Sept. 11, 1962 L. OSROW ET AL 3,052,911

FLOOR WAXING MACHINE

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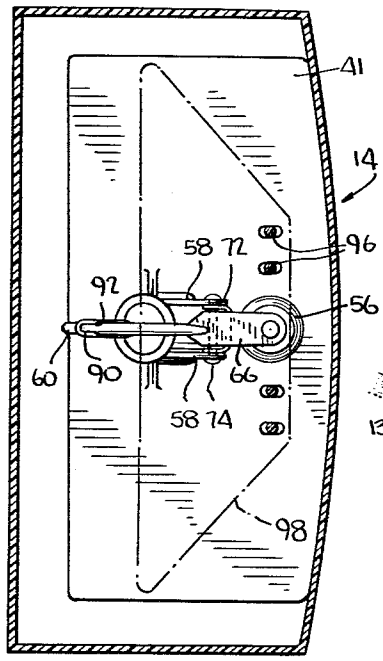


Fig. 4.

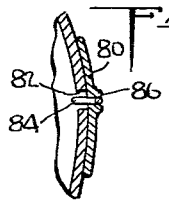


Fig. 8.

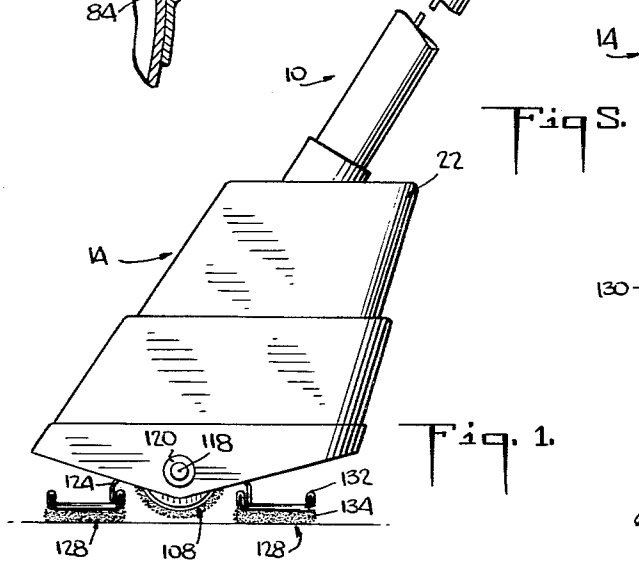


Fig. 1.

Fig. 6.

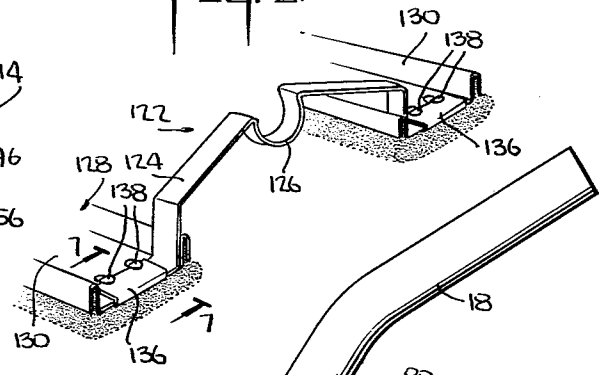
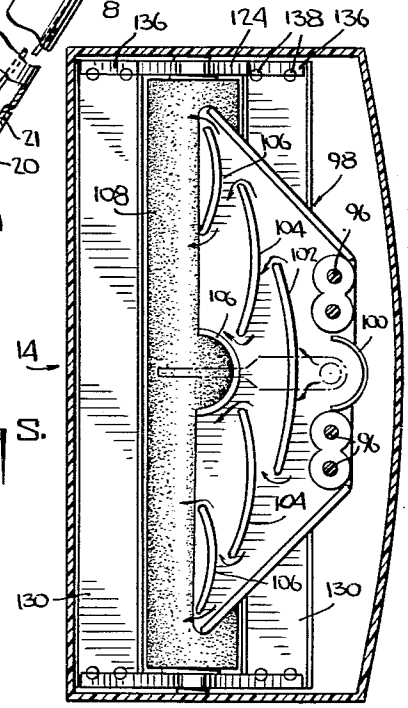


Fig. 5.



INVENTORS
LEONARD OSROW
HAROLD OSROW
BY
ATTORNEYS

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Fig. 2.

