Dec. 2, 1930. C. V. ANGIER, JR 1,783,689

TRAFFIC LINE MARKING AND STENCILING MACHINE

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Fig. 1.

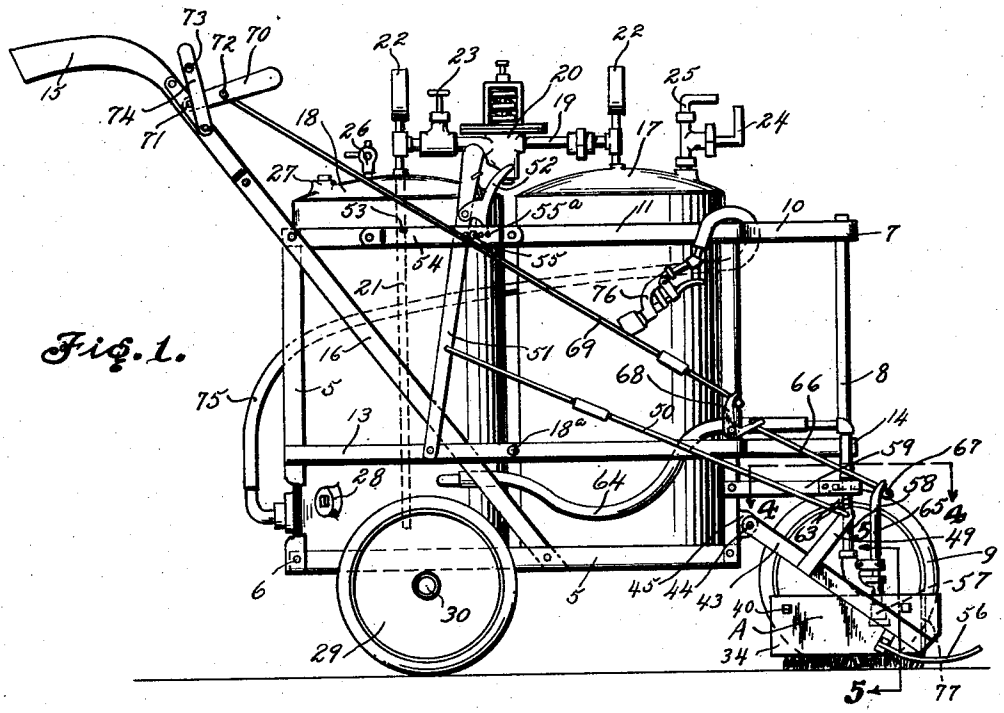
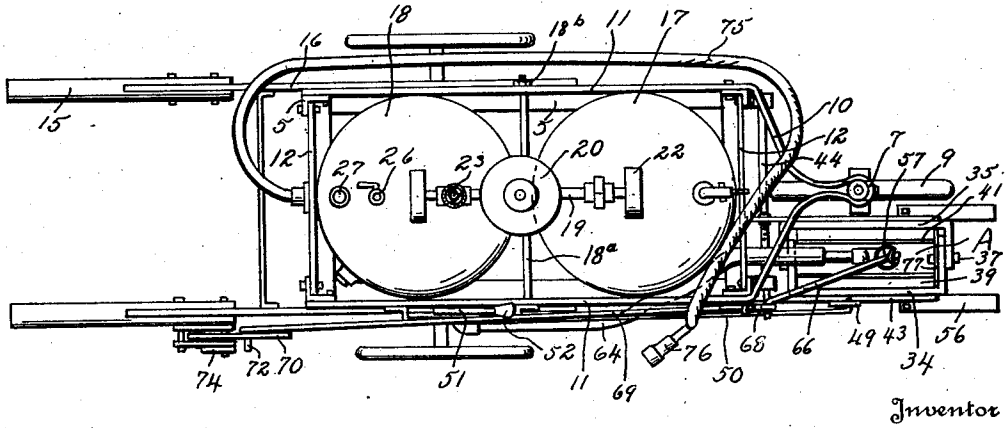


Fig. 2.



