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VALVE AND WIPING MECHANISM FOR ASPHALT DISPENSERS

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Fig. 1

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This invention relates to asphalt dispensing machines of the type especially adapted for use in sealing cracks and fractures in concrete and asphalt pavements, such as streets, roadways, parking areas, and the like.

Concrete and hard-surfaced bituminous pavements are often subject to settling and cracking under heavy traffic conditions, and often because of faulty foundation structures, or climatic temperature changes, and when such fractures occur it is customary to fill them with hot asphalt in a fluid state to seal off and prevent moisture from undermining the base structure.

Such operations are generally performed by workmen using a spouted container of hot asphalt which is guided along the fracture and the asphalt is dispensed thereinto through the spout. Such procedure, while effective, is slow and tedious, and economically impractical due to high labor costs and in wasted materials. Workmen are sometimes careless in the distribution of the asphalt, using more than necessary in some areas and failing to dispense sufficient quantities in others, resulting in an improperly sealed pavement.

It is also essential that the asphalt be sufficiently heated to a proper fluid consistency to flow into the cracks and insure an effective seal, and when the conventional spouted containers are used it is necessary that the workmen carry the asphalt from the heating vat, which is sometimes a substantial distance from the place of use, the asphalt losing much of its heat and fluidity. Moreover, the use of the spouted container in a high velocity wind, or in an unsteady hand, is unsatisfactory because the asphalt cannot be uniformly distributed along a tortuous course usually defined by a crack in a pavement and unsightly deposits and lines occur on the pavement adjacent to the repaired fractures.

An object of the invention resides in the provision of an asphalt dispensing mechanism by which asphalt can be heated and maintained at proper temperatures while being dispensed directly into a fracture, and affording a device which can be moved and guided along a crack by a single workman, and by which the flow of asphalt can be uniformly controlled in accordance with the requirements and the particular operations to be performed.

It is a prime object of the invention to provide a dispensing valve and applicator device by which an even and constant flow of the sealing material can be maintained under all climatic conditions and provide means for uniformly troweling or surfacing the asphalt along the depository.

While the foregoing objects are paramount, other and lesser objects will become apparent as the description proceeds when considered in connection with the appended drawings wherein:

FIGURE 1 is a side elevational view of an asphalt dispensing machine embodying the improved valve structure.

FIGURE 2 is a plan view of the dispensing machine.

FIGURE 3 is a plan view of the valve mechanism embodying the invention, portions being broken away to show the closure element, and fragmentarily showing a corner of the dispensing machine housing.

FIGURE 4 is a partial sectional view of the valve, on line 4-4 of FIGURE 3, showing the needle flow control and inlet connection, the dispensing machine housing being fragmentarily shown.

FIGURE 5 is a fragmentary side elevational view of the machine housing showing the dispensing cup and applicator device, the latter being shown in vertical section, and showing the actuating lever assembly.

FIGURE 6 is a transverse sectional view, on line 6-6 of FIGURE 5, showing the dispensing cup and the actuating lever assembly in plan, the latter being fragmentarily shown.

FIGURE 7 is a transverse sectional view, on line 7-7 of FIGURE 5, showing the dispensing cup in plan, and FIGURE 8 is a transverse sectional view, on line 8-8 of FIGURE 5, showing the applicator shoe.

Although the invention is embodied in the valve structure and applicant device illustrated in FIGURES 3 to 8, inclusive, it is desirable that apparatus with which the improvements are employed be sufficiently described to afford a proper understanding of the function and application of the invention.

In FIGURES 1 and 2 are illustrated an asphalt dispensing machine in which the improved valve and applicator device are embodied. The apparatus comprises a housing 10 having front and rear casters 11 and 12 and a rear platform 13 on which is supported a fuel tank 14, economically practical, with number of gauges, valves, and other instruments, by which pressures, temperatures, and the like, are determined and controlled.

In the housing 10 is arranged an asphalt vat 15, shown in broken lines in FIGURE 1, having a compartment 16 thereunder to accommodate a burner 17 for heating the asphalt in the vat 15 and in which the improved valve, shown in FIGURES 3 to 8, inclusive, is housed and which is designed to control the flow of hot asphalt through the applicator device which will be presently described.

