Sept. 4, 1951 E. R. MYERS 2,566,624

SURFACE MARKING MACHINE

Filed Aug. 11, 1948 3 Sheets-Sheet 1

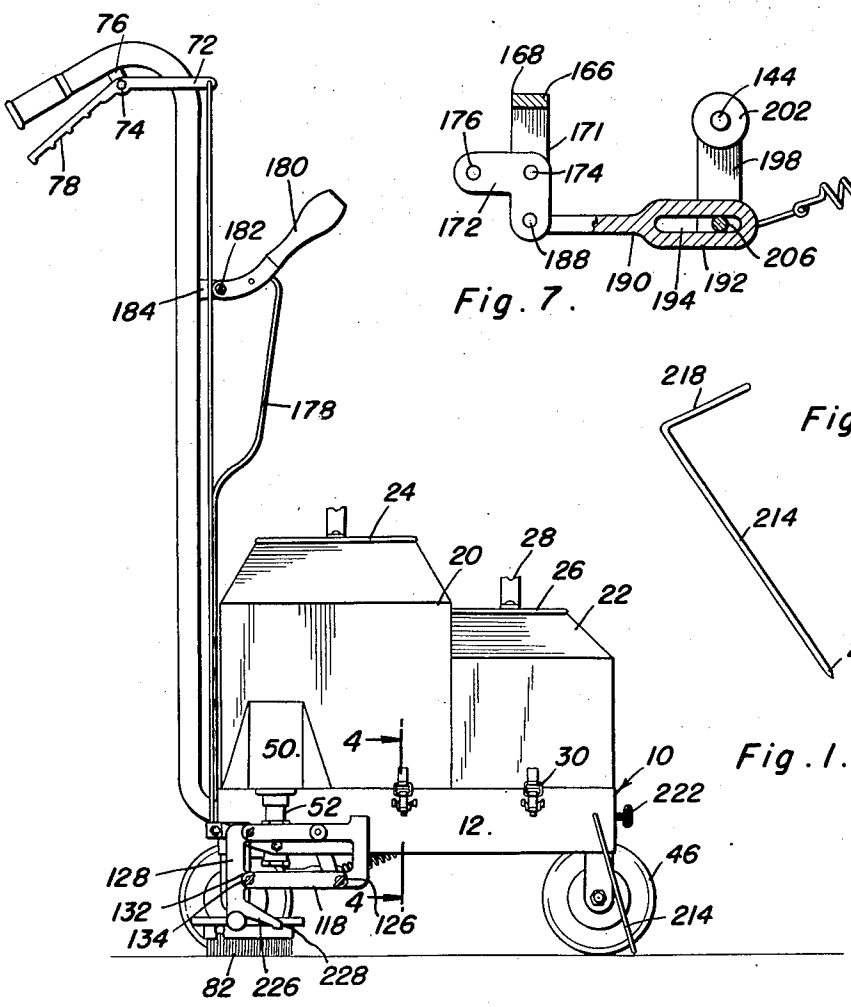


Fig. 1.

Fig. 7.

Fig. 12.

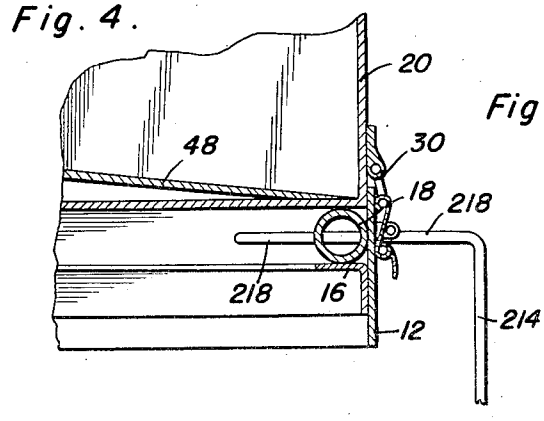


Fig. 4.

