June 20, 1933. M. KANEN 1,914,950

SPREADER FOR ROAD SURFACING FLUID

Filed Aug. 21, 1930

Fig. 1.

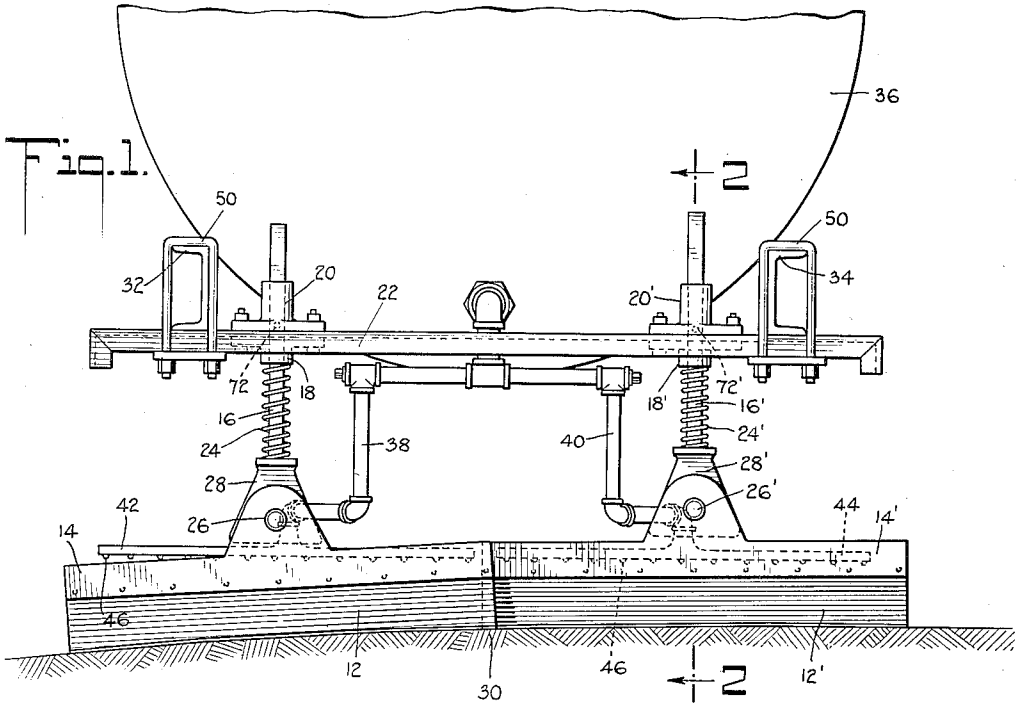


Fig. 2.

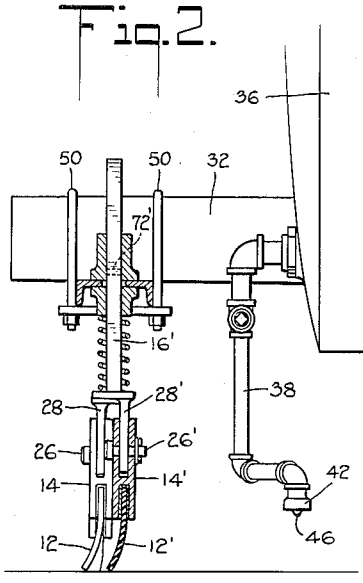
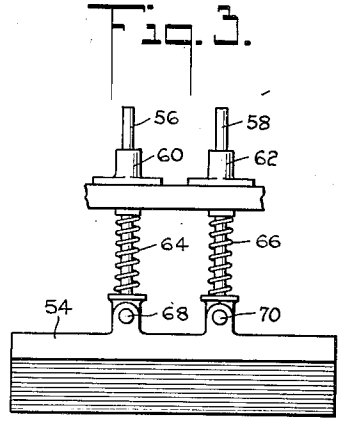


Fig. 3.



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SPREADER FOR ROAD SURFACING FLUID

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This invention relates to spreaders for road surfacing fluid, and more particularly to such a spreader adapted for attachment to apparatus used for distributing such fluid over the surface of a road.