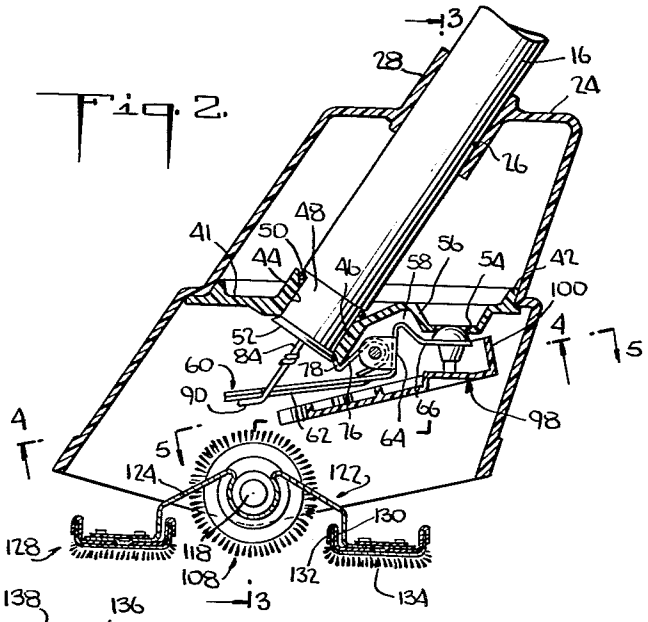


Fig. 5.

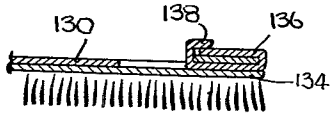


Fig. 7.

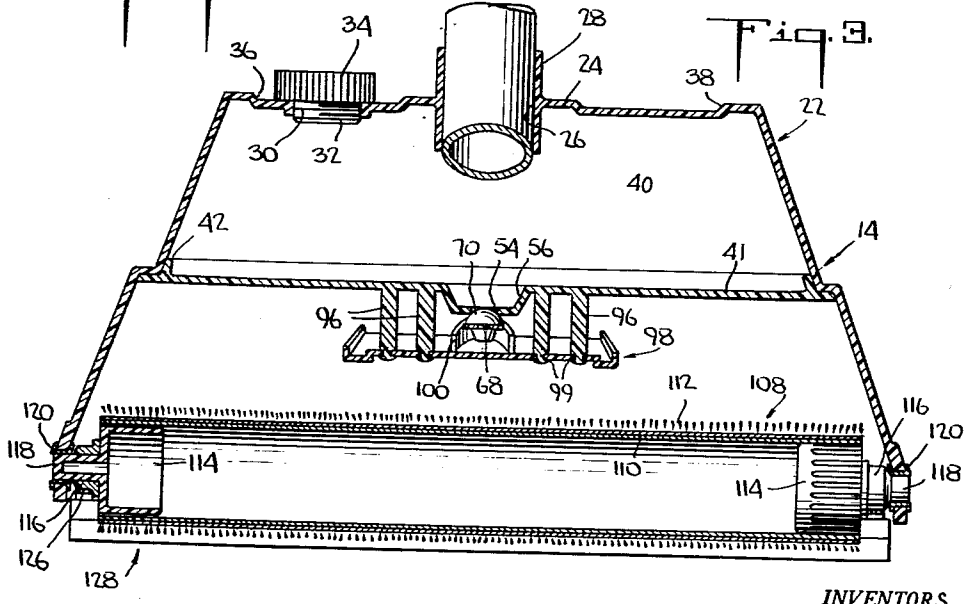


Fig. 3.

INVENTORS
LEONARD OSROW
HAROLD OSROW

BY Fischer, Fischer & Ottinger

ATTORNEYS

United States Patent Office

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FLOOR WAXING MACHINE

Leonard Osrow, Great Neck, and Harold Osrow, Roslyn Heights, N.Y., assignors to Osrow Products Company, Inc., Glen Cove, N.Y.

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7 Claims. (Cl. 15—533)

This invention relates to a floor waxing machine.

More particularly our invention is concerned with a machine of the character described which is designed for the application to a floor of wax carried by a liquid, e.g., wax in aqueous suspension, as distinguished from machines for applying paste wax to a floor.

