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W. F. MIDDLESTADT
DISPENSING APPARATUS FOR PLASTIC
SEALING COMPOSITIONS

2,530,777

Filed Dec. 31, 1946

2 Sheets-Sheet 1

Fig. 3.

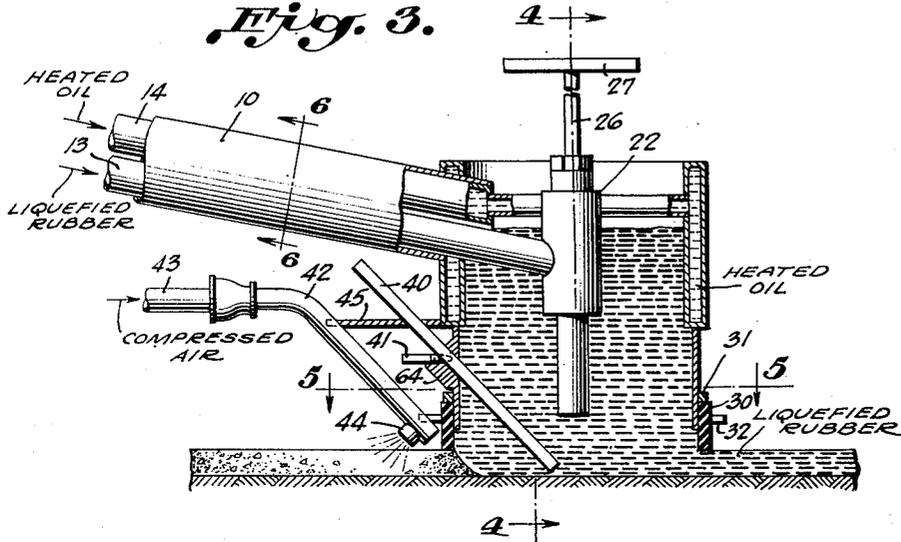


Fig. 4.

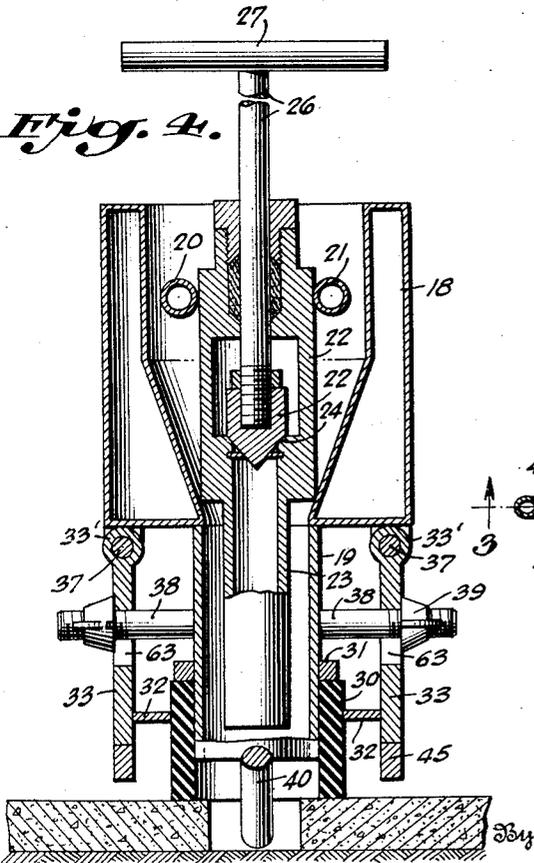


Fig. 6.

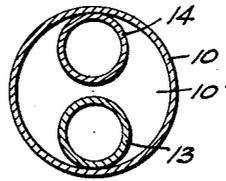
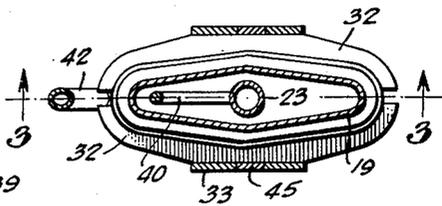


Fig. 5.



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2 Sheets-Sheet 2

Fig. 1.

