

March 15, 1966

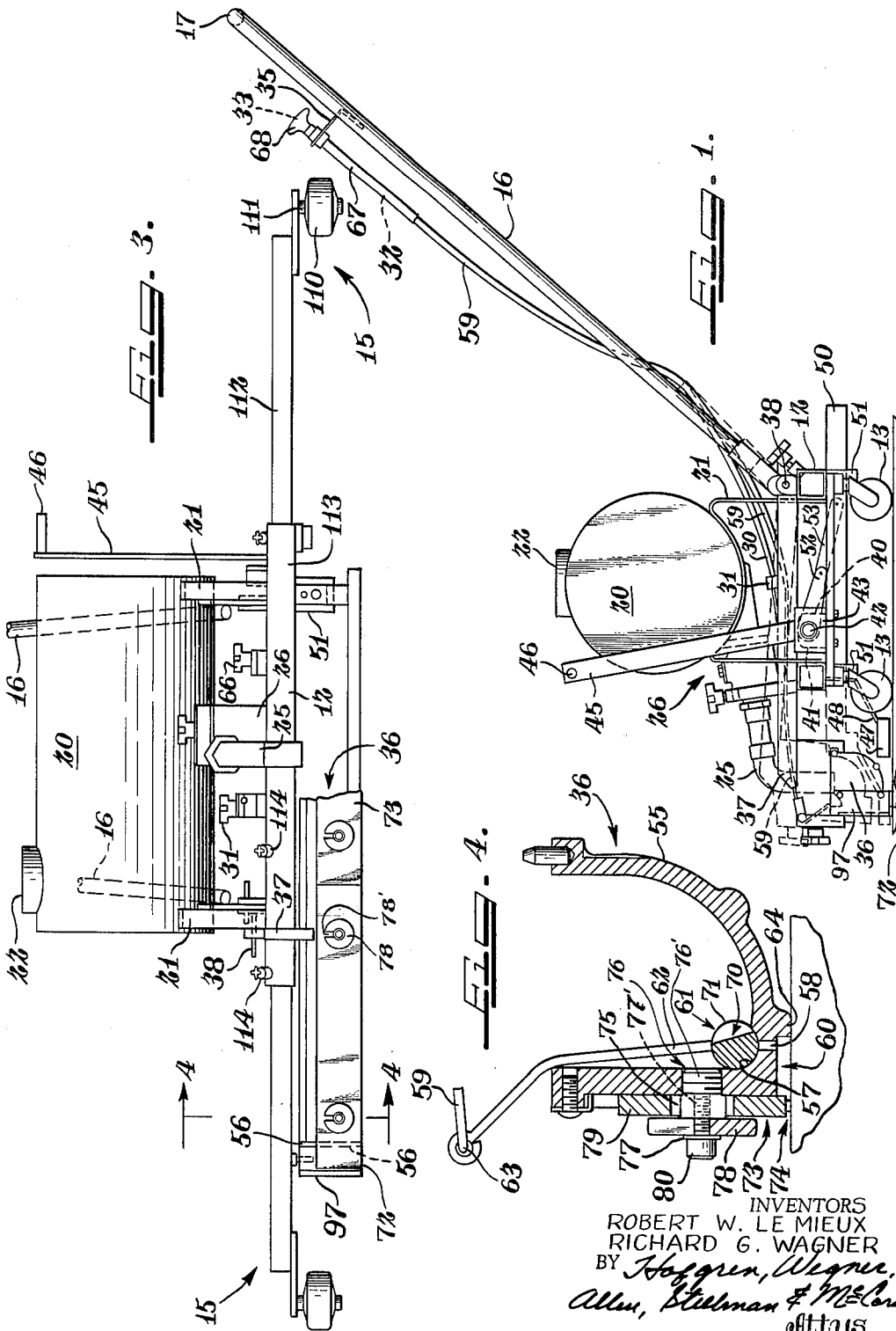
R. W. LE MIEUX ETAL

3,239,871

APPLICATOR APPARATUS

Filed Nov. 14, 1963

3 Sheets-Sheet 1



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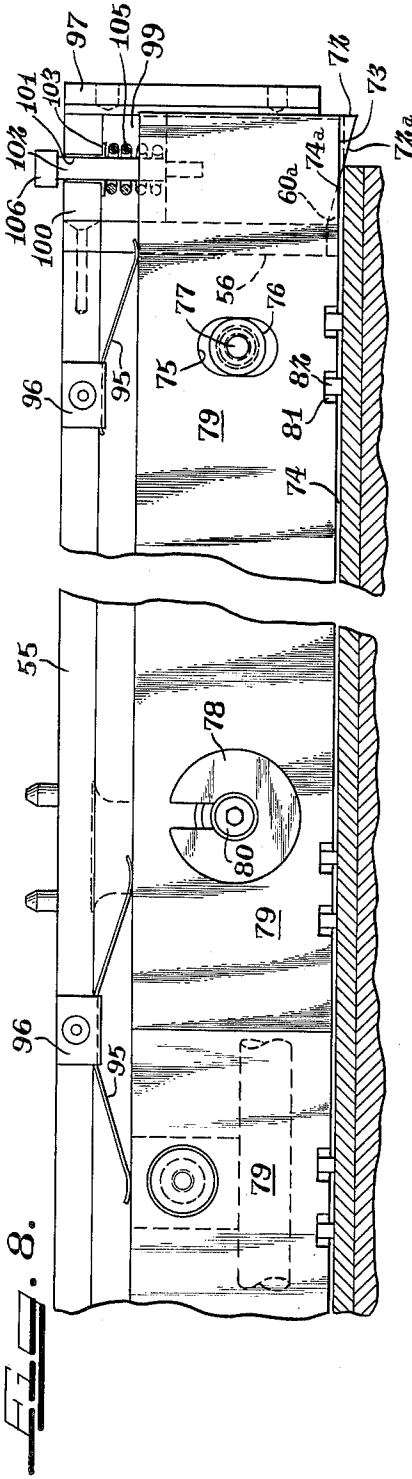
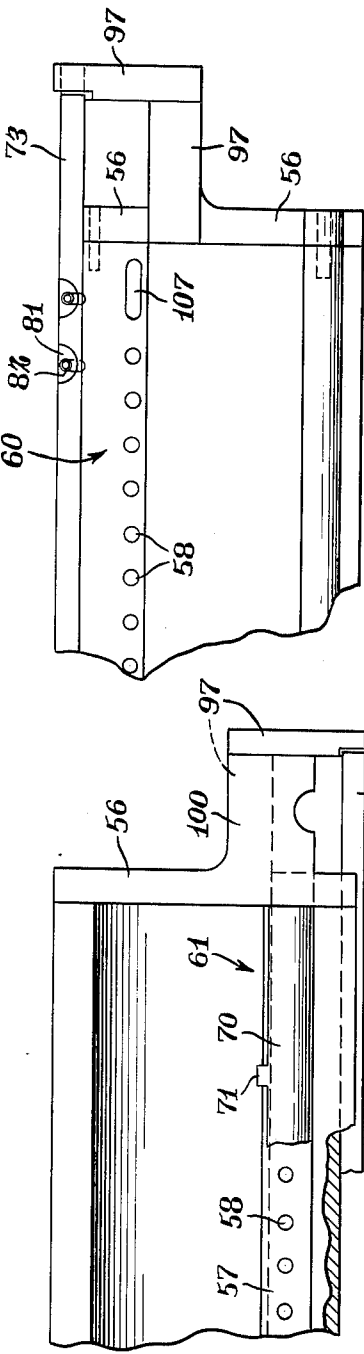


Fig. 10.

