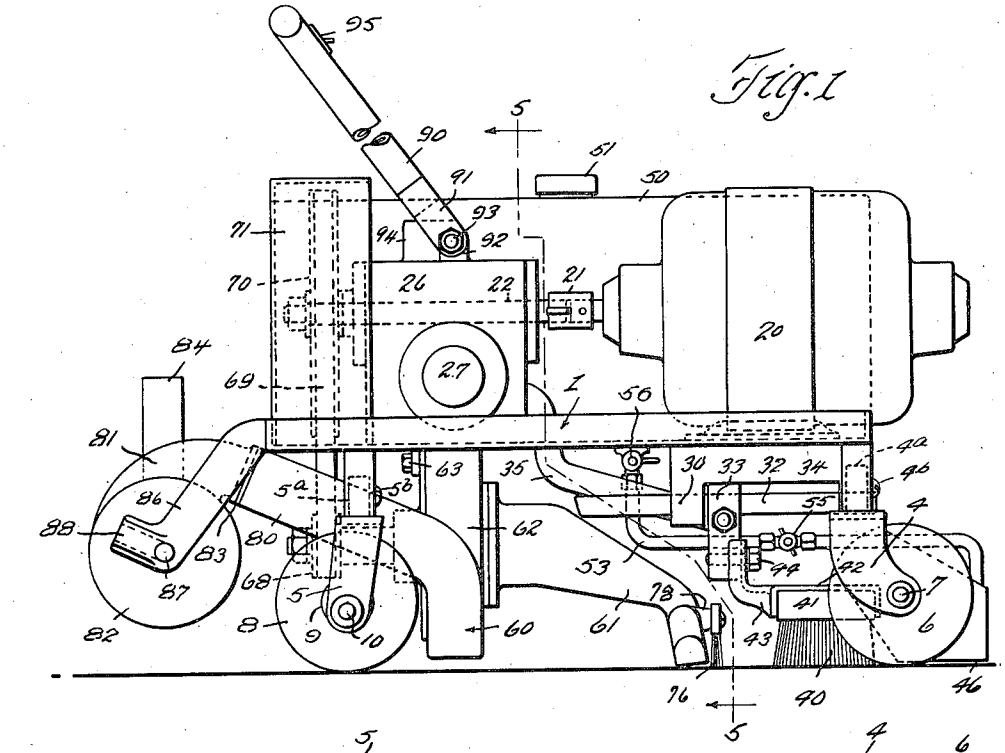


Fig. 1

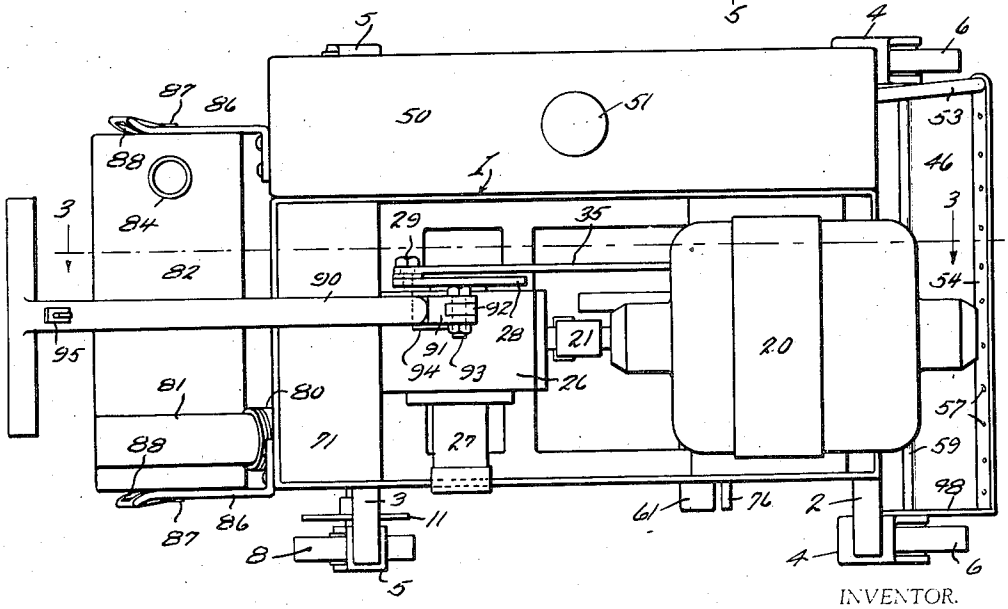


Fig. 2

