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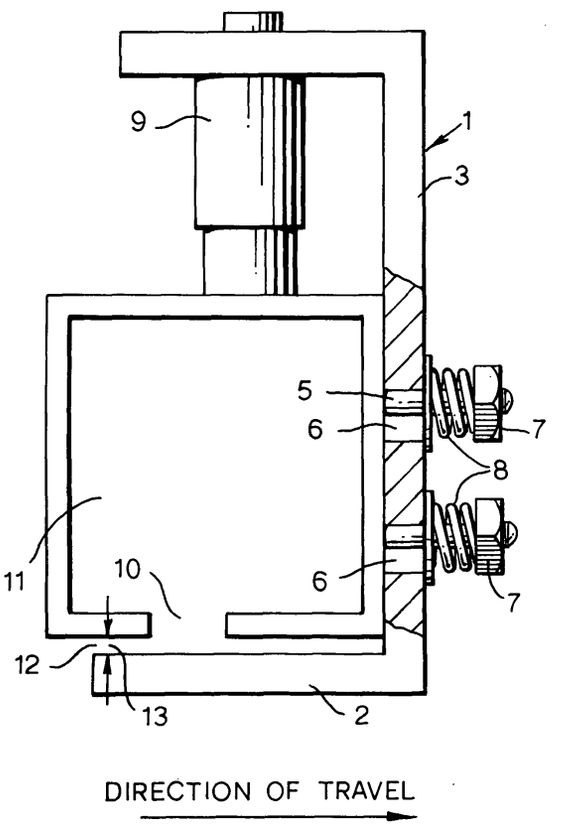
(54) Surfacing device

(57) A surfacing device for trailing application of a fluid material to a surface comprises a bar comprising a leading side wall and a trailing side wall and a cavity therebetween for holding the fluid material, and an underside having an aperture therein, and a plate which, in a first position, closes the aperture and which is downwardly movable to a second position in which the aperture is open and a further aperture is defined between the plate and the trailing side wall, such that in use the fluid material exits the device through said further aperture. The device finds particular application in the surface dressing of roads and pavements, and reduces the airborne contamination and clogging associated with conventional surface dressing spray bars.

Fig.2.



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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a device for use in the application of fluid materials to surfaces, in particular roads and pavements, and to a method of using the device.

BACKGROUND TO THE INVENTION

[0002] Conventional surface dressing of roads or pavements involves spraying of a liquid composition, typically "cutback" (diluted bitumen) or bitumen emulsion, *via* a spray bar attached to the rear of a surface dressing vehicle. The liquid composition is fed to the spray bar using a pump system, and is then sprayed on to the road or pavement through nozzles located on the underside of the bar at relatively high temperatures, typically 180-185°C for cutback and 85°C for bitumen emulsion.

[0003] However, the use of spray bars has well known drawbacks, in particular airborne contamination caused by the bituminous spray that is formed, which has environmental implications, and blockage of the nozzles, which lowers productivity through the need for frequent cleaning. While clogging of the nozzles may be reduced by heating the liquid composition to reduce its viscosity, or by increasing the pressure, this may in turn lead to increased airborne contamination, which is clearly undesirable.

[0004] Another disadvantage associated with the currently available spray bars is that they cannot satisfactorily coat cambered or uneven surfaces, as the surfacing composition is sprayed from a fixed height across the surface, and the pressure at which the composition exits the spray bar cannot be accurately controlled to vary the amount of composition applied to the surface.

SUMMARY OF THE INVENTION

[0005] According to a first aspect of the present invention, a surfacing device for trailing application of a fluid material to a surface comprises a bar, comprising a leading side wall and a trailing side wall and a cavity therebetween for holding the fluid material, and an underside having an aperture therein, and a plate which, in a first position, closes the aperture and which is downwardly movable to a second position, in which the aperture is open and a further aperture is defined between the plate and the trailing side wall, such that in use the fluid material exits the device through said further aperture.

