June 7, 1949. G. M. ETNYRE 2,472,199

DISTRIBUTOR FOR BITUMEN AND LIKE MATERIAL

Filed Dec. 8, 1945

3 Sheets-Sheet 1

Fig. 1.

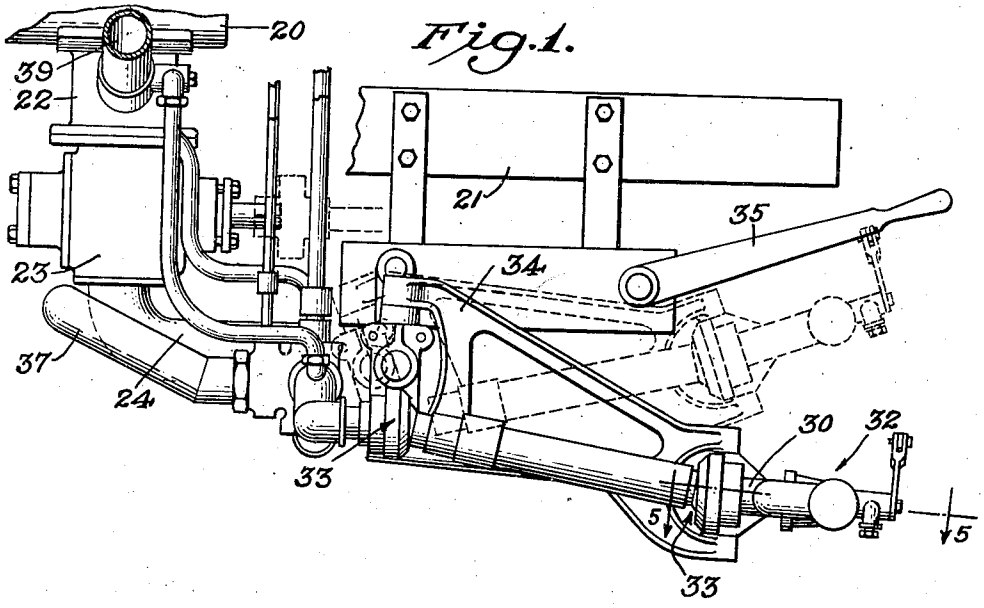
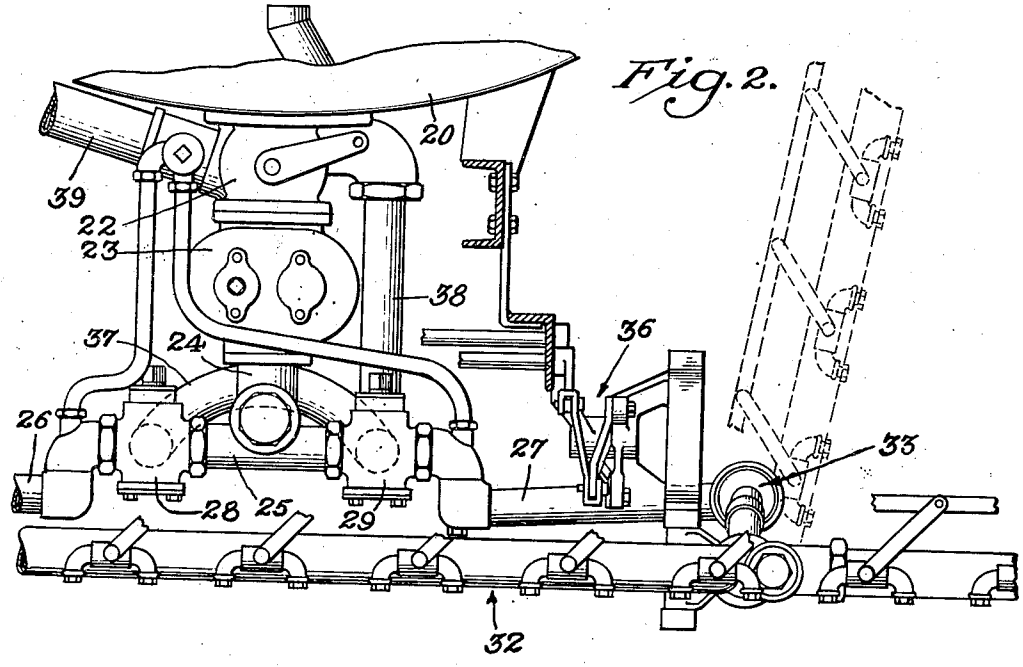


