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Method and apparatus for applying a bituminous sheet to a substrate.

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References cited:
DE-A- 1 652 399
FR-A- 1 381 238

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Description

The invention relates to a method for applying a wide bituminous sheet to a substrate through heating the sheet and rolling out the heated sheet over the substrate, the sheet being conveyed over a heating device over its entire width directly prior to rolling out.

Such a method is known from DE-A-1,652,399. The heating is in this case carried out by contact with hot gases. These gases have to have a higher temperature than is necessary in order to make the bitumen adhering, for the heat transfer is not efficient. Slight congestion in the feed-through rate gives rise to temperature differences and causes the sheet to burn through.

It is therefore common practice for bituminous sheets to be applied to a substrate by rolling out the sheet and heating it with burners, while liquid bitumen is added simultaneously. Burners which are controlled by hand or are fixed and are directed onto the bituminous sheet do not, however produce accurate, uniform heating either. The problems of uniform heating and adding of liquid bitumen increase as the surfaces to be covered increase, and as the width of the sheet increases. "Wide sheet" should be understood as a width of approximately 1 metre or more. The known methods cannot therefore meet the increasing requirements as regards accuracy and reliability of the covering by means of bituminous sheets.

Attempts to mechanise the process, such as by the method of the above-mentioned DE-A-1,652,399, have only led to less satisfactory results.

The object of the invention is then in the first place to provide a method by which the problems of the known method are solved.

This object is achieved according to the invention in that the sheet in this case is conveyed over its entire width in sliding direct contact over a preheated surface of which the temperature is essentially constant.

The sliding contact with a heated surface of which the temperature must, of course, be kept constant at the desired value, which temperature is of the order of magnitude of 300°C, ensures a more uniform heating of the bitumen layer. Accurately controlling and monitoring the temperature of a heated surface are possible with known equipment. The sliding contact means that a uniform good heat transfer takes place, so that the end temperature of the sheet will be virtually the same as that of the heated surface, with the surprising effect that the addition of liquid bitumen in the nip between the roller which presses the sheet onto the substrate and the substrate is no longer necessary.

The bitumen layer of the sheet is made uniformly liquid and thus also adheres uniformly all over the substrate. Local under-heating or overheating of the type which can occur in the case of hand-controlled burners or fixed burners no longer occurs now.

The invention also relates to an apparatus for use of the method, which apparatus is characterised in that, viewed in the direction of movement of the sheet, before the roll-out roller there is an internally heated drum over which the sheet is conveyed, and which during operation rotates in a direction opposite to the direction of movement of the sheet. A drum is an excellent means for being uniformly heated by internal heating. It is also a very suitable means over which to convey a sheet which, coming from a stock roll, runs over a guide roller and then over the surface of the heated drum, and from there to the roller which produces the rolling out onto the substrate. The contact of the sheet with the drum is over a large part of the periphery, at least half the periphery. The drum could stand still or rotate in the same direction as the direction of movement of the sheet, but at a different speed. It is, however, preferable to have an apparatus in which during the application of the sheet the drum rotates in a direction opposite to the direction of forward movement of the sheet over the drum, and this promotes uniform heating and maintaining of the wall of the drum at a constant temperature.

A surprising aspect in this case is that the wall of bitumen for the nip between the roller which produces rolling out and the substrate, and which was obtained in the case of the known method by pouring in liquid bitumen, now forms by itself without the addition of bitumen, which means that air inclusions between substrate and sheet are also prevented without adding bitumen. The great uniformity of the heating prevents local overheating.

It is thus possible with the invention to cover large surfaces rapidly in a high quality and without defects, with an apparatus which could be described as simple.

It is pointed out that a method and an apparatus are known from FR-B-1,381,238 for the application of strips to a substrate, in which the strip coming from a stock roll is brought into sliding contact with a stationary plate which is heated by burners at the side facing away from the contact side. This is, however, concerned with the softening of thermoplastic material, which thus does not have any bituminous layer, and with narrow strips such as road markings.

The problem on which the present invention is based, which arises from the correct formation of the wall of bitumen where the sheet comes into contact with the substrate, does not occur here.

The invention will be explained further with reference to the appended sketch.

It shows in cross-section a substrate 1 to which a bituminous sheet 2 must be applied. This sheet comes from a stock which is not shown and first runs over a reversing roller 3 and thereafter over the surface of the drum 4 rotating in the direction of the arrow 5, which is opposite to the direction of movement.
of the sheet 2, which is indicated by the arrow 6.

This drum is uniformly heated by means (not shown) which are known per se, such as burners, superheated steam or other means which are known per se. Schematically indicated at 7 is a temperature sensor which can measure the surface temperature of the drum 4 and can be incorporated in a control circuit for controlling the temperature of the surface of the drum 4.

Situated at 8 is the roll-out roller by means of which the sheet is pressed onto the substrate 1. The sheet leaves the heated drum 4 at 9 and runs directly to the roller 8, which ensures that the sheet with the liquid bitumen layer is pressed onto the substrate. A bitumen wall 10 automatically forms in the process, without additional bitumen having to be poured in. This wall of bitumen prevents air inclusions and, as it were, prepares the surface of the substrate 1.

Claims

1. Method for applying a wide bituminous sheet (2) to a substrate (1) through heating the sheet (2) and rolling out the heated sheet over the substrate (1), the sheet (2) being conveyed over a heating device (4) over its entire width directly prior to rolling out, characterised in that the sheet (2) in this case is conveyed over its entire width in sliding direct contact over a preheated surface (4) of which the temperature is essentially constant.

2. Apparatus for use in the method according to Claim 1, characterised in that, viewed in the direction of movement of the sheet (2), before the unrolling roller (8) there is an internally heated drum (4) over which the sheet (2) can be conveyed, and which during operation rotates in a direction (5) opposite to the direction of movement (6) of the sheet (2).

Reivendications

1. Procédé pour appliquer une large feuille bitumineuse (2) à un substrat (1) par chauffage de la feuille (2) et application au rouleau de la feuille chauffée sur le substrat (1), la feuille (2) étant acheminée sur un dispositif de chauffage (4) sur toute sa largeur, directement avant l'application au rouleau, caractérisé en ce que la feuille (2) est acheminée dans ce cas sur toute sa largeur en contact glissant direct sur une surface préchauffée (4) dont la température est essentiellement constante.

2. Appareil destiné à être utilisé dans le procédé selon la revendication 1, caractérisé en ce que, vu dans la direction de déplacement de la feuille (2), avant le rouleau d'application (8) il y a un tambour (4) chauffé par voie interne sur lequel la feuille (2) peut être acheminée et qui pendant le fonctionnement tourne dans un sens (5) opposé à celui du déplacement (6) de la feuille (2).

Patentansprüche

1. Verfahren zum Aufbringen eines breiten Bitumenstreifens (2) auf ein Substrat (1) durch Erhitzen des Streifens (2) und Ausrollen des erhitzten Streifens auf dem Substrat (1), wobei der Streifen (2) mit seiner gesamten Breite über eine Heizvorrichtung (4) direkt vor dem Ausrollen geführt wird, dadurch gekennzeichnet, daß der Streifen (2) in diesem Fall auf seiner gesamten Breite in direktem Geltkontakt über eine vorgeheizte Oberfläche (4) geführt wird, deren Temperatur im wesentliche konstant ist.

2. Vorrichtung zur Verwendung bei dem Verfahren