[0006] According to a second aspect of the present invention, a method of applying a fluid material to a surface comprises providing a device of the type defined above containing the fluid material in the cavity of the bar and having the plate in its first position; moving the plate to its second position; and drawing the device over the surface, wherein the size of the further aperture formed, on downwards movement of the plate, between the plate and the trailing edge of the bar is such that the fluid material extrudes from the bar and on to the surface.

[0007] The surfacing device according to the present invention overcomes the afore-mentioned problems associated with conventional spray bars. In particular, by application of the surfacing material by extrusion, in the form of a substantially smooth laminar flow, rather than in the form of a pressurised spray, airborne contamination is significantly reduced or avoided altogether. In addition, through the avoidance of nozzles, the surfacing device is less prone to blockage, and can be used to apply surfacing compositions of a range of viscosities and thicknesses.

DETAILED DESCRIPTION OF THE INVENTION

[0008] While it is envisaged that the surfacing device according to the present invention may be used to apply a variety of fluid materials to a variety of different surfaces, the preferred use of the device is in the surface dressing of roads, pavements, car parks and runways. In this context, the fluid material is typically "cutback" or bitumen emulsion which, after application, may be coated with aggregate to complete the surface dressing operation. However, the device may be used to apply a variety of bitumen emulsion-based materials.

[0009] In use, the device will normally be attached to the rear of a conventional surface dressing vehicle, such that it is trailed behind the vehicle and above the surface to be treated. Fluid dressing material is fed to the device via a pump or by gravity, and from there is laid on to the surface. If aggregate is to be applied, this will typically be sourced from a hopper located on the vehicle, or on a second vehicle. When the bar is not in use, the fluid material may be retained in the device or circulated back to a storage tank which, again, may be located on the vehicle.

[0010] Turning to the structure of the device itself, the bar in which the fluid material is contained may be manufactured in a fixed width form or in expandable form. The bar will typically be square or rectangular in cross-section, although other cross-sectional shapes may be envisaged. While the specific dimensions of the bar are unimportant, for surface dressing applications the bar will typically be 50 mm to 200 mm in width/height, and 2 m to 5 m in length.

[0011] The underside of the bar comprises an aperture through which fluid material exits the bar on to the surface to be treated. This aperture may in fact comprise the entirety of the underside of the bar, in other words the underside of the bar may be fully open. Alternatively, the underside of the bar may be partially closed, to define one or more distinct apertures. The dimension of the aperture may be dictated by the type of fluid material, or the type of surfacing effect desired.

[0012] In the closed, or rest, position, the aperture in the underside of the bar is closed by a plate which is downwardly movable relative to the bar, to open the aperture and define a further aperture, or gap, between the plate and the trailing side wall of the bar, in the direction of movement of the device across the surface to be treated. Typically, the size of this further aperture will be relatively small, for instance in the range 1 mm to 40 mm, so that fluid material will effectively be extruded through it and on to the surface to be treated. Further downwards movement of the plate, to define a larger aperture between the plate and the trailing side wall of the bar enables easy cleaning of the interior of the bar, for instance to remove bituminous deposits therefrom.

[0013] Conveniently, the plate will form the foot portion of a bracket also comprising an upright section substantially perpendicular to the foot portion. The bracket may be attached to the leading side wall of the bar through its upright portion, so that on downwards movement relative to the bar the upright portion of the bracket will effectively extend the leading side wall of the bar, thereby forcing the fluid material out of the back of the bar.

[0014] Movement of the plate, or bracket, relative to the bar may be effected by hydraulic, pneumatic or other means. Preferably, one or more pistons may be used to effect downwards movement of the plate which, if pneumatic, may be run on air from the brakes system of a vehicle to which the surfacing device is attached. In this case, the or each piston is preferably mounted on the bar itself and is in direct communication with the plate.

[0015] It is important that a tight seal is effected between the underside of the bar and the upper surface of the plate so as to prevent leakage of the fluid material. This may be achieved through provision of a seal, for instance made from rubber, which may be attached to the underside of the bar and/or to the upper surface of the plate.