Fig. 2.



Inventor
George M. Etnyre
BY
Cadwalader, Wickersham & Taft
Attorneys.

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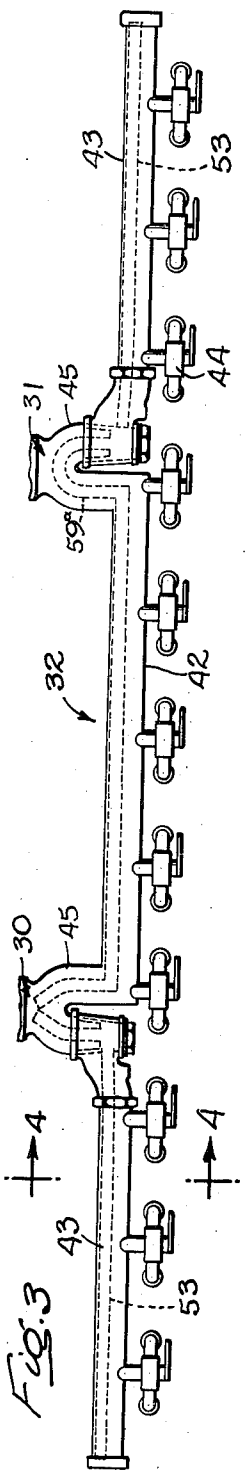


Fig. 3

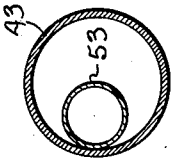


Fig. 4

Fig. 5

Fig. 5a

INVENTOR
George M. Etnyre
By Cullen, Pfleger, Hubbard, Wolf.
ATTORNEYS

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Fig. 6.

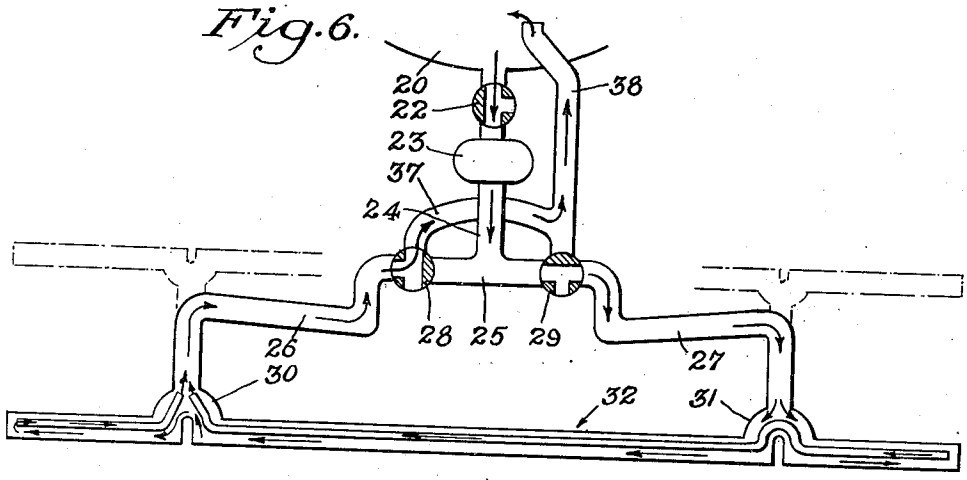
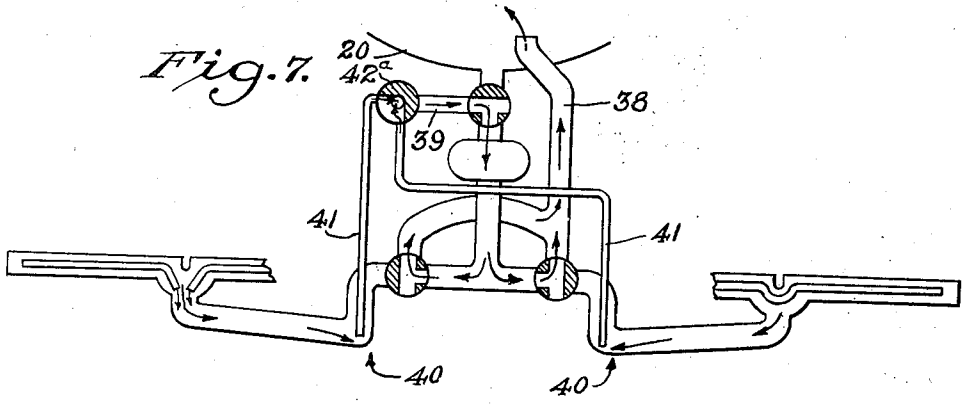