The present invention is intended for use in the construction, repair, and maintenance of roads made of sheet asphalt, asphaltic concrete, macadam, brick, or any other pavement upon which fluid or semi-fluid asphalt, tar, or other bitumen, or Portland cement grout, and the like, are spread. The useful life of such road pavements depends upon the denseness thereof, that is, upon the absence, or a minimum, of voids and interstices, in order not to admit moisture which, upon freezing and expanding, acts to crack the pavement, and then upon thawing, permits the same to rot. It is therefore, desirable that the particles of stone and the like be covered and impregnated with the asphalt or other cementing agent. A pavement too badly worn to be repaired, must be ripped out and replaced, and this is so costly that the desirability of applying a penetration coat and a sealing or enlivening coat of asphalt which effectively renovates the pavement and greatly lengthens its life, is now well recognized.

The object of the present invention is generally, to provide an apparatus making it possible to obtain a uniform coating of road surfacing fluid fluid over a pavement, which is effectively forced into the voids and interstices of the pavement, but which will not form puddles or mushy places which are annoying to vehicular and pedestrian traffic.

Heretofore, when road surfacing fluid was spread upon a road, it was not applied with sufficient force to penetrate appreciably below the surface of the road, and most of the fluid was not effectively utilized to seal the pavement. Accordingly, one object of the present invention resides in the provision of an apparatus which will transmit a vertical pressure to the fluid, in order to force it into the irregularities, voids, and interstices of the pavement, thereby renewing their cementation by replacing old, rotted, and decomposed asphalt or cement and the like, with fresh sealing fluid.

It has sometimes been attempted to obtain pressure on a spreading device by means of the weight of a tank of the fluid being distributed upon the road, but the pressure obtained by this method is a variable, dependent upon the amount of fluid carried at any one time. Other systems suffer from similar defects. Another object, therefore, of the present invention is to devise suitable means for making the pressure of the spreader, and more particularly the vertical pressure, the desirability of which has already been outlined, substantially constant in value.

It is ordinarily attempted to spread the road surfacing fluid by means of brushes or brooms, either by hand or by mechanical operation, but such devices suffer from the defect that the bristles have a tendency to remove or dig out the liquid from between the stones or aggregates of the road, thereby injuring, instead of improving, the desired sealing action of the liquid, and still another object of the present invention is to provide a spreader which will obviate this defect and which will permit a generous filling of the liquid to remain in the cracks and voids of the pavement.

While it is desirable to fill the small crevices and interstices of the pavement, it is undesirable to permit the liquid to remain in bodies of large area, for the consequent puddles are wasteful of the road surfacing material and are exceedingly annoying to vehicular and pedestrian traffic. Even when such puddles solidify, they remain mushy and form an unsatisfactory road surface. It is not easy to avoid the formation of such puddles because of irregularities in the surface of the road, together with other factors such as changes in speed of the distribut-

ing truck, clogging of some or all of the nozzles in the spraying apparatus, variations in the pressure within the tank from which the liquid is forced to the nozzles, as well as irregularities caused by inexperienced operation of the distributing truck. Still another object of my invention resides in the provision of a spreader which will permit the liquid to fill small crevices and voids in the pavement, and yet which will push or sweep the material spread on the surface of the road so as to distribute it evenly and to prevent the accumulation of excess material in spots in order to avoid the formation of puddles when the road is wavy or corrugated, such of the material as is not forced into the pavement being carried ahead until usefully absorbed by the pavement.

Roads are ordinarily crowned to facilitate drainage, and this alone enhances the difficulty of obtaining the desired uniform coating of asphalt or the like. Sometimes engineers and contractors attempt to avoid distributing the asphalt at the edges of the road, and depend upon a gravity flow of asphalt from the central portion of the road toward the sides thereof. Considerable manual labor is subsequently necessary to attempt to obtain an even distribution of the liquid at the side portions of the road, and even so, it is not possible to obtain the desired penetration of the liquid into the pavement, for the liquid already has time to partially cool. In accordance with still another object of my invention this difficulty is overcome by the provision of a spreader which is designed to accommodate changes in the configuration of the road so as to take care of the crown thereof.