[0016] In one embodiment, the surfacing device according to the present invention comprises a plurality of plates which are arranged along the bar and which are independently movable in relation to one another. The underside of the bar may comprise a single aperture running substantially along the entirety of its length, or a plurality of independent apertures, each of which is closed by its own plate. In this latter case, it may be desirable to partition the bar into a plurality of chambers, each chamber having an aperture in its underside and being closed by a plate. Movement of the plates may be effected by a plurality of pistons, typically mounted on the bar, each piston controlling the movement of a different plate. Such a device is particularly useful for the treatment of uneven or cambered surfaces, as through independent movement of the plates to different extents along the bar different amounts of fluid material may be laid on to the surface, for instance so as to form or retain a camber, or to level an uneven surface, as desired. Alternatively, one or more plates may be left in the closed position, thereby effectively shutting off sections of the bar, in order to pattern the surface or to create road-markings.

[0017] The device will typically be made from metal parts, for instance steel or aluminium. In this case, in order to avoid adhesion of bitumen emulsion to the surfaces of the device it may be beneficial to apply to those surfaces a charge having the same polarity as that of the bitumen emulsion, for instance as described in GB-A-2342943.

[0018] The present invention is now further described with reference to the accompanying drawings.

[0019] Figure 1 is a cross-sectional view of a device according to the present invention in its closed position, as viewed from one end of the device.

[0020] Figure 2 is a cross-sectional view of a device according to the present invention in an open position, as viewed from one end of the device.

[0021] Figure 3 is a perspective view of one embodiment of the present invention, which is a device comprising a plurality of plates and a bar.

[0022] With reference to Figures 1 and 2, bracket 1 comprises plate 2 and upright section 3, which is connected to bar 4 *via* bolt 5. Bolt 5 extends from the leading side wall 4A of bar 4 through slot 6 in upright section 3 and is secured by nut 7. The movement of nut 7 on bolt 5 is restricted *via* the action of spring 8, such that the bar is held flush against the upper surface of plate 2 and the upright section 3 therefore closing aperture 10 in the underside of bar 4, as shown in Figure 1.

[0023] During operation, plate 2 is lowered *via* the action of piston 9, which is activated by air from the brakes system of the vehicle (not shown) to which the device is attached, to release the fluid material (not shown) held in cavity 11 on to the surface being treated. The fluid material exits cavity 11 through aperture 10 and is extruded through gap 12, which is created between the upper surface of the plate 2 and the trailing side wall 4B of bar 4, as shown in Figure 2. Following use of the device, it is easily cleaned by lowering plate 2 further, ie. increasing distance 13 between the underside of the bar and the upper surface of the plate, to enable cavity 11 to be easily accessed *via* aperture 10.

[0024] With reference to Figure 3, aperture 10, which extends along the length of the underside of bar 4, is closed by a plurality of independently moveable plates 2A-2H, which are connected to the bar through upright sections 3A-3H to form brackets 1. During operation, aperture 10 is opened *via* downwards movement of plates 2A-2H due to the action of a piston associated with each plate (not shown), and the fluid material (not shown) contained in cavity 11 is extruded on to the surface to be treated. As the movement of plates 2A-2H may be controlled independently of one another, the aperture 10 may be opened to different extents along the bar, or left closed in some locations, so as to profile the surface to be treated, or apply patterns or markings thereto.

Claims

1. A surfacing device for trailing application of a fluid material to a surface, comprising:

   a bar comprising a leading side wall and a trailing side wall and a cavity therebetween for holding the fluid material, and an underside having an aperture therein, and
   a plate which, in a first position, closes the aperture and which is downwardly movable to a second position in which the aperture is open and a further aperture is defined between the plate and the trailing side wall, such that in use the fluid material exits the device through said further aperture.

2. A device according to claim 1, which comprises a bracket comprising an upright section connected to the leading side wall of the bar, and a foot portion which acts as the plate, the bracket being downwardly movable relative to the bar.