The dispensing apparatus is adapted to be moved about the area to be treated and is provided with a handle 18 arranged horizontally across the upper ends of a pair of standards 19 rising from the platform 13 and suitably stabilized by angularly arranged brace members 20. A control mechanism for the valve and applicator is mounted on the handle 18 and will be hereinafter referred to in detail.

The valve, generally designed by the numeral 21, comprises a body 22 which may be machined to a rectangular form in a solid block in which the several passages and recesses are formed with tools, such as drills.

The valve 21 is located in the compartment 16 beneath the vat 15 in the forward portion of the housing 10, and preferably on the right side thereof, as indicated in FIGURE 1. The reason for such arrangement will become apparent.

The body 22 of the valve 21 is supported above the floor 23 of the housing 10, as shown fragmentarily in FIGURES 3 and 4, by a bracket 24 comprising metal blocks 25 and 26 joined to each other by studs 27 and to the body valve 22 by studs 28, as shown in FIGURE 3. An inlet port 29 is formed in the top of the body 22 which is internally threaded to receive a fitting 30 having an annular flange 31 thereon. An internally threaded adapter collar 32 is applied to the fitting 30 and has an internal flange 33 engaging the flange 31 thereon. A flow tube 34 is connected by a coupling element 35 to the fitting 30 by the collar 32 in the manner illustrated in FIGURE 4. The opposite end of the tube 34 is connected to the bottom of the vat 15, as shown in dotted lines in FIGURE 1.

The inlet port 29 communicates with a passage 36 transversely thereof and drilled into one side of the body 22 and closed by a plug 37. A flow passage 38 is disposed perpendicular to the passage 36, communicates therewith through an orifice 39, a beveled seat 40 being formed in the end of the passage 38 about the orifice 39. The outer
end of the passage 38 is enlarged and has a packing gland follower 41 threaded thereinto. A needle valve stem 42 is threaded in the follower 41 and has a conical inner end 43 adapted to extend into the orifice 39 to close the same and control the flow therethrough. The stem 42 is embraced by a packing gland 44 and a washer 45 against which the packing gland 42 is seated to effect asuitable seal about the stem 42 which is rotated by a knob 46 attached to its outer end.

The passage 38 is intersected by a vertical passage 47 which is bored in the top of the body 22 and closed by a plug 47, extends below the passage 38, communicating with a valve chamber 48 bored in the side of the body 22 and having its axis transverse to the passage 47. The inner end of the chamber 48 has a conical seat 49 formed therein while its outer end is closed by a plug 50. A passage 51 communicates with the chamber 48 through the conical seat 49, and is coaxial thereof, having an enlarged portion 52 formed in its outer end and threaded to receive a packing gland follower 53 which, with a packing gland 54 and a washer 55, embraces the stem 56 of a poppet valve 57 adapted to engage the conical seat 49 as the stem 56 is slidably operated through the gland 54.

An outlet passage 58 extends at right angles to the passage 51 and is threaded in its outer end to receive a fitting 59 in which a flow tube 60 is connected by a coupling 61. The poppet valve 57 is actuated by a lever 62 which is attached to the outer end of a shaft 63, rotatably arranged through the block 25, and having a clevis 64 attached to its inner end, and the outer end of the poppet valve stem 56, being flattened, as shown in FIGURE 3, is pivotally attached to the clevis 64 by a bolt 65.

A rod 66 is connected by a clevis 67 at one end to the lever 62 and extends upwardly and rearwardly of the dispensing machine to handle bar 18 thereof, as shown in FIGURES 1 and 2, and having its upper end connected by a clevis 68 to a control lever 69 pivotally mounted on a plate 70 secured to one of the standards 19. The valve 57 is thus capable of operation while the machine is being moved about. A pull spring 71 is attached at one end to the lever 62 and at its opposite end to the platform 13 to bias the valve 57 to closed position.

The asphalt, heated in the vat 15 to a relatively high temperature, and in a fluid state, flows through the several passages in the valve body 22, being controlled by the valves 43 and 57, and out through the tube 60 into a receptacle 72 formed in the upper portion of a body 73 which is generally oval in transverse section, as indicated in FIGURES 6, 7 and 8, having flat surfaces 74 on each side. The receptacle 72 may be ellipsoidal in plan, as shown in FIGURE 7, and has an outlet port 75 formed in the lower portion of the body 73.

