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SPRAYBAR

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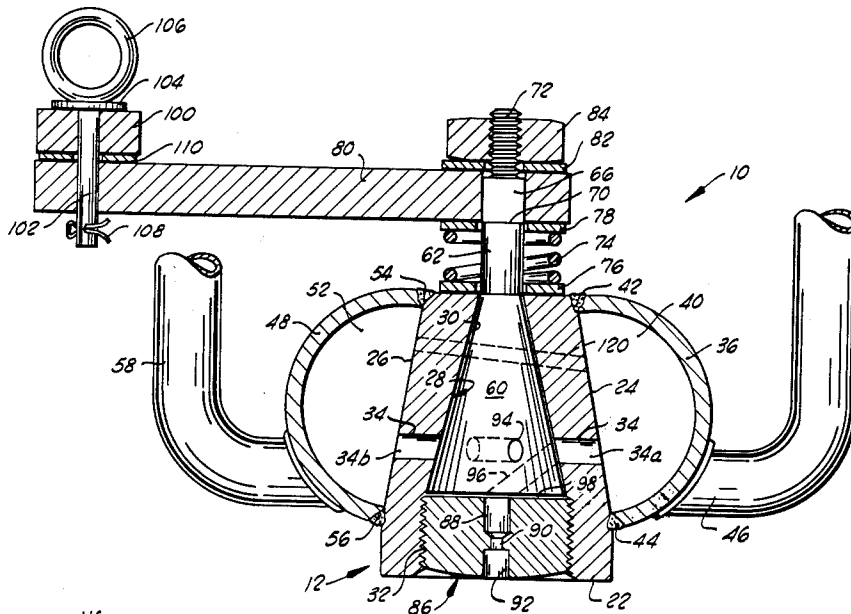


FIG. 1

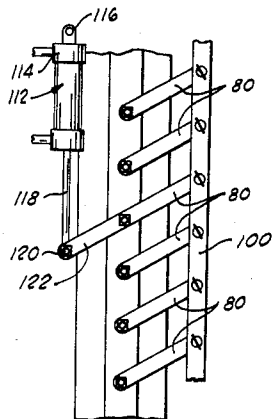


FIG. 3

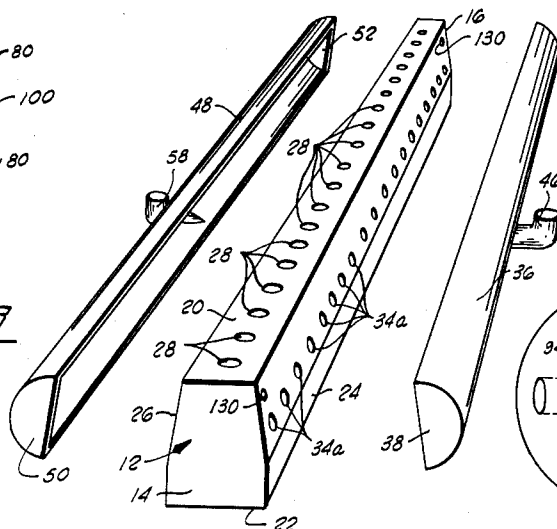


FIG. 2

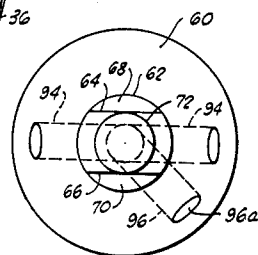


FIG. 4

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SPRAYBAR

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The present invention relates generally to the art of liquid spraying, and more particularly, but not by way of limitation, relates to an improved spraybar construction for applying a coat of liquid asphalt or the like to the surface of a roadbed.

As is well known in the road paving art, the construction of most bituminous surfaces usually includes the application of one or more coats of bituminous liquid preparatory to spreading a course of rock chips known as aggregate. The bituminous liquid may be any one of several types referred to generally as either primers or binders, the most common being generically referred to as asphalt. The liquid asphalt changes viscosity quickly with temperature and must be maintained at a relatively high temperature or it will congeal and tend to plug or freeze the liquid handling equipment. It is very important in the construction of a bituminous surface that the asphalt be distributed in a uniform layer or coat on the roadbed. Accordingly, the volume and spray pattern of the asphalt must be closely controlled. If the liquid asphalt is spread too thin, the aggregate may not be securely held in place and also the roadbed may not be made completely waterproof. On the other hand, if too much asphalt is applied or if applied unevenly so as to produce thick spots, the liquid will seep or "bleed" through the aggregate and collect on the surface of the aggregate, which is also an undesirable condition.