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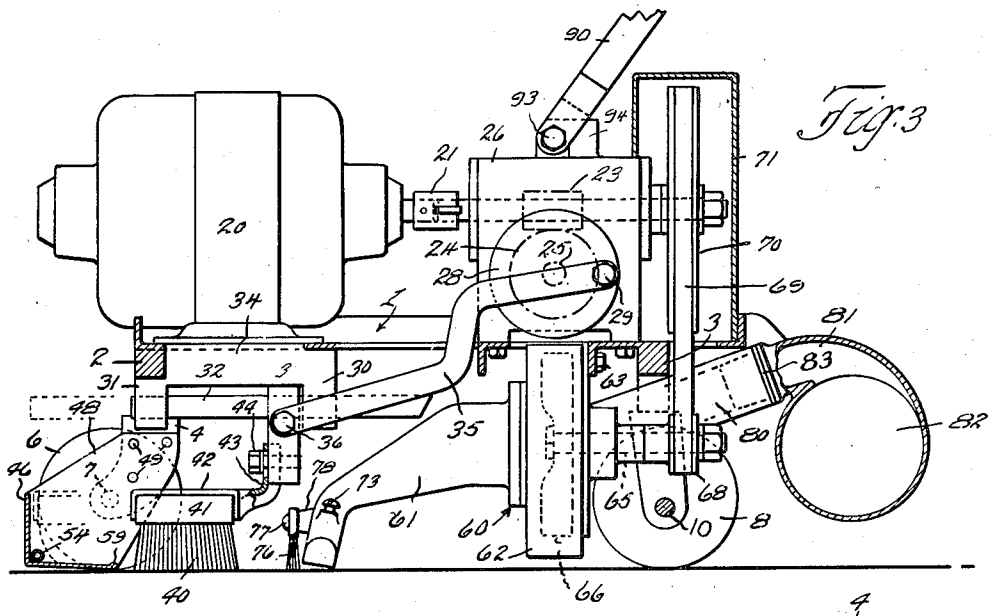


