

"Method for delivering a foamable mixture, especially for a temperature insulation material, using a mixing head for at least two reactive components in a low-pressure method and insulation material produced according to the method".

The method, the pertinent mixing head as well as the insulation material thusly produced can be employed wherever insulation material is produced and used with which larger roof areas are intended to be provided for forming an insulating and sealing layer.

The present invention relates to a method for the delivery of a foamable mixture, especially for a temperature insulation material, using a mixing head for at least two reactive components in a low-pressure method, comprising a pipe inside which an agitator rotates at high speed, a mixing head for performing the method and an insulation material produced in accordance with the method.

Mixing heads for polyurethane foaming mixtures in the low-pressure method are known. In order to distribute the material with the aid of a mixing head on a substrate passing through below the mixing head, the most widely varying methods and means are employed which are subject to a great many shortcomings. Given the high viscosity of the foaming mixtures, in most cases not even the reciprocal guiding of the mixing head transversally to the direction of travel suffices in order to achieve the desired flow of the foamable mixture. Employed are, by way of example, fishtail-shaped outlet nozzles. Pipes having small bores are also made use of, in which case the mixture is discharged with the aid of compressed air. All these forms of delivering or discharging the foamable mixture subsequent to the intermixing require a substantial effort and expenditure and do not produce the desired success or are, such as the delivery by compressed air, hazardous to health.

Thus, from the US-A-3,111,389, a method for the delivery of a foamable mixture, more particularly for a temperature insulation material, is known, in which, with the aid of a mixing head for at least two reactive components in a low-pressure method, comprising a pipe within which an agitator rotates at high speed, the mixture ready for the reaction is delivered by means of gravity and, with the aid of gas additionally injected into the discharge area, is spread fanwise and distributed on a substrate so as to completely react and foam there.

The DE-OS 27 25 937 shows an unrollable web of temperature insulation material comprising an insulating layer of foamed plastic material with transversally proceeding notches and a waterproof covering web attached thereto on one side which is preferably bonded on, in which the insulating layer tapes between two oppositely located borders of the rectangular web of temperature insulation material so that the insulating strips possess a wedge-shaped cross-section.

From the DE-GM 85 14 452.5, a polymer bitumen welding web for the covering of roofs is known, in which a substrate material comprises a glass fabric, a non-woven fabric or the like with an impregnation of polymer bitumen and a sealing layer of polymer bitumen, wherein provision is made for the sealing layer to be constructed on its underside in the form of a separating and (vapour pressure) equalizing layer, the equalizing layer being comprised of a system of channels which consist of intersecting longitudinal and transversal grooves. Provision may also be made for the equalizing layer to be comprised of knob-like projections.

That is why it is the object of the present invention to provide a method of the kind stated in the beginning and a device for this in which these shortcomings no longer exist and with which the delivery of foamable material can be carried out

without any fluctuations in quality, without any interruptions due to resulting set-up times and so as to be adaptable without any problems to all requirements.

For the resolution of this technical problem a method of the kind stated in the beginning is proposed, according to which only one component of materials which do not react by themselves is, within the proximity of an external bearing of a floating shaft upon which an agitator is mounted, in the vicinity of the shaft introduced into a mixing chamber and, by the action of centrifugal force, is conveyed on further by the same, in order to only then be made to be intermixed with a further component that was introduced first so that the bearing, in order to avoid premature reactions, contaminations, heating or damage to the bearing, does not come into joint contact with the interreacting materials.

A pertinent mixing head for realizing the method which is mounted within an engine frame and the mixing head itself consisting of a casing-like mixing tube which, on its upper extremity, is provided with the discharge aperture located opposite the lower extremity, possesses a lid-like closing member, is constructed according to the invention in such a way that a bearing is disposed inside the closing member in which a shaft that can be driven by a driving means is floatingly mounted, on which is mounted an agitator body extending as far as into the area of the discharge aperture and which is constructed so as to extend through the entire mixing pipe or tube, in which, below the bearing, while forming a gap-like interspace, the cylindrically configured agitator body is disposed on the shaft, a first feed channel is constructed in the closing member which terminates in the interspace and, in the mixing pipe, a second feed channel is constructed which terminates in a mixing chamber constructed between the inner wall of the mixing pipe and the surface of the agitator.

If, by way of example, larger or smaller widths of the foamable mixture strand have to be produced on a laminator, then this can be achieved by the vertical adjustment of the mixing head, in which case the cone of the applied mixture formed due to the centrifugal force accordingly is spread across a larger or smaller area.