Fig. 9.

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3,239,871

APPLICATOR APPARATUS

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Muskegon Heights, Mich., assignors to Brunswick Corporation, a corporation of Delaware
Filed Nov. 14, 1963, Ser. No. 323,826
40 Claims. (Cl. 15—522)

This application is a continuation-in-part of our copending application Serial No. 258,987, filed February 18, 1963, entitled "Applicator Apparatus," and assigned to the common assignee of this application.

This invention relates to apparatus for coating or finishing a generally level surface and more particularly relates to apparatus for applying a finish or coating to a bowling surface of a bowling lane.

It has been customary in many instances to coat, finish, recoat or refinish surfaces, such as wood surfaces, in the maintenance of such surfaces. At times, periodic refinishing or recoating of a surface is necessary because of continuous wear which has rendered a previous finish unreliable for protection purposes. As an example, in the game of bowling, the bowling of a ball upon a wood base bowling lane produces surface wear which eventually wears through the lane finish. If the surface is not refinished, such wear would eventually attack the wood of the bowling lane base to an extent rendering the bowling lane unfit for its intended purpose.

In order to prevent excessive wear to the wood, bowling lane surfaces are usually periodically sanded before wear has progressed to the point where the wood is attacked. A new coating or finish is then applied to the surface. The refinishing is usually scheduled for a slack bowling period; however, since many refinishing techniques require the application of three or four thin coats of finish, permitting drying between coats, the time required for finishing may often exceed any normal slack bowling period. The resulting "down" time of a lane being recoated can be considerable when measured in loss of revenue through loss of bowling hours on the lane to the proprietor.

Recently, effort has been concentrated on the development of bowling application techniques which will permit application of a finish to a bowling lane in one step i.e. in one step after application of a base coat, using one coating, thereby eliminating the time required for the application and drying of a greater plurality of successive coats. As a result, a device has been developed which functions by depositing a puddle of coating material on the surface to be coated and spreading the coating material into a single even coat over the surface. This device is described by us in our above-mentioned copending application.

It is a general object of this invention to provide a new and useful apparatus and improvements for use in applying a coating or finish to a surface.

In a preferred form of the invention, it is an object to provide improvements in a coating applicator of the type using puddling of the coating material and spreading of the coating material from the puddle in a one-step procedure.

It is another object of this invention to provide a new and useful spreader device constructed to minimize undesired flowage or drippage of liquid coating material from portions of the device to the surface to be coated, especially in the puddling type applicator; it is further an object of this invention to provide such a device which may include a system for raising portions of the spreader in contact with the coating material on the surface to raised positions during transportation between bowling lanes; it is also an object of this invention to provide a new and useful system for moving a drippage

collector beneath raised dripping surfaces of a spreader device.

Still another object of this invention is to provide a new and useful coating spreader including an improved readily controllable valve mechanism.

Yet another object is to provide a new and useful spreader system in accordance with any of the above objects capable of positive action for engagement with irregular surfaces for containing a puddle of liquid coating material against the surface to be coated and spreading a generally uniform coating from the contained puddle on the surface.

A further object of this invention is to provide a new and useful spreader system including a spreader member supported on the surface to be coated and capable of spreading an even coat over the supporting surface, which spreader system may be adapted for spreading different preselected coat thicknesses, if desired, and which may also lessen drippage, especially in the puddling type applicator.

It is also an object of this invention to provide an applicator in accordance with any of the foregoing objects wherein a pool or puddle of finish on a bowling lane is confined by walls including wall portions positively urged against the lane surface.

Another object is to provide such a spreading member having spacer means for supporting the spreading member from the surface to be coated by tracking such surface and direction means to direct passage of finish material behind the spacer means tracking the bowling lane surface to eliminate any gaps or streaks in the coating which may otherwise be caused by the spacer means.

It is a still further object to provide an applicator in accordance with any of the foregoing objects including a yieldable spreading means formed of independent transverse sections for conforming to lateral irregularities in the bowling lane surface.

Other objects of this invention will be apparent to those in the art from the following description and the drawings, in which:

FIGURE 1 is a side view of a form of finish applicator in accordance herewith in position for finishing a bowling surface;

FIGURE 2 is a plan view of the device of FIGURE 1 with cutaway portions to show structure;

FIGURE 3 is a front view of the applicator of FIGURE 1 with parts removed or broken away to more clearly show other structure;

FIGURE 4 is an enlarged section taken along line 4—4 of FIGURE 3;

FIGURE 5 is an enlarged front view of a spreader bar having spacer members for use in the applicator of FIGURE 1;

FIGURE 6 is an enlarged showing of interchangeable spacer members in association with the spreader bar of FIGURE 5;

FIGURE 7 is a bottom view of the portion of spreader bar seen in FIGURE 6;

FIGURE 8 is an enlarged front view showing portions of the spreader bar assembly mounted on the device of FIGURE 1 including mounting details and disposition of the spreader bar with respect to the surface to be coated;

FIGURE 9 is an enlarged plan view of a portion of the spreader device of FIGURE 1 with parts removed and broken away for clearer understanding; and

FIGURE 10 is a bottom view of the portion shown in plan view in FIGURE 9.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment

with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

Referring first to FIGURES 1-3, there is illustrated an embodiment of an applicator as an exemplification of the present invention. The illustrated applicator includes a carriage having a frame 12 supported by wheels in a form of casters 13 pivotally mounted to frame 12 so that the carriage may be moved upon the casters along a surface. Because the illustrated applicator is for use in coating bowling lanes surfaces, guide means 15 are provided to guide the carriage on a bowling lane by engagement of the side edges of the bowling lane at the gutters thereof. Also mounted on frame 12 is a handle 16 having a gripping end or portion 17 for manual movement and directional control of the carriage by an ambulatory operator. Handle 16 is pivotally mounted by means of pins at 18 anchored to frame 12.

Also carried by the carriage is a coating material storage tank 20 which is supported by brackets 21 secured to and supported by frame 12. Storage tank 20 includes a coverable or capable inlet opening 22 for filling the tank to provide a reservoir of coating material for supplying the coating application system during movement of the carriage along the surface to be coated. Tank 20 has an outlet at the bottom thereof and a conduit 25 extending from the outlet with a valve 26 for controlling flow through conduit 25.