3. A device according to claim 1 or claim 2, which further comprises pneumatic or hydraulic means for moving the plate.

4. A device according to claim 3, which comprises a piston mounted on the bar in communication with the plate.

5. A device according to any preceding claim, wherein the underside of the bar is fully open.

6. A device according to any preceding claim, which further comprises sealing means for effecting a seal between the underside of the bar and the plate.

7. A device according to any preceding claim, which comprises a plurality of plates arranged along the bar and which are movable independently of one another.

8. A device according to claim 7, wherein the underside of the bar comprises a plurality of apertures, and each plate closes an aperture.

9. A device according to claim 7 or claim 8 as dependent on claim 4, comprising a plurality of pistons, each piston being in communication with a different plate.

10. A method of applying a fluid material to a surface, comprising

    providing a device as defined in any preceding claim containing the fluid material in the cavity of the bar and having the plate in its first position,
    moving the plate to its second position, and
    drawing the device over the surface, wherein the size of the further aperture formed on downwards movement of the plate, between the plate and the trailing side wall of the bar is such that the fluid material extrudes from the bar and on to the surface.

11. A method according to claim 10, wherein the surface is selected from a road, a pavement, a car park and a runway.

12. A method according to claim 10 or claim 11, wherein the material is selected from bitumen emulsion and bitumen emulsion-based compositions.

13. A method according to claim 12, wherein the material is bitumen emulsion.

Fig.1.