The body 73 is attached to the lowermost end of a rod 76 having a plate 77 welded thereto and transverse to its axis. The plate 77 is secured to the body 73 within the receptacle 72 by screws 78 threaded into integral bosses 79 formed on each side of the outlet port 75, as shown in FIGURES 5 and 7. The rod 76 is slidably supported in a vertical plane by a sleeve 80 welded to an angle bracket 81 attached to the platform 13 of the machine 10, as shown in FIGURES 1, 2, 5 and 6. A stud 82 is threaded into the rod 76 through a longitudinal slot 83 in the sleeve 80 whereby the rod 76 can be operated vertically, raising and lowering the body 73 with respect to the ground, indicated by the broken lines 84 shown in FIGURES 1, 2 and 5, and also limiting the vertical movement of the rod 76 and preventing its rotation.

The body 73, in which the receptacle 72 is defined, provides for measured dispensing of the fluid asphalt and functions as a carrier for a wiper shoe 85 which is attached to its lowermost end. The shoe 85 comprises a strip of flexible material, preferably rubber, or similar materials, reinforced by cotton fibers, such as beltling, and shaped to define an ellipsoidal in transverse section, as illustrated in FIGURE 8, the ends of the strip being brought together and fastened by rivets 86. The body 73 has a relatively deep channel 87 formed in its lowermost end having an ellipsoidal shape conforming to that of the shoe 85 and having a longitudinal slot 88 in its forward portion through which the joined ends of the strip which forms the shoe 85 extend, as shown in FIGURES 5 and 8. The shoe 85 is secured in the channel 87 by set-screws 89 threaded through the sides 74 of the body 73 and may be removed for replacement as required.

The body 73 is manipulated to its operative and inoperative positions by a rod 90 which extends downwardly from the handle 18 of the dispenser apparatus where its upper end is connected by a clevis 91 to a lever 92 pivoted to the plate 70 secured to the standard 19, as shown in FIGURES 1 and 2. The lower end of the rod 90 is connected to an angular cam lever 93 by a clevis 94, as shown in FIGURES 5 and 6.

The cam lever 93 is pivoted at its lower end by a bolt 95 to the angular bracket 81 while the clevis 94 is pivoted to a bolt 96 at its upper end, as best shown in FIGURE 5. The lever 93 has an integral angular extension or finger 97 on its upper end whose longitudinal axis is in a plane oblique to that of the lever 93 and extends forwardly and rearwardly adjacent to the rod 76 above the sleeve 80 and is engageable with a pin 98 arranged through and projecting rearwardly from the rod 76 whereby, when the lever 93 is moved rearwardly on its pivot 95 by the rod 90, the finger 97 engages the pin 98 to lift the rod 76 and the body 73 to which the shoe 85 is attached.

Operation

In order to dispense the asphalt in proper amounts to adequately seal the cracks and fractures in hard surface pavements, it is essential that the flow be carefully controlled through the valve 21. My directing the asphalt into the receptacle 72 the operator may, at all times, observe the rate of flow and effect the necessary controls through the operation of the lever 69, the rod 66, and the lever 62. The shaft 63 to open and close the valve 57. The flow from the vat 15 through the valve 21 may be shut off or minimized by the needle valve 43 which is operated by the knob 46.

By dispensing the hot fluid asphalt into the receptacle 72 it is always possible to constantly maintain proper temperatures since only relatively small quantities of the material are exposed to atmospheric temperatures. The vat temperatures are maintained by heat applied thereto from the burner 17. The dispensing tube 60 may be wrapped or coated with insulation material to prevent cooling of the liquid asphalt as it flows from the vat 15 into the receptacle 72.

The shoe 85, being capable of vertical operation through the lever 92, the rod 90, the cam lever 93 and the finger 97, may be raised and lowered by the operator as the machine is moved about. By the simple manipulation of the levers 69 and 92 near the handle bar 18 the flow of asphalt can be shut off or maintained and the shoe 85 raised and lowered. As the asphalt is flowed through the port 75 in the bottom of the body 73 from the receptacle 72 it is restrained within the shoe 85 and evenly distributed along the path of the fracture, wiping the material thereto and preventing excessive deposits on the pavement.