Valve 26 is of the type having a rotary valve stem for increasing or decreasing the flow or stopping the flow through valve 26 and line 25. Secured to the valve stem is an arm 27 which is, in turn, pivotally attached at the other end thereof to a pivotal mounting member 28 which is secured to a rigid mechanical control line 30. Control line 30 is supported adjacent valve 26 by a bracket 31 secured to frame 12 and is slidably supported adjacent handle 17 through a tube member 32 secured to bracket 35 extending between and secured at each end to the arms of handle 16. The upper end of line 30 has a knob 33 for gripping so that line 30 may be pushed or pulled to turn valve 26. Valve 26 is shown in FIGURE 2 in its closed position and it is apparent that pulling handle 33, secured to line 30, will pivot arm 27 for opening valve 26. Reclosing of valve 26 is affected by pushing handle 33 toward tube 32 so that the rigid line 30 urges arm 27 counterclockwise back to the position shown in FIGURE 2. It will also be apparent that the amount of opening and closing of valve 26, which, in turn, regulates the flow through line 25, may be adjusted by adjusting the disposition of knob 33 outward or inward from mounting bracket 35.

A second coating material reservoir in the form of an open top trough 36 is provided for receiving coating material discharged from tank 20 through line 25. Trough 36 is secured to ends of a pair of arms 37 pivotally mounted at their other ends to frame 12 at 38. A camming block 40 is adapted to engage each of arms 37 between pivot 38 and trough 36. The camming blocks 40 are generally square cornered but have a rounded corner camming surface 41. Blocks 40, in essence, are eccentric cams keyed to a shaft 42 for rotation therewith. Shaft 42 is rotatably supported by a mounting member 43 at each end thereof secured to frame 12.

Also keyed to shaft 42 is an upstanding lever 45 having a grasping handle 46. Lever 45 is movable to move the trough 36 between a "trough down" position, shown in full lines in FIGURE 1, and a "trough up" position, shown in dotted lines in FIGURE 1. With lever 45 in the trough down position, arms 37 are slightly above surfaces constituting rows of cams 40. Pivoting of lever 45 to raise trough 36 to the dotted line trough up position rotates shaft 42 clockwise in FIGURE 1, carrying cam 40 clockwise to support arms 37 on camming surfaces 41 which correspond to highs of the eccentric cams 40. Arms 37

are thereby urged upward and pivoted clockwise about pin 38, as viewed in FIGURE 1, raising trough 36 to the dotted line position.

A drip receiving means in the form of a drip receiving tray or pan 47 is provided and is positionable under trough 36 with trough 36 in its raised position. Tray 47 is mounted on brackets 48 which are in turn releasably secured, e.g. by a slot and clamping bolt arrangement or hook arrangement, to a pair of slides 50, slidably supported by slide brackets 51 secured to frame 12, so that slides 50 may be moved to the left and right, as viewed in FIGURE 1, for moving tray 47 between the full line and dotted line positions. In the mechanism for moving tray 47, an arm 52 is mounted for rotation with shaft 42, arm 52 being secured to a surface of cam 40 which is not used for camming arms 37 upward. Arm 52 extends rearward of the device, as viewed in FIGURE 1, and is pivotally connected at its other end to one end of a link 53, link 53 having its extended end pivotally connected to a slide member 50. Each of cams 40 has an arm 52 secured thereto with a link 53 connecting the arm 52 to a slide member 50. Thus, as lever 45 and shaft 42 are pivoted clockwise, as viewed in FIGURE 1, for raising trough 36, arm 52 is pivoted clockwise, pulling link 53 and pivoting links 53 counterclockwise about their pivotal connections to slides 50 resulting in pulling of slides 50 to the left, as viewed in FIGURE 1, slides 50 carrying tray 47 to the dotted line position as arms 37 come to rest on surfaces 41 with trough 36 raised. Tray 47 in the dotted line position is disposed to catch any drippage from the trough 36 and associated equipment when trough 36 is in the dotted line position.

Referring to FIGURES 1-4, trough 36 includes an elongate trough-like casing 55 having end plates 56 secured to each end thereof for sealing the ends of the trough against escape of liquid therefrom. At a low surface of casing 55 on the interior thereof to which liquid will tend to flow or will be present when significant amounts of liquid coating material are present within trough 36, there is provided a valve seat surface 57 in the form of an elongate concave surface which may be considered as a longitudinal strip of an inner circular surface of a cylinder. A plurality of outlet ports 58, shown in linear array, are provided originating at surface 57 and extending through casing 55 for gravity flow of liquid through the outlet conduits to a chamber 60 defined therebelow. Thus, outlet conduits or ports 58 provide communication between the chamber 60 and trough 36 at surface 57.

Seated on valve seat 57 and mounted at each end to end plates 56 for rotation about its axis is an elongate valve member generally indicated by reference numeral 61. An arm 62 is secured to valve member 61 at one end and is pivotally secured at 63 to a rigid mechanical control line or wire 59 of the same type described above with reference to line 30. Line 59 extends through an upper groove in a support member 66 secured to frame 12 for supporting line 59 and through a tubular member 67 secured to cross frame 35 adjacent handle 17. A control knob 68 is secured to the end of line 59 projecting from the tubular support 67 beyond mounting 35. It will be apparent that pulling of knob 68 outward from mounting 35 will pull line 59 slidably through conduit 67 and mounting 66 and will pivot arm 62 clockwise as viewed in FIGURE 4 to also pivot valving member 61 clockwise. Pushing of knob 68 will pivot valving member 61 counterclockwise for return to the position shown in FIGURE 4.

Valving member 61 in the illustrated form is a rigid elongate cylindrical or round rod having an outer surface conforming for cooperation with the rounded valve seat surface 57. A plurality of chordal sections in linear array has been removed from rod 61 providing chordal passageway 70 between solid chordal sections 71 which have not been removed from rod 61. Upon pivoting rod

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61 clockwise, as viewed in FIGURE 4, sections 71 continue to ride on surface 57 as passageways 70 come into communication with outlet ports 58, thereby providing flow through passageways 70 at ports 58 from trough 36 while retaining the rod member 61 in position for accurate and reliable closure of ports 58, i.e. by pushing knob 68 to pivot member 61 counterclockwise.

Returning now to chamber 60 and with special reference to FIGURE 4, chamber 60 is provided for containing a puddle or coating liquid supplied thereto from tank 20 through line 25, trough 36 and ports 58, against the surface therebelow to be coated. Thus, one face of chamber 60 may be considered as being defined by the surface to be coated. One edge of chamber 60 is defined by a projection or ridge 64 formed on the lower surface of casing 55 and having its bottom surface in contact with the lane surface therebelow to support the trough with arms 37 slightly above cams 40. Ridge 64 comprises the leading edge or wall of chamber 60 as the applicator is pulled by handle 17 along a bowling lane surface.