Fig. 3

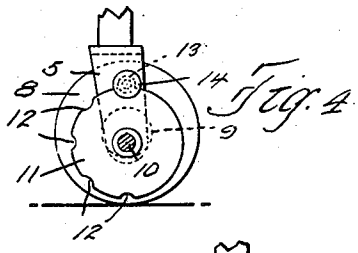


Fig. 4

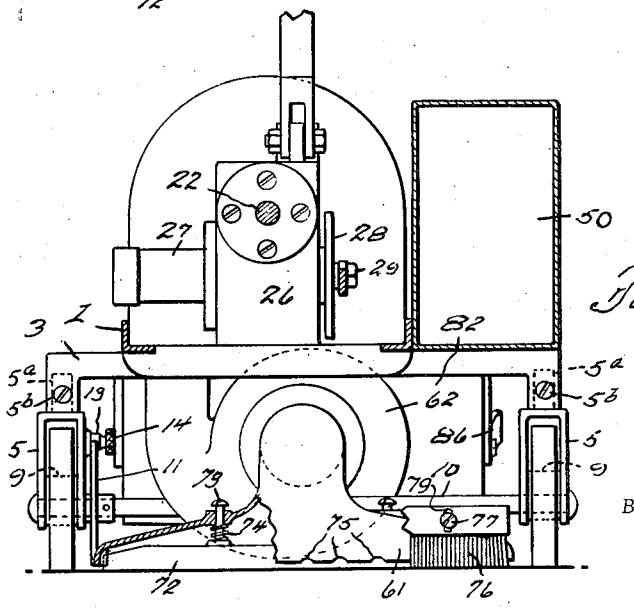


Fig. 5

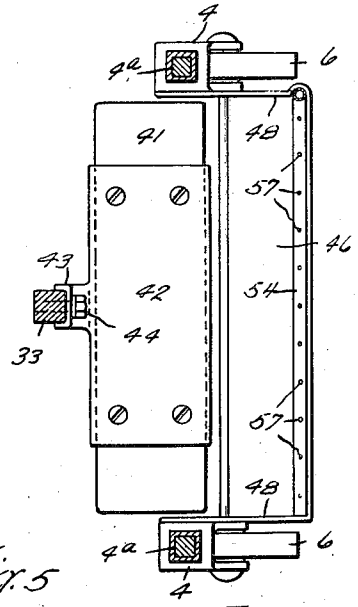


Fig. 6

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Patented June 21, 1938 2,121,649

UNITED STATES PATENT OFFICE

2,121,649

SCRUBBING MACHINE FOR FLOORS AND FLOOR COVERINGS

Albert B. Beitman, Cleveland Heights, Ohio, assignor to The French Renovating Company, Cleveland, Ohio, a corporation of Ohio

Application September 23, 1935, Serial No. 41,728

4 Claims. (Cl. 15—50)

This invention relates to improvements in machines for treating floors and floor coverings, especially for scrubbing or washing carpets and rugs on floors, and the general object of the invention is to provide a machine of this kind which is comparatively simple in design and construction and especially convenient of use.

A more specific object of the invention is to provide a machine of the above character that operates in a well defined path and is adapted for use on carpets and rugs having either long or short nap.

Another object is to provide, in a machine of this character, a liquid distributing device which delivers the liquid to a place adjacent the brush from where it is picked up by the brush and, without waste or excess, brought, in an effective and well distributed manner, into contact with the floor or floor covering.

Another object of the invention is to provide a squeegee so placed that it will scrape up the refuse liquid immediately back of the brush and collect it directly under a suction nozzle through which the liquid is delivered to a waste receptacle on the machine.

A further object is to include in the liquid distributing means, along with the usual shut-off or control valve, an adjustable regulator whereby the flow of liquid may be varied to meet the requirements of different types of carpets, rugs and floors.

A still further object of the invention is to provide in scrubbing mechanism a brush action that is simple and positive and of a directly forward and backward reciprocating nature; and a suction nozzle of sufficient lateral extent to draw up all the refuse liquid from the area covered by the brush.

The foregoing objects, with others hereinafter appearing, are attained in the embodiment of the invention illustrated in the accompanying drawings wherein Fig. 1 is a side elevation of the machine; Fig. 2 is a plan view thereof; Fig. 3 is a vertical longitudinal section through the machine, approximately on the line 3—3 of Fig. 2, looking in the direction of the arrows and showing particularly the brush reciprocating mechanism and the drive therefor; Fig. 4 is a detail of the adjustment for the rear wheels of the machine; Fig. 5 is a sectional front elevation, on the line 5—5 of Fig. 1, in which a part of the suction nozzle is broken away to show the squeegee and its adjustment, and Fig. 6 is a fragmentary sectional plan view showing the liquid distributing means and the scrubbing brush.