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Fig. 3.

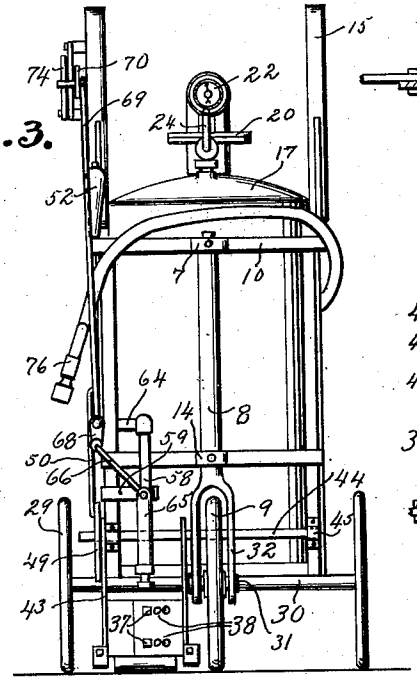


Fig. 4.

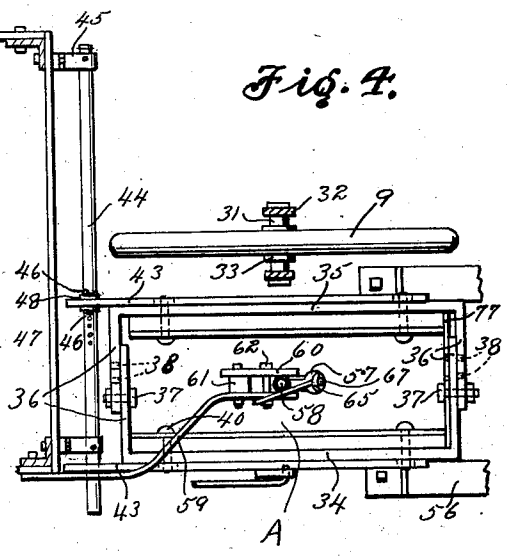


Fig. 5.

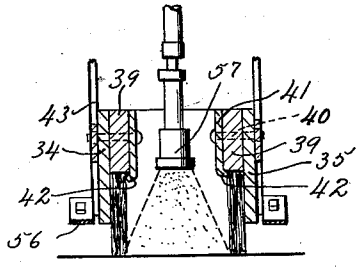
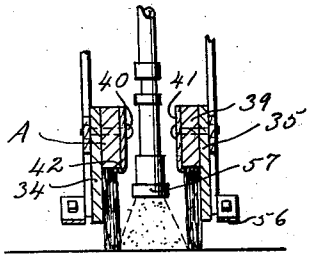


Fig. 6.



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UNITED STATES PATENT OFFICE

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TRAFFIC-LINE MARKING AND STENCILING MACHINE

Application filed March 5, 1925. Serial No. 13,313.

This invention is an improvement in machines for marking and stenciling traffic lines on streets, and one of the principal objects of the invention is to provide a machine which sprays the line, as differentiated from smearing the line with a brush or brushes, the structure of the machine being such that the lateral edges of the line are sharply defined by the use of spaced brushes arranged longitudinally of the line, and which are maintained lightly in contact with the street surface.

Another object of the invention is to so position the paint-applying portion of the machine, called the brush-box, that the traffic lines can be extended to close proximity with the curbs, and in cases where lines are to be marked parallel with the curbs, to define parking spaces, such lines can be marked while automobiles are in parked position without danger of interference of the marking machine with such automobiles. It is customary to position the lines defining the parking spaces a distance from the curb approximately equal to the length of an automobile, and with many types of line marking machines, it has been necessary to mark such lines at night time when the streets were cleared of parked automobiles, since parts of the line-marking machines projected beyond the lines to be defined, and hence interfered with automobiles when the latter were in parked position. My machine is so constructed that the brush box is substantially in alignment with the right hand side of the machine, so that the machine can be moved along in close proximity to the rear ends of parked automobiles, to define the parking lines while the automobiles are in position, thus doing away with the necessity of marking lines at night.