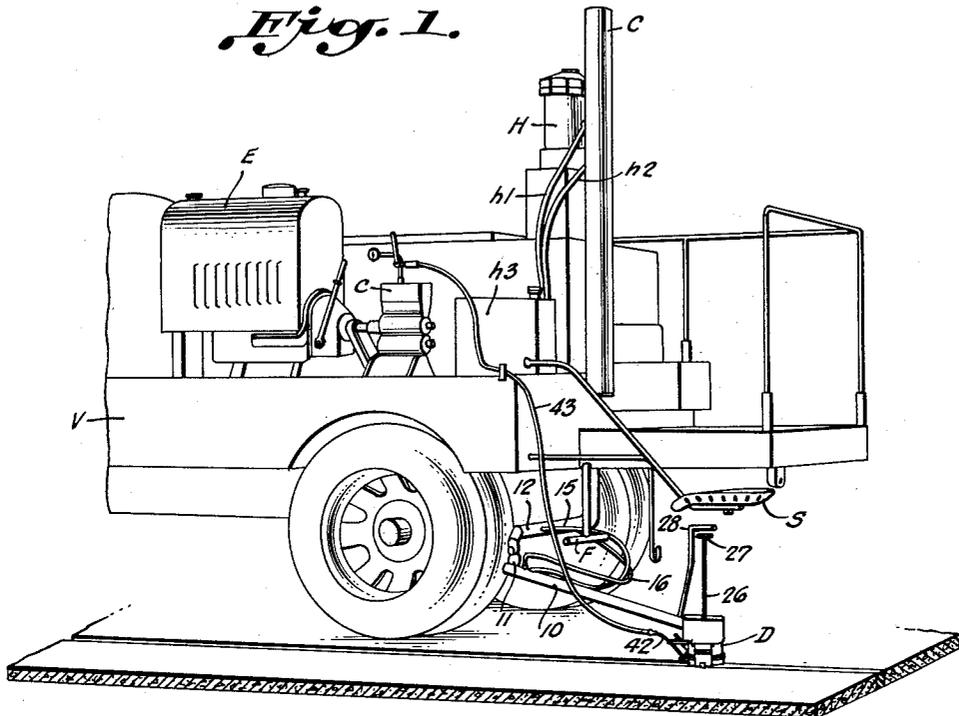
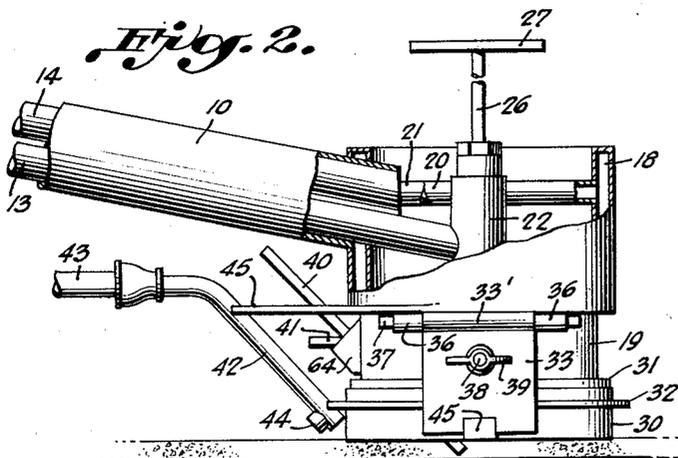


Fig. 2.



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DISPENSING APPARATUS FOR PLASTIC SEALING COMPOSITIONS

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7 Claims. (Cl. 94—39)

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This invention relates to a dispensing apparatus for liquid material, particularly a heated plastic sealing composition, for filling the gaps or spaces between the sections of pavements, roadways, aeroplane landing fields, etc.

It is the object of the present invention to provide a dispensing apparatus which may be conveniently associated with a motor vehicle so that the dispensing unit is propelled over the gap between the pavement sections, and the sealing material which is conditioned for effective flow is mounted on the vehicle and supplies the fluid plastic composition to the dispensing unit in quantities which may be regulated conveniently by an operator of the dispensing unit to fill the gap with rapidity and certainty and without overflowing of the material over the roadway sections. Thereby the filling operation may be performed quickly, economically, effectively and cleanly, requiring no subsequent operations in the completion of the roadway.

It is a further object of the invention to provide a dispensing unit which is simple and rugged in construction and which may be controlled by an operator with minimum experience and attention to obtain uniformly good results. The dispensing unit is so mounted and connected to the propelling vehicle that the same is guided effectively at all times over the gap between the pavement sections despite variations in the path of the vehicle from a strictly true course adjacent to the gap and variations in spacing, level and direction of the gap. Furthermore, the sealing material is deposited along a line of substantially uniform width despite variations of the propelling vehicle from a strictly straight course.