Referring now more in detail to the drawings, 1 represents the frame of the machine which includes front and rear cross members 2 and 3, respectively, whose ends are turned down and have attached to them forks 4 and 5. As shown in dotted lines in Figs. 1 and 5, the forks 4 and 5 have shanks 4^a and 5^a that are received by sockets in the downturned ends of the members 2 and 3 and are secured therein by screws 4^b and 5^b. Front wheels 6, mounted on suitable anti-friction bearings (not shown), are carried by short shafts 7 each of which is supported by and between the opposed branches of one of the forks 4, while rear wheels 8 are mounted, through suitable anti-friction bearings (not shown), on eccentric portions 9 of a shaft 10 that extends entirely across the machine and has portions on opposite sides of the eccentric 9 journaled in opposed branches of the forks 5. Immediately inside one of the forks 5 the shaft 10 has fastened to it a disk 11 (Figs. 2, 3 and 5) in the periphery of which notches 12 are formed for the reception of an enlargement 13 on a screw 14, threaded into the adjacent fork 5. When the screw is retracted so as to withdraw the enlargement 13 from a notch 12, the shaft 10 may be rotated to swing the eccentrics 9 to different positions thereby to raise and lower the rear end of the machine for a purpose hereinafter to be explained, the parts being held in adjusted position by returning the screw 14 to its former position with its enlargement 13 in the appropriate notch 12.

Supported on the forward end of the frame 1 is an electric motor 20 whose shaft is connected, by a suitable coupling 21, with a shaft 22 that carries a worm 23. The worm 23 meshes with a worm wheel 24 on a shaft 25. The worm wheel and worm are contained within a housing 26 that is supported by the frame 1 to the rear of the motor 20 and the shafts 22 and 25 are journaled within bearings of the housing on opposite sides of the worm and worm wheel, respectively, the shaft 25 at one end being supported within a bearing member 27 that is applied to and projects from one side of the housing 26. The shaft 25 protrudes beyond the opposite side of the housing where it has secured to it a crank disk 28 having a crank pin 29 shown as consisting of a shouldered screw that is threaded into the disk 28.

Slidably mounted in guides 30 and 31 that are spaced apart longitudinally of the machine and depend from the front portion of the frame 1 at about the transverse center thereof, is a rod 32 to which a cross head 33 is fastened, the same desirably bearing at its top on the under side of a

beam 34 shown as an integral part of a member that includes the beforementioned guides 30 and 31. A connecting rod or pitman 35 has one of its ends pivotally connected at 36 to the cross head 33 and its opposite end journaled on the crank pin 29. The scrubbing brush is designated 40 and the back 41 thereof is secured to a carrier 42 having a rearwardly and upwardly extending arm 43 of channel formation that is fitted about the forward lower end of the cross head 33 and is secured thereto by a screw 44 that extends through a vertical slot in the arm 43 and is threaded into the cross head. By reason of this arrangement the brush may be adjusted in a vertical direction to compensate for wear as well as to alter its pressure upon the carpet or other surface being cleaned.

Directly in front of the brush 40 is a liquid distributor 46 in the nature of a trough, one wall of which lies adjacent the floor or carpet and is inclined at a slight angle upwardly and forwardly to where it joins the front vertical wall of the distributor, the trough-like structure including end members 48 that are removably attached to the opposed front forks 4 by screws 49.

Mounted on one side of the frame 1 and extending from front to rear thereof is a reservoir 50 having a filling opening normally closed by a cap 51. A tube or conduit 53 leads from the bottom of the reservoir to the distributor 46 where a part 54 lies within the angle between the bottom and front walls of the distributor. The tube or conduit includes a regulating valve 55 and a control valve 56, the latter being desirably located for convenient access adjacent one side of the machine. The portion 54 of the tube or conduit is perforated at intervals, the perforations being designated 57 in Fig. 6. By means of the regulating valve 55 the maximum volume of liquid to be fed at any time during an operation may be determined, while by means of the control valve 56 the liquid supply to the distributor 46 may be turned on and off at will.

A shallow lip or flange 59 extends along the rear edge of the bottom wall of the liquid distributor 46 and as the cleaning liquid is discharged from the perforations 57 it flows rearwardly across said wall and accumulates forwardly of said lip in sufficient quantity to insure thorough distribution of the liquid throughout the length of the distributor. As the parts are illustrated in the drawings, the brush 40 is at the rear end of the stroke. As the brush moves forwardly it rides over the lip 59 and takes up a supply of liquid which is transferred to the surface that is being cleaned when the brush next moves rearwardly, the lip 59 serving also to remove excess liquid from the brush.