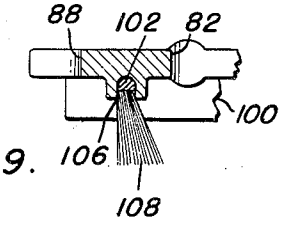


Fig. 9.

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Fig. 2.

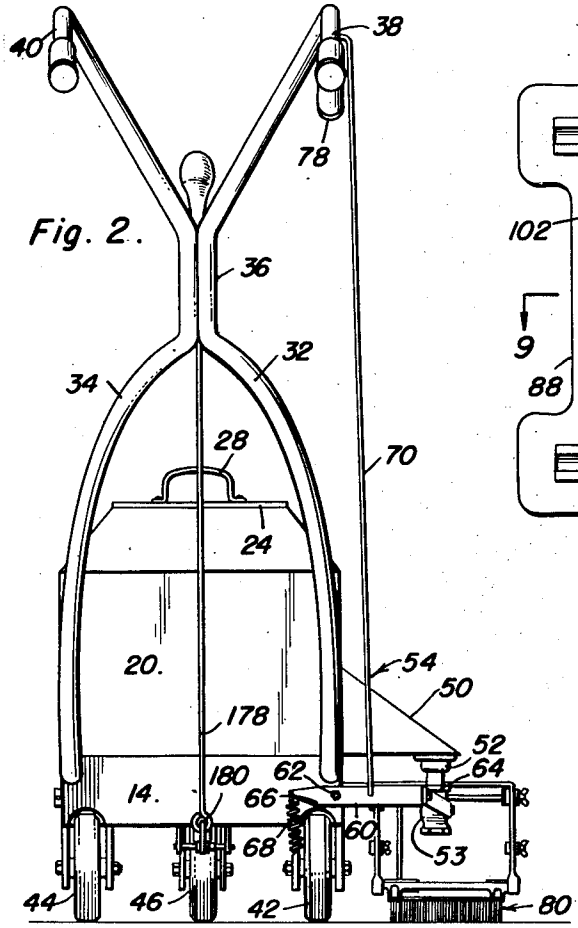
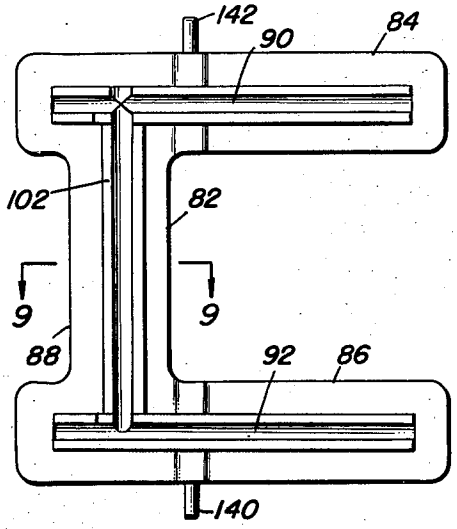


Fig. 8.



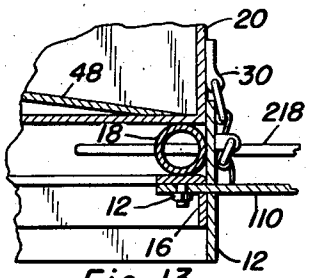


Fig. 13.

Fig. 5.

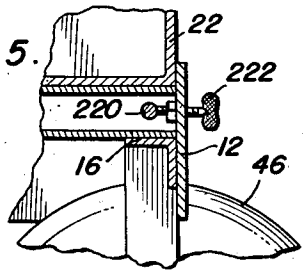
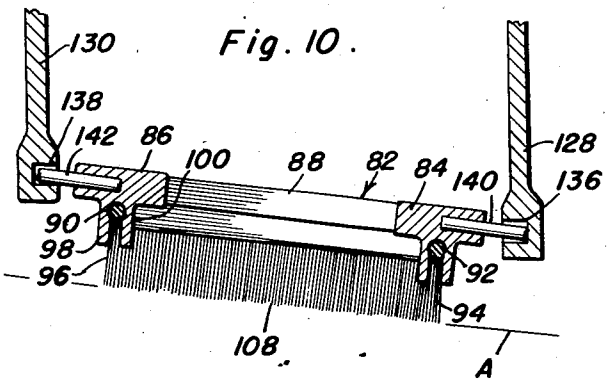


Fig. 10.