It is a further object of the invention to provide a dispensing unit which maintains the plastic sealing medium in effective pouring condition in substantially the same state as the same exists at its original source on the vehicle. This plastic medium in the dispensing unit is within easy view of the operator and an adequate supply for filling may be maintained easily despite variations in the speed of the propelling vehicle.

It is another object of the invention to provide a dispensing unit which is capable of easy dismantling for the purpose of cleaning and replacement of worn parts.

Another object of the invention is to provide, as an attachment to the dispensing unit, a cleaning nozzle for blowing away debris from the gap immediately prior to the filling of the plastic material therewith.

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The invention proceeds upon the principle of providing a dispensing unit comprising a depositing chamber for heated plastic sealing material which may be connected to a vehicle by means of a universal connection thereto, through which is fed, from a suitable container on the vehicle, a supply of heated plastic sealing material in liquid state to the depositing chamber. The depositing chamber is in the form of an open-topped closed frame which is provided with a flexible squeegee at the bottom edge thereof for the purpose of controlling the flow of the plastic medium therefrom, and which confines the upper level of the plastic medium in the gap, scraping clean the top surface of the pavement sections adjacent to the gap. The upper end of the frame is provided with a heating jacket through which circulates a heating fluid to maintain the sealing composition in a liquid state of low viscosity for effective pouring. A valve projects upwardly from the depositing chamber to control the level of the sealing composition within the chamber so that an adequate liquid head is always present therein for flow into the gap while the quantity of the composition is limited to a point less than what would cause the overflow of the composition over the top of the chamber. This provides a large degree of latitude in the extent of sealing composition which is fed from the primary source on the vehicle so that an inexperienced operator can operate the device with but little training and experience, since the apparatus is virtually automatic in its operation and is largely controlled by the speed of movement of the vehicle and the dispensing device attached thereto.

The depositing chamber is maintained in proper position in overlying relation to the gap requiring no attention from either the operator of the vehicle or the dispensing device by the provision of a guide bar projecting into the gap which automatically guides the depositor over the gap. Also, the deposit of the material is substantially uniform despite variations of the vehicle from a strictly straight course, by the special configuration of the depositor in the form of a diamond with rounded ends, which resembles the configuration of an ellipse. An effective filling of the gap with plastic material is enhanced by the cleaning of the gap by blowing any debris therefrom by means of a nozzle forcing compressed air thereinto immediately in front of the depositing chamber and in a direction forwardly thereof.

Other objects and purposes will appear from

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the detailed description of the invention following hereinafter, taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a perspective view of the dispensing unit mounted upon the rear of a vehicle which is fitted with apparatus for conditioning the sealing composition to bring it into a liquid pouring state;

Fig. 2 is a front elevation of the dispensing unit with certain portions broken away;

Fig. 3 is a vertical sectional view of the depositing chamber with certain parts in elevation;

Fig. 4 is a transverse sectional view along line 4—4 of Fig. 3;

Fig. 5 is a horizontal sectional view along line 5—5 of Fig. 3; and

Fig. 6 is a sectional view along line 6—6 of Fig. 3.

Fig. 1 shows the locale of the present invention as applied to the rear of a vehicle or truck V, upon which is mounted all of the apparatus needed to prepare plastic sealing compositions to bring them into a liquid state for pouring purposes in the filling of the gaps or joints between sections of pavements, roadways, landing fields, etc. Such apparatus is disclosed in my co-pending application, Serial No. 637,433, filed December 27, 1945, and patented as No. 2,439,367 for the purpose of melting thermoplastic rubbery sealing compositions known in the trade under various names such as "Sealz," "Para-Plastic," and other plastic fillers compounded with rubber and/or natural and synthetic resins and/or asphaltic and bituminous materials, with or without fillers. Such apparatus may include a hydraulic extruding device H which is controlled by hydraulic conduits h1 and h2 energized from a hydraulic pump unit and valve casing h3. Mounted on the truck are also one or more burners for the purpose of heating a suitable fluid such as oil to apply indirect heat to the sealing composition to bring the same into a liquid state at temperatures below those which would cause a burning or charring of the constituents and resulting damage to the physical and chemical properties thereof to vitiate the sealing and adhesive effects sought to be attained thereby. A stack for the exhaust gases of the burner is indicated at C.