The invention is obviously capable of substantial changes and modifications in structure and design without departing from the spirit and intent thereof or the scope of the appended claims.

What is claimed is:

1. In an asphalt dispensing apparatus having a wheel...
housing, a handle on said housing, a heating vat in said housing, and a heating chamber beneath said vat having a burner therein, a dispensing valve in said heating chamber having an inlet communicating with said vat, and having a dispensing tube connected thereto extending through a wall of said housing, the said valve comprising a body having inlet and outlet passages therein, a needle valve in said inlet passage for restricting the flow therethrough and closing said passage and a poppet closure in said outlet passage capable of intermittently interrupting the flow of asphalt through said dispensing tube, a guide rod slidably arranged on said housing and a dispensing receptacle, having a wiping shoe thereon, supported on the lower end of said rod adjacent to said dispensing tube and adjustably vertically with respect thereto, and means comprising a pair of levers pivoted on a portion of said housing having a linkage with the handle of said independently operating said valve and vertically adjusting said shoe.

2. In apparatus for dispensing fluid asphalt having a wheeled housing and a handle thereon, an asphalt vat in said housing having a heating chamber thereunder, and a heater in said chamber, a dispensing valve in said chamber having a body, an inlet passage and an outlet chamber formed in said body, the said inlet passage having communication with said vat and having a needle valve providing an adjustable closure element therefor, a poppet valve normally seated in said outlet chamber, a dispensing tube connected to said outlet chamber, a vertically adjustable rod arranged on said housing and a dispensing receptacle fixed to said rod adjacent to said dispensing tube, a wiper shoe on said receptacle, and means comprising levers and linkage elements operatively attached to said handle for actuating said poppet valve and vertically adjusting said receptacle and said shoe.

3. In a dispensing valve and wiper device for hot asphalt in repairing paved surfaces, in combination with an asphalt dispensing machine having a wheeled housing, a handle for said housing, and a vat and heating chamber in said housing, a valve body having an inlet passage connected to said vat and an outlet chamber having a dispensing tube connected thereto, a needle valve for providing an adjustable closure element in said inlet passage and a normally closed poppet valve in said outlet chamber for intermittently interrupting the flow of liquid asphalt therethrough, a vertically adjustable rod supported on said housing and a dispensing receptacle fixed to said rod for receiving heated asphalt from said dispensing tube, a wiper cup on said receptacle for confining the fluid asphalt and wiping the same along a paved surface, and lever and linkage elements attached to the handle of said housing for independently operating said poppet valve and vertically adjusting said wiper.

4. In a valve and wiper mechanism for a machine for dispensing hot asphalt for filling fractures in paved surfaces, the said machine having a wheeled housing, a handle for said housing, and a vat and heating chamber in said housing, in combination, a valve body in said heating chamber having an inlet passage connected to said vat and a needle valve closure for said passage, an outlet chamber in said body having a normally seated closure therein and having a lever operable from the handle of said housing for intermittently interrupting the flow of liquid asphalt therethrough, an outlet tube connected to said outlet chamber, a vertically adjustable rod supported on said housing and a dispensing receptacle on said rod adjustable vertically with respect to said dispensing tube, a wiping shoe on said receptacle engageable with a paved surface, and means on said handle comprising a lever and a linkage for vertically operating said receptacle and said shoe.

5. In a valve and wiper mechanism for an asphalt dispensing machine for filling fractures in paved surfaces, the said machine having a wheeled housing, a handle, an asphalt vat in said housing and a heating chamber, in combination, a valve body in said heating chamber having an inlet passage connected to said vat and a needle valve closure for said passage, an outlet chamber in said body having a normally closed poppet valve therein, a vertically adjustable rod arranged on said housing and a dispensing cup fixed to said rod, a dispensing tube having communication with said outlet chamber and extending into said cup, a wiper element depending from said cup and engageable with a paved surface in its operative position, and means comprising a lever and linkage attached to the handle of said machine for actuating said poppet valve and a second lever and linkage on said handle for vertically operating said dispensing cup and wiper.

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