Although the patent literature is replete with liquid floor waxers, as a practical matter considerable trouble has been experienced in providingl a good commercial floor waxer of this type. The difficulties involved are many. For instance, an aqueous wax suspension deposits a waxy residue when the liquid carrier evaporates, the basic operation of a waxer depending upon this factor. However, wax will deposit in the machine, as well as on the floor and this clogs up present-day waxers. For example, the waxy deposits clog valves and fill up channels through which the liquid wax is supposed to pass for distribution. Another difficulty is that a practical waxer must have a wide applicator head to enable the waxer to cover a room in a reasonable number of strokes. But, since an aqueous wax suspension is not as fluid as water it will not flow with sufficient rapidity through the small passages of conventional waxers and, therefore, does not even obtain distribution in a wide head. A further difficulty arises from the to and fro manual operation of a waxer. If spreader pads are placed in front and in back of the zone of wax application, the pad ahead of the applicator tends to dig into the floor and inhibit free movement and the pad behind the applicator lifts off the floor instead of spreading the freshly deposited suspension. In addition, the to and fro motion of the hand results in a variable pressure on the floor, the pressure being greater on the forward stroke when the waxer tends to be pushed into the floor than on the return stroke when the waxer tends to be lifted off the floor.

It is the object of our invention to provide a waxer which overcomes all of the aforesaid difficulties and constitutes a simple, practical and fool-proof machine.

It is another object of our invention to provide a waxer of the character described which constitutes few and inexpensive parts and which can be made and assembled in an economical manner.

It is another object of our invention to provide a waxer of the character described which is so constructed as readily to lend itself to mass production.

It is another object of our invention to provide a waxer of the character described which is strong and capable of withstanding rough handling.

It is another object of our invention to provide a waxer of the character described, the various parts of which are carefully fashioned and arranged to achieve maximum efficiency of operation.

Other objects of our invention in part will be obvious and in part will be pointed out hereinafter.

Our invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the waxer hereinafter described and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings in which we have shown one of the various possible embodiments of the invention,

FIG. 1 is a side fragmentary partially broken away elevational view of a waxer constructed in accordance with the present invention;

FIG. 2 is a central vertical sectional side view of the head of said waxer;

FIGS. 3, 4 and 5 are sectional views taken substantially along the lines 3—3, 4—4 and 5—5, respectively, of FIG. 2;

FIG. 6 is a perspective view of one end of the spreader carriage;

FIG. 7 is an enlarged sectional view taken substantially along the line 7—7 of FIG. 6; and

FIG. 8 is an enlarged fragmentary sectional view taken substantially along the line 8—8 of FIG. 1.

Referring now in detail to the drawings, the reference numeral 10 denotes a floor waxing machine constructed in accordance with and embodying the instant invention. Essentially, the machine includes a handle 12 and a head 14.

The handle is of conventional construction constituting, for example, an elongated tubular (hollow) light-wall pipe 16 of any suitable material, steel or aluminum being exemplificative. As is customary, the main portion of the handle is straight with the upper end 18 thereof inclined at an angle to form a grip. Optionally, and as indicated, the handle comprises two sections, i.e., lengths, connected in an end-to-end relationship by a suitable joint 20 to facilitate packing of the waxer in a small carton. Said joint may constitute a hollow stub 21 of reduced diameter at the lower end of the upper section which is snugly, tightly, frictionally received in the hollow upper end of the lower section so that the two sections when once joined are operationally integral.

The head 14 is secured on the lower end of the handle. It includes a hood 22 of any suitable configuration, the same herein being illustrated as a frustum of an oblique stepped pyramid. Said hood is fabricated from any suitable material, a synthetic plastic being preferred for lightness and for economy of manufacture. Moreover, it is desirable to utilize for the hood a material which, when molded into the frusto-pyramidal shape illustrated, will allow the walls thereof to be flexed. The purpose of the deflection will become apparent as the description proceeds. By way of example, the hood can be molded from polystyrene resin. It may be mentioned, however, that it is within the scope of our invention to fabricate the hood from sheet metal.

The top wall 24 of the hood is essentially horizontal and is provided with two openings. One of these openings is a central aperture 26 which is defined by a short tube 28 molded in one piece with the hood. Said tube receives the handle conduit 16. The connection between the tube and conduit is snug, and the tube is inclined at an angle to the top wall in order to slant the handle.