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SURFACE MARKING MACHINE

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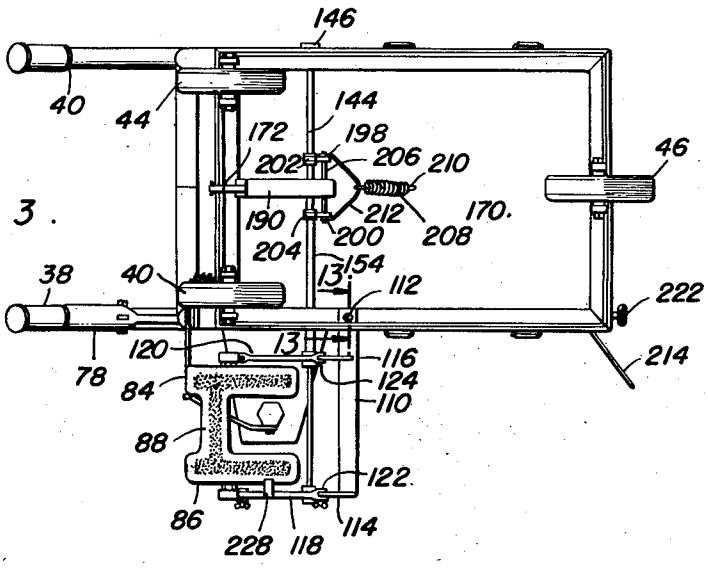


Fig. 3.

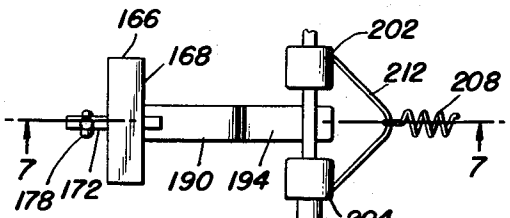


Fig. 6.

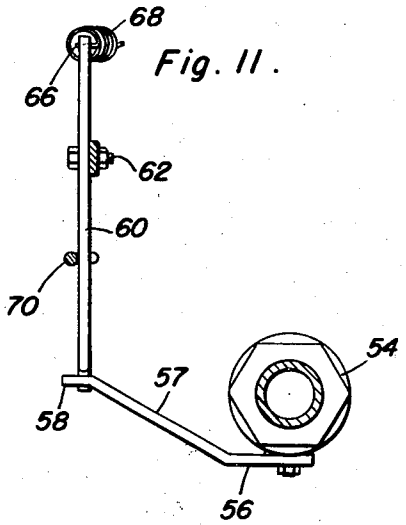
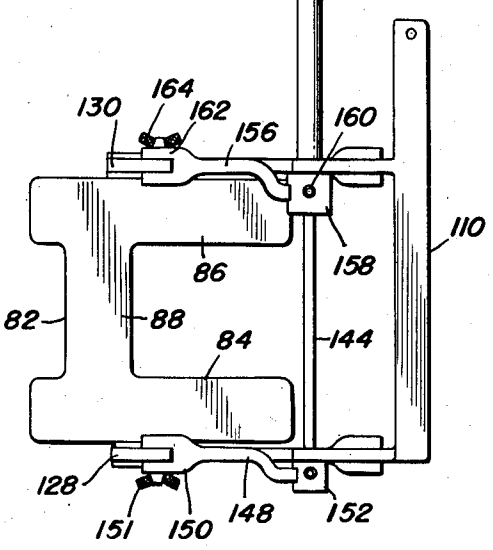


Fig. 11.



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SURFACE MARKING MACHINE

Earl R. Myers, Lancaster, Pa.