A further object of the invention is to provide a paint-applying mechanism in which a spray-nozzle is mounted between spaced brushes which define the lateral edges of the line to be marked, the construction being such that the brushes may be adjusted for defining the edges of lines of different widths, and the spray nozzle is also adjustable vertically so that the spray will strike the brushes at the same distance above the street surface, irrespective of the distance apart of such brushes.

Further objects of the invention are to provide an improved machine of the character described, in which means is provided for preventing drafts or gusts of wind from interfering with or affecting the spray; to provide means for automatically guiding the brush-box over obstructions in the roadway, such as railway rails positioned above the level of the roadway; to provide means for lifting the brush-box into inoperative position when it is desired to move the machine from place to place without forming a line; to provide a construction of the frame of the machine such that the tanks for containing the paint and compressed air may be expeditiously and bodily mounted in and removed from the frame, thus providing for ease in assembling and disassembling of the machine; to so construct the brush-box that the side edges thereof limit the lateral movement of the brush bristles, and co-operate with plates on the insides of the brushes for keeping the brush bristles in position to sharply define the lateral edges of the marked lines.

Another object of the invention is to so construct the machine that when it is loaded with paint the center of gravity is approximately over or slightly forward of the rear wheels of the machine, so that the latter may be readily tilted up about its rear axle for readily turning the machine about.

With these and other objects in view which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which like characters of reference indicate like parts throughout the several figures, and in which,—

Figure 1 represents a side elevational view of the machine.

Figure 2 represents a top plan view of the machine.

Figure 3 represents a front elevational view of the machine.

Figure 4 represents an enlarged detailed horizontal sectional view on the line 4—4 of Figure 1.

Figure 5 represents a vertical transverse sectional view on the line 5—5 of Figure 1, and

Figure 6 represents a view similar to Figure 5, in which an adjustment of the brushes for marking a narrower line, and a corresponding lower adjustment of the spray nozzle, is shown.

Referring more particularly to the drawings, the body of the machine includes a frame of general rectangular shape, both in vertical and horizontal section, the lower frame members and vertical corners of the frame being formed of angle iron as indicated at 5, the vertical corner pieces being secured at their lower ends at the corners of the lower frame pieces by bolts or rivets as at 6. The side rails of the machine frame at the upper part thereof, are formed of a length of strap iron, which is doubled at the front of the machine to form a bearing 7 for receiving the upper end of the fixed fork 8 in which the single front wheel 9 is mounted, the ends of the strap iron being then separated as at 10, and bent into parallelism as at 11, to form the upper side bars of the frame, being secured in suitable manner to the upper ends of the corner angle irons 5. Cross bars 12 at the front and rear of the frame, connect the upper ends of the corner angle irons, and side braces 13, intermediate the height of the machine, are secured to the corner irons, such braces being formed of a length of strap iron in the same manner as already described with regard to the side rails 11, the bearing 14, formed at the forward doubled portion of the side braces 13, together with the bearing 7, supporting the fork 8, and being fast thereto. Handles 15 riveted or otherwise secured to diagonal side braces 16, form a means for manually propelling the machine.

Within the body frame are located a forward tank 17, and a rear tank 18, the former of which is adapted to receive air under pressure, and the latter to receive the paint with which the lines are to be sprayed. These tanks may be clamped in position by means of a long bolt or headed cross bar 18^a connecting the side braces 13 between the tanks, such bar having means for drawing the side braces against the tanks, for binding them in position, such as a nut 18^b. A pipe connection 19 is provided between the tanks at their upper ends, and therein is arranged a valve 20 for reducing the pressure between the air tank 17 and the paint tank 18, the pipe line 19 connecting at the paint tank with a pipe 21 which terminates at its lower end near the bottom of the paint tank so that the air in escaping into the paint tank will continuously agitate the paint contained therein. Pressure gauges 22 are provided for each tank, to indicate the pressures therein, and a cut-off valve 23 is arranged between the pressure-reducing valve and the paint tank.