The second opening 30 is located to one side of the aperture 26 and is tapped to receive the threaded stud 32 of a closure cap 34. Inasmuch as an aqueous wax suspension will be poured through the opening 30, it is desirable to so configure the top wall 24 in the region of said opening as to tend to prevent spillage of the liquid. For this purpose, the opening 30 is located in a shallow depression 36. A similar depression 38 is provided on the opposite side of the handle for symmetry of design.

The hood 22 constitutes the major portion of a tank 40 in which the liquid wax is contained. The top wall of the tank constitutes the top wall 24 of the hood. The side walls of the tank constitute the side walls of the stepped oblique frusto-pryamidal shape. The bottom wall of the tank is formed by a bottom plate 41 which spans the interior of the hood at the step in the pyramid. The periphery of the plate is suitably secured to the interior of the hood at the step as by cohesion, e.g., an autogenous plastic weld. To aid in securing a tight

sealing fit at the bottom of the tank, the plate optionally includes an upstanding peripheral flange 42 that fits nicely within the inner surface of the upper portion of the frusto-pyramidal shape. The plate is provided with a through opening 44 defined by a tube 46 the opposite ends of which are internally chamfered. Said tube is coaxial with the tube 28 and is adapted to receive the reduced lower end 48 of the handle.

When securing the handle to the hood after the bottom plate has been connected, the handle is slid into the tube 28 and the lower end 48 is seated in the tube 46. At this time, the tip of the reduced lower end 48 is of the same diameter as the remainder of said lower end, that is to say it is not flared as indicated in FIG. 2. This permits the lower end to be introduced freely and easily into the tube 46. Moreover, prior to such introduction, an annular sealing member, such, for instance, as an O-ring 50, is placed on the lower end 48 of the handle and brought up against the step connecting the reduced end to the large diameter main portion of the handle. Thus, when the handle is compressed downwardly into the hood, the O-ring will form a liquid seal between the upper chamfered end of the tube 46 and the step in the handle. Next the bottom of the handle is flared as indicated at 52 aaginst the lower chamfer of the tube 46, thereby to compress the O-ring between the upper end of the tube and the step in the handle and simultaneously permanently secure the handle to the hood.

The bottom wall 41 is formed with a valve opening 54 in back of the handle opening 44 (see FIG. 2). Said second opening desirably is located at the bottom of a sump depression 56. Wax leaves the tank 40 through this latter opening.

Depending from the wall 41 are a pair of parallel fish plates 58 which aid in stabilizing the tube 46. The fish plates extend in what may be considered a front-to-back direction, that is to say in the direction in which the waxer moves during use. Said plates, in addition to acting as reinforcing members, provide journals for an actuating element of a control valve that regulates the flow of liquid wax from the tank.

The said actuating element is a valve arm 60, best seen in FIGS. 2, 3 and 4, which may be formed from sheet metal to include an elongated upwardly convex handle 62, the free end of which is located beneath the lower end of the handle. The other end of the handle is integral with an erect reach 64 that runs into a rearwardly directed finger 66. The finger is located immediately below the valve opening 54. Said finger is bifurcated to captively receive the neck 68 of an elastomeric button 70 made, for instance, of rubber or a synthetic plastic and pressed by the actuating element 60 against the bottom rim of the opening 54. It will be appreciated that when the button is lowered, liquid wax is free to flow through the valve opening and when the button is raised it will block the opening. Note should be taken that the connection between the button and the valve opening constitutes a simple abutment rather than an engagement of turning or tapered surfaces and that, therefore, the deposition and hardening of wax on any parts of the valve will not inhibit proper functioning thereof. Wax deposited within the valve opening has not effect on the simple abutment of the button and wax deposited on the button will flake or crack off as the button flexes.

The erect reach 64 is formed with a pair of forwardly extending ears 72 which fit easily between the fish plates 58. The fish plates and ears are formed with registered openings through which a pivot pin 74 extends to act as a journal for the valve arm 60.

Means is included to bias the valve arm for oscillation in a counterclockwise direction as viewed in FIG. 2 whereby to spring-load the button 70 to closed position. Said means conveniently constitutes a double-end torsion spring 76 which partially encircles the pin 74. One end of the spring is braced against the handle 62 of the valve arm and the other end of the spring is formed with a hook 78 which is caught beneath the lower flared end of the pipe 16. The spring is held in torsional compression between its ends so that it tends to expand and thereby maintains the desired spring-loading.