The suction apparatus is designated generally by the reference numeral 60. It is in the nature of a vacuum sweeper and includes a nozzle 61 and a snail shell fan casing 62, the latter being attached to a cross member of the frame 1 by screws 63. The shaft 65, that carries the fan 66 (both of which are shown in dotted lines in Fig. 3), is journaled within a boss that extends from the rear wall of the casing 62 and said shaft has secured to its rear end a pulley 68 that is driven, through a belt 69, from a much larger pulley 70 that is fastened to the rear end of the shaft 22 where it extends beyond the housing 26. The fan drive is enclosed by a casing 71. It is evident from the construction described that the fan 66 will have a considerably higher rate of speed than the motor 20, due to the ratio of the pulleys 68 and 70, while the speed of the brush 40 is reduced through the worm drive involving the parts 23 and 24.

The width of the inlet end of the nozzle 61 is substantially the same as that of the brush 40, and the machine is preferably so adjusted as to cause the rear lip of the nozzle to embed within the nap of a carpet or rug that is being cleaned. In the embodiment shown, a squeegee 72, in the nature of an elongated blade, is slidably supported within the mouth of the nozzle by guide members 73 that are reciprocable within openings in the upper wall of the nozzle, and springs 74 surround the guide members 73 and tend to force the squeegee into contact with the surface being treated. The forward lip of the nozzle is desirably provided with a series of notches 75 so as to avoid "choking" in case the floor covering is sucked up against the mouth of the nozzle.

For the purpose of smoothing out the nap after it has been acted upon by the brush 40 I may include a relatively narrow brush 76, substantially co-extensive in length with the brush 40, that is shown as carried by the nozzle immediately in front of the inlet end thereof, and to compensate for wear as well as to provide means for changing the pressure of the brush 76 upon the floor covering its connection with the nozzle is made adjustable by utilizing screws 77 that are threaded into bosses 78 on the nozzle and extend through slots 79 in the body of the brush.

The outlet of the suction apparatus consists of a tube 80 that extends upwardly and rearwardly from one side of the casing 62. The inlet spout 81 of a waste receptacle 82 is adapted to be frictionally engaged within the rear end of the tube 80, the joint being preferably sealed by a gasket 83 (Fig. 3). The tank 82 may be vented in any approved manner as through a stack 84 that rises from the top of the tank to a height sufficient to prevent any of the waste liquid from being blown out with the escaping air. The tendency of such action is lessened by the fact that the waste is impelled into the receptacle with a swirling action due to the manner in which the inlet spout 81 joins the receptacle, such being clearly illustrated in Fig. 3.

The waste receptacle is supported for convenient detachment and attachment by spring arms 86 having recesses or openings for the reception of buttons 87 that extend from the ends of the tank, and these buttons are guided to the recesses or openings by rearwardly and upwardly extending channeled portions 88 of said arms, the axes of which are substantially parallel to that of the outlet tube 80 of the suction apparatus.

A handle 90 is pivotally connected to the machine by having its lower bifurcated end 91 engaged over a boss 92 that rises from the housing 26 and to which boss the handle is swingably connected by a pivot member 93. While the handle may be swung forwardly from the position shown in the drawings, it is held against further rearward movement by engagement of the branches of its bifurcated end 91 with a widened portion 94 of the boss 92.

Current is conducted to the motor 20 through wires (not shown) and, according to the usual practice in such devices, parts of these wires are desirably housed within the handle 90 where they are connected to a switch 95 adjacent the upper end of the handle so as to place the motor control in convenient reach of the operator.

In the use of the machine, a quantity of clean-

ing liquid is poured into the reservoir **50** through the filling opening and said opening is then closed by a cap **51**. If necessary, the elevation of the nozzle is changed, by adjusting the shaft **10** in the manner previously described, to adapt the machine to the surface to be cleaned, as, for example, to the length of the nap of rug or carpet. Assuming that the regulating valve **55** has been properly adjusted, the control valve **56** is opened and the switch **95** manipulated to close the circuit and energize the motor **20** whereupon the brush **40** will be set in action and the fan of the suction apparatus rotated at high speed.

