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(54) Title: APPLICATOR FOR APPLYING A SURFACE DRESSING

(57) Abstract: An applicator for mounting on a vehicle for applying a surface treatment of tar and/or bituminous binder material reinforced with glass fibres, such an applicator comprising an open bottomed spray bar housing, a fan for producing a downdraft in the housing, at least one spray bar mounted on said housing and adapted to extend transversely of the direction of movement of the vehicle on which the applicator is mounted, a plurality of nozzles spaced longitudinally along the spray bar for spraying binder material, means for controlling said nozzles, a plurality of sources for dispensing cut glass fibres through said open bottomed housing to the surface of binder material previously sprayed from the spray bar nozzles during use of the applicator, said sources being mounted at locations spaced along a plane substantially parallel to said spray bar, such that the glass fibres are dispensed substantially evenly onto the surface of binder material previously sprayed from the spray bar nozzles.

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APPLICATOR FOR APPLYING A SURFACE TREATMENT

This invention relates to an applicator for mounting on a vehicle for applying a surface treatment of tar and/or bituminous binder material reinforced with glass fibres.

5 GB-A-2 081 603 describes a surface dressing comprising a binder which is reinforced with chopped glass fibres with a suitable aggregate then being added to the thus coated substrate to be bound thereto by the same binder as has been reinforced with glass fibres.

10 GB-A-2 121 853 describes an applicator for attachment to a vehicle for applying a surface dressing of the type described in GB-A-2 081 603. The applicator comprises an open-bottomed housing containing at least one spray bar mounted to said housing for spraying binder  
15 material from a plurality of nozzles placed longitudinally on the spray bar housing to extend transversely of movement of the vehicle when mounted to said housing and means for depositing cut glass fibres from the glass fibre distributor through the open bottomed housing onto the  
20 surface of a layer binder material previously sprayed from the spray bar nozzles.

A problem associated with the applicator disclosed by GB-A- 2 121 853 is providing an even layer of chopped glass fibres, and controlling the distribution of this



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layer over a first binder layer provided by a first spray bar. It has been found that the layer of chopped glass fibres is dispensed unevenly and indeed can be deposited on areas where there is no binder material. The unevenness  
5 gives a less than satisfactory surface treatment and the glass fibres which do not settle on the strip of binder applied are wasted, which is economically, as well as environmentally inefficient.

A further problem with the device of the prior art  
10 is the circulation of air caused by the spray of bitumen in the applicator. It is inevitable that within the housing, a certain amount of bitumen spray is circulated in an updraft and attaches to the source of the glass fibre spray, and/or the glass fibre feeders. Without frequent  
15 maintenance and cleaning of the glass fibre sources and feeders, the sources and feeders will clog up and operation of the applicator will be halted.

The present invention seeks to overcome the problems of the prior art described above. Thus the  
20 present invention provides an applicator for mounting on a vehicle for applying a surface treatment of tar and/or bituminous binder material reinforced with glass fibres, such an applicator comprising an open bottomed spray bar housing, at least one spray bar mounted on said housing and  
25 adapted to extend transversely of the direction of movement of the vehicle on which the applicator is mounted, a



plurality of nozzles spaced longitudinally along the spray bar for spraying binder material, means for controlling said nozzles, means for dispensing cut glass fibres through said open bottomed housing to the surface of binder material previously sprayed from the spray bar nozzles during use of the applicator, wherein the means for dispensing the cut glass fibres comprise a plurality of sources mounted in said housing and mounted at locations spaced along a plane substantially parallel to said spray bar, such that the glass fibres are dispensed substantially evenly onto the surface of binder material previously sprayed from the spray bar nozzles.

The plane along which the plurality of glass fibre sources are located is preferably a single straight line. Such an arrangement allows the plurality of sources to be powered easily by a single power supply but to operate individually.

The plurality of sources for the glass fibre are preferably similar in number, for example  $\pm 1$  or 2 of the number of spray bar nozzles. Most preferably, the number of glass fibre sources are identical to the number of spray bar nozzles. Such an arrangement allows the plurality of nozzles and glass fibre sources to be arranged such that each glass fibre source is in substantially the same plane of the applicator in the direction of motion of the vehicle as an associated nozzle. Preferably, each pair of a nozzle



and an associated glass fibre source is individually  
controllable.

