United States Patent [19]

Lobmeier

[11] **3,804,696**

[45] **Apr. 16, 1974**

[54] **APPLICATOR CAR FOR FLOWABLE MATERIAL**

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[22] Filed: **Feb. 29, 1972**

[21] Appl. No.: **230,282**

[30] **Foreign Application Priority Data**

Mar. 4, 1971 Germany 2110240

[52] **U.S. Cl.** **156/499,** 118/108, 118/305, 156/575, 156/578

[51] **Int. Cl.** **E04d 5/04,** E04d 5/06, E04d 5/07

[58] **Field of Search** 156/71, 289, 574, 575, 156/577, 499, 578; 118/108, 207, 305; 161/206, 406

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[57] **ABSTRACT**

An applicator machine for applying bitumen, adhesive, varnishes or highly viscous materials to a surface or roof comprises a wheeled frame having a storage tank for the flowable material and a transversely extending application means for applying the material to the surface. The wheels may be coated with silicone rubber to prevent adhesion of the applied material to the wheels. The application means includes a transversely extending distribution channel which is formed by a pair of rubber apron side walls defining an open slot at the lower ends thereof through which the material flows to the roof surface. To assure flow of material into the uphill section of the distribution channel when the machine is on a sloped roof, a valve means may be operated to direct the flow of material section of the channel means. Also, to assist working on sloped roofs, the application chamber may be pivoted in relationship to the tank.