Application August 11, 1948, Serial No. 43,592

1 Claim. (Cl. 91—12)

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This invention relates to a surface marking or patterning device and has for its primary object to provide a novel and improved portable marking machine.

Conventional portable surface striping and marking machines have been widely employed to form safety zones, pedestrian walkways and vehicular travel lanes. However, certain defects in the structure and operation of the machines has resulted in the formation of faulty pattern lines and strips due mainly to a clogging of the machine and overflowing of the marking liquid causing irregular lines, and an inconvenient control system for the dispensing of the liquid and the placement of the tufts of bristles.

To obviate the above defects is the primary aim and purpose of this invention and, correspondingly, this invention has for an important object to provide a portable marking device that can be easily propelled by an operator and the operation of the device can be controlled by the operator with ease and convenience, while moving the device.

Another important object of this invention is to provide a portable marking device in which the liquid marking substance is dispensed directly from a tank onto the brush head, the dispensing being controlled by the operator and means being provided for avoiding an overflow of the liquid through and onto the brush head.

Yet another important object of this invention is to provide a marking device with means for guiding the device in the desired pattern and for guiding and positioning the brush in conformity with the contour of the surface.

A meritorious feature of this invention resides in the provision of a wheeled frame having a paint and solvent tank mounted thereon in a detachable manner and having a handle structure extending upwardly from the frame with means carried by the handle structure for manual operation to control the discharge of the paint from a funnel laterally extending from the paint tank and overlying a brush unit, which is adjustable and which is provided with automatic means for controlling the movements of the brush unit in conformity with the contour of the surface.

These and ancillary objects and other meritorious features to become more fully apparent as the following description proceeds are attained by this invention, a preferred embodiment of which is set forth in the following specification and illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a marking machine, constructed in accordance with the principles of this invention;

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Figure 2 is an end elevational view of this invention, illustrating the manually operated remote control means for the dispensing operation and for raising and lowering the brush unit;

Figure 3 is a bottom plan view of this invention;

Figure 4 is a fragmentary sectional view taken substantially on the plane of line 4—4 of Figure 1 and looking in the direction of the arrows;

Figure 5 is a fragmentary sectional view of the means provided for securing a marking device in adjustable position on the device;

Figure 6 is an enlarged bottom plan view of the operating structure for raising and lowering the brush unit;

Figure 7 is a sectional view taken substantially on the plane of line 7—7 of Figure 6;

Figure 8 is an enlarged top plan view of the brush unit;

Figure 9 is a cross sectional view taken substantially on the plane of line 9—9 of Figure 8;

Figure 10 is a vertical sectional view taken through the brush unit and illustrating the means provided for attaching the brush unit to the operating linkage in a freely mounted manner;

Figure 11 is a top plan view of the operating linkage for controlling the valve, which is disposed in the dispensing unit;

Figure 12 is a view in perspective of the guide means provided; and

Figure 13 is a fragmentary sectional view taken substantially on line 13—13 of Figure 3 and looking in the direction of the arrows.

In carrying out this invention, there is provided a wheeled frame, generally indicated by the reference numeral 10, which comprises a pair of longitudinally extending opposed side walls 12, joined at their opposite ends by transversely extending end bars 14. A pair of longitudinally extending angle irons 16 are secured in a conventional manner to the inside surface of the opposing side walls 12 and serve as retaining brackets. A pair of elongated tubular members 18 are seated upon the laterally extending portion of the angle irons, as seen in Figure 4. A tank 20 is mounted on the opposing tubes 18 at the rear portion of the frame and a smaller tank 22 is mounted in a similar fashion at the forward end. Both of the tanks are formed with open tops which are detachably closed by lids 24 and 26, having handles 28. The tank 20 is adapted to retain a supply of paint, while the tank 22 will retain the needed or desired amount of paint sol-

vent. Of course, means is provided for securely locking the tanks in their seated placement in the frame and comprises a plurality of conventional fasteners or clasps 30.