When brushes or brooms are used for spreading asphalt, considerable difficulty arises due to hardening of the asphalt throughout the body of bristles of the brush, it being very difficult to remove the hardened asphalt in order to clean the brush. Still another object of the present invention is to facilitate the cleaning of a spreader used with asphalt and similar road surfacing materials.

The road surfacing liquid is ordinarily distributed by means of spraying equipment mounted on a truck chassis and including a large tank and an appropriate system of spray nozzles arranged at the rear end of the truck chassis. It is desirable that the spreading of the liquid take place immediately after it has been sprayed, in order to prevent premature cooling of the same. It is also desirable that the spreader be propelled by the distributing truck for simplicity and economy, and for the further reason that any additional vehicle employed especially for the spreader would have to run upon the freshly deposited bitumen, whereas the wheels of the distributor truck run upon the pavement ahead of the spray nozzles. It is, therefore, still another object of the present invention to provide spreader equipment embodying all of the foregoing objects and advantages, which will be adapted for attachment to the chassis of the conventional type of distributor truck, and which will preferably be detachably attachable so that it may be applied as an accessory to any distributor truck.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the spreader elements and their relation one to the other as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawing in which:

Fig. 1 is a rear elevation of a spreader embodying features of my invention;

Fig. 2 is a section taken in the plane of the line 2—2 in Fig. 1; and

Fig. 3 illustrates a modification.

Referring to the drawing, the spreader of my invention comprises a relatively thick pad 12 of rubber, felt, or asbestos, or the like, which is held in a substantially upright position. This pad is made sufficiently thick to be relatively stiff and to be able to transmit the desired vertical pressure for forcing the fluid into the cracks and interstices of the road, but has sufficient give to adjust itself to the surface irregularities of the pavement as it sweeps over the same, so as to carry excessive fluid along with it. The action is effectively like that of a squeegee, although, of course, greatly magnified in dimension.

The pad 12 is rigidly held along its upper edge in a channeled frame 14 mounted on a rod 16 which is vertically reciprocable in bearings 18 and 20, bolted to a transverse channel member 22. A helical spring 24 surrounds the rod 16 and provides a downward pressure on the frame 14 and pad 12, which serves to effectively prevent the accumulation of excess asphalt, and which at the same time insures deep penetration of the asphalt into the road surface. The frame 14 is preferably mounted on the rod or post 16 through a pivotal connection 26 which permits the frame and pad to tilt or oscillate to an inclined position so that it will more readily accommodate irregularities in the configuration of the road, and more especially so as to enable accommodation of the crown of the road and to provide effective operation even at the edge portions of a crowned road. The rod or post 16 is preferably made square in cross section, or otherwise altered in configuration, and mates with a corresponding aperture in the bearings 18 and 20 in order to prevent rotation of the pad 12 about the post 16 as an axis.

In order to accommodate irregularities in the pavement and particularly the crown

thereof, I prefer to subdivide the spreader so as to include a plurality of spreader members arranged substantially end to end. In the present case a spreader member is provided including a pad 12′, held in a frame 14′ pivoted at 26′ to a post 16′ reciprocable in bearings 18′ and 20′, all constructed exactly like the spreader member previously described. It should be noted that the resulting plurality of spreader members are each independently urged in a substantially vertical direction by separate resilient means 24 and 24′ and are each free for independent tilting or oscillation about the pins 26 and 26′. While the several spreader members are arranged substantially end to end, they overlap slightly at the adjacent ends, as is indicated at 30, and this overlap is permitted by reason of a slight staggering of the positions of the spreader members, as is best indicated in Fig. 2. This desired stagger is obtained by offsetting each of the plates 28 and 28′ with respect to the posts 16 and 16′. The resulting overlapping of the ends of the spreaders prevents escape of material therebetween and avoids the production of streaks or unfinished portions between the pads of the individual spreader members.