The vehicle or truck has also mounted thereon an internal combustion engine E which functions as a prime mover for operation of many of the pumps and auxiliary units which are used in the installation, such as a rotary pump for acting upon the heated plastic material to cause a mastication of the particles to bring them into a state of lower viscosity by such mastication and bringing them into more effective heat exchange relationship with the heating medium, which may be a heated oil. One of the many devices operated by the internal combustion engine E is a compressor C which is used to furnish a source of compressed air to a nozzle 42 through the intermediary of a conduit 43, which nozzle is disposed in advance of the depositor D in accordance with the present invention and through the mouth 44 of which is directed a mass of compressed air to blow out the dirt and debris between the pavement sections prior to the flow thereinto of the heated plastic material, which may for all practical purposes be designated as a liquefied rubber or thermoplastic rubbery composition.

A seat for an operator S may be conveniently

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mounted from the frame of the truck where an operator can sit with his feet resting on the foot-rest bar F in position to control the flow of the material into the dispensing unit D, as is more fully explained hereinafter.

While depositing devices for bituminous or asphaltic materials have been used previously, none has been known heretofore which possesses the many structural and functional advantages of the dispensing unit disclosed herein.

The depositing chamber D of the dispensing unit is mounted at the end of a tubular extension 10 which extends outwardly from the vehicle by a universal connection 11 to the conduit 12 of the vehicle. The tubular extension 10 houses two conduits 13 and 14 therein. The conduit 13 supplies the heated plastic composition to the dispensing unit as described below, while the conduit 14 communicates with the high pressure side of the oil circulating pump on the truck through flexible conduit 15 and the jacketed conduit 12 on the truck to introduce the heated oil to the hollow or jacketed upper portion 18 of the depositing chamber. The tubular extension 10 serves as the return conduit for the heating medium and is connected to the low pressure side of the circulating pipe on the truck through the flexible tubing 16 (Fig. 1).

As shown in Figs. 2 and 3, the inlet conduit 14 for the heated oil is connected to tubes 20 and 21 at the front of the depositing chamber near the top thereof, which tubes feed the heated oil to the rear wall of the jacket 18 and which divide thereat to return to the front end of the jacket through the tubular extension 10. Thereby, the upper end of the depositor or dispensing unit D maintains a heated body of oil in heat exchange relationship to the body of the plastic composition which is fed into the depositing chamber through inlet conduit 13 which opens into the internal casing 22 and which is selectively dispersed therefrom into the interior of the depositing chamber by a lifting of the valve 25 from the seat 24 in the valve body 22 (Fig. 4). The sealing composition tends to drop directly into the expansion joint through the nozzle 23 extending downwardly from the valve body 22, and the excess material rises therefrom to a level above the bottom of the nozzle 23 and into the upper end of the jacket 18, which is flared internally (Fig. 4), to maintain the excess material hot and in a liquid state of low viscosity. Thereby the liquid composition which is fed from the source of supply through the jacketed conduit 12 through the flexible joint 11 is maintained in a liquid state as the same courses through conduit 13 in close adjacency to the heated oil in conduits 14 and 10 and thereafter the same passes through valve body 22 and nozzle 23 into the gap of the expansion joint. Upon the closing of the valve 25, the material is maintained in a liquid state by reason of the close contact therewith of the oil in the heating jacket, and whatever excess material accumulates in the dispenser as the same rises therein below the overflowing point thereof, is maintained in a liquid state by the direct connection of the walls of the chamber 19 below the heating jacket 18 and the proximity of the heating jacket 18 and the tubes 21 to the mass of liquid material at the upper portion of the depositing chamber.

The rapidity of the flow of the sealing composition is largely controlled by the speed of movement of the vehicle as the same passes along the gap and the excess material is scraped clean by

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a squeegee 30 in the form of a sleeve of flexible material which fits onto the bottom exterior of the frame 19 directly below a retaining flange 31 on the latter. This squeegee, which may be formed of rubber, reenforced rubber, or any other durable and wear resistant fabric, is designed to limit the area of deposit of the plastic material and to scrape over the surface of the pavement sections so that the level of the sealing material is smoothed off conforming to the level of the adjoining pavement sections. Such action simplifies the pouring operation and presents a distinct advantage over pouring with a kettle up to a predetermined level, which is back-breaking and painstaking work and results in incomplete filling or overflowing despite the careful attention of the operator.