A pair of inwardly curved bars or rod-like members 32 and 34 are secured to the rear portion of the frame and extend vertically therefrom to converge at 36. The rods 32 and 34 are slanted outwardly from the connecting point 36 and are bent upon themselves adjacent their upper ends, defining downwardly extending handle bars 38 and 40. A pair of opposed casters 42 and 44 are provided at the end portion of the frame with a similar caster 46 provided at the front medially of the rear casters 42 and 44, whereby portability is imparted to the frame.

Of course, the actual specification of the frame and appurtenant details can be varied in actual construction to accommodate the same for use in various operations, where a larger or smaller paint or solvent tank would be needed and where the dimensions of the frame would be important in carrying out a particular marking operation.

Means is provided for dispensing or discharging the paint or similar liquid marking substance from the tank 20 which is formed with an inner slanting bottom wall 48. The means preferred comprises an outwardly extending funnel 50 which projects outwardly from one side of the tank 20 and is formed with a bottom opening adjacent its extending end. A nozzle 52 or discharge tube is secured around the opening and depends from the funnel, as seen in Figure 2. A conventional valve is housed within the nozzle end 53 of the tube 52 and controls the flow of the liquid from the tank, the valve being actuated by manually operated control means 54. The operating or actuating means for the valve, as seen in Figures 2 and 11, comprises an arm 56 which is secured at one end to the laterally extending stem of the valve, the valve being transversely disposed in the nozzle end 53. The arm 56 is formed with an offset section 57 terminating in an apertured end flange 58. A bar 60 is pivoted, as at 62, to the end 14 of the frame and has a coaxially reduced end extension or tongue 64 journaled in the apertured ear or flange 58 on the arm 56, with suitable securing means being provided for maintaining the end 64 therein. The opposite end of the bar 60 is formed with a reduced opening 66 within which one end of a spring 68 is anchored, the opposite end of the spring being secured to the yoke for the caster 42. An actuating rod 70 is secured at its lower end to the medial portion of the bar 60 and has its upper end secured to one end of a crank-like bar 72, which is pivoted as at 74 to an extending bearing surface or ear 76. The bearing surface 76 depends from the under surface of the handle bar 38 and the opposite end 78 of the bar 72 is formed in a channel-like manner so as to engage against the handle bar. Thus, it can be seen that the operating rod 70 can be controlled by an operator without the need of removing his hands from the handle bars 38 and 40, thereby insuring a more convenient, speedier and more dependable actuation of the valve.

A brush unit 80 is adjustably disposed in vertical alignment below the discharge nozzle 53 to receive the liquid substance emitted therefrom and to thereby convey the liquid substance to the surface in a patterned manner. The brush unit 80 comprises a substantially U-shaped brush head or holder 82, shown in Figure 8, which is preferably cast from aluminum or the like material. A pair of longitudinally extending opposed side members 84 and 86 joined adjacent one end by a transverse back section 88 make up the holder. The under surface or bottom surface of the sides of the holder are formed with centrally disposed, longitudinally extending U-shaped openings or recesses 90 and 92, within which are frictionally held the tufts of the bristles 94 and 96. The openings 90 and 92, as seen in Figure 10 of the drawings, are provided with depending opposed side walls 98 and 100 which are preferably straight and extend downwardly in parallel fashion to maintain the side bristles in rigid depending formation. A U-shaped longitudinally extending recess or channel 102 is centrally formed in a transverse portion 88 of the holder. To accommodate the ends of the transverse brush 108 frictionally held in the channel 102, there is provided a V-shaped notch 106 in the inner side walls 100 of the openings 90 and 92. Thus, the transverse or back brush 108 can move forwardly and rearwardly, bending easily in either direction with its opposed ends inserted in the V-shaped notches and in brushing contact with the depending bristles of the opposed side brushes. The V-shaped notches in the opposing side walls enable the back brush to retain the paint or liquid in the U-shaped opening defined by the opposing sides and the forward portion of the back or transverse section.