9 Claims, 4 Drawing Figures

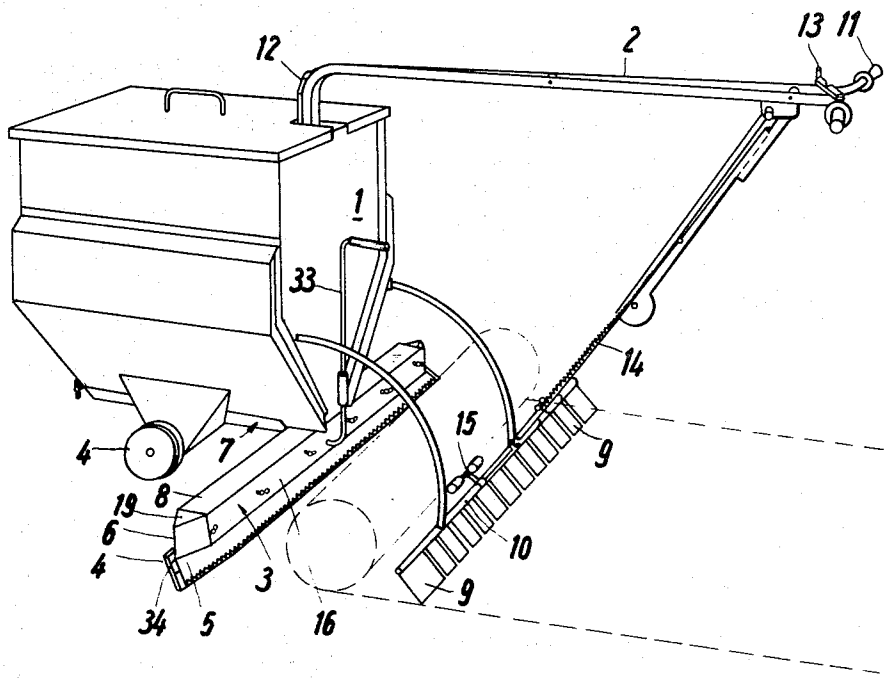


Fig. 1

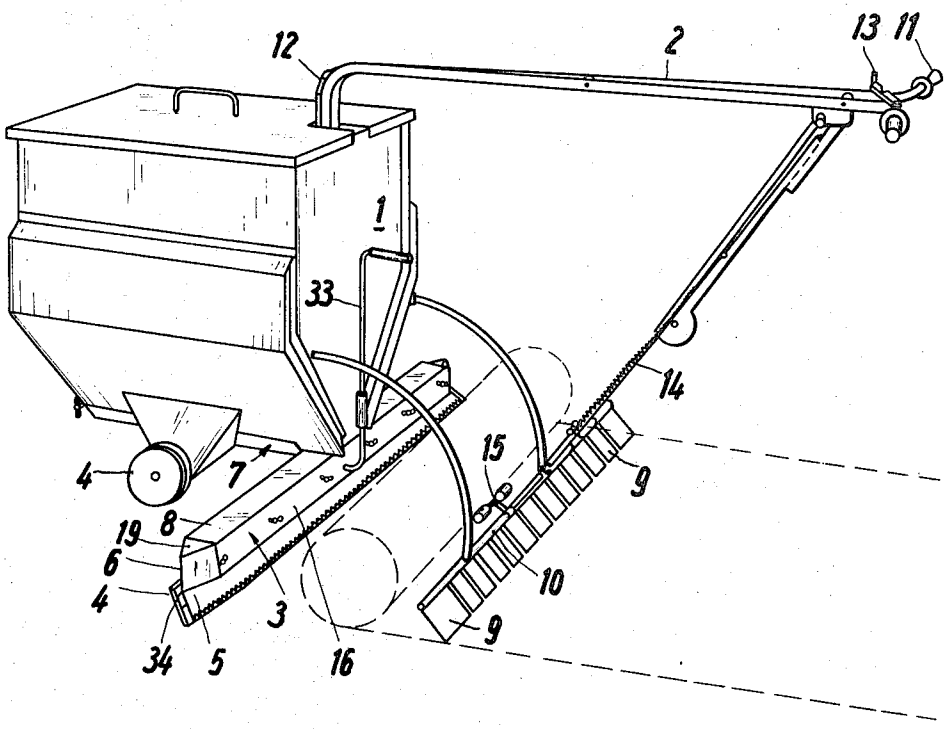
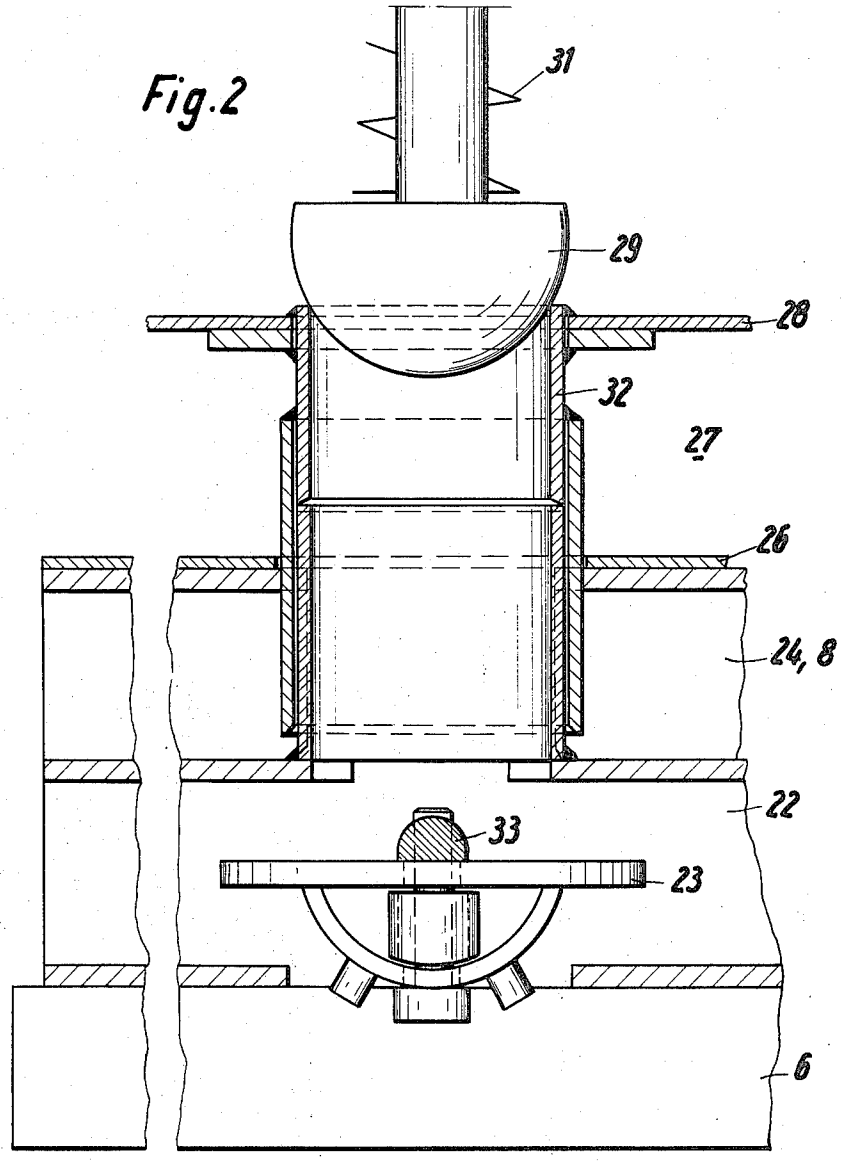