Liquid asphalt is presently spread by vehicular equipment known in the art as a distributor which generally includes a relatively large supply tank, a suitable heater for maintaining the asphalt at an elevated, highly fluid temperature, in the general range from 150°-300° Fahrenheit. An elongated spraybar is disposed transversely across the distributor vehicle, usually at the rear, and the liquid is pumped from the supply tank to the spraybar. A return flow is usually provided to insure circulatory agitation and uniform heating of the fluid within the supply tank. The spraybar means is usually comprised of elongated conduits having a plurality of "on-off" valves spaced along the bar, each of which controls fluid flowing to a spray nozzle for directing a fan-shaped spray of liquid onto the roadbed. Considerable effort has been directed toward constructing the spraybar in such a manner that valves controlling each of the nozzles, and also the nozzles, are substantially surrounded by the hot liquid so that when the valves are closed and the spray nozzles are inoperative, the parts will continue to be heated and liquid asphalt trapped in the valves and in the nozzles will not congeal and disrupt operation of the spraybar means.

As previously mentioned, it is essential that the volume rate at which the liquid is dispersed be accurately controlled so as to insure a coat of the desired thickness. There are basically two means by which the volume can be controlled. First, the fluid pressure applied to the nozzle can be maintained constant. Then so long as the resistance to fluid flow through the length of the spraybar and through each nozzle remains constant, the volume of fluid dispersed through each nozzle will be equal. In practice this is relatively difficult to attain. Previous spraybar constructions have considerable pressure drop as the liquid travels the length of the spraybar because the valves for controlling each of the nozzles are normally disposed in the inlet passageway of the spraybar in order to heat the valves by the hot liquid and pose a tortuous

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path for the incoming liquid. Also each time that the spraybar is started and stopped, the pressure regulating means may be incompetent to handle the sudden volume change and pressure surges may result. The second means of controlling the volume dispersed is by controlling the volume delivered to the spraybar. This type of control usually employs a positive displacement pump which is driven at a constant rate. While having some merits, this type of system is generally unsatisfactory because to be accurate, all liquid must be dispensed from the nozzle and in order to turn the nozzles "on" or "off" the pump had to be stopped. When this occurred no fluid is circulated through the spraybar and accordingly there is danger that the liquid asphalt will congeal in the nozzles and disrupt further operations. For these and other reasons, the positive displacement type spraybar systems are not presently permitted by most State agencies charged with the responsibility of building public highways and roads.

The present invention contemplates a novel spraybar device comprising in general an input manifold, an outlet manifold, a plurality of fluid passageways extending between the input manifold and the outlet manifold, a spray nozzle means in fluid communication with each of the fluid passageways, and a three-way valve operatively associated with each of the passageways for alternately passing fluid through the passageways or through the respective nozzles. The present invention also contemplates a novel spraybar construction which will hereafter be set forth in greater detail.

An important object of the present invention is to provide an improved spraybar construction having greater reliability of operation.

Another object of the present invention is to provide an improved spraybar construction which can be utilized in connection with either constant pressure type or controlled volume type systems.

Yet another object of the present invention is to provide an improved spraybar construction wherein the pressure delivered to each of the distribution nozzles is substantially equal due to the fact that there is very little pressure drop over the length of the input manifold or over the length of the return flow manifold.

Another object of the present invention is to provide an improved spraybar construction which can be used in combination with a positive displacement pump and yet which can be instantly turned on and off without stopping the pump while maintaining circulation through the spraybar.

Still another object of the present invention is to provide an improved spraybar construction wherein one or more nozzles can be turned off to narrow the path over which the asphalt is distributed without causing a change in the operating pressure or volume requirements of the spraybar.

A still further object of the present invention is to provide an improved spraybar construction wherein the spraying operation can be started and stopped without materially varying the pressure of the fluid in the input manifold.

Yet another object of the present invention is to provide a novel spraybar construction having a solid metallic heat sink disposed around all fluid passageways, nozzles and valve bodies, which heat sink is in direct contact with the incoming and outgoing hot liquid asphalt so as to maintain all trapped fluid at an elevated temperature and prevent plugging of the passageways, nozzles or valves.