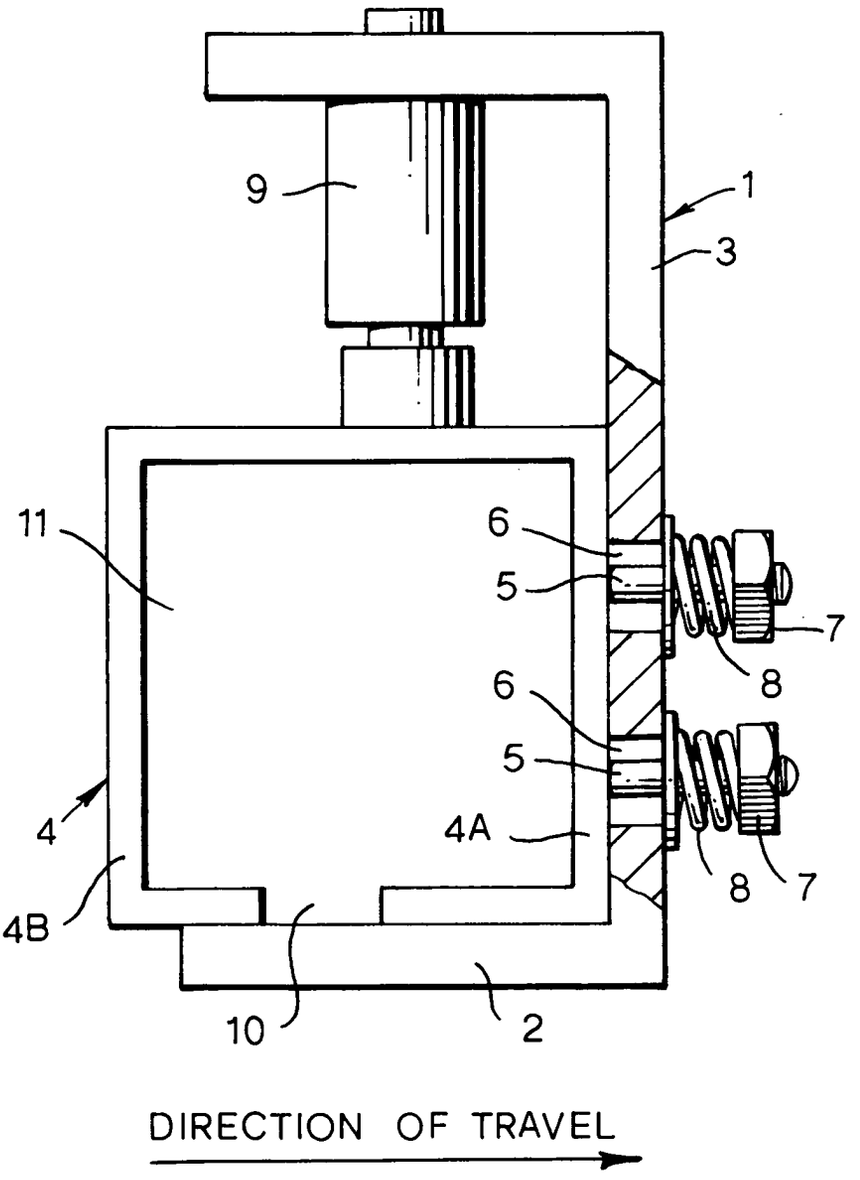
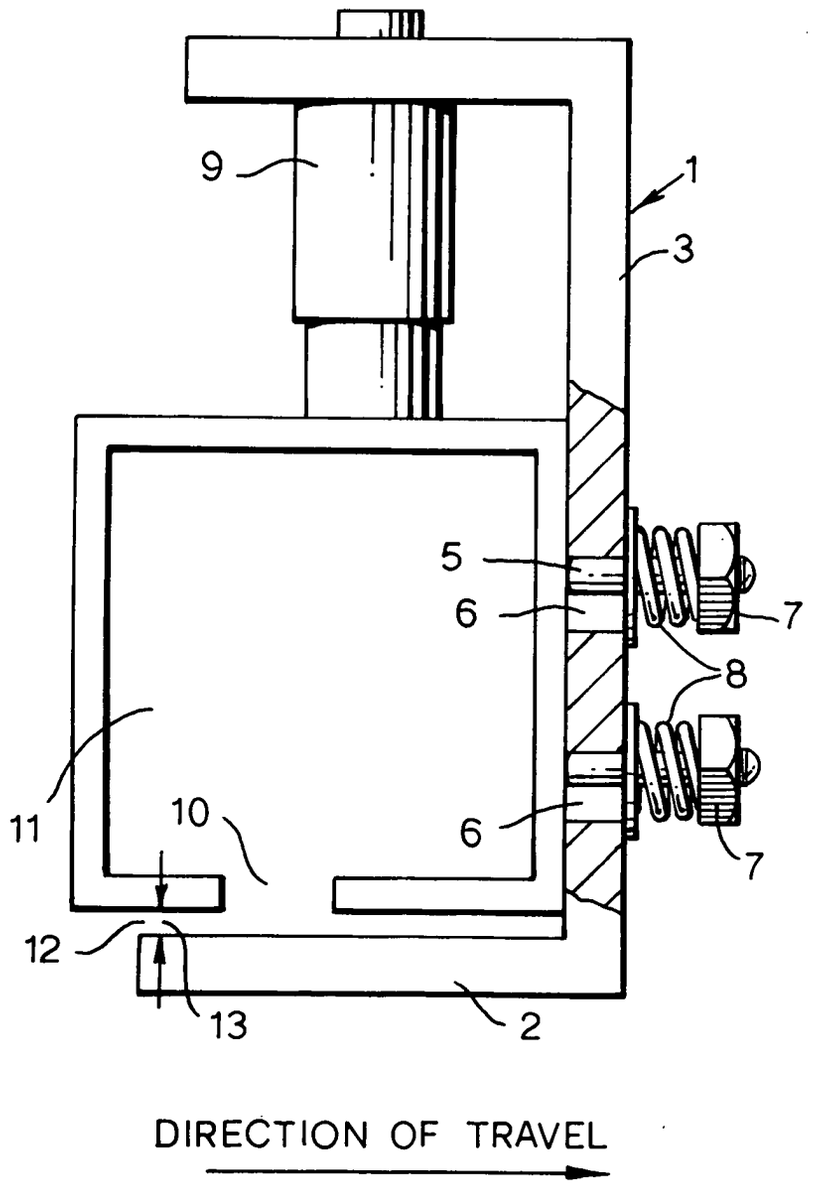


Fig.2.