Fig. 7.



Inventor
George M. Etnyre
BY
Cadwalader, Pitzman, Hubbard & Wolf.
Attorneys.

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UNITED STATES PATENT OFFICE

2,472,199

DISTRIBUTOR FOR BITUMEN AND LIKE MATERIAL

George M. Etnyre, Oregon, Ill., assignor to E. D. Etnyre & Co., Oregon, Ill., a corporation of Illinois

Application December 8, 1945, Serial No. 633,728

7 Claims. (Cl. 299—34)

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The invention relates generally to apparatus for distributing heavy viscous fluids such as bitumen material used in road construction, and the present application is a continuation-in-part of my copending application Serial No. 449,888, filed July 6, 1942, now abandoned, which in turn is a division of application Serial No. 185,033, filed January 14, 1938, now Patent No. 2,346,478, dated April 11, 1944.

The general aim of the invention is to provide a new and improved distributor of this character embodying novel means operating to produce an efficient flow of material through the distributor bar.

More specifically stated, the invention has for its object the provision in such a system of a distributor bar composed of a plurality of relatively swingable sections together with means for producing a circulating but nondistributing flow of material throughout the entire bar.

Other objects and advantages will become apparent in the following description and from the accompanying drawings in which:

Figure 1 is a fragmentary side elevational view of a distributor system embodying the features of the invention.

Fig. 2 is a fragmentary view thereof in rear elevation.

Fig. 3 is a plan view of the distributor bar.

Fig. 4 is a transverse sectional view on an enlarged scale through the distributor bar and is taken substantially along the lines 4—4 of Fig. 3.

Fig. 5 is an enlarged fragmentary plan view showing details of construction of the distributor bar, the view being partially in section as indicated by the lines 5—5 of Fig. 1.

Fig. 5a is a sectional view taken approximately in the plan of line 5a—5a of Fig. 5.

Figs. 6 and 7 are diagrammatic views illustrating the paths of flow under various operating conditions and show respectively the system during circulation of material and drainage.

Since distributor systems embodying the present invention are adapted to be used without substantial modification in various types of distributing apparatus, it has not been deemed necessary herein to illustrate or describe fully such apparatus. The apparatus illustrated in the drawings in that more fully shown and described in my parent application above identified and in my prior patents referred to therein.

With particular reference to Figs. 1 and 2 of the drawings, a supply tank 20 is mounted on a suitable chassis or frame which has a member 21 for supporting parts of the distributor system.