Still another object of the present invention is to provide a spraybar construction of the type described which can be very easily cleaned after use and which can be easily disassembled for repairs and reassembled.

Another very important object of the present invention

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is to provide an improved spraybar construction which can be very easily and economically manufactured and which will have a long, trouble-free operating life.

Many additional objects and advantages of the present invention will be evident to those skilled in the art from the following detailed description and drawings, wherein:

FIG. 1 is a partial sectional view through a spraybar constructed in accordance with the present invention;

FIG. 2 is an exploded perspective view of the major components of the spraybar of FIG. 1;

FIG. 3 is a top view of a portion of the spraybar of FIG. 1; and,

FIG. 4 is a top view of one of the valve bodies of the spraybar of FIG. 1, showing the fluid passageways there-through in dotted outline.

Referring now to the drawings, and in particular to FIG. 1, a spraybar constructed in accordance with the present invention is indicated generally by the reference numeral 10. The spraybar 10 is comprised of an elongated valve body housing 12 which is fabricated from a single length of metal or similar heat conductive material preferably having a high specific heat. For orientation purposes, the valve body housing 12 may be considered as having ends 14 and 16, a top face 20, a bottom face 22, and an inlet side 24 and an outlet side 26.

A plurality of valve cavity bores 28 extend from the bottom face 22 to the top face 20 and preferably have an upper, conically tapered valve cavity portion 30 and a cylindrical, threaded portion 32 opening to the bottom face 22. It will be noted that the diameter of the cylindrical portion 32 is as great as or slightly greater than the maximum diameter of the conically shaped valve cavity portion 30. A fluid passageway 34 intersects each of the valve cavity portions 30 and extends from the inlet face 24 to the outlet face 26 so as to form an inlet fluid passageway 34a and outlet fluid passageway 34b.

An input manifold 36 is connected to the inlet face 24 of the valve body housing 12. The input manifold 36 is conveniently fabricated from one-half of a longitudinally split length of standard pipe the ends of which are closed by semi-circular caps 38 and 40. The input manifold 36 may then be connected to the inlet face 24 by weld seams 42 and 44, as seen in FIG. 1. Liquid is supplied to the input manifold 36 through an inlet conduit 46 which may be connected to the lowest point of the input manifold 36 so that liquid can be more efficiently withdrawn from the manifold 36 in order to clean the spraybar 10, as hereafter described.

A substantially identical return flow manifold is indicated by the reference numeral 48 and may conveniently be fabricated from the other half of the length of standard pipe and closed by semi-circular caps 50 and 52, as best seen in FIG. 2. The return flow manifold 48 can be connected to the outlet face 26 of the valve body housing 12 by weld seams 54 and 56, as best seen in FIG. 1. A return flow conduit 58 is also connected to a mid-point of the return flow manifold 48, also preferably at a low point so as to facilitate the efficient removal of liquids. It will be appreciated that the conduits 46 and 58 could be connected to the manifolds 36 and 48, respectively, at any convenient point without causing excessive pressure drops over the length of the spraybar because of the size and flow characteristics of the two manifolds, as will hereafter be described in greater detail. For example, the inlet and outlet conduits could be connected to the closure caps 38 and 50 if desired.

A valve body 60, only one of which is illustrated, is received in each of the valve cavity portions 30 of the several valve cavity bores 28. Each valve body 60 has a conical taper corresponding to the conical taper of the respective valve cavity portion 30. Each valve body 60 also has a stem portion 62 which extends upwardly through the bore 28. Each stem portion 62 is provided with a pair of flattened sides 64 and 66, as best seen in FIG. 4, which form upwardly facing shoulders 68 and 70

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which form a keyed portion for receiving an actuating lever arm presently to be described. The uppermost end of the stem 62 is cylindrical and is provided with threads 72 having a maximum diameter less than the distance between the faces 64 and 66. A coil spring 74 is disposed between a washer 76 contacting the upper face 20 of the valve body housing 12 and a second washer 78. An actuating lever arm 80 having a keyed aperture for receiving the keyed portion of the valve stem 62 by engaging the faces 64 and 66 is pressed against the shoulders 68 and 70 by a washer 82 and nut 84 which is threaded onto the threads 72. Thus it will be noted that the coil spring 74 continually biases the conical surface of the valve body 60 against the conical surface of the valve cavity portion 30 of the bore 28 to provide a fluid-tight seal. This bias is also assisted to some degree by fluid pressure acting on the bottom face 98 of the valve body 60, as will presently be described.