The brush holder is adjustably associated with the side of the frame in vertical alignment with the discharge nozzle 54 so that the liquid selectively discharged from the tank through the nozzle is directed into and through the U-shaped opening defined by the sides and forward portion of the transverse section. In this respect, a bracket or retaining bar 110 is secured as at 112 to the side of the frame and extends laterally in a horizontal position outwardly therefrom, as seen in Figure 3. The bracket arm is provided with a pair of hanging arms or depending bearing surfaces 114 and 116, which are suitably provided with small openings adjacent their terminating portions. A pair of idler or stabilizing links 118 and 120 are pivotally associated with the hanging brackets 116 and 114 through their clevis ends 122 and 124 which are pivoted to the terminating portions of the hanging bracket arms through the medium of a conventional bolt assembly, having wing nuts 126 as tightening agents. The opposite ends of the idler or stabilizing links 118 and 120 are clevised and are pivotally associated with a pair of operating arms or links 128 and 130. The operating links 128 and 130 are provided with medial offset portions 132, the same being suitably apertured for receiving a transversely inserted pivot pin, secured therein by a wing nut 134. The operating links, as seen in Figure 10 of the drawings, are formed, adjacent their depending ends, with bearing recesses 136 and 138 within which are received the extending ends of a pair of journaling pins 140 and 142 which integrally extend outwardly from the opposing sides of the brush holder, as seen in Figure 8.

An operating rod 144 extends transversely on the under side of the frame and is journaled at one side thereof in a bearing 146, as seen in Figure 3. The rod 144 extends outwardly beyond the opposing side of the frame and terminates,

adjacent to the ends of the retaining bar 110 in longitudinal alignment with the bearing or hanging bracket 114. An actuating link or arm 148, having a clevis end 150, is associated with the extending end of the rod 144 by a bearing collar 152 carried by its opposite end. The bearing collar 152 is journaled on the end of the rod in a secured fashion, while the clevis end 150 of the arm is received around the upper end of the link 128 and secured thereon by a bolt and wing nut 151, as seen in Figure 6.

An elongated hollow shaft or sleeve 154 is concentrically disposed on the rod 144, and integrally associated therewith is an operating link 156, which terminates in an integral bearing collar 158 secured to the sleeve 154 and rotatably received on the rod 144, certain fittings 160 being provided. The opposite end of the operating link 156 terminates in a clevis 162 which is secured to the upper end of the operating link 130 by a conventional bolt assembly, having a wing nut fastener 164.

A direct brush actuating mechanism is provided to raise and lower the brush holder, in association with the rod or shaft 144 and comprises a bracket 166, having a laterally extending head portion 168 secured to the bottom 170 of the frame. A yoke or clevis portion 171 depends medially from the retaining head 168 and a bellcrank 172 is secured by a pivot pin 174 therein. The bellcrank 172 is formed in one section with an aperture 176 within which a tie rod or operating rod 178 is secured by a hook at 180, as seen in Figure 2. The operating rod 178 extends upwardly and is secured to a hand lever 180, the hand lever being pivoted, as at 182, to an outstanding apertured ear or bearing surface 184 projected forwardly from the connected portion 36 of the rods 32 and 34.

The opposite section of the bellcrank 172 is secured by a transverse pin 188 through an elongated rod 190. The rod 190 terminates in an enlarged portion 192 having a centrally disposed, longitudinally extending guide slot 194 therein, as seen in Figure 7. The rod 190 is associated with the rod 144 and sleeve 154 through the elongated slot 194. In this respect, a pair of bearing brackets 198 and 200 are provided with collars 202 and 204, the latter being integrally associated with the end of the sleeve 154, as seen in Figure 6. The bracket arms 198 and 200 retain a transversely disposed rod-like member 206, the same being transversely disposed through and in the slot 194 in the rod 190, as seen in Figures 7 and 3. Resilient means 208 is provided and preferably comprises a compression spring having one end anchored, as at 210, to the bottom surface of the bottom 170 of the frame and having its opposite end secured on a triangular rod 212 which is secured to the rod 206.