The sleeve 30 is maintained in tight engagement with the lower end of the distributor 19 by virtue of lateral pressing arms 32 (Figs. 4 and 5), which are disposed laterally on the inside of plates 33 which are pivotally mounted below the opposite sides of the jacket 18 of the depositing chamber. Each of the plates 33 is provided with a cylindrical extension 33' at the top thereof which cooperates with cylindrical lugs 36 at displaced points on each side of the depositor, through which extend a common pintle 37. A bolt 38 extending from the frame 19 on each side thereof passes through an opening 63 in each plate and a wing nut 39 is designed to cooperate with the threaded end of each bolt 38 to press the respective plates 33 with presser bars 32 against the squeegee sleeve 30 to bring it into tight engagement with the lower end of the depositing nozzle 19. Wear resistant inserts 45 of manganese steel or any other suitable alloy, extend below the lower edges of the plates 33 in order to prevent the wear of the lower edges of the plates 33 by the pavement sections, and when such wear resistant inserts come into contact with the pavement sections, it is a simple operation to disengage the plates 33 and the pressing bars 32 from the squeegee sleeve and either renew the same or else draw the same downwardly along the depositing nozzle 19.

A guide bar 40 is mounted in the lug 64 at the front of the depositing chamber D and is maintained in set position by means of set screw 41. This guide bar 40 projects below the level of the squeegee sleeve and extends into the gap of the joint to be filled, so that the depositing chamber is maintained in overlying relation to the gap at all times. This guiding bar terminates preferably in approximately the center of the depositing chamber so that any swaying of the truck and the movement of the tubular extension 10 around a center in advance of the dispensing unit will cause no binding of the guide bar in the expansion joint and will perform effectively its centering function in conjunction with the body of the depositing chamber.

As pointed out above, a blowing nozzle 42 is also provided at the front of the depositing chamber which may be braced by horizontal plate 45 (Figs. 2 and 3) to clear the joint of dust, dirt or debris prior to the filling thereof with the rubbery sealing material. The nozzle is directed forwardly so that the compressed air does not blow the dirt towards the plastic material flowing from the depositing chamber. Furthermore, the air gives rise to no cooling effects of the heated plastic material flowing into the gap, although this objection could be obviated by the heating of the compressed air.

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Valve 25, for controlling the flow of the material into the depositing chamber is connected to a shaft 16 terminating in a handle 27 which cooperates with a handle bar 28 extending from the frame of the dispensing device so that an operator as he sits on the seat S can observe the level of the plastic material in the depositor D and by periodically manipulating the valve 27 he can maintain the same in a substantially filled state so that there is an adequate supply of plastic material for flow into the expansion joint while taking care that the supply is cut off when the plastic material rises in the depositing chamber near the overflow point thereof.

Thus, the filling of the gaps with the heated plastic material constitutes a simple operation requiring no special skill and one which assures a uniform extent of filling with least attention by either the operator of the vehicle or the operator of the dispensing device.

The dispensing unit, including the depositing chamber with a head of liquid plastic sealing material therein and the conduits connected thereto for the sealing material and heating oil, render the unit sufficiently heavy so that the squeegee sleeve 30 drags along the pavement with sufficient force to produce a clean wiping action; otherwise additional weights may be attached to the depositing chamber, for example, by suspending such around the upper rim thereof. Such additional weights may be desirable in such cases when the heating jacket is heated by electrical means rather than by circulating a heated oil therethrough.

While the invention has been illustrated in conjunction with a motor vehicle carrying a complete plant for melting the sealing composition, the unit is as well applicable to a manually propelled vehicle and one carrying a simple container for the melted plastic material which preferably is maintained under pressure to facilitate the discharge of the material therefrom. In the installation as disclosed herein, the heated plastic is conveyed to the dispensing unit under pressure by means of a rotary pump which may also serve to masticate the particles of the composition as described above, incidentally to bringing it into a state of low viscosity at temperatures below the breakdown points of its ingredients.

While I have described my invention as embodied in a specific form and as operating in a specific manner for purposes of illustration, it should be understood that I do not limit my invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

I claim:

1. A portable apparatus for filling the gap between pavement sections with a heated plastic sealing material, a depositing chamber formed of a continuous frame adapted to be guided over the gap, a flexible sleeve functioning as a squeegee mounted on the bottom edge of said frame and adapted to scrape over the surfaces of the pavement sections adjacent to the gap, means for clamping said flexible sleeve to said frame, a heating jacket for said chamber to maintain the plastic material in a state of low viscosity, means for feeding the plastic sealing material to said chamber under pressure, valve control means in said chamber for maintaining the level of the plastic material adequate for filling the gap as

the depositing chamber is moved thereover but below the point of overflowing from said chamber, and wear resistant inserts inserted in said clamping means terminating at a level intermediate the bottom edge of said flexible sleeve and that of said clamping means to reduce the wear on the latter as said sleeve is worn down.