A valve 24 for the admission of compressed air to the air tank, from a suitable source of supply, is provided, and a high pressure cut-off valve 25 is arranged between the air intake valve 24, and the air tank. The paint tank is equipped at its upper end with a relief valve 26 for placing the tank in communication with the atmosphere when it is desired to agitate the contents of the paint tank, for instance, when the machine has been out of operation for a period of time, such agitation being secured by opening the relief valve and the cut-off valve 23, to thus allow air under pressure to bubble through the paint preparatory to putting the machine into operation. The paint tank is also equipped at its upper end with a plug 27 through which it may be filled, and adjacent its lower end with a large clean-out plug 28, which may be removed for the purpose of allowing access to the bottom of the paint tank to clean it when such operation becomes necessary.

In addition to the forward wheel, the machine is supported upon a pair of rear wheels 29, mounted on an axle 30, so disposed with respect to the center of gravity of the machine when the paint tank is full, that such center of gravity is above or slightly in advance of the rear axle, so that the machine may be readily tilted up about the rear axle as a center of pivotal movement, in order that the machine may be readily turned into various positions. The front and the rear wheels may be made of pressed steel; may be equipped with rubber tires; and mounted on ball bearings.

The front wheel is mounted on an axle 31 upon which axle the wheel rotates, and it will be noted that the sides 32 of the lower bifurcated end of the fork 8 are spaced sufficiently beyond the hub 33 (see Figure 4) of the wheel to allow for play of the wheel longitudinally of the axle 31. This play is to allow shifting movement to the right and to the left of the forward end of the machine with regard to the front wheel 9, so as to allow the machine to follow curved lines.

The paint-applying apparatus includes a box indicated generally at A, arranged along side the front wheel, and substantially in alignment with the right side of the machine, such disposition of the box being to allow of the traffic lines being marked up closely to the curbs, and also to allow of the lines being marked immediately behind and close to parked vehicles, where it is so desired, it being noted that by having no part of the machine projecting materially to the right of and beyond the line marking apparatus, such apparatus may be moved in close proximity to vehicles or other obstructions to facilitate the marking of parked lines parallel to the street curbs and while the vehicles are in parked positon.

The brush-box constitutes a pair of metal plates 34 and 35 having their ends turned toward each other to provide flanges 36 at the ends of the box, such flanges over-lapping each other. The flanged ends of one box side are provided with means such as bolts 37, which may be passed through any set of a series of spaced openings 38 in the flanged ends of the other box side, so as to allow the box sides being shifted toward or away from each other and being locked in their adjusted positions so that lines of different widths may be marked. Long narrow brushes 39 are mounted against the inner faces of the box sides 34 and 35, being removably attached thereto by bolts or equivalent devices 40, and in such position that the lower ends of the brush bristles extend below the edges of the box sides, say about an inch, so that the box sides retain the bristles on the outer sides of the brushes in alignment, and at the same time, themselves offer no resistance to the bending of the bristles sufficiently to allow the bristles to adjust themselves to the road surface. The brushes are relatively narrow, their function being not to mark the line, but merely to sharply define the edges thereof, and in carrying out this purpose, as will hereinafter appear, the construction is such that when the box is in marking position, the brushes rest only lightly upon the surface of the street, so that their function of defining the edges of the line will be carried out and at the same time, no material resistance to the movement of the machine will be affected, wear upon the brush bristles will be reduced to a minimum, and no spreading of the brushes such as might interfere with this function of sharply defining the line edges, will take place.

Upon the inner sides of the bodies of the brushes are mounted plates 41, the lower edges of which are inturned as at 42, to force the brush bristles at their upper ends against the side plates of the brush box, thus co-operating with such side plates in keeping the bristles in alignment at the outer edges of the brushes, and maintaining such bristles in position to sharply define the lateral edges of the marked lines.