The applicator optionally contains a second spray  
bar housing and spray bar mounted thereto mounted behind  
5 the source of glass fibre. The second spray bar, which is  
advantageously controllable independently of the first  
spray bar will usually have fewer nozzles than the first  
spray bar, and these nozzles are preferably in interleaving  
planes in the direction of motion of the vehicle to the  
10 nozzles of the first spray bar.

Desirably, the invention also comprises an  
applicator according to the invention which additionally  
comprises a means such as a fan for producing a downdraft  
in said applicator to distribute said fibres more evenly  
15 into the wet bitumen film. The downdraft created by the  
fan reduces the circulation of binder spray from the  
nozzles of the applicator, and thus protects the glass  
fibre choppers of the applicator from being clogged up with  
binder. The downdraft may be produced by a fan located  
20 above the source of the glass fibres and such a fan may be  
powered by any suitable means, e.g. electrically.

Preferably, the glass fibre source comprises a  
supply of a tow of glass fibre, means for supplying the tow  
to a chopper, and means for driving the chopper. The  
25 chopper and supply may be of a conventional type, for  
example a rotary pneumatically powered cutter which drags



in the tow of glass fibres which are chopped into short lengths, for example 20 to 30 mm, which then fall perpendicularly onto a layer of binder provided by the first set of spray bar nozzles.

5           However, in a preferred embodiment of the invention, the glass fibre source comprises a novel chopper comprising a cylindrical cutter drum rotatable about its axis on a driveshaft, the drum comprising axially extending cutter blades protruding above the periphery of the drum at  
10 circumferentially spaced intervals, and a pressure roll for feeding a tow of glassfibre between said pressure roll and said drum, the cutter drum being continuously rotatable and the pressure roll being mounted on a pivotal arm which is individually pivotal by means of a fluid pressure operated  
15 piston and cylinder arrangement onto the surface of the cutter drum.

When the applicator of the invention, optionally fitted with a fan to produce a downdraft, contains a plurality of the novel choppers which form one aspect of  
20 the present invention, the cutter drums of said choppers may be mounted on a single driveshaft, which is continuously rotated, and the movement of the individual pressure rolls of said choppers onto and away from the cutter drum may be individually controlled. With such an  
25 arrangement, the width of the applicator across which glass fibres are sprayed is controlled by selecting which



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pressure rollers are positioned onto their corresponding cutter drums, and which are lifted away from said drums.

The invention will be further described, by way of example, with reference to the accompanying diagrammatic  
5 drawings, in which:

Figure 1 is a side view of one embodiment of an applicator according to the invention;

Figure 2 is a perspective view of an array of choppers for use in the applicator of the invention;

10 Figure 3 is a side view of a chopper of Figure 2;

Figure 4 is a plan view of a cutter drum of the chopper of Figure 3; and

Figure 5 is a side view of the chopper of Figure 3, from the other side.

15 Referring to Figure 1 there is shown a spray bar housing 1 which has an open bottom and is provided with a plurality of nozzles for ejecting conical sprays of binder onto a surface 2 being dressed. In this embodiment an attachment bar 4 is shown mounted to the forward side of  
20 the housing 1 for securement of the applicator to the rear of a vehicle, conventionally a tanker from which liquid binder is supplied. A first spray bar 5 comprising a plurality of longitudinally spaced spray nozzle heads 6, from which conical jets of spray 12 of binder are  
25 projected, is mounted in the forward part of the housing 1. The heads 6 are provided with valves 10 individually

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connected to a supply conduit 8 connected to a binder supply hose. The valves 10 of the individual nozzles control the supply of binder through each spray nozzle.

The applicator housing 1, in its central portion, contains a plurality of choppers 14, the choppers 14 each being fed a tow of fibreglass which is chopped to produce short glass fibres, which fall substantially perpendicularly onto the surface 2 which has been coated with a first layer of binder from the nozzle 6. Situated above the plurality of choppers, is a fan 16 for the production of a downdraft of air in the housing 1, in order to reduce upward circulation of the binder spray 12 and evenly to distribute the spray of chopped glass fibres 18 onto the surface.

In the preferred embodiment of the invention illustrated by Figure 1, a second spray bar 19 comprising an array of longitudinally spaced nozzles 20 distributes a further layer of binder over the surface 2 which has been sprayed. The nozzles 20 are located in spaced planes (parallel to the direction of movement of the vehicle) between the nozzles 6, thereby producing a more even surface treatment.