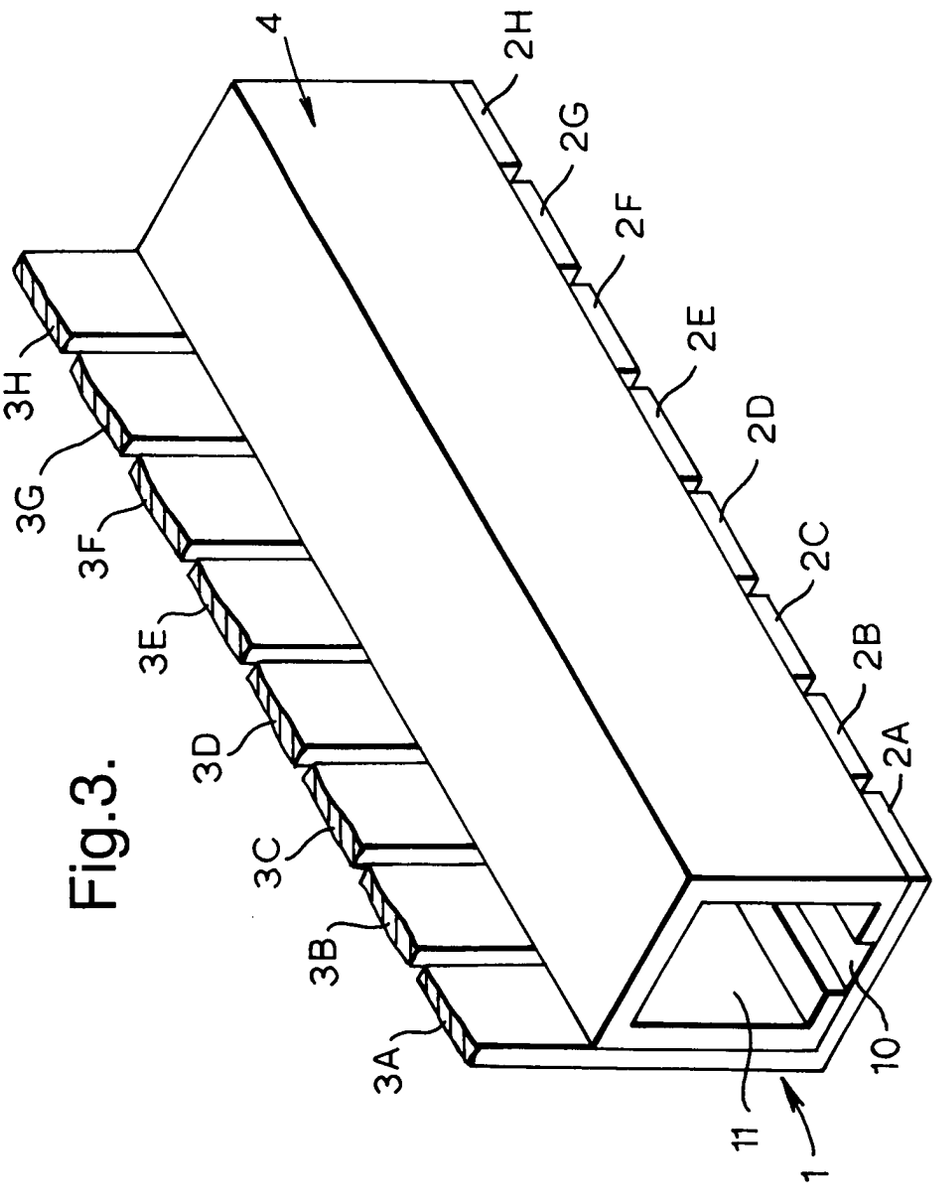


Fig.3.