The brush box is pivotally mounted on the machine, so that it may be bodily lifted out of contact with the road surface when the machine is to be moved from place to place, and so that adjustment of the contact of the brush bristles with the street surface may be had. This mounting includes side supporting arms 43 welded or otherwise secured to the box sides 34 and 35, such arms extending upwardly and rearwardly at an angle with respect to the brush box, and being hinged at their upper ends to a cross rod 44 mounted in brackets 45 at the forward end of the machine.

The supporting arms 43 can slide on the rod 44 as the box is adjusted to move the brushes closer together or farther apart, and the brush box, in its adjusted position, may be prevented from shifting bodily along the rod 44 by cotter pins 46 arranged on each side of one of the arms 43, and passing through openings in the rod 44, it being understood that additional openings 47 for the cotter pins, may be provided in the rod for allowing the cotter pins to be shifted to retain the box as a whole against shifting on the rod, when it is in other adjusted positions. Washers 48 may be interposed between the cotter pins and the supporting arms. Other means, of course, than that just disclosed, can be readily used for maintaining the box when in various adjusted positions against shifting on the rod 44, without departing from the invention. An ear 49 extending upwardly from one of the box-supporting arms 43, serves as the forward terminal of a rod 50, the rear end of which is connected with a hand lever 51 pivoted on one of the side braces 13, and which is accessible to the operator of the machine so that he may, at will, lift and lower the box by drawing the lever 51 rearward or allowing it to move forward. The hand lever is equipped with a spring-actuated release 52 which, when the lever is drawn rearwardly to lift the box and brushes clear out of engagement with the street, may engage in a notch 53 provided in the guide strap 54 for the hand lever, and thus retain the box in lifted position. A pin 55, is mounted in one of a series of closely arranged openings 55ª, in the guide strap 54, and this pin serves as a stop to the forward movement of the lever, to thereby retain the box in an adjusted lowered position, in order to allow the brushes to bear the desired extent against the street surface, but to relieve them of the weight of the brush box. By shifting the pin 55 forward or backward in the series of openings, the brushes can be moved more closely or less closely into contact with the road surface, and thus proper contact of the brushes with the street surface may be attained, and whatever wear which takes place in the brush bristles, may be taken up.

Attached by means of brackets to the outer faces of the box sides, and projecting forwardly therefrom, is a pair of curved springs 56, so positioned as to normally move over the surface of the street just out of contact therewith, but when an obstruction is encountered, such as street car rails projecting above the street surface to engage such rails or other obstructions to ride the box, together with the brush bristles, thereover, hence preventing any tendency to retard the progress of the machine, as well as to prevent damage to any of its mechanism or to the brush bristles. Upon the brush box being lifted by reason of the springs riding over the obstruction, the hand lever merely moves back to an extent

determined by the height to which the box is moved, and when the obstruction is passed, again moves forward under the weight of the box to contact with the stop pin 55 and allow the brushes to again regain their adjusted contact with the street surface.

Within the brush box, and in the space between the brushes, is arranged a spray nozzle 57 connected to the lower end of a pipe length 58 (see Figure 1), which is held in vertically adjustable position at the forward end of a supporting arm 59, carried by the machine frame. The means for holding the spray nozzle in adjustable position, includes a clamp (see Figure 4), consisting of a metal strap 60, spaced from the supporting arm 59, by a block 61, and held against the pipe length 58 by a tension means such as a bolt 62. The advantage of having the nozzle adjustable vertically is to retain a constant proportion between the distance apart of the brushes, and the diameter of the cone of paint spray projected from the nozzle, i. e., the cone is so adjusted as to strike the inner surfaces of the brushes about one-half inch above the road surface. Hence, as the brushes are moved apart or brought closer together, to make lines of relatively greater or relatively narrower widths, the nozzle, through the adjustment just described, is likewise adjusted vertically, either up or down, to keep constant the point at which the cone of spray strikes the brushes. This is illustrated in Figures 5 and 6, in which in Figure 5 the position of the brushes with respect to each other, and to the nozzle, is illustrated for forming a relatively wide line, and in Figure 6 is illustrated the position of the parts for forming a relatively narrow line, in which the brushes have been adjusted toward each other, and the spray nozzle lowered to the proper extent to allow the cone of sprayed paint to strike the brushes at the same distance above the road surface at which the cone struck the brushes in the position of the parts as illustrated in Figure 5. In practice, I mark in some manner, the pipe length 58, as by nicks 63, to fix the point of adjustment of the pipe length up and down with regard to the supporting arm 59, to correspond with the various lateral adjustments of the brushes relatively to each other, so that it is a matter of but a moment to properly fix the vertical adjustment of the nozzle to correspond to any given lateral adjustment of the brushes. In order to close the forward end of the brush box and prevent drafts or gusts of wind circulating through the brush box, there is provided an apron 77 of rubber or suitable fabric, which apron is positioned between the forward ends of the brushes 34, and the inturned flanges 36 which form the forward end of the brush-box, and the apron at its lower edge terminates flush with the lower edge of the brush bristles, so as to lightly bear against the pavement. This apron stretches across the entire front of the box and may be held in place by the bolts 37 which hold the inturned flanged ends 36 together.