The operation of the device thus far is believed to be extremely simple and advantageous. After the tanks have been filled with the desired marking substance, a line is made out on the surface to be marked by any suitable means. The device is then wheeled in alignment with the line so as to mark the same. In this respect, a guide is provided in association with the brush to enable an operator to maintain the brush in the desired travelling position. The guide, as seen in Figure 12, comprises an elongated rod 214 which terminates in a faired point 216. The opposite end of the rod is laterally offset, as at 218, whereby the same may be easily and conveniently attached to the frame in adjusted position. In

this respect, attention is directed to Figures 1 and 5 of the drawings. As seen therein, an aperture 220 is transversely disposed through the side panels 12, adjacent the forward ends thereof, to accommodate the lateral portion 218 of the rod. A set screw 222 is inserted through the front panel of the frame and engages the lateral portion 218 of the guide rod, as seen in Figure 5, to lock the same in the adjusted position. Thus, the guide rod may be adjusted laterally of the frame to be moved in relative position with respect to the frame and also the end 216 of the rod may be disposed in a lowered or raised position.

After the line has been marked off on the surface, the guide rod end 216 is disposed on the line so as to enable the device to be moved in the proper and accurate position. The brush unit 80 is then lowered in ground engagement. In this respect, the hand lever 180 is moved forwardly on its pivot point 182, causing the tie rod or operating rod 168 to be moved downwardly. Downward movement of the rod 178 moves the bellcrank 172 downwardly, causing the rod 190 to be moved forwardly. As the rod 190 moves forwardly, the rod 206 engages the rear portion of the slot 194 and moves the bearing arm 198 outwardly about the horizontal axis of the shaft 144, as seen in Figure 7. The bearing collar 202 being secured to the shaft 144, rotation is imparted to the shaft. As rotation is imparted to the end of the shaft, the laterally extending end of the shaft rotates, causing the collar 152 to move and imparting a downward movement to the clevis end 150 of the link 148. Downward movement of the clevis produces a downward movement of the vertically disposed operating link 128, causing one end of the brush holder to move downwardly. As the one end moves downwardly, the opposite end moves correspondingly and coincidentally so that the brushes 94, 96 and 108 are disposed in even placement on the ground.

At this time, the device is moved forwardly or rearwardly, as may be desired, by the operator. As the operator moves the device forwardly, gripping the handle bars 38 and 40, one hand is engaged about the lever end 78. Compression of the lever end 78 of the crank-like actuating lever 72 moves the rod 70 downwardly. Movement downwardly of the rod opens the mouth in the nozzle 54 and allows the liquid in the tank 20 to flow outwardly into the U-shaped opening. The device is propelled forwardly, with the back brush smoothly and evenly applying the liquid to the surface, the side brushes functioning to produce straight even edges on the line applied.

It is to be particularly noted that the dispensing of the liquid substance can be easily controlled, as the device is being propelled, the same responding speedily to manipulation of the lever end 78 of the crank-like operating lever.

To compensate for the irregularity in the contour of the surface to be marked, an automatic means is provided for the brush unit, whereby the same is self-adjustable to associate itself in various angular or tilted positions with the surface. The automatic mechanism is activated in a manner similar to the manually operated mechanism except for the important factor that it is relatively free for independent movement and quick response to any irregularity in the surface. In this respect, resilient pressure is imparted from the spring 208 to the rod 190. The

rod 190, of course, is associated with the depending bracket arms, one of which is secured on the shaft 144 and the other formed integral with the sleeve 154.

Thus, it is to be noted that while the opposite sides of the brush holder are adapted for a synchronized lowered and raised movement, the same are provided with means for independent movement relative to a tilted position, as seen in Figure 10.

Thus, when the sleeve or hollow shaft 154 rotates, independent of the rod or shaft 144, the collar 158 is rotated and the same moves the arm 156 downwardly, forcing the transversely disposed operating link 130 downwardly.