Fig.2



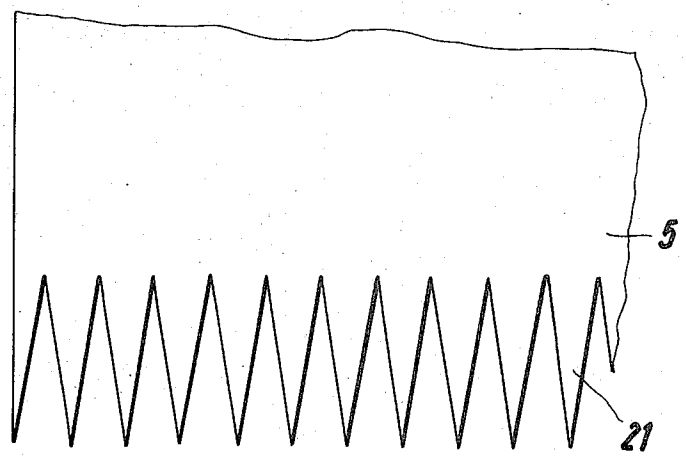


Fig. 4

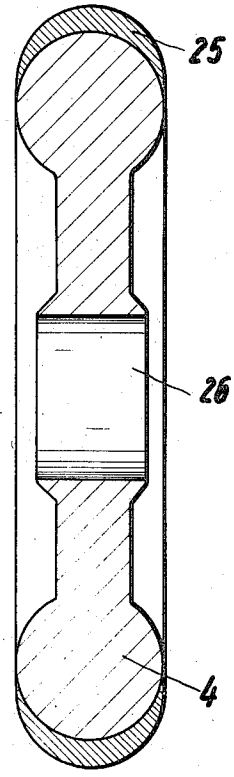


Fig. 3

APPLICATOR CAR FOR FLOWABLE MATERIAL

The invention relates to an applicator car for flowable media, particularly bitumen, adhesive substances, varnishes and similar highly viscous masses.

Applicator cars of the kind mentioned are used to apply bituminous adhesive substances and the like when covering inclined and horizontal roof or other surfaces, in order to either cover these surfaces or to use these substances as connective layer for roofing paper and/or other coatings.

Until now, the applicator cars known from prior art were unable to meet the requirements in practical operations.