A suitable nozzle member 86 is screwed into the threaded cylindrical portion 32 of each of the bores 28. The nozzle member 86 has a central fluid passageway 88 with a restrictive orifice 90 and a diametrical groove 92 of conventional design for producing a fan-shaped spray. The valve body 60 is provided with a fluid bypass passageway 94 which extends through the valve body 60 in such a manner as to simultaneously register with the inlet passageway 34a and outlet passageway 34b and thereby provide a continuous fluid passageway from the input manifold 36 to the return flow manifold 48. Another fluid passageway 96 has an opening 96a, as best seen in FIG. 4, which is located at the same relative height but is circumferentially spaced approximately 45 degrees from the bypass passageway 94 so as to register with the inlet passageway 34a when the valve body 60 is rotated 45 degrees. The passageway 96 then extends downwardly at an angle and opens at the center of the lower face 98 of the valve body 60 so as to be in continuous fluid communication with the central bore 88 of the spray nozzle 86. Thus it will be noted that the valve body 60 is what is normally termed a three-way valve because when the valve body 60 is in such a position that the passageway 94 registers with the inlet passageway 34a, fluid will pass directly from the input manifold 36 to the return flow manifold 48, and bypass the spray nozzle 86. The passageway 96 and therefore the spray nozzle 86 will be closed. This position of the valve body 60 will hereafter be referred to as the "bypass" position. When the valve body 60 is rotated approximately 45 degrees until the passageway 96 registers with the passageway 34a, the bypass passageway 94 will be closed and fluid will be directed from the input manifold 36 through the nozzle 86 and sprayed on the roadbed. This position of the valve body 60 will hereafter be referred to as the "shoot" position. By stopping the valve body 60 at an intermediate position, both the bypass passageway 94 and the spray nozzle passageway 96 can be closed. This position of the valve body 60 will hereafter be referred to as the "off" position. The bypass passageways 34 and 94 are preferably sized so as to create the same magnitude pressure drop as the passageway 96 and nozzle 86 so that the same pressure drop will occur whether the valve bodies are in "shoot" position or "bypass" position.

A gang bar 100 extends between the outer ends of the several actuating lever arms 80 and is connected to each by a suitable pin 102 which may conveniently have a stop disc 104 for engaging the gang bar and a finger ring 106 to assist removal. A cotter key 108 may be inserted through a suitable bore in the lower end of the pin 102 to prevent accidental loss of the pin 102. A washer 110 may be disposed between the gang bar 100 and each of the lever arms 80 to reduce friction and promote free operation in the conventional manner. The gang bar 100 provides a means for simultaneously actuating all of the lever arms 80 so as to provide simultaneous operation of

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the several three-way bodies 60, and therefore of the spray nozzles. The gang bar 100 may be manually actuated by suitable linkage means connected to one of the lever arms 80 or to the gang bar 100, but preferably is actuated by a suitable fluid motor 112. The cylinder 114 of the fluid motor 112 may be pivotally connected to the spraybar 10 or associated structure by a suitable bracket and pin 116 and the piston rod 118 of the motor connected by a suitable pin 120 to an extension 122 of one of the lever arms 80. Suitable stop means (not illustrated) may be provided to limit travel of the lever arms 80 at the "bypass" and "shoot" positions of the valve bodies 60.