Figure 2 shows in more detail part of an array of a plurality of choppers according to the invention. A support bracket 24 is mounted to the applicator housing. The said bracket supports a drive shaft 26 onto which





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several cutter drums 28 are mounted. The choppers and their operation will be better understood by reference to Figure 3.

Figure 3 shows the side view of an individual  
5 chopper. A support bracket 24 supports the cutter drum 28 as illustrated in Figure 2. The bracket 24 also supports a hinged arm 30 pivoted by a retaining means 32. The arm 30 contains a pressure roll 34 and a feed roll 36. In use, a tow of glass fibres 38, fed through a conduit 40 from a  
10 source (not illustrated) is passed into the nip of the pressure roll 34 when it is contact with the drum 28, and feed roll 36. The arm 30 is held in place by a piston and cylinder arrangement 42 fixed to the support bracket 24. The cylinder is connected to a suitable hydraulic or  
15 pneumatic supply. Upon actuation, the arm 30 moves about pivot 32 to bring the pressure roll 34 into contact with the cutter drum 28. In operation, the cutter drum 28 will be continuously rotating, thus imparting rotation to pressure roll 34, when it is in contact with the drum 28,  
20 and in consequence pulling the tow of glass fibres 38 over the cutter drum, causing the tow of fibres to be chopped by the cutter blades 44.

Figure 4 shows a cutter drum in further detail. The drum 28 is mounted on a drive shaft 26. Cutter blades  
25 44 are held in axially extending slots in the surface of the drum. The blade 44 is retained in the slot by a



retainer plate 46 and by an inturned rim 48 at one end and  
a bush 50 with an inturned rim 52 at the other. The bush  
50 is fixed to the driveshaft by a retaining screw (not  
illustrated) which can be loosened, allowing the bush 50 to  
5 be moved along the drive shaft, allowing removal and  
replacement of the blades 44 and plates 46 from the cutter  
drum without the requirement to remove the drum from the  
drive shaft.

Figure 5 shows the opposite side view to Figure 3  
10 showing piston 42 fixed by fixing means 56 to the arm 30.  
The Figure also shows a bush 54 mounted on the drive shaft  
26 to stop lateral movement of the cutter drum 28 on the  
opposite side of the bracket 24. In the embodiment of the  
chopper of the invention illustrated, the feed roll 36 is  
15 mounted on an eccentric stub shaft 58 on a lockable  
rotatable support 60, in order that the position of the  
feed roll 36 may be adjusted relative to the pressure roll  
34.

The binder as applied in use of the applicator of  
20 the invention is a conventional tar or bitumen emulsion  
binder with tar, bitumen or a tar and bitumen blend being  
used as convenient. Whereas normally applied hot, for  
example, using K170 bitumen which is a normal 70% bitumen  
emulsion, it can also be applied cold, for example, with  
25 K160 which contains 60% bitumen. In a particular  
embodiment, the operation of the spray bars is arranged so



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that a suitable thickness of bitumen is applied when the vehicle on which the applicator is mounted is moved forwardly at a speed of 1 to 2 km per hour.

The invention thus provides an applicator which can  
5 lay a more even distribution of glass fibres in a surface treatment than applicators of the prior art. Furthermore, through the use of individually operable spray nozzles and associated glass fibre sources, controlled widths of a surface treatment may be efficiently laid by the  
10 applicator.



CLAIMS

1. An applicator for mounting on a vehicle for applying a surface treatment of tar and/or bituminous binder material reinforced with glass fibres, such an applicator comprising an open bottomed spray bar housing, at least one spray bar mounted on said housing and adapted to extend transversely of the direction of movement of the vehicle on which the applicator is mounted, a plurality of nozzles spaced longitudinally along the spray bar for spraying binder material, means for controlling said nozzles, means for dispensing cut glass fibres through said open bottomed housing to the surface of binder material previously sprayed from the spray bar nozzles during use of the applicator, wherein the means for dispensing the cut glass fibres comprise a plurality of sources mounted in said housing and mounted at locations spaced along a plane substantially parallel to said spray bar, such that the glass fibres are dispensed substantially evenly onto the surface of binder material previously sprayed from the spray bar nozzles.