The pipe length 58 leading to the spray nozzle is connected with the paint tank through a flexible tube 64 so that paint from the tank is supplied to the nozzle. The nozzle is provided with a cut-off valve normally held in closed position by spring pressure, such nozzle being obtainable on the open market, and being of well known construction, and hence illustration of the details by which the valve which controls the nozzle is constantly held toward closed position under spring pressure, is not illustrated. The valve is provided with an operating lever 65. The control of the valve from the handles of the machine is had through a short rod 66 having a ball and socket connection 67 with the upper end of the valve lever 65 at the forward end of the rod, and at its rear end having a ball and socket connection with one arm of a bell crank lever 68 pivoted to the machine frame. The other arm of the bell crank lever through the medium of a ball and socket connection is under the control of a longer rod 69, the rear end of which is pivoted to a hand lever 70 which is in turn pivoted as at 71 on one of the handles of the machine. Such hand lever, in order to open the valve at the spray nozzle when it is desired to mark a line, is drawn rearwardly, thus drawing the valve handle 65 rearwardly against the spring pressure to open the valve and allow the paint to be sprayed through the nozzle. The rearward movement of the hand lever 70 brings a lug 72 on the lever into engagement with an opening or recess 73 in a spring retainer 74, carried by the machine handle to which the hand lever 70 is pivoted, to thereby snap the lug into engagement with the spring. When the spray is to be cut off, this spring 74 is simply shifted to the right, thereby moving the notch or recess 73 out of engagement with the lug 72 and allowing the spring controlling the cut-off valve of the nozzle to immediately shift such valve to closed position, to discontinue the spray. Such movement carries the valve lever 65, and the connecting mechanism to and including the hand lever 70 to the forward position indicated in Figure 1 where it will remain until the hand lever is again pulled back to open the spray nozzle.

At the lower end of the paint tank is provided a tap for connection to a flexible pipe or hose length 75, the forward end of which is equipped with a similar spray nozzle 76, for use by the operator of the machine in spraying stencils where such are required.

The foregoing description has been given for purposes of illustration only, and no undue limitations should be deduced therefrom, but the appended claims should be constructed

as broadly as permissible in view of the prior art.

Having thus described my invention what I claim as new, and desire to secure by Letters Patent is:—

1. In a machine of the class described, the combination of a frame-work, rear wheels, and a forward wheel arranged substantially intermediate the rear wheels for supporting the frame-work, and a paint-applying mechanism arranged substantially along side the forward wheel and substantially in alignment with one of the rear wheels.

2. In a machine of the class described, the combination of a wheel-supporting frame-work including a forward wheel, a paint-applying means pivotally mounted with respect to the frame work arranged substantially alongside the forward wheel and substantially in alignment with one side of said frame-work, and means mounted along said side of said frame-work for raising and lowering said paint-applying means relatively to the framework at will.

3. In a machine of the class described, the combination of a body and running gear, and a paint-applying means, the body and running gear and paint applying means as a whole defining substantially a rectangular horizontal area, the said paint-applying means being arranged substantially at one corner of the area.