At the trailing end of chamber 60 and defining the trailing wall thereof is a spreader member in the form of bar 73 providing a gap 74 therebeneath for spreading of liquid coating material from chamber 60 to the surface to be coated during movement of the carriage over the surface. The opposing ends of the elongate chamber 60 beneath trough 36 are defined by walls in the form of blocks 72 (FIGURE 8).

Returning now to spreader member 73 in more detail, the spreader member or bar 73 is formed of a linear plurality of spreader blades 79, three in the illustrated form, mounted end-to-end on the exterior of the trailing wall of casing 55 and forming a continuous spreader blade across the full extent of chamber 60 for receiving and spreading liquid therefrom. Each blade member 79 is independently vertically slidably mounted on casing 55 by means of a plurality of vertically extending slots 75 in the blade 79 through which pins 76 extend, pins 76 being attached to the wall of casing 55 by male threaded stud portion 76'. Each of the pins is internally threaded as at 77'. A bolt portion 80 having a flange 77 is threadably inserted into bolt 76 at 77'. A washer 78 including a cut-out slot 78' is retained by bolt 80 between the flange 77 and stud portion 76. It will be noted that the distance between the wall of casing 55 and washer 78 is slightly larger than spreader blade 79 thereby allowing sliding movement of blade 79 upward and downward relative to casing 55 when the bolt 80 is tightly inserted into pin 76. In order to remove blade 79 without completely removing either bolt 80 or pins 76, flange 77 is smaller than the slot 75 in the spreader blade 79, and the washer 78 has a slot 78'. To remove spreader blade 79 it is only necessary to loosen bolt 80 thereby allowing release of washer 78 from around bolt 80 by means of slot 78'. Spreader blade 79 can then be removed from the applicator by passing slots 75 over ridge 77 and bolt 80. Although any number of slot-and-pin mountings 75, 76 may be used for each blade 79, two such mountings are deemed sufficient for reliable operation.

On the lower or spreading edge of each member 79 there is provided a plurality of pockets 81 (FIGURE 6), each surrounding one of a plurality of spacers or nubs 82. In the illustrated blades, two pairs of nubs 82 are included on each blade 79, although more or less can be used. Preferably, the nubs are disposed near the ends of blades 79, omitting nubs from the more central portions. Nubs 82 function as spacers for maintaining the correct spacing 74 between blades 79 and the surface to be coated during the coating operation. The pockets 81 extend into the blade 79 from the lower edge thereof and from the leading edge thereof and provide curved surfaces 83 for directing fluid entering the leading edge in the direction of the arrows in FIGURE 7 around behind the spacer or nub 82 for spreading from the lower edge of

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the blade at 85 behind nub 82 to provide an even coat of material applied from space 74 across each blade member, omitting any voids that might be otherwise left from the presence of nubs 82 which track the surface to be coated. The rounded bottom of nubs 82 (as shown in FIGURE 6) minimize scratching or scraping of the surface therebelow.

As best seen in FIGURE 6, spacers 82 include shanks 86 extending upward into receivers in the form of cylindrical bores 87 extending from the top wall of pocket 81 upward vertically into blade 79. A transverse female threaded bore 90 intercepts bore 87. A recessed screw 91 is threadably received in bore 90 and is tightened against the shank 86 to hold spacer 82 in place. Upon loosening screw 91, the projection 82 may be removed. Since the projection 82 is the determinant of the coating thickness because it determines the height of space 74, the coating thickness may conveniently be preselected by preselection of nubs 82 of various heights for use in the blade elements. For this purpose, various sizes of nubs 82 may be provided. For example, a complete set of nubs 82 extending $\frac{1}{8}$ inch below the spreading edge of blades 79 may be used for applying a coating of one thickness while a complete set of nubs extending $\frac{1}{16}$ inch below the spreading edge of each of blades 79 may be used for applying a thinner uniform coating. In FIGURE 5, the spacers 82a may be considered as a set of spacers of a size differing from those illustrated by reference number 82 for interchange with spacers 82 to provide a different coating thickness.

It will be recalled that the independent blade numbers 79 are independently vertically slidably mounted on the casing 55. Referring to FIGURE 8, positive means in the form of leaf springs 95 secured to an outwardly projecting top flange of casing 55 by means of clamps 96 are provided for urging blades 79 downward to give positive contact of nubs 82 of the surface to be coated to provide the desired uniform space 74 for desired coating thickness.

The end walls for chamber 60 are provided by block 72 slidably mounted between casing end plates 56 and channel-like assemblies of plates 97 which, together with spreader 73, define a pair of rectangular slide cavities identified by reference number 99 in FIGURE 2, in each of which cavities a block 72 is slidably positioned. A partial cover for cavity 99 is defined by a lateral extension 100 from the upper portion of end plate 56. Extension 100 includes a semi-circular guiding bore 101 through which a shank 102 is slidably positioned, the lower end of shank 102 being secured to block 72. A ring member 103 is disposed beneath cover 100 and functions as a washer for grounding a compression spring 105 against the cover 100. The other end of compression spring 105 rests against the upper surface of block 72 for normally urging block 72 downward. A stop member 106 larger than the bore 101 is provided on the upper end of shank 102 to retain block member 72 in cavity 99, during lifting of the trough or of the entire machine from the supporting surface.

Each block 72 has a lower surface 72a inclined to present a bearing surface against the edge of a bowling lane. Under the urging of spring 105, the lower surface 72a of each block 72 is positively urged against the edge of the surface to be coated and limits the lateral travel of coating material from cavity 60 by tapering the cavity 60 as at 60a, defining the cavity limit at the bowling lane edge. It will be noted that among the outlet ports 58 from trough 36 at each end of the linear array of ports there is provided a port larger than the rest in the form of an elongated slot 107 for supplying extra coating material from the trough 36 to assure maintaining cavity portions 60a laterally thereof supplied with coating material. The outlet ports 58 do not extend to a position directly above cavity portion 60a to supply coating material thereto. The coating material for application through the ends of

gap 74 at 74a is supplied by slots 107 through cavity ends 60a.

Referring especially to FIGURES 1 through 3, the guide means 15, provided for guiding the applicator along a bowling lane, includes a pair of guide rollers 110, each rotatably mounted at 111 to an arm 112 which is telescopically received in a square tubular member 113 forming a part of frame 12. Thumb screws 114 are threaded through a corner wall of member 113 for engagement interiorly with arm 112 for retaining arm 112 against telescopic sliding within member 113. The thumb screws 114 may be loosened to adjust the extension of arms 112 from member 113 to thereby adjust the lateral disposition of rollers 110. It is intended that rollers 110 engage and guide upon the outer gutter surfaces such as may be provided in conjunction with or adjacent divider strips between open lanes.