2. An applicator according to claim 1 wherein the number of sources of glass fibres is equal to the number of spray bar nozzles.

3. An applicator according to claim 2 wherein the plurality of nozzles and glass fibre sources are arranged such that each



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glass fibre source is in substantially the same plane of the applicator in the direction of motion of the vehicle as an associated nozzle.

4. An applicator according to claim 3 wherein each pair of a nozzle and an associated glass fibre source is individually controllable.

5. An applicator according to any one of the preceding claims wherein a second spray bar is mounted on said housing to extend substantially parallel to said first spray bar behind the source of glass fibre.

6. An applicator according to claim 5 wherein the second spray bar is controllable independently of the first spray bar.

7. An applicator according to claim 5 or 6 wherein the nozzles of the second spray bar are in interleaving planes in the direction of motion of the vehicle to the nozzles of the first spray bar.

8. An applicator according to any one of the previous claims wherein the applicator additionally contains a means for producing a downdraft within the housing.

9. An applicator according to claim 8 wherein the downdraft

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is produced by a fan located above the sources of the glass fibres.

10. An applicator according to any one of the preceding claims wherein each source of glass fibres is a chopper comprising a cylindrical cutter drum rotatable about its axis on a driveshaft, the drum comprising axially extending cutter blades protruding above the periphery of the drum at circumferentially spaced intervals, and a pressure roll for feeding a tow of glassfibre between said pressure roll and said drum, the cutter drum being continuously rotatable and the pressure roll being mounted on a pivotal arm which is individually pivotal by means of a fluid pressure operated piston and cylinder arrangement onto the surface of the cutter drum.

11. An applicator according to claim 10 wherein the arm of each chopper additionally comprises a feed roll in a position such that a tow of glassfibre is retainable between the pressure roll and said feed roll.

12. An applicator for mounting on a vehicle for applying a surface dressing of tar and/or bituminous binder material reinforced with glass fibres, such an applicator comprising an open bottomed spray bar housing, at least one spray bar mounted on said housing and adapted to extend transversely of the direction of movement of the vehicle on which the applicator is mounted, a



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plurality of nozzles spaced longitudinally along the spray bar for spraying binder material, means for controlling said nozzles, means for dispensing cut glass fibres through said open bottomed housing to the surface of binder material previously sprayed from the spray bar nozzles during use of the applicator, wherein the applicator contains a means for producing a downdraft within the housing.

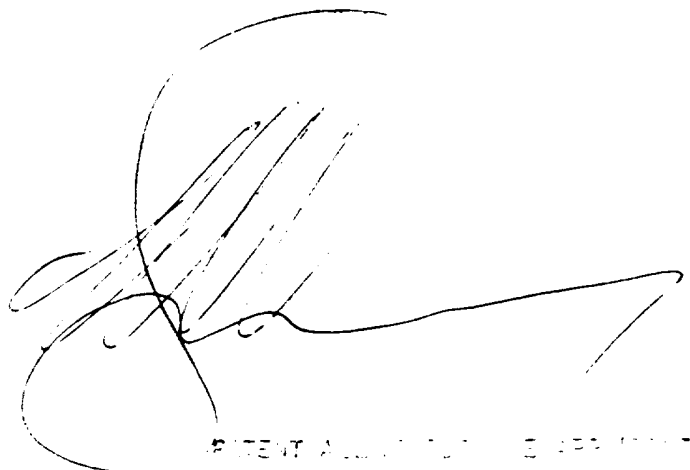
- 10 13. A tow chopper comprising a cylindrical cutter drum rotatable about its axis on a driveshaft, the drum comprising axially extending cutter blades protruding above the periphery of the drum at circumferentially spaced intervals, and a pressure roll for feeding a tow of fibres  
15 between said pressure roll and said drum, wherein the cutter drum is continuously rotatable and that the pressure roll is mounted on a pivotal arm which is pivotal by means of a piston onto the surface of the cutter drum.



ABSTRACT

An applicator for mounting on a vehicle for applying a surface treatment of tar and/or bituminous binder material reinforced with glass fibres, such an applicator comprising an open bottomed spray bar housing, a fan for producing a downdraft in the housing, at least one spray bar mounted on said housing and adapted to extend transversely of the direction of movement of the vehicle on which the applicator is mounted, a plurality of nozzles spaced longitudinally along the spray bar for spraying binder material, means for controlling said nozzles, a plurality of sources for dispensing cut glass fibres through said open bottomed housing to the surface of binder material previously sprayed from the spray bar nozzles during use of the applicator, said sources being mounted at locations spaced along a plane substantially parallel to said spray bar, such that the glass fibres are dispensed substantially evenly onto the surface of binder material previously sprayed from the spray bar nozzles.