The control valve is manipulated from the handle by a trigger plate 80 near the grip 18. The trigger plate is curved to match the external configuration of the upper section of the handle and is in face-to-face sliding contact with the same. Said plate is formed with a through opening and lies over an axial slot 82 in the handle. An actuating wire 84 runs from the trigger plate to the valve arm 62. At its upper end, said wire is caught between a pair of external ribs 86 on the trigger plate. A jog 88 in the wire passes through the opening in the trigger plate and through the slot 82. The wire continues down through the hollow interior of the handle and protudes from the lower end thereof, the lower terminal of the wire being in the form of a bent loop 90 through which the free end of the valve arm 62 extends. The sides of said arm include a pair of registered depressions 92 in which two depressions in the sides of the loop are received thereby to effectively pivotally interconnect the wire and the control valve.

If the handle is shipped in two parts, the wire desirably is formed into two sections which are interconnected by concatenated bights 94 at the lower end of the upper wire section and the upper end of the lower wire section, these permitting the wire to be sharply bent when the upper section of the handle is disconnected. It will be understood, of course, that at such time, i.e., during shipment, when the handle is in two pieces, the loop 90 is disconnected from the valve arm and is reconnected by the housewife or by a storekeeper preparatory to use.

Extending downwardly from, and integral with, the bottom plate 41 are a set of, e.g. four, legs 96 which are utilized to support a diverter plate 98 that is made of the same material as the bottom plate and hood, to wit, polystyrene. The lower ends of the legs have pendant therefrom fingers 99 that extend through openings in the diverter plate, the tips of the fingers being headed to permanently secure the diverter plate to the bottom plate. The bottoms of the legs are slanted to locate the diverter plate in proper position with respect to the bottom plate, i.e., sloping downwardly and forwardly (see FIG. 2). The rear end of the diverter plate is located beneath the valve opening 54 so that liquid wax flowing through this opening and spilling down the button 70 will drip onto the back of the diverter plate. A splash flange 100 is provided at the rear of the area where wax falls on the diverter plate.

The liquid wax dropping on the diverter plate will due to the inclination of said plate flow forwardly gently in a thin film. Rather than forming the forward edge of said plate with a series of closely spaced fine forwardly directed ridges to, in theory, evenly disperse the liquid wax and actually to clog the valleys between the ridges we avoid such difficulty by the use of a "Christmas tree" arrangement of transversely directed spreading ridges that is not prone to clog. One transverse spreading ridge 102 is located in front of the portion of the diverter plate below the valve opening 54, and is centered with respect to the axis of said plate running forwardly from the valve opening. Said ridge 102 slopes forwardly, that is to say, it is rearwardly convex, both ends thereof being further forward than its center. This, in combination with the downward and forward slope of the diverter plate, will cause the liquid wax to flow outwardly along the back of the first ridge and off both ends thereof, thus achieving an initial spreading of the liquid wax toward the sides of the waxer.

The diverter plate includes further spreading ridges to successively spread wax flowing off the ends of preceding

ridges. Any number of spreading ridges can be utilized depending upon the desired fineness and the degree of spread. As shown herein, we provide three sets of spreading ridges, one ridge in the first set, two in the second and three in the third. Each transverse bowed spreading ridge of the second set of spreader ridges **104** has its center located about beneath an end of the first spreader ridge **102**. The ends of the second spreader ridges **104**, like those of the first ridge **102**, are further forward than their centers. Thus the liquid wax initially spread by the first ridge **102** will be further spread by the ridges **104** which also tend to fill in the space beneath the center of the first ridge **102**.

The third series of ridges **106** are arranged and function in the same manner as the ridges **102** and **104**. Optionally, the middle ridge of the third series may be more sharply curved than the endmost ridges as seen in FIG. 5.

It will be noted that the ridges are progressively shorter in order to evenly distribute the wax without overlapping. As a result of the described arrangement the wax is guided down the surface of the diverter plates in a series of continually more finely broken rivulets so that by the time the wax reaches the forward edge of the plate it constitutes several small, preferably evenly spaced, streams. It will be appreciated that, with this arrangement, the deposition of wax in normal use will not quickly clog the plate and inhibit a desirable distribution of wax and, moreover, any such deposits can be easily removed.