Consequently, the invention is based on the problem of creating an applicator car for flowable media, particularly highly viscous substances, such as bitumen, adhesive substances, varnishes, lacquers and the like which is free from the disadvantages of prior art, of easy operation and simple design, and where one individual is able to coat large areas within the shortest time, with savings of a considerable quantity of the substance to be applied, with which the application and pressing on of roofing paper is possible in one operation and simultaneously with the application of the bitumen, said car also being able to be put in operation after prolonged down times and chilling of the bituminous mass, being usable on both flat and inclined roofs, being able to travel over adhesive substances already applied but not yet solidified, and said car moreover being able to apply without difficulty the adhesive substances to a marginal strip of tracks already laid for the subsequent overlapping of the tracks.

It shall moreover be a problem of the invention to create a rubber apron for use at the application chamber of an applicator car for flowable media, particularly highly viscous media, making possible the application both of highly viscous and of highly fluid masses in the desired quantity by controlling the pressure of the chamber, which achieves an absolutely uniform distribution of the masses applied and avoids adhesion of the applied masses, which no longer deforms under the effect of temperatures, and which has a long life.

The problem is solved by the invention in that the applicator car comprises a storage tank and an application chamber extending transversely to the direction of movement of the car, for the flowable medium, said chamber being open on the bottom and its sidewalls consist of a rubber apron.

It is advantageous to apply to the rubber apron in rear position in the direction of movement of the applicator car, serrations having a prong height of about 10 mm and a distance from prong tip to prong tip of about 3 mm.

For the equalization of unevennesses in the ground or floor surface the applicator chamber may be of limited pivotability with regard to the tank about its longitudinal axis. For easier operation it is advantageous to arrange between the application chamber and the supply tank a locking valve operable by remote control, and, in order to make possible the renewed start of operations after an interval, the application chamber may be provided with a heating channel; moreover, an appropriate heating chamber fit for heating with a gas burner may be present surrounding the supply tank on the bottom and laterally and connected to the heating channel.

In order to make possible the application of a coating reel in one operation, the applicator car may be provided with an entrainment hook with wheels for trailing and rolling out, as well as with compression springs for pressing on a reel of coating material.

For easier turning the applicator car according to the invention may moreover have between the shaft of the compression springs and the car trolley a spring-loaded knee lever which is rigid in its stretched position and which can be placed by pressure against the articulation for the collapsing and lifting of the springs and the unwinding wheels.

In order to make possible a movement over surfaces already provided with medium, the applicator car finally may be provided with a coat or tread jacket of silicon rubber, in order to prevent adhesion of the applied mass or with a coat of silicon rubber, available in the trade under the designation F 36, Transparent, specific gravity 1.2, about 50 Shore, by Pampus KG.

Below an embodiment of the invention is explained in detail by means of drawings.

FIG. 1 shows a view in perspective of an applicator car according to the invention;

FIG. 2 shows a partial longitudinal section through an applicator chamber, a heating channel and the distribution system for the medium;

FIG. 3 shows a section through a wheel according to the invention, and FIG. 4 shows the bottom side of a rubber apron on an enlarged scale.

According to FIG. 1, the applicator car according to the invention comprises a supply tank 1 for the medium (mass) to be applied, a guide trolley 2, an application chamber 3 extending transversely to the moving direction of said applicator car and rotatable wheels 4 being fastened to said supply tank.

The supply tank 1 is provided with an upper opening for feeding in the mass and its bottom is provided for collecting the mass remnants with obliquely converging walls and with a valve sphere 29 (FIG. 2) remotely operable by a Bowden cable 12 at the end near the trolley.

The bottom and the sidewalls of the supply tank 1 are surrounded by a heating chamber 7 having an opening (not shown) at the posterior part of the car, through which a gas flame can be introduced. By such a heating the content of the supply tank can be returned to its application temperature after a possible solidification.

The trolley 2 is provided at its end with a handle 11, to which the operating lever 13 for the Bowden cable 12 is fastened. The trolley can be turned as needed, so that the applicator car also is operable from its end or from the side.