For operation of the device, tank 20 is filled through inlet 22 with the coating material to be used to coat a bowling lane. Knob 33 is pulled to open valve 26 and permit gravity flow of coating material through line 25 to trough 36. The applicator is wheeled to one end of the bowling lane and rollers 110 are engaged for guiding on the bowling lane edge, the extent of arms 112 being adjusted as needed, with the inclined lower surfaces of block 72 resting on the bowling lane edges. Handle 68 is then pulled to permit flow of fluid into chamber 60 and after chamber 60 is filled, evidenced by leakage of material from beneath ridge 64, the carriage is pulled down the bowling lane by handle 17 while adjusting the liquid flow to the lane surface by adjusting knobs 33 and 68 as needed in accordance with the speed of travel of the carriage down the lane and the thickness of coating desired. The coating material flows as an even coating thickness from cavity 60 through gap 74.

At the end of the lane, valves 26 and 61 are closed and lever 45 is moved to place trough 36 in the dotted line position shown in FIGURE 1. This dotted line position is the idle position with respect to the spreader member, the spreader member having been elevated from the floor with drip pan 47 being in drip-receiving association with the raised trough and spreader. Drip pan 47 also receives any drippage from the surfaces defining the top of chamber 60, ridge 64 and block members 72. The device may then be moved to the pit end of another lane to be coated, handle 46 returned to the full line position of FIGURE 1 in which the spreader members are in operative association with the bowling lane surface and the procedure repeated. Drip tray 47 may be readily emptied as desired by removing tray 47 on brackets 48 from slides 50, e.g. by unhooking.

In the illustrated construction, it is advantageous that the chamber 60 is maintained at a minimum so that upon lifting the trough assembly from the surface with valve 61 closed drippage from the surfaces surrounding chamber 60 is maintained at a minimum. In such form, the outlets 58 from the supply trough 36 are in close proximity with the leading edge of chamber 60 and the distance from the outlets 58 to the blade 73 is sufficient to permit the distribution of the liquid as a puddle prior to contact with blade 73 without providing an excess amount of space within the chamber 60.

It will be apparent from the foregoing that an applicator device has been provided which, in the preferred form, includes a puddling and spreading system and a drip tray which can be moved to a position catching drippage from the puddling and spreading system during transportation of the device between bowling lanes. Preferred linkages have been provided for raising the spreading system and sliding the drip-receiving means therebeneath. Further, a particular advantageous valve mechanism may be employed for insuring seating of the valve to shut off flow from a reservoir from the surface, minimizing the likelihood of drippage due to leakage from the reservoir. The device may be adapted to spread a

coating of preselected thickness over a surface by merely attaching spacer members of preselected size to the spreader member. For this purpose, new and useful spreader means have been provided which have interchangeable means for supporting the spreader different preselected distances from the surface to be coated; flow directing means are also provided for directing coating material around the spreader support members, which track the surface to be coated, to assure a more even coating over the surface. Although these and other features of the present invention have been described with respect to a specific form of applicator their modification or their use in other forms of applicators, as well as other modifications of the present device, are intended to be within the scope of the present invention.

We claim:

1. An apparatus for applying a coating or finish to a bowling lane surface comprising a carriage having a frame, means mounted on the frame for depositing liquid coating material on the surface to be coated, horizontally disposed spreader means spaced from the surface to be coated for spreading the liquid over the surface, means mounting said spreader means on said frame for pivotal movement away from the surface to be coated, drip receiving means, means slidably mounting said drip receiving means for movement to a position beneath said spreader member with said spreader member pivoted to the position away from the surface to be coated, said drip receiving means being adapted to block dripping from said spreader member in said position to the surface therebeneath, and common manually operable means for moving said spreader member away from the surface to be coated and said drip receiving means into position blocking dripping from said spreader member.

2. In an apparatus for applying a coating or finish to a surface which apparatus includes a portable frame and means for dispensing a puddle or pool of liquid coating material downwardly from a reservoir to the surface to be coated for spreading over the surface by a spreader bar member mounted on said reservoir, the improvement comprising a first lever, an eccentric cam, means coaxially pivotally mounting said first lever and cam for pivotal movement together with said first lever generally upstanding, a second lever resting on said cam and pivotally mounted on said frame at one end and secured to said reservoir at the other end, said second lever carrying said reservoir and being pivotal between a lowered position and a raised position while riding on said cam by pivoting said cam to different angular positions, slide means mounted on said frame for sliding toward and away from a drip catching position below the raised position of said reservoir, a drip receiving tray removably mounted on and carried by said slide means for disposition beneath the raised position of said reservoir when carried by said slide means into drip catching position, an arm secured to and projecting from said cam, a link pivotally connected at one end to said arm and at the other end to said slide means, said link and arm being disposed to slide said slide means to carry said tray into drip receiving position by pivoting said cam to an angular disposition raising said reservoir and away from drip receiving position by pivoting said cam to an angular disposition lowering said reservoir, whereby movement of said first lever to pivot said cam results in raising said reservoir and spreader bar member and sliding said tray therebeneath and movement of said first lever to pivot said cam to another angular disposition results in moving said tray from beneath said reservoir and spreader bar and lowering said reservoir and spreader member.

3. In an apparatus for applying a coating or finish to a surface which apparatus includes a portable frame and means for dispensing a puddle or pool of liquid coating material downwardly from a reservoir to the surface to be coated for spreading over the surface

by a spreader means, the improvement comprising a first lever, an eccentric cam, means coaxially pivotally mounting said first lever and cam for pivotal movement together, a second lever resting on said cam between the second lever ends and pivotally mounted on said frame at one end and secured to and supporting said spreader means at the other end, said second lever being pivotal by pivoting said first lever to move said other end and spreader means carried thereby between a lowered position and a raised position by pivoting said cam, drip receiving means mounted for movement beneath said spreader means with said spreader means in raised position.

4. An apparatus for applying a coating or finish to the surface of a bowling lane having lateral gutters which apparatus comprises a carriage including a frame, a handle for moving said carriage along a bowling lane, reservoir means movably supported by said frame for containing a supply of liquid coating material, manually operable lever and cam means for moving said reservoir means away from an operative position adjacent the lane surface, outlet means from said reservoir for flowing liquid downward therefrom to the bowling alley surface, rotary valve means for controlling flow from said outlet, drip tray means movably mounted on said frame for positioning beneath said reservoir when moved away from operative position, and walls carried by said reservoir means defining chamber means adapted for association with the surface to be coated to define a second reservoir disposed to receive flow from said first reservoir through said outlet controlled by said valve means, said walls including: vertically slidable positively acting spreader means having spacer means on the spreading edge of said spreader means for supporting said spreader means from the surface to be coated, vertically slidable positive acting wall portions maintaining limits of said second reservoir generally commensurate with the surface to be coated and a wall facing said spreader means, said last mentioned wall being in close proximity with said outlet means.

5. An apparatus for applying a coating or finish to the surface of a bowling lane, which apparatus comprises a frame, carriage means supporting the frame for movement along the surface to be coated, handle means attached to said carriage for moving said carriage over the bowling lane surface, spreader means, means carried by said frame and mounting said spreader means for movement between a spreading position spaced above the surface to be coated for spreading coating material dispensed to the surface to be coated and an idle position removed from spreading association with the surface to be coated, open bottom means carried with said spreader means for containing a small quantity of liquid coating material against the bowling lane surface and in communication with said spreader means for applying the coating to the surface as the carriage is moved over the surface, reservoir means mounted on said carriage, supply means mounted on said carriage for supplying coating material to said containing means including a manually operable valve operable from said handle for controlling such flow, and drip receiver means movably mounted on said frame for movement to a position underlying said container and spreader means with said spreader means in idle position.