The wax leaving the forward edge of the diverter plate drips onto a transverse applicator roller **108**. Said roller includes a sleeve **110** on which there is mounted a tubular element **112** of a springy liquid absorbent material. There are only two types of material which answer this description, to wit, spongy materials and pile materials. Thus, there may be utilized for the material of the tube **112** sponge rubber or a foamed flexible synthetic plastic such as foamed polyurethane. Any of the well-known textile piles, desirably a velvet pile, is suitable, these comprising the usual woven or knit backs from which cut pile fibers extend. Preferably, the pile height is comparatively low, e.g., in the range of ⅛ or 3/16 of an inch. These pile fibers may constitute natural fabrics such as wool or mohair or artificial fabrics of which acrylic fibers and rayon fibers are typical examples. The tube is given the requisite stiffness by the sleeve **110**.

The ends of the sleeve **110** are frictionally fitted on and adhered to knurled drums **114**, the outer ends of each of which is provided with a projecting shaft including a bearing sleeve **116** and a protruding journal portion **118**. The journal portions of the drums are rotatably received in metal ferrule bearings **120** provided on opposite sides of the hood **22** adjacent the lower edge thereof. To dismount the roller **108**, the sides of the hood are pulled apart, the hood being sufficiently flexible as noted heretofore to permit such movement. This disengages the journals from their bearings and permits the roller to be removed.

The bearing sleeves **116** serve to rotatably and detachably support a spreader carriage **122**, one end of which is shown in FIG. 6. Said carriage includes two springs **124** (one at each end) fabricated from a resilient flat strip stock. Each said spring comprises a central circular portion **126** of somewhat more than 180° and shaped to lightly frictionally engage the bearing sleeves **116**. The spring portions **126** are adapted to be snapped on to the bearing sleeves and grip the same with sufficient force to hold the carriage in place.

The ends of both springs are rigidly connected to the ends of pad members **128** which with the springs constitute the spreader carriage. Each pad member is suitably constructed to provide a springy liquid absorbent flat surface designed to engage a floor to be waxed. As noted earlier, only two materials fall within this description, to wit, a foamed elastomeric material or a pile fabric. Such construction may include an elongated channel-shaped metal strip **130**, the edges of which are retroverted as at **132** to grip the longitudinal edges of a flexible pad sheet **134** here shown as a mohair pile strip, the same material as illustrated for the tube **112**. Tabs **136**, **138** integral with the channel-shaped strips **130** securely engage the ends of the springs **124**. Thus each spreader carriage in effect constitutes two parallel resiliently supported springy liquid-absorbent pads which are parallel to the applicator roller and which are detachably interengaged with the bearing sleeves at the ends of the roller. One of these pads is located in front of the roller and the other behind the roller.

As best will be appreciated from FIGS. 1, 2 and 3, the springs **124** are so formed that when clipped onto the bearing sleeves of the rollers and in the absence of stress, the lower surfaces of the pads **128** in front and in back of the roller are slightly below the roller. In practice, it has been found that satisfactory results are secured when the bottoms of the pads are about 1/16 of an inch below the roller. The purposes of the height differential are twofold. Firstly, we thereby counteract the tendency of the pads to exert different pressures on the floor when the waxer is reciprocated by hand. Secondly, we counteract the tendency of the "following" pad to lift off the floor. The expression "following" as used at this point denotes the pad which trails after the roller in the direction of movement, that is to say, the rear pad is the following pad when the waxer is moving forwardly and the front pad is the following pad when the waxer is moving rearwardly. Normally the following pad will lift and, since the following pad should perform the spreading, this would prevent proper distribution of the wax on the floor. We have overcome this with the present invention by the difference in the elevations of the pads and rollers and by the spring mounting for the pads which engenders an overriding downward force on both pads, that is to say by providing a downward vertical spring-loading for both pads.

It will be appreciated from the foregoing that the liquid wax undergoes several lateral spreading operations from the time it is first deposited on the diverter plate. Initially, it experiences a gross lateral spreading on the "Christmas tree" spreading ridges. Thereafter, it is more finely spread laterally by diffusion in the roller. Ultimately, it is again finely spread laterally by diffusion in the front and back pads.