For adjusting the compression pressure of the application chamber 3, the shaft 10 connecting the compression springs 9 is connected by a lever 14 of variable length to the trolley 2. If the lever is set at a greater length (lever 14), the application chamber is placed higher between the wheels 4 and the springs 9 and the compression pressure is reduced. As the lever 14 is shortened, the effect is reversed.

The shaft 10 of the springs 9 bears moreover two thrust rollers 15, the roofing paper web to be unreeled being placed ahead of said rollers which coast above the ground, but free from it; they are of limited pivotability in the horizontal plane and roll the roofing paper web to be applied ahead of them.

The lever **14** is designed as spring-loaded knee lever, which is rigid in stretched position, and is moved at a pressure applied to the knee joint and then bends inwardly at once. That way the lever can be pushed upward in order to be free from the roofing paper reel, for pivoting and turning of the applicator car. Conversely, it can likewise be lowered behind the roofing paper reel and there it locks on automatically. Both the raising and lowering operations can be carried out with one handle.

The moving wheels **4** of the applicator car are mounted proximal the center between the center of the supply tank and the trolley-side end, in order to balance thereby the weight of the application chamber. In order to prevent upon movement over a surface to which mass has been applied already, any adhering of said mass to the wheels **4,** the wheels **4** of the applicator car are provided with a jacket of silicon rubber. FIG. **3** shows a wheel **4** in section with the jacket **25** pulled thereover, which is made from silicon rubber. The wheel is applied to the axle of the car via a hub perforation **26.** Naturally, these wheels also may be used in any other equipment which is moved at least at times or occasionally over a surface which has been coated with bituminous adhesive substance.

The rubber strip **5** placed in front in moving direction, of the application chamber, may have in its longitudinal direction (transverse to the movement of the applicator car) a bias of about 1.5 percent. This bias prevents that upon heating of the rubber plate **5** it undulates because of its longitudinal expansion at its lower edge in relation to its clamping on.

The rubber apron **6** placed rearward in the direction of movement is provided at its lower longitudinal edge with prongs **21** having a distance from prong tip to prong tip of 3 mm and a prong height of 10 mm. If the applicator car is now pushed by a person, this person may apply the pressure upon the application chamber at will and thus upon the rubber apron **6** of the application chamber, and thus adjust the quantity of the discharging material according to its visosity via the prong bending.

In the center of the floor of the container **1** there is a valve operable by the Bowden cable **12,** comprising a sealing sphere **29,** a spring member **31** urging the locking sphere into closing position and a feed pipe **32** for the mass inserted into the bottom of the container **28** and extending upward slightly into the interior of the container.

When the Bowden cable **12** is pulled up, the sphere **29** is moved against the force of the spring member **31** from its seat toward the feed pipe **32,** and, depending on the position of the operating lever **13** of the Bowden cable **12,** it releases a more or less large annular gap for the feeding of the mass from the supply tank **1** into the application chamber **3.** When the Bowden cable **12** is returned, the sphere **29** closed again. That way the quantity of the discharging mass can be metered precisely.

The feed pipe **32** itself can be of limited pivotability, either by the elasticity of the tank bottom **28** and of the heating chamber **27** or by additional means not shown, with regard to the longitudinal axis of the supply tank **1,** in order to enable the application chamber **3** to adjust to unevennesses of the surface to be coated.

The application chamber **3** itself comprises a distribution channel **22,** with a heating channel **8, 24** being placed on top of said channel **22** which bears at its longitudinal sides, with the aid of a guiding angle **16,** the rubber aprons **5** and **6,** which converge at the end of the distribution channel where they form laterally overlapping lips.

According to FIG. **2** the distribution channel **22** has a rectangular cross-section and the mass discharges through apertures placed in the center and at the lateral ends of the pipe bottom, into the area between the rubber aprons **5** and **6.**

A valve member **23** is placed above the central aperture of the pipe bottom, said valve member being adjustable via an adjustment lever **33,** which is lockable and guides, depending on its position, the mass in a uniform manner into both sides of the distribution channel **22** and into the center of the area between the rubber aprons **5** and **6** or, for example in a moving direction transversely to the inclination of a surface, it can guide the mass primarily or entirely into one side of the distribuion channel **22,** the side being on top in each particular instance.