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PATENT APPLICATION NO. 8 199 1981





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Fig. 2.

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Fig.3.

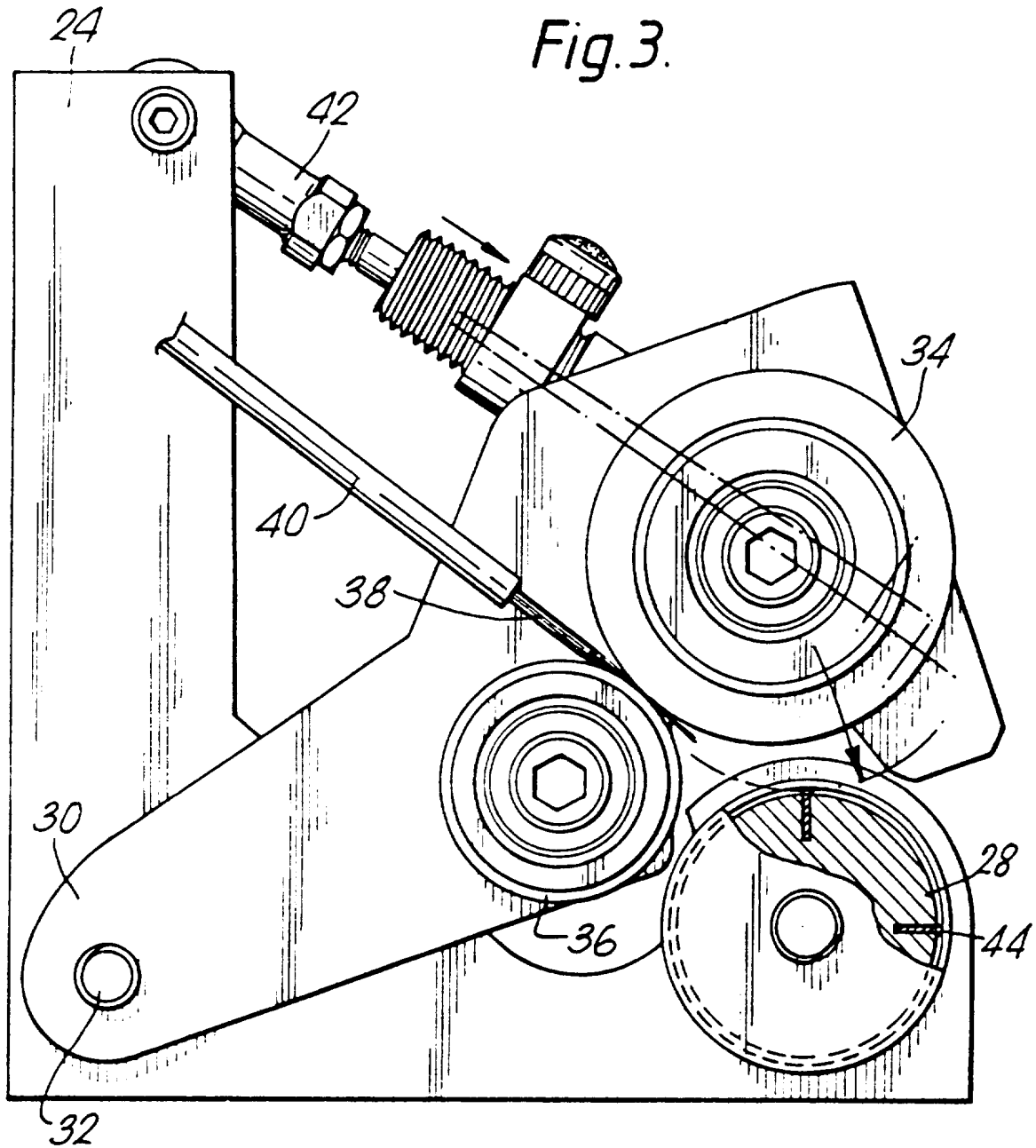


Fig.4.