6. In a bowling lane coating applicator in which coating material is flowed to a bowling lane surface, a valve for controlling the flow comprising a casing, an inlet to said casing, laterally elongate outlet means from said casing, a laterally elongate valve seat having a curved valve seat surface transverse to the lateral dimension surrounding said outlet means, an elongate valving member having a curved surface, means configured for sealing facial engagement with the curved valve seat surface and a second surface engageable with said valve seat surface for defining a flow path between said valving member and

valve seat from said casing through said outlet means, means mounting said valving member for pivotal movement between a valve closed position with the first valving surface engaging said valve seat and a valve open position with the second valving surface engaging said valve seat, and handle means secured to said valving member for moving said valving member between said position.

7. The applicator of claim 6 wherein said valving member comprises an elongate circular rod and said valve seat comprises a cylindrical cavity in said casing at said outlet means, said first valving surface being defined by a portion of the outer surface of said rod extending the length thereof and the second valving surface being defined by another such portion of said outer surface angularly disposed from said first portion and including an array of generally parallel chordal slots, said mounting means mounting said rod for pivotal movement about its axis with the outer surface of the rod in circular sliding engagement with said valve seat.

8. An apparatus for applying a coating or finish to a lane surface, which apparatus comprises a carriage, a reservoir carried by the carriage for containing a supply of coating material, chamber means carried by said carriage below said reservoir for confining the coating material against the lane surface to be coated, flow path means for directing coating material from said reservoir to said chamber means, said chamber means having vertically slidably mounted lateral dam members having bevelled bottom surfaces and disposed the correct distance from each other to define the ends of said chamber so as to have the bevelled bottom surfaces ride upon opposing lateral edges of a bowling lane over the length of the bowling lane preventing flow of liquid coating material from the bowling lane edges, resilient means biasing said dam members downward, a rear wall defining a spreader member for spreading coating over the lane surface, and resilient means biasing said rear wall downward to desired spreading position, each of said lateral and rear walls including portions engaging and supporting from the lane surface against the urging of said resilient means.

9. In an apparatus for applying a coating or finish to a bowling lane surface by passage of a generally horizontal spreader member on a carriage over a puddle of coating material, the improvement which comprises means mounting said spreader member for vertical movement with respect to said carriage, said spreader member being disposed across said carriage and comprising a plurality of independent spreader blades including spacer members removably mounted to said spreader blades and projecting downward below the spreading edges of said blades, resilient means urging each of said spreader blades downward and urging said spacer members against said surface, said plurality of blades riding independently over the surface to be coated spaced from the surface by said spacer members during a coating operation while providing a laterally continuous spreading edge generally conforming with lateral irregularities in the surface to be coated, said spreader blade including blade portions having generally straight spreading edges throughout their length and continuous behind each of said spacer members, and pocket means in the front face and spreading edge of each spreading blade around each of said members including surfaces defining a portion of said pocket means for directing coating material from the blade front to the area behind each spacer member for spreading from said area beneath said blade edge as a relatively even coat.

10. In an apparatus for applying a coating or finish to a bowling lane surface which apparatus spreads the coating material from a liquid puddle by means of a lower spreading surface or edge on a pendant bar generally horizontal to and spaced above the surface and mounted for vertical movement, projection means on said

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pendant bar and disposed to follow the surface and support said pendant bar therefrom, and pocket means in the leading and spreading surfaces of said pendant bar surrounding said projection means at and above the level of the spreading surface, said spreading surface being continuous in a generally straight configuration on the trailing face of said spreading bar, whereby during the spreading operation coating material is collected in said pocket and applied from said pocket beneath the spreading surface behind said projection means in sufficient amount to fill voids or depressions in the spread coating occasioned by the projections.

11. An apparatus for applying a coating or finish to a lane surface which apparatus comprises means for applying a puddle or pool of liquid coating material to the surface, a spreader member disposed horizontally and spaced a distance from the surface to be coated corresponding to the desired coating thickness, carriage means for moving said spreader member over the applied puddle or pool of coating material on the surface to be coated, said spreader member being vertically movably mounted on said carriage means, projecting spacer means mounted on said spreader member adapted and disposed to support said spreader bar by contact with the surface to be coated, and means for directing coating material for spreading by said spreader member as an even coat across the area tracked by said spacer means on a surface being coated.

12. In an apparatus for applying a coating or finish to a bowling lane surface which apparatus dispenses a puddle of the coating material from a reservoir to the surface to be coated and spreads the coating material from a dispensed liquid puddle by means of a pendant bar slidably mounted for vertical movement and generally horizontal to and spaced above the surface, the improvement which comprises projection means on said pendant bar and disposed to follow the surface and support said pendant bar therefrom, pocket means in the spreading surface of said pendant bar for collecting fluid at the leading edge of the bar during the spreading operation adjacent each said projection means in sufficient amount to fill voids or depressions in the spread coating occasioned by the projection means, and means enclosing said puddle against the surface to be coated and against said spreader bar and within said pocket means.

13. In an apparatus for applying a coating or finish to a bowling lane surface which includes a carriage, coating material reservoir and dispenser means mounted on said carriage for dispensing a puddle of coating material to the surface to be coated, a spreader member formed of a linear array of independent spreader portions for spreading the coating material from the puddle over the surface to be coated, and means slidably mounting said spreader member for vertical movement on said carriage, the improvement which comprises resilient means independently urging each said spreader member portion downward toward the surface to be coated and a plurality of spacer members removably mounted on said spreader member for spacing each said spreader member portion upward from the surface to be coated against the downward urging of said resilient means.

14. The apparatus of claim 13 wherein each of said spacer members extends the same distance below the spreading surface of said spreader member and including a second plurality of spacer members adapted to be mounted on said spreader member upon removal of said first plurality, each spacer member of said second plurality extending the same distance below the spreading surface as each other of said second plurality and a different distance from that of said first plurality, whereby replacing of either of said first and second pluralities with the other plurality of spacer members results in a change of the spacing of said spreader member from the surface to be coated.

15. The device of claim 14 including mounting means

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adapted to mount either of said pluralities of spacer members alternatively.

16. In an apparatus for applying a coating or finish to a bowling lane surface which includes means for dispensing a puddle or pool of liquid coating material to the surface to be coated for spreading over the surface by a vertically yieldably mounted spreader bar member, the improvement comprising a plurality of removable spacer members removably mounted to said spreader bar member and supporting said spreader bar member from the surface to be coated.