For reasons previously set forth, it is preferred to so design the spreader that it may be mounted as an attachment on any of the standard or conventional types of truck chassis used for carrying the spraying apparatus which distributes the road surfacing fluid.

Such distributing trucks almost invariably have a chassis which includes a pair of side channels such as the channels 32 and 34. The spraying apparatus includes a tank 36 mounted on the truck chassis and kept under pressure in order to facilitate the desired discharge of relatively heavy road surfacing fluid. The fluid is fed through pipes 38 and 40 to tubes 42 and 44, each provided with a series of nozzles or outlets 46.

In accordance with the present invention the spreader is attached to the channels 32 and 34 of the truck chassis directly behind the distributing apparatus. In the present case this is accomplished simply by bolting the channel 22 to the rearward ends of the channels 32 and 34 by means of pairs of U bolts or shackles 50 which encompass both the truck channels and the channel 22 of the spreader apparatus.

In Fig. 3 a slightly modified form of distributor member is shown, in which the frame 54 is carried upon a pair of upright rods or posts 56 and 58 reciprocable in bearings 60 and 62 and resiliently urged downward by springs 64 and 66. The frame 54 is permitted to tilt or oscillate by reason of pivotal bearings 68 and 70. With this arrangement rotation of the distributor member about a vertical axis is prevented while employing rods 56 and 58 which are round in cross section and therefore convenient and inexpensive to use.

It should be understood that in either modification suitable means may be, and preferably are, provided for permitting the distributor members to be raised when the truck is not being used on the road to be repaired. This may consist of appropriate lever mechanism for drawing the distributor members upward against the pressure of the helical springs, or it may consist of any desired type of mechanism for swinging the entire spreader mechanism upwardly behind the vehicle. In the present case an exceedingly simple device is illustrated, comprising merely holes 72 and 72′ in the posts 16 and 16′ respectively, and a pair of pins, not shown, which may be inserted in the holes. The spreader members are lifted upwardly, one at a time, against the spring pressure until the apertures come above the tops of the bearings 20 and 20′, at which time the pins are inserted in the apertures and hold the spreader members in their elevated position by pressing against the upper faces of the bearings 20 and 20′.

The manner in which the spreader equipment of my invention may be constructed and applied to a distributor vehicle, will, it is thought, be understood from the foregoing description thereof. The many advantages of the present spreader will be evident from the construction and may be summarized as follows. The pads or squeegee portions 12 and 12′ of the spreader produce a pressing action and a sweeping action. The pressing action consists of pressure transmitted in a substantially vertical direction which produces an excellent penetration of the surfacing liquid into the small cracks, voids, and interstices of the pavement. The liquid is left in any such spaces, and is not carried out of the same as is the case with a brush or broom. The sweeping action carries any excess of liquid before the spreader and prevents the accumulation of puddles in waves and holes in the pavement. The success of the squeegee portions depends upon their having sufficient stiffness to transmit a vertical pressure, and yet having sufficient yieldability or give to adjust themselves to all of the surface irregularities of the pavement except the small crevices and voids. For this result, the squeegee portions are preferably made straight or flat or plane in the manner shown, for such a construction readily permits the lower edges to yield by bending backward. The pressure applied remains relatively constant and is effective immediately after the distribution of the liquid and while the same is still in a fluid and readily workable condition. Irregularities in the road surface are accommodated by subdividing the spreader into a plurality of spreaders, each of which is independently resiliently urged into direct contact with the road surface. These spreaders overlap to prevent the escape of liquid therebetween. The spreaders

are pivotally mounted so that they may tilt in order to accommodate irregularities located at one side or the other of the spreader member, and so as to accommodate definite changes in level such as are caused by the crown of the road. The squeegee portions of the spreader are relatively long in life and take considerable wear, first because the road surfacing liquid itself tends to protect them, and secondly because wear at the lower edges thereof is taken up by the resilient mounting, until they have become almost completely worn off. When the bitumen solidifies and hardens on the spreader members between the periods of use, it may be removed with but slight difficulty relative to the trouble occasioned by the same difficulty in connection with brushes and brooms or the like. The spreader member may be manufactured as an accessory which is readily attached to distributor wagons or trucks, and in the latter case the attachment is facilitated by the conventional projection of the side channels of the truck chassis at the rear end thereof.