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The tank has a bottom outlet controlled by a tank valve 22 (see Fig. 6) and material passing this valve flows to a suitable force pump in a casing 23 which delivers it under pressure to a downwardly and rearwardly extending conduit 24 ending in a transverse header 25. Conduits 26, 27 are connected with the ends of the header through control valves 28, 29 and lead to spaced flow passages or inlets 30, 31 (Fig. 3) on a distributor bar 32. The conduits 26, 27 include leakproof universal connections 33 and have swinging supporting brackets 34 which permit the distributor bar to be raised and lowered as desired by means of a lever 35 actuating suitable linkage 36. The brackets also permit the distributor bar to be swung endwise transversely of the frame. Connected with the ends of the header through the control valve 28, 29 are the opposite ends of a rearwardly disposed return conduit 37, having an intermediately connected return pipe 38 leading to the supply tank.

The valves 28, 29 are several position devices and are the main valves for controlling the direction of flow of material through the distributing system. In one setting they are arranged to connect both ends of the header with the conduits 26, 27 while preventing flow into the return conduit 37. This flow is for the distribution of material since with the tank valve 22 open to connect the tank with the pump material will be delivered to the distributor bar through both of its inlets 30, 31. In another setting the valves 28, 29 close the conduits 26, 27 to the distributor bar and connect the ends of the header with the conduit 37 to return material to the supply tank by way of the pipe 38. This setting is for filling the tank with material drawn into the system through an intake pipe 39 connected to the suction side of the force pump through the tank valve 22 which in this position closes the outlet from the tank. In still another setting a circulatory flow which includes the distributor bar is established. Thus, as shown in Fig. 6, the valve 29 is positioned to connect the header 25 with the conduit 27 for delivery of material to the distributor bar inlet 31. The valve 28 is set to connect the conduits 26 and 37, 38 and establish a flow from the distributor bar inlet 30 (which then serves as an outlet) to the supply tank. Thus, in this circulatory flow material passes into one and out of the other of the distributor bar inlets.

The system may be so conditioned that all material therein beyond the valves 28, 29 and including the distributor bar may be drained there-

from and returned to the supply tank. As shown in Fig. 7 each conduit **26**, **27** is arranged to have a low point therein, indicated at **40**, when the distributor bar is elevated. Small pipes **41** opening at the bottom of these low points communicate with the intake pipe **39** through a control valve **42***a* arranged to connect either or both of pipes **41** with the intake pipe **39**. When so connected and with the system in its filling condition, suction of the pump **23** is utilized to return to the supply tank all material draining to the low points.

In general the distributor bar illustrated herein is an elongated member preferably comprising a fixed central section **42** (Fig. 3) and two end sections **43** which are relatively movable from an alined position with respect to the intermediate section to a vertical nonalined and out of the way position as shown in dotted outline in Fig. 2. The distributor bar, including the two end sections **43** thereof, is provided with a series of discharge nozzle units **44** of suitable construction. In the present instance each discharge nozzle unit comprises a pair of nozzles having a common connection with the distributor bar, the flow of material being controlled by a suitable cut-off valve. All of the valve actuating levers may be connected by suitable actuating members for simultaneous opening and closing.

The material inlets or flow passages **30** and **31** are shown clearly in Figs. 3 and 5 located intermediate the ends of the bar and preferably at the ends of the intermediate section **42**. Referring to Fig. 5 the intermediate section has at each end a U-shaped fitting **45** which may be integral or permanently connected through one arm to the intermediate section. The other arm of the fitting is in the same flat plane as the intermediate section and has a slightly tapered externally finished surface rotatably to receive an internally complemental tubular sleeve **46** formed at one end of an end section **43**. Each end section is suitably held on its associated arm for relative rotational movement as by a screw threaded stud **47** projecting from an end wall **48** on the arm for engagement by a nut **49** to hold an over-sized washer **50** in limiting abutment with the end of the sleeve **46**. An elongated aperture **51** suitably formed in the side wall of the arm affords communication between the interior of the fitting **45** and the end section associated therewith. The base or bend of the fitting has an inlet aperture defined by a flange **52** which forms a part of one of the universal connections **33**.