For example, attention is directed to Figure 10. Assuming that the ground A is irregularly contoured, so that various bumps and raised portions are to be located thereon, yet it is desirable that the brush holder be securely associated with the surface so that the brushes are at all times in engagement with the surface. If this were not the case, the liquid substance would leak out under the brushes and would flow freely on the surface. However, as seen in Figure 10, the side brush 94 is in a lower plane, while the side brush 96 is in a raised plane, the connecting brush being tiltably associated therebetween. Now, then, it is to be noted that the depending operating link 128 is associated with the end of the rod 144 so that the same can be moved downwardly, responsive to rotation of the shaft or rod 144. However, the depending arm or link 130 is pivotally and operatively associated with the sleeve 154, through the link 156, so that the same is moved downwardly and upwardly through rotation of the sleeve 154. Thus, the position shown in Figure 10 has been achieved by the lowering of the link 148 on the shaft 144, for the link or operating arm 156 has raised. Thus, the shaft 144 and the sleeve 154 are rotated in a clockwise and a counterclockwise direction to achieve the placement of the brush holder.

Of course, the spring 208 serves as an automatic restoring element to return the brush holder to its normally disposed placement, responsive to movement of the device onto a smooth surface. In this respect, it is to be noted that when either or both ends of the brush holder are moved downwardly relative to ground engagement, the spring is placed under tension so that the same is at all times ready for moving the rod and sleeve in a direction equivalent to restoring the brush holder to a raised position.

The links or arms 118 and 120 act as stabilizing agents during the upper and lower placement of the brush holder and the travelling movements relative to the said positions. In this respect, the vertically disposed pivots or operating links 128 and 130 are provided with oversized apertures or openings for the brush holder pivot to obviate any tendency of binding. Also, the link 128 is provided with a projected portion 226, terminating in a laterally extending finger 228, adapted to engage and underlie the extending longitudinal marginal edge of the side 84 of the brush holder. In this manner, the finger 228 will engage the under surface of the marginal edge and will prevent the brush holder from rotating when in operation.

In view of the foregoing, it is believed that those skilled in the art will appreciate the novelty and utility of this device, wherein it is to be particularly noted that means has been provided for automatically operating the device, as the same is being operatively moved on the surface to be patterned or marked. The controls for the dispensing mechanism and for the brush unit are believed dependable in operation and yet simple in manufacture so that the inherent advantage and convenience of the device can be enjoyed to the ultimate. However, since many other environments and variation of this invention will become apparent to those skilled in the art upon a perusal of the foregoing description in view of the accompanying drawings, it is to be definitely understood that certain changes may be effected thereon, as coming within the spirit of the invention and the scope of the appended claim.

Having described the invention, what is claimed as new is:

A surface marking machine comprising a base plate having raised peripheral side walls on the upper surface thereof and casters on the bottom surface, a handle structure extending from the base plate, a liquid tank seated on said base plate, locking means connected between said tank and the side walls, a discharge funnel laterally extending from one of said side walls, a valve in said funnel, a manually operable control linkage carried by said handle structure and associated with said valve, a bracket arm laterally extending from the base plate, a pair of bearing brackets depending from said bracket arm, a pair of idler links pivotally connected at one end to said bearing brackets, a pair of operating arms pivoted to said idler links, recesses in the lower ends of said arms, a brush holder, laterally disposed pins carried by said holder and freely journaled in said recesses, a shaft rotatably journaled transversely on the bottom of the base plate and extending beyond one side thereof, an elongated sleeve concentrically disposed on said shaft, one of said operating arms being secured to one end of the sleeve and the other of said operating arms being secured to the extending end of the shaft, a bellcrank pivoted to said base plate, and elongated rod having a centrally disposed longitudinally extending slot carried by one end of said bellcrank, a pair of bracket arms carried by said shaft and sleeve, a transverse member carried by said bracket arms, said transverse member being disposed through the slot in the rod, resilient means connected between said base plate and the transverse member, an operating rod pivotally carried at one end by the handle structure and having its opposite end anchored to the bellcrank, whereby selective vertical movement of the rod effects a rotation of the shaft.

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