From the above description, it will be evident to those skilled in the art that the spraybar 10 can be very easily and economically manufactured. The valve body housing 12 may be formed from a single elongated block of suitable metal having the general cross sectional shape illustrated. The valve cavity bores 28 may be drilled, conically reamed and tapped by equipment found in the simplest machine shop. The bypass bores forming the passageways 34 may also be very rapidly drilled either successively by a single drill or simultaneously by multiple drills. The valve body housing 12 will then be complete. The input and return flow manifolds 36 and 48, respectively, may be formed merely by splitting a length of pipe and closing the ends by welding the caps 38, 40, 50 and 52 and the input and return flow conduits 46 and 58, respectively, in place. The manifolds 36 and 48 can then be easily welded to the valve body housing 12. The three-way valve bodies 60 and nozzles 86 may be machined on a mass production basis by conventional machining methods. It will be noted that the only close tolerances required are the matching tapers of the conically tapered valve bodies 60 and the conically tapered valve cavity portions 30 of the bores 28. Assembly of the spraybar 10 is then accomplished merely by inserting the valve bodies 60 in the valve cavity portions 30 and threading the nozzles 86 into the threaded cylindrical portions 32 of the bores 28. Next the washer 76, the spring 74, the washer 78, the lever arm 80, and the washer 82 are placed over the valve body stem 62 and the nut 84 tightened until the lever arm 80 abuts tightly against the shoulders 68 and 70. The lever arms 80 can then be interconnected by the gang bar 100 and the fluid motor 112 connected as previously described to complete the assembly. A portion of the assembly process can, of course, be reversed in order to remove any one of the valve bodies 60 for repair.

In operation, the spraybar 10 is normally disposed parallel to the surface to be coated and will usually be disposed in a horizontal position and connected to a vehicle having a source of hot asphalt under pressure. The hot asphalt is introduced to the input manifold 36 through the inlet conduit 46. Assuming that the valve bodies 60 are in the "bypass" position, the hot asphalt will then pass through the inlet passageways 34a, through the bypass passageways 94 in the respective valve bodies, and through the outlet passageways 34b into the return flow manifold 48, and will then be returned to the source through the return flow conduit 58.

The hot asphalt in the input manifold 36 and the return flow manifold 48 is in direct heat exchange relationship with the valve body housing 12 such that the housing 12 is efficiently heated to substantially the same temperature as the asphalt. Thus it will be noted that the mass of the valve body housing 12 serves as a heat sink. The valve body 60 will continually be heated by the hot asphalt passing through the bypass passageway 94 and also by reason of the fact that it is in close sliding engagement with the valve body housing 12. The spray nozzle member 86 is in good heat transfer relationship with the valve body housing 12 by reason of the tight threaded connections 32 and also will be maintained at a temperature substantially as high as the hot asphalt fluid. Therefore it will be appreciated that what little liquid asphalt may be trapped in the spray nozzles, the

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valve cavities and the passageways of the valve bodies will continually be heated and will remain highly fluid so as to prevent "freezing" and promote reliable operation.

When the actuating lever arms 80 are moved by operation of the fluid motor 112 and shift the valve bodies from the "bypass" position to the "shoot" position so as to rotate the valve bodies approximately 45 degrees, the passageway 96 is moved into register with the inlet passageway 34a and hot asphalt from the input manifold 36 will be directed to the spray nozzle member 86 and expelled from the restrictive orifice 90 in a fan-shaped spray pattern by the diametrical groove 92. The diametrical grooves 92 of the several spray nozzle members 86 can be arranged in any suitable manner but normally will be oriented at an angle to the longitudinal length of the spraybar means so that the sprays from the adjacent nozzles will overlap without intermingling. The hot asphalt will continue to enter the input manifold 36 and the inlet passageway 34a of the valve body housing 12. The hot asphalt will also be passing through the passageway 96 in the valve body 60 so that it will be directly heated and maintained at a high temperature and, of course, the spray nozzle members 86 will also be heated by direct fluid contact and maintained at a high temperature.

The hot asphalt under pressure will act on the lower face 98 of the valve body 60 and assist the spring 74 in urging the valve body 60 into fluid sealing engagement with the valve cavity portion 30 of the valve cavity bore 28. When all of the valve bodies 60 are in the "shoot" position it will be appreciated that no asphalt will be delivered to the return flow manifold 48. In most cases this will not present a problem because the valve body housing 12 will continue to be heated by the hot asphalt in the input manifold 36 and will in turn conduct the heat to the asphalt standing in the return flow manifold 48. However, as a precautionary measure against cooling and congealing of the asphalt in the return flow manifold 48, a fluid passageway 130 may extend completely through each end of the valve body housing 12 in order to permit a restricted volume of fluid to pass into the return flow manifold 48 and provide some agitation and heating to prevent congealing. For purposes which will hereafter become more evident, the volume of asphalt bypassed in this manner should be maintained as low as possible.