An important feature of the improved apparatus is the provision in a distributing bar having inlets thereto which are spaced from the ends of the bar of means for effecting a circulating flow of material throughout the distributor bar from one end to the other. As has been described, the system may be set so the material will be delivered to the distributor bar through one of the flow passages or inlets (as shown, the right hand inlet) and flow from the bar through the other (the left) flow passage. Normally this would produce a flow of material through the intermediate section of the bar between the inlets but the material in the end sections would not be circulated.

In the present embodiment each of the end sections is constructed to form contiguous channels or passages for the circulation of fluid therethrough through the provision of a tube **53** (Figs. 3, 4 and 5), of substantially less diameter than the internal diameter of the section, extending from a point closely adjacent to the outer end of

the section into a boss **54** formed as a part of the end section sleeve **46**. The associated arm of the fitting **45** has a transverse wall **55** spaced from the end wall **48** to provide a closed chamber **56** at the end of the arm. Each tube **53** communicates with its chamber **56** through a bore **57** in the boss and through one or another of a series of appropriately positioned apertures **58** in the side wall of the arm. The apertures **58** are so disposed that the tube **53** will communicate therewith in either the alined or unalined position of an end section relative to the intermediate section. As shown in Figs. 4 and 5, the tubes **53** are located at one side (herein the front side) of their respective end sections **43**, although they may be variously positioned as may be desired. Similarly, the elongated portion of the tube **59***a* is shown positioned adjacent the front side of the main section **42**.

Two tubes **59** and **59***a* respectively open into the left and right hand chambers **56** through their walls **55**. One of the tubes extends from the chamber of the left hand fitting forwardly as seen in Fig. 5 so as to terminate in the left hand flow passage **30**. The other tube **59***a* leads from the chamber **56** in the right hand fitting and runs the length of the intermediate bar section and then rearwardly, terminating in the flow passage **30**. As shown, the ends of the two tubes **59** and **59***a* are joined together and to the walls of the fitting as by welding (Figs. 5 and 5*a*).

During the operation of the system when set for distribution, the material is delivered to the end and intermediate sections of the distributor bar through both of the inlet or flow passages **30** and **31**. The use of both flow passages for the delivery of material to the distributor bar during distribution increases the rate at which material may be distributed. Other aids to the rate of distribution which improve that rate for distributing apparatus of reasonable size result from an increase of the flow pressure during distribution and from the fact that the inner tubes **53** and **59**, **59***a* are constructed and arranged to carry material to the end portions of the bar during distribution, the pressures at the outer extremities of the tubes **53**, adjacent the discharge nozzles, being relatively low. As a result of these differences in pressure, the tubes **53** and **59** carry material during distribution and thereby compensate for their occupation of space during that phase of the operation of the distributor system. This flow keeps all sections of the distributor bar fully supplied with material.

When the system is set for a circulating flow (as shown in Fig. 6) the material passes into the right hand flow passage **31** of the distributor bar and part of it will flow through the intermediate bar section to the left hand flow passage **30**. Material will also flow into both end sections and thence reversely through tubes **53**, chambers **56** and tubes **59** and **59***a* to the left hand flow passage **30** for return to the supply tank. The tubes **53** and **59** coact with the several sections of the distributor bar to form contiguous flow channels whereby to effect circulation of the material through the end as well as through the intermediate sections of the bar.