It is also possible to achieve a varying thickness of the foamable mixture application transversally to the direction of travel, if it is necessary e.g. for the production of sloping plates by means of a tilting by a few degrees from the vertical and a slight displacement in the horizontal of the mixing head.

If larger widths of application become necessary (e.g. in excess of 1000 mm), in that case it is possible to arrange two mixing heads side by side without allowing the mixing head to oscillate transversally to the direction of movement of the substrate.

By conveying the one component of the foam which does not react by itself into the proximity of the external bearing of the mixing head and of the shaft and by centrifuging the same in the mixing chamber so that it comes in contact only there with the component with which the reaction takes place, a contamination of the bearing is avoided and the entire mixing head is maintained operative for continuous operation.

The casing grooves of the agitator which interrupt the screw channels and bring about a subsequent mixing are expediently not to be carried right up to the agitator end. With this it is avoided that, when the conveying screw channels are not filled completely owing to a high rate of revolution or due to a lower material throughput, mixed material coming to reaction or air reaching the lower portion of the agitator again and a contamination thus being excluded here too.

Preferred further developments of the device are characterized in the Claims 2 to 12. With such a device it is possible to provide a temperature insulation material in the form of an insulating or sealing layer for roof areas, which makes it possible to cover larger areas of several square metres in one operation and which consists of strips of temperature insulation material bonded on to a substrate.

In the case of flat roofs, especially where non-insulated roofs are involved, it is known to apply the roof sealing in several layers on top of the insulation. The manufacturers of insulation materials tried to simplify this multi-layer application in that insulation elements having the normal dimensions of 1 m x 0.5 m were provided with an overlap projecting on two sides for being bonded to material already lying on the roof and consisting of insulation elements that had already been placed on. With this it was intended to simplify the entire roof covering operation and the insulation material would be protected from weather factors immediately after having been laid. It was then still necessary to additionally apply the actual sealing layer (at least one) because, owing to the application of the element, overlaps were produced which were too short and which gave rise to the fear that moisture could penetrate from the outside.

Then, for the sake of a further simplification and a speedier work flow, web rolls were produced which consisted of an appropriately wide sealing web having a length of up to 10 m, on to which the strips of insulation material were bonded which made it possible to roll up the same so as to form webs of up to 10 m in length. Said web rolls have a width of up to 1 m and, with a length of 5 m, they cover a roof area of 5 m² in one operation. 5 m was the minimum length required in order to avoid overlaps of the elements which were too short.

These web rolls rendered possible the unrolling of the insulation material strips so as to form a larger unit for a laying which covered an extensive area. In this case, normal bitumen roofing webs are employed. However, when being unrolled, said webs exhibit buckling creases in the substrate web so that leakages in the finished flat roof have to be feared. That is why additionally several, but at least one, roofing web(s) have (has) to be additionally applied.

Even today, when flat roofs are involved which have a slope of 3% and more, the laying of at least two sealing layers on top of one temperature insulation layer is stipulated. When the slope is less than 3% or even zero slope, three sealing or welding webs on the temporary insulating layer are considered to be in keeping with good workmanship. Even plastic foils, which have today reached a high degree of development and which are admissible in a single layer also for zero-slope roofs, require as a safeguard on a temperature insulation layer an additional substrate web for the protection of the laid foil on the joints of the temperature insulation against damage and against the emigration of e.g. plasticizers from the foil sealing. However, the substrate web to be found on a roll web, irrespective of which type, is recognized as a foil protection.

A further significant disadvantage in the multi-layer roof sealing is the dreaded bubble formation on the flat roof. This is caused by the non-bonded points between the sealing layers. The slightest occlusion of moisture when sealing layers are laid on top of each other or on top of the temperature insulation material results in non-bonded points and, with it, inevitably, in the formation of bubbles. This bubble formation is often attributed to the apparently arising vapour pressure, e.g. by solar radiation. However, a vapour excess pressure above atmospheric can only take place at 100°C or more. The formation of bubbles in the top layers is only possible by the increase in volume of the occluded air at the non-bonded

points in accordance with the law of Gay-Lussac. According to this law, the air volumes behave just like the absolute temperatures. That is why a distension of the air between the individual sealing layers is inevitable when the connection between the individual sealing layers by appropriate bonding or welding is not established in such a way that several layers become one and a perfect joint is produced. However, this is quite impossible. Matters have improved by the employment of welding webs where the surface of the two joined webs are fused together. Hence the formation of bubbles can only be avoided when the superposed layers or sealing layers are joined in such a way as to form a unit.

Furthermore, a further requirement arises today. As far as flat roofs are concerned it is increasingly stipulated, be it in a new building or in reconstruction, that no water must remain standing on the roof after rain has fallen. Thus more and more sloping roof are constructed.