When the valve bodies 60 are shifted to positions intermediate the "bypass" and "shoot" positions, both the bypass passageway and the spray nozzle members will be turned "off." Although there is very little reason to ever use this position, if it is so desired a means for providing at least some bypass such as the passageway 130 would have to be provided or no circulation of hot asphalt could be attained through either the input manifold 36 or the return flow manifold 48.

As previously mentioned, the spraybar means 10 can be used in combination with either a constant pressure type or constant volume type asphalt supply system. For example, assume first that a constant pressure system is to be employed. The uniform dispersment of asphalt is dependent upon the maintenance of the same fluid pressure at each of the spray nozzle members 86. It will be noted that the input manifold 36 provides a very clean and relatively large fluid passageway which extends the entire length of the spraybar means without any interruptions or interference. Therefore, the pressure applied to the several inlet passageways 34a will be substantially equal, even if the inlet and return flow conduits 46 and 58, respectively, are connected at one end of the respective input and return flow manifolds. Since the passageways 96 through the several valve bodies 60 and the passageways 88 and orifices 90 of the several spray nozzle members 86 are of the same size and length, the fluid pressure applied to each of these orifices 90 will be substantially equal. While the actuating lever arms 80

are being shifted to rotate the valve bodies 60 from the "shoot" position to the "bypass" position, there will be a momentary rise in the pressure within the input manifold 36 because all passageways are momentarily closed. Therefore, the actuating lever arms 80 should be moved as rapidly as possible. If desired, the passageways 94 and 96 can be oriented closer together so as to require a lesser degree of rotation of the valve bodies 60. However, as soon as the passageway 94 registers with the inlet passageway 34a and the outlet passageway 34b so that the liquid asphalt can pass to the return flow manifold 48, the pressure in the input manifold will quickly be restored to the pressure that existed when the valve bodies were in "shoot" position because the pressure drop of the liquid passing through the bypass passageway means is substantially equal to the pressure drop when the liquid is passing through the spray nozzles. Since the same pressure conditions exist, the same volume of fluid will be entering the input manifold 36. Therefore, it will be appreciated that the range of flow rates which the pressure regulating means of the constant pressure system must regulate will be reduced, thereby permitting greater accuracy. Since the return flow manifold 48 is also very clean and relatively large, the fluid leaving each of the outlet passageways 34b will encounter substantially the same back pressure because no appreciable pressure drop will occur over the length of the return flow manifold 48.

As previously mentioned, an important advantage of the present invention is that one or more of the spray nozzles 86 can be turned off so as to vary the width of the asphalt coat laid down without appreciably changing the volume requirements and operating pressures of a constant pressure system so that the pressure regulating means is not required to make an appreciable change. This can be accomplished very simply by removing the pin 102 connecting the actuating lever arm 80 of the particular valve body 60 which it is desired to disconnect and manually moving the lever arm into a "bypass" position. Then the same volume which normally would have been directed through the nozzle member 86 will always be bypassed into the return flow manifold 48. Since the pressure drop and volume flow remains the same whether the liquid is directed through the spray nozzles or through the bypass passageways, substantially the same volume will be required in the input manifold 36 to maintain the preselected constant pressure. In the event the permanent bypass passageways 130 are provided in the valve body housing 12, the quantity of liquid bypassed through these passageways will be relatively small and insignificant and will not materially affect operation of the spraybar means 10, as described above.

Assume now that the spraybar means is to be operated in combination with a constant volume type asphalt supply system. In other words, assume that a constant volume of asphalt is delivered to the input manifold 36 regardless of the pressure existing in the input manifold. Even when a constant volume supply system is utilized, the volume dispersed from each particular spray nozzle member 86 will always be directly related to the fluid pressure at the orifice 90 of the particular spray nozzle member. The pressure drop as the liquid travels along the input manifold should be negligible so that, for any given volume introduced to the input manifold, the pressure at the respective spray nozzles will be equal. When the valve bodies 60 are shifted to the "bypass" position, the pressure within the input manifold 36 will, of course, fluctuate upwardly during the brief period that all passageways are closed. However, as soon as the valve bodies 60 reach the "bypass" position, the same volume of liquid will be passed through the valve body housing 12 to the return flow manifold 48 with the same pressure drop such that the pressure within the input manifold 36 will quickly return to the same pressure that existed when the valve bodies 60 were in the "shoot" position. Therefore it will be appreciated that the posi-

tive displacement or other constant volume pump can continue to operate at the same rate. Also, it will be appreciated that the pressure within the input manifold 36 is always at the desired high value prior to shifting the valve body 60 to the "shoot" position. Therefore, when the valve bodies are shifted from the "bypass" to the "shoot" positions, the full desired volume of liquid will be instantaneously sprayed from each of the nozzles 86, thereby greatly reducing the problem involved in getting the spraying operation underway.