It will be apparent that while I have shown and described my invention in the preferred forms, many changes and modifications may be made in the structures disclosed without departing from the spirit of the invention, defined in the following claims.

I claim:

1. A spreader for spreading road surfacing fluid comprising a plurality of squeegee members each including a flexible sheet or pad and a metallic frame for supporting and rigidifying the same along its upper marginal edge, a plurality of vertically yieldable support members, means pivotally securing said squeegees to said support members in order to permit each of the squeegees to independently tilt or oscillate about a horizontal axis extending transversely thereof, resilient means urging each of said support members downwardly, means to prevent oscillation of the squeegees about a vertical axis, said plurality of squeegees being arranged in substantially end to end relation, whereby the squeegees are independently liftable and independently oscillatable in order to form a continuous squeegee surface which will accommodate irregularities in and the crown of a road being spread with surfacing fluid.

2. A spreader for spreading road surfacing fluid comprising a plurality of squeegee members each including a flexible sheet or pad and a metallic frame for supporting and rigidifying the same along its upper marginal edge, a main cross member, a plurality of generally upright and vertically reciprocable members slidable in said cross member, means pivotally securing said squeegees to said vertically reciprocable members in order to permit each of the squeegees to independently tilt or oscillate about a horizontal axis extending transversely thereof, resilient means urging each of said reciprocable members downwardly, means to prevent oscillation of the squeegees about a vertical axis, said plurality of squeegees being arranged in substantially end to end relation with an overlap at the adjacent ends, whereby the squeegees are independently liftable and independently oscillatable in order to form a continuous squeegee surface which accommodates irregularities in and the crown of a road being spread with surfacing fluid.

3. The combination with a truck chassis and apparatus thereon for the distribution of road surfacing fluid, of a spreader for spreading said fluid immediately after its distribution, said spreader comprising a plurality of squeegee members each including a flexible sheet or pad and a metallic frame for supporting and rigidifying the same along its upper marginal edge, a cross member arranged to be detachably attached to the rear ends of the side channels of the truck chassis, a plurality of generally upright and vertically reciprocable members slidable in said cross member, means pivotally securing said squeegees to said vertically reciprocable members in order to permit each of the squeegees to independently tilt or oscillate about a horizontal axis extending transversely thereof, resilient means urging each of said reciprocable members downwardly, means to prevent oscillation of the squeegees about a vertical axis, said plurality of squeegees being arranged in substantially end to end relation with an overlap at the adjacent ends, whereby the squeegees are independently liftable and independently oscillatable in order to form a continuous squeegee surface which accommodates irregularities in and the crown of a road being spread with surfacing fluid.

4. A spreader for spreading road surfacing fluid comprising a squeegee member including a flexible sheet or pad and a metallic frame for supporting and rigidifying the same along its upper marginal edge, a vertically yieldable support member, means pivotally securing said squeegee to said support member in order to permit the squeegee to independently tilt or oscillate about a horizontal axis extending transversely thereof, resilient means urging said support member downwardly, and means to prevent oscillation of the squeegee about a vertical axis.

5. A spreader for spreading road surfacing fluid comprising a squeegee member including a flexible sheet or pad and a metallic frame for supporting and rigidifying the same along its upper marginal edge, a main cross member, a generally upright and vertically reciprocable member slidable in said cross member, means pivotally securing said squeegee to said vertically reciprocable member in order to permit the squeegee to independently tilt or oscillate about

a horizontal axis extending transversely thereof, resilient means urging said reciprocable member downwardly, means to prevent oscillation of the squeegee about a vertical axis, whereby the squeegee is independently liftable and independently oscillatable in order to form a squeegee surface which will accommodate irregularities in and the crown of a road being spread with surfacing fluid.

Signed at New Rochelle in the county of Westchester and State of New York, this 8th day of August A. D. 1930.

MAX KANEN.