The apertures not shown, placed proximal the ends of the application chamber **3** make sure that the area between the rubber aprons **5** and **6** is supplied adequately with mass in all sections. The valve member **23** itself comprises a deflection panel fastened with a screw for deflecting the incoming mass into one of the sides of the distribution channel **22** when the adjustment lever **33** is inclined accordingly, and also a semicircular part engaging into the central aperture of the bottom of the distribution pipe **22,** said part closing in case of a tilting of lever **36** the central aperture in an increasing measure.

The heating channel **8** is connected to the heating chamber **7,** and both may be heated jointly by a gas burner if the mass to be applied should be chilled and solidified, for example following an interruption of the operation. The heating gas current thereby discharges for example through ventilation openings **19.**

The applicator car solves the problems demanded of it in a most simple manner. Its particular advantage consists in that, surprising to the person skilled in the art, it offers savings of up to 30 percent in the mass to be applied and assures moreover a pressing on of the roofing paper in a manner which otherwise is impossible.

The shaft **10** trailed for this purpose has a large number of steel spring leaves **9,** placed transversely to the direction of movement, and 2 mm thick for example, which deliver a uniform pressing force, as their surface of adhesion is extremely low and the individual spring is resilient.

The application chamber is provided at its end with vertically extending reinforcement bars **34** and elastic supporting members placed thereunder to prevent a bending of the rubber strips **5** and **6** at the ends.

What we claim is:

1. An applicator machine for a flowable material comprising a frame having wheels for movement in a given direction, a storage tank carried by said frame for carrying said flowable material to be applied to a surface over which the machine passes, application means for applying the flowable material to the surface and including a transversely extending chamber and a distribution channel therein, said chamber being open on the bottom to permit the material to flow downwardly through the open bottom of the chamber to the surface,

flexible aprons extending downwardly from said bottom to define front and rear side walls for said chamber, conduit means extending between said storage tank and said application means to allow the material to flow therethrough and into the distribution channel, valve means for controlling the amount of material flowing to said distribution channel, means for deflecting the discharge of the flowable material from said conduit means in predetermined directions as toward the uphill side of the channel means when the machine is on a sloped surface, and manually adjustable means for controlling said deflecting means and movable to reverse the direction of material deflection when said machine has been turned about to travel in the reverse direction.

2. An applicator machine according to claim **1** including means for mounting said application means for pivotable movement about a longitudinally extending axis for said machine and relative to the storage tank to facilitate application of flowable material to a sloped roof surface.

3. An applicator machine in accordance with claim **1** in which a heating means surrounds the bottom of said storage tank to apply heat thereto and further comprises a heating channel extending transversely with said distribution channel to heat the material flowing to and through said distribution channel.

4. An applicator machine according to claim **1** comprising rolls spaced above said surface for engaging a roll of roofing material to be applied to said surface, and further comprising a plurality of spring plates disposed rearwardly of said rolls for applying pressure to the roofing material.

5. A machine in accordance with claim **1** in which a silicone rubber coating is provided on said wheels to prevent adhesion of the flowable material to said wheels.

6. An applicator machine in accordance with claim **1** in which said rear apron is made of rubber and is provided with prongs on the bottom edge thereof.

7. A machine in accordance with claim **6** in which said prongs have a height of about 10 mm and the spacing between adjacent prong tips on the bottom is 3 mm.

8. An applicator machine in accordance with claim **1** in which said front apron is made of rubber and is disposed at an angle of about 1.5° to the longitudinal direction of the apron.

9. An applicator machine according to claim **1** including a trailing means for engaging the surface with a compression force, and means for adjusting the trailing means to control force applied by the trailing means to said surface.

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