As described above, any one or more of the actuating lever arms 80 can be disconnected from the gang bar 100 and moved into the "bypass" position in order to reduce the width of the asphalt coat laid down without changing the volume requirements or operating pressure within the input manifold 36. Even if the permanent bypass passageways 130 are provided, the volume passed through these passageways will be sufficiently small as to be insignificant and of no appreciable consequence.

From the above detailed description and drawings it will be evident to those skilled in the art that an improved spraybar construction has been disclosed which will be highly reliable in operation and which will simplify the asphalt supply systems required. It will be evident that spraybars of substantially any length can be fabricated in this manner. Also, two or more spraybars as described can be pivotally interconnected by a simple hinge. Flexible jumper conduits may then interconnect the several input manifolds and the several return flow manifolds of the sections because of the relatively low pressure drop through the manifolds. It will also be appreciated by those skilled in the art that a very economical and simple construction has been disclosed which will have a full and economical operating life.

Although a particular embodiment of the present invention has been described in detail, it is to be understood that various changes, substitutions and alterations can be made in the structure disclosed without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground, comprising: means forming an inlet fluid passageway; means forming a return flow fluid passageway extending generally parallel to the inlet fluid passageway; means forming a plurality of bypass fluid passageways extending between the inlet fluid passageway and the return flow fluid passageway; a corresponding number of spray nozzle means in fluid communication with the inlet fluid passageway for spraying the liquid onto the surface; and, three-way valve means operatively associated with each of the bypass fluid passageways and respective spray nozzle means for selectively directing the passage of fluid from the inlet passageway alternately through the spray nozzle means or through the bypass fluid passageway to the return flow fluid passageway.
2. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground as defined in claim 1 wherein: each of the three-way valve means is disposed between the inlet and return flow fluid passageways and is in heat exchange relationship with liquid in at least one of the passageways.
3. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground as defined in claim 2 wherein: the spray nozzle means is in heat exchange relationship with the liquid in at least one of the inlet and return flow fluid passageway means.
4. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground, comprising: an elongated valve body housing fabricated of heat conductive material;

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- input manifold means connected to one side of the valve body housing to form an inlet fluid passageway;
- a return flow manifold means connected to another side of the valve body housing to form a return flow fluid passageway;
- a plurality of valve cavities formed in the valve body housing;
- a plurality of bypass fluid passageways extending through the valve body housing, each bypass fluid passageway extending between the inlet and return flow fluid passageways and intersecting a valve cavity;
- spray nozzle means having a fluid passageway in fluid communication with each valve cavity and having spray means for directing a spray of liquid onto the surface; and,
- three-way valve means in each valve cavity for selectively directing liquid from the inlet fluid passageway alternately to the spray nozzle passageway or through the bypass fluid passageway to the return flow fluid passageway.
5. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground as defined in claim 4 wherein:
- each valve cavity is formed by a conically tapered bore extending transversely through the valve body housing;
- each three-way valve means is comprised of a conically tapered valve body rotatably disposed in the valve cavity and having an actuating stem extending from one end of the tapered bore; and,
- each spray nozzle means is comprised of an insert in the other end of the tapered bore.

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6. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground as defined in claim 5 wherein:
- the actuating stem extends from the small end of the conical valve body through the small end of the tapered bore, and further characterized by
- an actuating lever arm connected to each actuating stem for rotating the respective valve body; and,
- spring means disposed between each actuating lever arm and the valve body housing for urging the conically tapered valve body into fluid sealing engagement with the conically tapered valve cavity.
7. An improved spraybar for distributing a liquid such as asphalt on a surface such as the ground as defined in claim 6 further characterized by:
- a gang bar for interconnecting the several actuating lever arms for simultaneously actuating the valve bodies; and,
- fluid motor means operatively connected to one of the gang bar and lever arms for actuating the gang bar and lever arms.

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