17. An apparatus for applying a coating or finish to a bowling lane surface by passage of a generally horizontal spreader member over a puddle of coating material, comprising a carriage, means mounted on said carriage for forming a puddle of coating material on a surface therebelow, a plurality of independent spreader blades independently aligned end-to-end and disposed across said carriage, means independently slidably mounting each of said spreader blades for independent vertical movement on said carriage, each of said spreader blades including spacer members projecting downward below the spreading edges of said blades for supporting said blades each solely from the surface to be coated during movement of said carriage over such surface while coating such surface.

18. In an apparatus for applying a liquid finish coat of uniform predetermined thickness to a bowling lane surface, a carriage including a generally horizontally disposed rectangular frame and wheels supporting the frame approximately at the four corners thereof for movement along the lane surface, means supported by the carriage for depositing a puddle of liquid finish on the entire width of the lane surface progressively along the length thereof as the carriage is moved therealong, a wiper structure pivoted on the carriage and extending longitudinally rearwardly therefrom, including a wiper extending across the width of the lane surface and trailing the depositing means, a wiper edge on the bottom of the wiper for striking the puddle of liquid deposited ahead of the blade structure, and means engaging the lane surface in the puddle immediately ahead of the wiper edge for spacing the wiper edge a predetermined distance from the lane surface to control the thickness of the coat applied.

19. In an apparatus for applying a coating or finish to a bowling lane surface including a portable frame, means mounted on the frame for depositing liquid coating material on the surface to be coated and horizontally disposed spreader means spaced from the surface to be coated for spreading the liquid over the surface, the improvement which comprises the combination therewith of means mounting said spreader means on said frame for pivotal movement away from the surface to be coated, drip receiving means, and means slidably mounting said drip receiving means for movement to a position beneath said spreader member with said spreader member pivoted to the position away from the surface to be coated, said drip receiving means being adapted to block dripping from said spreader member in said position to the surface therebeneath, said mounting means including a dispensing container for liquid coating material to be deposited on the bowling lane surface and said spreader member being mounted on and carried by said container in liquid receiving proximity to said container.

20. An apparatus for applying a coating to a bowling lane surface comprising a carriage, spreader means for spreading coating material on the lane surface during movement of the carriage over the surface, means for containing coating material and supplying coating material to said spreader means, means mounting said containing means and spreader means on said carriage for movement toward and away from the lane surface, drip receiving means, means mounting said drip receiving means on said carriage for movement toward and away from a drip receiving position in drip association with said spreader means while said spreader means is in away position rela-

tive to the lane surface, and common operable means for moving said containing and spreader means away from the lane surface and moving said drip receiving means into drip receiving position.

21. A bowling lane surface coating device comprising a frame, guide means on said frame which cooperate with the lane to prevent the machine from running off the two opposed edges thereof when moved lengthwise thereof, means adapted for discharging coating material onto the lane surface, and a spreader extending across the width of the lane surface behind the discharge means to distribute the coating material uniformly on the lane surface, said spreader being pivotally connected to said frame to swing about a horizontal axis substantially parallel to the lane surface on which the device is moved, and having means for adjusting the height thereof off the bowling lane surface.

22. An apparatus for applying a coating or finish to the surface of a bowling alley having lateral gutters, which apparatus comprises a carriage including a frame, first and second reservoir means supported by said frame for containing a supply of liquid coating material, dam and cover means adapted for association with the surface to be coated to define a third reservoir disposed to receive flow at said cover under a pressure head from said second reservoir, fluid flow conduit means for interconnecting said first and second reservoirs, said dam means defining the walls of said third reservoir and including as one wall of the third reservoir vertically flexible elongate spreader means having spacer means on the spreading edge thereof for supporting said spreader means from the surface to be coated, and portions of said dam means defining the ends of said third reservoir at each end of said elongate spreading means comprising vertically slidably mounted lateral dam members disposed the correct distance from each other and having bevelled bottom surfaces to ride upon opposing lateral edges of a bowling lane over the length of a bowling lane preventing flow of liquid coating material from the bowling alley edges.

23. An apparatus for applying a coating or finish to a generally horizontal and generally planar surface which apparatus comprises a carriage including a frame and means supporting the frame for movement along the surface to be coated, first reservoir means supported by said frame, reservoir inlet means for introducing liquid coating materials to said first reservoir means, second reservoir means supported by said frame, conduit means interconnecting said first and second reservoir means for gravity flow from said first to said second reservoir, first valve means in said conduit means for controlling flow of liquid therethrough, means for actuating said first valve means, outlet means from said second reservoir for flowing liquid downward therefrom to the surface to be coated, second valve means for controlling flow from said outlet, means for actuating said second valve means, and dam means adapted for association with the surface to be coated to define a third reservoir disposed to receive flow under hydrostatic pressure from said second reservoir through said outlet, a portion of said dam means defining one wall of said third reservoir comprising a spreader blade slidably mounted for vertical movement on said frame.

24. An apparatus for applying a coating or finish to the surface of a bowling lane, which apparatus comprises a frame, carriage means supporting the frame for movement along the surface to be coated, handle means attached to said carriage for gripping said carriage for movement thereof, reservoir means supported by said frame, reservoir inlet means for introducing liquid coating materials to said reservoir means, outlet means from said reservoir for dispensing liquid downward therefrom to the surface to be coated, spreader means mounted on said frame and spaced above the surface to be coated for spreading coating material dispensed to the surface to be coated, vertically slidably mounted dam

means for laterally containing liquid coating material on the bowling alley, said dam means having outwardly and downwardly inclined lower faces adapted to follow opposing lateral edges of a bowling alley over the length of the bowling alley, and guide means on said frame and extending generally laterally thereof disposed to ride upon opposing guiding surfaces of a bowling alley for guiding said carriage during its travel the length of a bowling alley.

25. In an apparatus for applying a coating or finish to a bowling lane surface which includes a carriage, coating material reservoir and dispenser means mounted on said carriage for dispensing a puddle of coating material to the surface to be coated, and a spreader bar member for spreading the coating material from the puddle over the surface to be coated, the improvement which comprises means mounting said spreader bar member for vertical floating movement on said carriage, and spacer members secured to and carried by said spreader bar member for riding on the surface to be coated and spacing said spreader bar member from the surface to be coated.

26. In an apparatus for applying a coating or finish to a bowling lane surface which apparatus spreads the coating material from a liquid puddle by means of a pendant bar generally horizontal to and spaced above the surface, the improvement which comprises means slidably mounting said pendant bar for vertical movement, projection means on said pendant bar and disposed to follow the surface and support said pendant bar therefrom, and groove means in the spreading surface of said pendant bar permitting passage of fluid therethrough during the spreading operation adjacent each said projection means in sufficient amount to fill voids or depressions in the spread coating occasioned by the projections.

27. An apparatus for applying a coating or finish to a lane surface which apparatus comprises means for applying a puddle or pool of liquid coating material to the surface, a spreader bar member disposed horizontally and spaced a distance from the surface to be coated corresponding to the desired coating thickness, carriage means for moving said spreader bar member over a puddle or pool of coating material on the surface to be coated, said spreader bar member being vertically movably mounted on said carriage means, and a plurality of projecting spacer means spaced along and carried by said spreader bar member to support said spreader bar member by contact with the surface to be coated.