The machine is rolled slowly forwardly along the floor in a straight path, preferably parallel to and adjacent one edge of the floor or floor covering, and at a speed depending somewhat upon the condition of the surface being cleaned. If the same consists of a carpet or rug that is especially dirty the speed is less than in a case where the work to be performed is not so heavy. The brush **40** is reciprocated at a speed very considerably greater than that at which the machine is moved along the floor, and effectively scrubs the surface, the brush, at each stroke depositing a quantity of the cleaning liquid taken from the distributor **46**. As the machine advances, if operating on a carpet or rug, the brush **76**, as well as the rear lip of the nozzle **61** (or the squeegee **72** if present) smooths out the nap. The suction apparatus removes a high percentage of the liquid from the cleaned surface and deposits it in the waste receptacle **82**, leaving the surface clean and sufficiently free from liquid to dry under ordinary conditions within a short time. For example, a room in which the carpet has been cleaned may be used in the course of an hour or so after the work is completed.

To remove the waste receptacle for the purpose of emptying it requires only a slight separation of the spring arms **86** to disengage them from the buttons **87** on the ends of the receptacle, and after the receptacle has been emptied it may be returned to position on the machine with equal facility.

The machine may be used in very close proximity to walls parallel, or at right angles, to the direction of movement of the machine; and the machine may be turned conveniently by depressing the grip end of the handle and tilting the machine to remove the front wheels from the floor. It is evident from the fact that the action of the brush **40** is restricted to a fixed course longitudinally of the machine, that the machine operates within a well defined path whose edges are straight and therefore easily followed as the work progresses in successive trips across the floor, and that very little area is left adjacent the walls for cleaning by the ordinary methods. Attention is also directed to the fact that, by reason of its reciprocatory action, the brush **40** wears evenly thus insuring uniform pressure at all times throughout its entire area.

Having thus described my invention, what I claim is:

1. In a machine for scrubbing floors and floor coverings adapted for movement over a surface to be cleaned, a scrubbing device movably supported in contact with said surface, a relatively flat open liquid distributor adjacent said surface and within the range of movement of said scrubbing device and substantially coextensive in length therewith so that in the movement of the latter it rides over and in contact with the distributor thereby to receive a limited amount of liquid practically throughout its scrubbing area, means for containing a cleaning liquid and delivering it gradually to the distributor, and a prime mover for imparting movement to the scrubbing device.

2. In a machine for scrubbing floors and floor coverings adapted for movement over a surface to be cleaned, a scrubbing device supported in contact with said surface for reciprocatory movement, a liquid distributor in the nature of a flat plate disposed adjacent the surface and in a position to be overridden by the scrubbing device as the latter approaches and recedes from one end of its range of movement, means for containing a cleaning liquid and feeding the same gradually to the liquid distributor, and a prime mover for imparting movement to the scrubbing device.

3. In a machine for scrubbing floors and floor coverings adapted for movement over a surface to be cleaned, a scrubbing device supported in contact with said surface for reciprocatory movement, a liquid distributor in the nature of a flat plate disposed adjacent the surface and in a position to be overridden by the scrubbing device as the latter approaches and recedes from one end of its range of movement, said distributor having a lip along the edge over which the scrubbing device moves, means for containing a cleaning liquid and feeding the same gradually to the liquid distributor, and a prime mover for imparting movement to the scrubbing device.

4. In a machine for scrubbing floors and floor coverings and adapted for movement over a surface to be cleaned, a scrubbing device supported in contact with the surface for reciprocatory movement, a liquid distributor including a relatively flat plate supported substantially horizontally in close proximity to the surface and in a position to be overridden by the scrubbing device, the plate including a lip along the edge over which said device moves and being inclined downwardly slightly toward said edge, means for containing a cleaning liquid and feeding the same to the aforesaid plate adjacent and substantially throughout the length of the elevated edge of the plate, and a prime mover for imparting movement to the scrubbing device.

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