To insure delivery of material to the left hand section of the bar for circulation therethrough, the effective cross sectional area of the left hand flow passage **30** with the upper ends of the pipes **59** projecting into it is made smaller than the cross sectional area of the right hand leg of the U-shaped fitting **45** so that a portion of the ma-

terial is diverted to the left hand leg of the fitting and thence by way of the aperture 51 to the left hand bar section 43. At the same time a zone of reduced pressure is produced in the region immediately above the tubes inducing a return flow of the material through the tubes 53 and 59. Thus the distributing operation of the system may be temporarily interrupted for indeterminate periods of time during which material may be caused to circulate continually throughout practically every part of the system thereby preventing solidification of the material in the conduits or where it might interfere with flow to any nozzle, and maintaining the system in condition for immediate resumption of operation. When operation of the system is to be discontinued entirely, the distributor bar will be elevated and the residual material drained from the system (Fig. 7). It will be noted that when the bar is elevated the tubes 53, 59 and chambers 56 will drain by gravity to the low points 40 of the system.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and herein described in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

I claim as my invention:

1. In a distributor of the character described, a bar comprising inner and outer pipes, means closing said pipes at one end collectively and establishing communication therebetween, means for supplying one of said pipes with material to be dispensed, means in the outer pipe for dispensing said material, means for folding a portion of said bar relative to another portion thereof, and means in said folding means for maintaining communication between the respective pipes of the respective portions in a plurality of angular positions thereof.

2. In a spray bar of the character described, a bar section comprising pipes, one within the other, means closing the ends of said pipes collectively and establishing communication therebetween, means for supplying one of said pipes with material to be dispensed, means in the outermost pipe for dispensing said material, means for folding a portion of said section relative to another portion thereof, and means in said folding means for maintaining communication between the respective pipes of the respective portions in selected angular positions thereof.

3. A distributor bar for bituminous material and the like comprising, in combination, two substantially alined sections each having a pair of contiguous flow passages, hinge means connecting said sections and providing two passages respectively connecting the passages in adjacent sections of the bar, the passages in one section communicating with each other at the ends thereof remote from the other section, inlet means communicating with one of said connecting passages, and outlet means communicating with the other of said connecting passages.

4. A distributor bar for bituminous material or the like, having a fixed section with an outlet at one end, a pivoted section, U-shaped hinge means connecting said sections comprising two substantially parallel leg portions respectively

connected to the two sections and a connecting yoke portion having a material inlet for the material to be distributed, said fixed section having two passages extending lengthwise thereof and both communicating at one end with said outlet and said pivotal section having two passages extending lengthwise thereof and communicating with each other at their outer ends, and said hinge means providing two passages respectively connecting the two passages in each of the two sections both communicating with said outlet and one with said inlet.

5. A distributor bar for bituminous material or the like, having a fixed section with an outlet at one end, a pivoted section, U-shaped hinge means connecting said sections comprising two substantially parallel leg portions respectively connected to the two sections and a connecting yoke portion having a material inlet for the material to be distributed, said pivotal section having two passages extending lengthwise thereof and communicating with each other at their outer ends, and said hinge means providing two passages both communicating with said outlet and one communicating with said inlet.

6. A distributor bar for bituminous material comprising a fixed section having an outlet at one end, a pivotal section, U-shaped hinge means connecting said two sections and comprising two substantially parallel leg portions respectively connected with the two sections and a yoke portion having a material inlet communicating with each of said sections, and means providing a separate circulating passage extending from the end of the pivotal section through the hinge means and said fixed section to said outlet, said circulating passage opening into the outer end of the pivotal section.

7. A distributor bar for bituminous material or the like comprising, in combination, a member providing a flow passage constituting a material supply conduit, an outlet conduit, a distributor bar section mounted for swinging movement relative to said member, a member disposed in said section defining inner and outer passages extending longitudinally thereof and communicating with each other at their outer ends, the outer one of said passages communicating with said material supply conduit, a series of valved outlet nozzles mounted on and spaced apart longitudinally of said section, said nozzles communicating with said outer passage for the discharge of the material delivered through said supply conduit, and means connecting the inner end of said inner passage with said outlet conduit for discharge of the material thereto when said valved nozzles are closed.

GEORGE M. ETNYRE.

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