28. The apparatus of claim 27 wherein each of said spacer means comprises a pair of spaced projections from the plane of the spreader member spreading surface and groove means in said surface adjacent each of said projections, said groove means being of sufficient size to accommodate an amount of fluid coating material during the application of a coating to a surface to flow into and fill depressions left in the coating by said projections.

29. In an apparatus for applying a coating or finish to a bowling lane surface by passage of a generally horizontal spreader member on a carriage over a puddle of coating material, the improvement which comprises means mounting said spreader member for vertical movement with respect to said carriage, said spreader member being disposed across said carriage and comprising a plurality of spreader blades including spacer members projecting downward from the spreading edges of said blades, said plurality of blades riding over the surface to be coated spaced from the surface by said spacer members during a coating operation and generally conforming with lateral irregularities in the surface to be coated.

30. In an apparatus for applying a coating or finish to a bowling lane surface which apparatus dispenses a puddle of the coating material from a reservoir to the surface to be coated and spreads the coating material from a dispensed liquid puddle by means of a pendant bar gener-

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ally horizontal to and spaced above the surface, the improvement which comprises means slidably mounting said pendant bar for vertical movement, projection means on said pendant bar and disposed to follow the surface and support said pendant bar therefrom, groove means in the spreading surface of said pendant bar permitting passage of fluid therethrough during the spreading operation adjacent each said projection means in sufficient amount to fill voids or depressions in the spread coating occasioned by the ridges, means enclosing said puddle against the surface to be coated and against said spreader bar and means maintaining a pressure head between the reservoir and the puddle or pool of liquid coating material.

31. In an apparatus for applying a coating or finish to a bowling lane surface, which apparatus comprises a frame, a reservoir carried by the frame for containing a supply of coating material and for dispensing the coating material to the lane to be coated, and means for spreading the dispensed coating material over the lane as a coating thereon, the improvement which comprises means for confining the coating material on the surface to be coated and adjacent to the spreader member, including vertically movably mounted lateral dam members disposed the correct distance from each other and having bevelled bottom surfaces to ride upon opposing lateral edges of the bowling lane over the length of the bowling lane preventing flow of liquid coating material from the bowling lane edges.

32. An apparatus for applying a coating or finish to a lane surface, which apparatus comprises a carriage, a reservoir carried by the carriage for containing a supply of coating material, a spreader member for spreading coating over the lane surface, chamber means for confining the coating material against the lane surface to be coated and for feeding the coating material to said spreader member, said chamber means being carried by said carriage below said reservoir and having vertically slidably mounted lateral dam members disposed the correct distance from each other, said dam members defining the ends of said chamber and having bevelled bottom surfaces to ride upon opposing lateral edges of a bowling lane over the length of the bowling lane preventing flow of liquid coating material from the bowling lane edges, and conduit means defining a gravity flow path from said reservoir to said chamber for maintaining a pressure head from said reservoir within said chamber.

33. An apparatus for applying a coating or finish to the surface of a bowling lane having lateral gutters which apparatus comprises a carriage including a frame, reservoir means supported by said frame for containing a supply of liquid coating material, outlet means from said reservoir adjacent the surface to be coated for flowing liquid downward therefrom to the bowling alley surface, valve means for controlling flow from said outlet, and walls defining chamber means adapted for association with the surface to be coated to define a second reservoir disposed to receive flow under a pressure head from said first reservoir through said outlet, said walls including vertically flexible spreader means having spacer means on the spreading edge of said spreader means for supporting said spreader means from the surface to be coated.

34. In an apparatus for applying a coating or finish to a bowling lane surface including means for depositing a pool or puddle of liquid coating material from a reservoir to the surface to be coated and horizontally disposed spreader bar means spaced from the surface to be coated for spreading the liquid puddle over the surface, the improvement which comprises means for enclosing and containing a deposited puddle of coating material against the surface to be coated and against said spreading bar for spreading therefrom over the surface and means for maintaining a pressure head on the enclosed puddle.

35. An apparatus for applying a coating or finish to a bowling lane having two opposing lateral edges, which apparatus comprises movable carriage means, means mounted on said carriage means for depositing a pool or puddle of liquid coating material on the surface, horizontally disposed spreader means carried by said carriage means spaced from the surface to be coated for spreading the liquid puddle over the surface, a pair of lateral containing means having outwardly and downwardly inclined lower faces and spaced from each other a proper distance for disposing said lower faces for bearing on opposite lane edges for laterally containing a deposited puddle of coating material as a confined puddle against said spreader means for spreading from said spreader means at the trailing edge of the confined puddle as said carriage is moved the length of the lane, and means mounting each of said lateral containing means for tracking the lane edge.

36. The apparatus of claim 35 including independent means for each of said lateral containing means for resiliently biasing the containing means to bear against the respective lane edge.

37. An apparatus for applying a coating or finish to a bowling lane surface including means for depositing a pool or puddle of liquid coating material on the surface, means for peripherally enclosing and containing a deposited puddle of coating material and comprising horizontally disposed spreader bar means spaced from the surface to be coated for spreading the liquid puddle over the surface, wall means for containing the liquid puddle against said spreader bar means, said wall means comprising a wall opposing said spreader bar means and a pair of lateral walls extending between said opposing wall and spreader bar means, and means mounting said lateral walls for vertical movement relative to said spreader bar means and relative to said opposing wall.

38. An apparatus for applying a coating or finish to a bowling lane surface which includes a carriage movable over the surface to be coated, means on the carriage for dispensing a puddle or pool of liquid coating material to the surface to be coated, flexible spreader bar means, and means mounting said flexible bar means on the carriage for floating movement on and in engagement with the surface to be coated for generally conforming said flexible spreader bar means to said surface during movement of the carriage over the surface, whereby the puddle of liquid coating material is spread evenly from said spreader bar means over the surface.

39. In an apparatus for applying a coating or finish to a surface which includes means for dispensing a puddle or pool of liquid coating material downwardly from a reservoir to the surface to be coated for spreading over the surface by a spreader bar means, the improvement comprising a vertically flexible spreader bar means, means mounting the spreader bar means for vertically flexing movement, and means urging said spreader bar means against the surface to be coated, said spreader bar means including means defining a gap at its lower edge for spreading coating material therethrough as the spreader bar member is moved over the surface.

40. In an apparatus for applying a coating or finish to a bowling lane surface which includes a carriage, means on said carriage for dispensing a puddle or pool of liquid coating material to the lane surface to be coated for spreading over the lane surface, the improvement comprising a floating vertically movable flexible spreader means mounted on said carriage and extending across said carriage, and means for flexing said spreader bar means for retaining said spreader bar member generally in equally spaced relation with respect to the surface across the lane while the carriage is moved along the lane surface for spreading the coated material over the lane surface.

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