It will thus be seen that we have provided a waxer which achieves the several objects of our invention and is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention and as various changes might be made in the waxer above set forth, it is to be understood that all of the parts heretofore described and shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A floor waxer comprising a handle, a container secured to the handle, an opening at the bottom of said container, a valve for closing said opening, means biasing said valve to closed position, a manually operable element carried by the handle, a kinematic linkage connecting said element to the valve, a forwardly and downwardly sloping diverter plate beneath the opening, a plurality of transverse spreader ridges on the upper surface of the plate, said ridges being approximately parallel to the forward edge of the plate and being arranged in sets at different distances from said forward edge, the individual lengths of the ridges of each set varying directly as the distance of the set from said forward edge and the ends of the ridges in each set being located rearwardly of the intermediate portions of the ridges in the next most forward set, a roller having a cylindrical surface of springy liquid-absorbent material, means mounting said roller for

rotation about an axis extending transversely of the waxer, said roller extending parallel to the forward edge of the diverter plate and being located directly below said forward edge to receive liquid wax flowing off the plate, a pair of elongated pads having lower surfaces of springy liquid-absorbent material, said pads being parallel to the roller with one pad in front of and the other pad behind the roller, means mounting said pads for vertical movement relative to the roller, and means biasing said pads downwardly, said pads when unstressed being lower than the roller.

2. A floor waxer comprising a forwardly and downwardly sloping diverter plate, a plurality of transverse spreader ridges on the upper surface of the plate, said ridges being approximately parallel to the forward edge of the plate and being arranged in sets at different distances from said forward edge, the individual lengths of the ridges of each set varying directly as the distance of the set from said forward edge and the ends of the ridges in each set being located rearwardly of the intermediate portions of the ridges in the next most forward set, a roller having a cylindrical surface of springy liquid-absorbent material, means mounting said roller for rotation about an axis extending transversely of the waxer, said roller extending parallel to the forward edge of the diverter plate and being located directly below said forward edge to receive liquid wax flowing off the plate, a pair of elongated pads having lower surfaces of springy liquid-absorbent material, said pads being parallel to the roller with one pad in front of and the other pad behind the roller, means mounting said pads for vertical movement relative to the roller, and means biasing said pads downwardly, said pads when unstressed being lower than the roller.

3. A floor waxer comprising a forwardly and downwardly sloping diverter plate, means to selectively deposit liquid wax adjacent the back of the diverter plate, a plurality of transverse spreader ridges on the upper surface of the plate, said ridges being approximately parallel to the forward edge of the plate and being arranged in sets at different distances from said forward edge, the individual lengths of the ridges of each set varying directly as the distance of the set from said forward edge and the ends of the ridges in each set being located rearwardly of the intermediate portions of the ridges in the next most forward set, and an applicator to transfer to the floor liquid wax flowing off the plate.

4. A floor waxer comprising a handle, a hood on which the handle is mounted, a partition within the hood spaced from the top thereof and spanning the hood in a front-to-back and side-to-side direction whereby to form a tank, an opening in said partition, an element below said opening, means mounting said element for movement toward and away from said opening so as to provide a valve, means biasing said element towards said opening, an imperforate forwardly and downwardly sloping diverter plate supported by said partition, said diverter plate having a configured upper surface to laterally spread liquid flowing from the tank when the valve is open, said configured upper surface including sets of transversely extending spreading ridges substantially parallel to the forward edge of the diverter plate which interrupt and divide the flow of liquid down the plate, and a roller having an axis of rotation parallel to and directly below the forward edge of the diverter plate, whereby all the liquid leaving the tank and spread on the configured upper surface of said plate will flow off said forward edge onto said roller.

5. A waxer as set forth in claim 4 wherein the ridges are upwardly convex and wherein the ends of each ridge except the lowermost ridges are above the next lowermost ridges.

6. A floor waxer comprising a tank, a handle operationally secured to said tank, a single roller, means leading liquid from said tank to said roller, means mounting said roller for rotation about an axis extending transversely of the waxer, and a spreader carriage, said spreader carriage including prehensile gripping means lightly frictionally and rotatably engaging said roller and further including a pair of pads and spring means supporting said pads from said gripping means, one in front of and the other behind the roller, said pads and said roller having springy liquid-absorbent surfaces.

7. A floor waxer comprising a head having a set of registered bearings, a single roller having journals turning in said bearings, said roller including rotatable sleeves and a spreader carriage including prehensile means lightly frictionally engaging said sleeves and further including pads in front of and behind the roller, said pads and roller having springy liquid-absorbent surfaces, and means to deposit liquid wax on said roller along the length thereof.

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