4. In a road-marking machine, the combination with spaced brushes laterally adjustable with respect to each other and arranged longitudinally of a line to be marked for defining the edges of such line, of means vertically adjustable with respect to said brushes for supplying a paint spray to the roadway between the brushes.

5. In a machine of the class described, the combination with spaced devices for defining the edges of a line, and adjustable toward and away from each other, of means arranged between the devices and adjustable vertically for projecting a spray in fixed relation to the devices irrespective of their adjustment.

6. In a machine of the class described, the combination of spaced line defining means, means for raising and lowering the brushes at will, and means intermediate the line defining means and unaffected by the raising and lowering movement thereof for spraying paint upon the roadway between the line defining means.

7. In a machine of the class described, the combination of a wheel-supported frame, a box pivotally connected to the frame, spaced brushes laterally adjustable with respect to each other carried by the box, means for raising and lowering said box at will, and means vertically adjustable with respect to the brushes and unaffected by the raising and lowering of the box for supplying a paint spray between the brushes.

8. In a machine of the class described, the combination of a wheel-supported frame, a box, the side walls of which are shiftable toward and away from each other, means for pivotally connecting the box with the frame, means for raising and lowering the box at will, brushes carried by the box sides in spaced relation to each other, and a spray nozzle supported by the frame in vertically adjustable position, and arranged between the brushes.

9. In a machine of the class described, a brush-box including side walls, brushes arranged thereagainst, and extending therebelow, and plates carried by the brushes and forcing the upper ends of the bristles of the brushes against the side walls of the brush-box.

10. In a machine of the class described, a brush-box including side walls, brushes carried by the side walls of the box and having bristles projecting slightly below such side walls, and means for forcing the brush bristles towards the side walls of the box.

11. In a road-marking machine, the combination with spaced brushes for defining the edges of a line to be marked, of means for spraying the roadway between the brushes, and means other than the brush structure above the lower ends of the brush bristles for keeping such bristles in alignment.

12. In a machine of the class described, the combination of a wheel-supported frame, a brush-box connected thereto and adjustable toward and away from the road surface, and having brushes for contacting with the road surface, and means including a lever and adjustable stop for maintaining the brush-box in position such that the brushes contact with the road surface but are relieved of the weight of the box.

13. In a machine of the class described, the combination of a frame, rear wheels, and a forward wheel arranged substantially intermediate the rear wheels, for supporting the frame, a box arranged substantially along side the forward wheel and substantially in alignment with one of the rear wheels, the sides of such box being laterally adjustable with respect to each other and being pivotally mounted on the frame, means carried by the frame for raising and lowering the box, means carried by the box sides for defining the edges of a line, a spray nozzle supported by the frame between the line defining means and being vertically adjustable with reference thereto, such nozzle being valve-controlled, and means carried by the frame for controlling the position of the nozzle valve.

14. In a machine of the class described, the combination with a frame, rear wheels,

and a forward wheel arranged substantially intermediate the rear wheels, for supporting the frame, a box arranged substantially along side the forward wheel and substantially at one edge of the machine and pivotally carried on the frame, means carried by the box sides for defining the edges of a line, a spray nozzle supported by the frame between the line defining means and being vertically adjustable with reference thereto, such nozzle being valve-controlled, means carried by the frame for raising and lowering the box, and means carried by the frame for controlling the position of the nozzle valve.

15. In a machine of the class described, the combination of a frame, rear wheels, and a forward wheel arranged substantially intermediate the rear wheels, for supporting the frame, a box arranged substantially along side the forward wheel and substantially at one side of the machine, and pivotally carried on the frame, means carried by the box sides for defining the edges of a line, a spray nozzle, supported by the frame between the line-defining means, such nozzle being valve-controlled, means carried by the frame for raising and lowering the box, and means carried by the frame for controlling the position of the nozzle valve.

In testimony whereof I hereunto affix my signature.

CLARENCE V. ANGIER, JR.