2. A portable apparatus for filling the gap between pavement sections with a heated plastic sealing material, a depositing chamber formed of a continuous frame adapted to be guided over the gap, a flexible sleeve functioning as a squeegee mounted on the bottom edge of said frame and adapted to scrape over the surfaces of the pavement sections adjacent to the gap, means for clamping said flexible sleeve to said frame, a heating jacket for said chamber to maintain the plastic material in a state of low viscosity, means for feeding the plastic sealing material to said chamber under pressure, valve control means in said chamber for maintaining the level of the plastic material adequate for filling the gap as the depositing chamber is moved thereover but below the point of overflowing from said chamber, said clamping means comprising a plate pivotally mounted on each side of said frame and provided with a presser bar extending towards the center of the frame, and adapted to be brought into pressing engagement with a part of the flexible sleeve fitted over the lowermost part of the frame.

3. A portable apparatus for filling the gap between pavement sections with a heated plastic sealing material, a depositing chamber formed of a continuous frame adapted to be guided over the gap, a flexible sleeve functioning as a squeegee mounted on the bottom edge of said frame and adapted to scrape over the surfaces of the pavement sections adjacent to the gap, means for clamping said flexible sleeve to said frame, a heating jacket for said chamber to maintain the plastic material in a state of low viscosity, means for feeding the plastic sealing material to said chamber under pressure, valve control means in said chamber for maintaining the level of the plastic material adequate for filling the gap as the depositing chamber is moved thereover but below the point of overflowing from said chamber, said clamping means comprising a plate pivotally mounted on each side of said frame below said heating jacket, a presser bar on each plate extending inwardly towards said frame, and adjustable clamping means between the plate and frame to selectively press the flexible sleeve into engagement with the bottom of the frame through the intermediary of said presser bar or to permit the disengagement of the presser bar therefrom for purposes of mounting or renewal of the flexible sleeve on said frame.

4. A portable apparatus for filling the gap between pavement sections with a heated plastic sealing material comprising a vehicle and a depositing chamber adapted to be propelled over the gap, a tubular extension connected on one end of said depositing chamber, a universal joint connection to said vehicle at the opposite end of said extension whereby said chamber may move in vertical and horizontal planes to enable the depositing chamber to conform to any variations of the gap in level or direction, a flexible squeegee forming the bottom boundary of said continuously enclosed depositing chamber, a guide bar

mounted on said chamber and extending below the level of said squeegee for projection into said gap to guide the chamber thereover, a heating jacket for said chamber to maintain the plastic material in a state of low viscosity, means for feeding the plastic sealing material to said chamber under pressure, and valve control means in said chamber for maintaining the level of the plastic material adequate for filling the gap as the depositing chamber is moved thereover but below the point of overflowing from said chamber.

5. An apparatus as set forth in claim 4 wherein the guide bar extends into said gap below the bottom of said chamber at approximately the center thereof so the guiding is effected without binding at the center of the deposition of the material.

6. A portable apparatus for filling the gap between pavement sections with a heated plastic sealing material comprising a vehicle and an open-topped depositing chamber adapted to be propelled thereby over the gap, a tubular extension extending rearwardly from said vehicle to said depositing chamber, a universal joint connection between said tubular extension and said vehicle to permit free movement of said depositing chamber in conformity with surface variations of said gap, a flexible continuously enclosed squeegee forming the bottom boundary of said depositing chamber, a guide bar mounted on said chamber and extending below the level of said squeegee for projection into said gap to guide the depositing chamber thereover, a heating jacket for said chamber to maintain the plastic material in a state of low viscosity, means for circulating a heating fluid through said jacket comprising a conduit in said tubular extension for conducting the heating fluid to said jacket which is led away therefrom through said tubular extension, means for feeding the plastic sealing material to said chamber under pressure comprising a second conduit in said tubular extension leading from a source of supply of said heated plastic sealing material on said vehicle, and valve control means in said chamber for maintaining the level of the plastic material adequate for filling the gap as the depositing chamber is moved thereover but below the point of overflowing from said chamber.

7. An apparatus as set forth in claim 6 wherein a seat for an operator is fitted upon the rear of the vehicle within view of the depositing chamber, and manual means adjacent thereto for operating said valve control means to maintain a liquid head of plastic sealing material in said depositing chamber.

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