This is done in the conventional manner, in new buildings many times by the application of a sloping course, either in normal-weight concrete or by means of light-weight concrete. With this the slope is provided and requires no further consideration when applying the temperature insulation material and the sealing.

If this is not the case, then the temperature insulation material is for the most part supplied in the form of wedges and this to a large extent in polystyrene. Various stipulations are made regarding the slope, especially of from 1% to 3%. This is mostly done in accordance with previously produced drawings, the entire slope is then produced in the works in one form or another, either by cutting or by the construction of individual pieces. That is why it would be desirable to provide a temperature insulation material which, by means of a web-like

construction, makes it possible to produce larger surface elements of the material in one operation and to cover larger areas of several square metres at a time.

It is desirable to provide a temperature insulation material in the form of an insulating and sealing layer for roof areas which can be used as the sole roofing element for the roof areas, which can be laid on larger areas in one operation and which can also be employed for the construction of a roof slope without the prior application of a slope piece, in which the disadvantages of the known solution such as the cutting or the necessity of the individual forming or the formation of buckling creases and the formation of bubbles can be avoided.

More particularly is it possible with the method and the device to provide a temperature insulation material in the form of an insulating and sealing layer, in that the strips of insulation material are bonded on to a suitable foil web in the form of a sealing layer in such a way that the temperature insulation material is constructed in the form of a temperature insulating and sealing layer so that, when it is laid, no further sealing web has to be applied, and in that the insulation material strips possess a rectangular or wedge-shaped cross-section.

Provision is preferably made in this connection for the angle of inclination of the wedge shape transversely to the longitudinal direction of the web roll to correspond to a slope of 1%, 2% or 3%.

With such a temperature insulation material it is possible to provide a roof area in one operation with the requisite temperature insulating and sealing layer without an additional sealing web having to be applied. With this a quite decisive saving in labour and material can be achieved, while, at the same time, the quality of the roof covering is improved since,

due to the reduction in the manual activity, as reduction in the possibility of errors is achieved at the same time.

According to a preferred embodiment, provision is made in this case for the laminating material to comprise a plastic film while, according to another preferred embodiment, the laminating material comprises a metal foil. What is essential in this connection is, with the aid of such laminating materials, it is ensured that the temperature insulation material is applied to the roof area in such a way that a suitable temperature insulation is produced on which a sealing layer is disposed at the same time which can be readily joined within the overlap areas so that the insulation material, subsequent to having been laid, is protected against weather factors. In this case the insulation material may, according to a preferred embodiment, be comprised of polyurethane strips while, according to another preferred embodiment, it is possible for polystyrene particle foam or extruded polystyrene to be employed as insulation material. This construction of the strips of insulation material in the form of rigid foam members results in an optimal temperature insulation, provision being preferably made in this connection for the insulation material being produced and/or applied in such a way that the insulation material strips, in the laid state, lie disposed in side-by-side arrangement without exhibiting any gaps.

In order to increase the inherent stability of the temperature insulation material, particularly for the highest stresses or loads, provision may preferably be made for the insulating material and/or the laminating material to be provided with a stabilizing or reinforcing fabric.

Advantageous and expedient embodiments of the invention are characterized in the subclaims.

In the following, embodiments of the invention are explained with the aid of the drawings. Thus

F i g. 1 shows, in a diagrammatical representation, a mixing head in vertical section;

F i g. 2 shows, in a diagrammatical representation, the mixing head according to Fig.1 with a driving means in an indicated engine frame with an indicated foamable mixture discharge;

F i g. 3 shows the assembly according to Claim 2 with the mixing head swivelled out of the vertical and in lateral displacement;

F i g. 4 shows, in a view from below, a section of a temperature insulation material;

F i g. 5 shows, in a vertical section in the direction of Line V - V in Fig.4, the temperature insulation material, and

F i g. 6 shows the temperature insulation material in the side-by-side arrangement provided for a flat roof for the construction of a slope.

In the Figs. 1 to 3, a mixing head for the delivery of a foamable mixture not depicted in the drawing and consisting of the components A and B is shown. Such a mixing head is mounted within an engine frame 11 and is driven by a driving means 12, the components A and B being supplied with the aid of feeding lines which are not shown.

The mixing head comprises a mixing pipe 13 which, at its lower extremity 14, forms the discharge aperture 15, while the upper extremity 16 is closed by means of the closing member 17, on which the mixing tube 13 is retained.

Within the area of the discharge aperture 15, the mixing tube 13 is provided with a chamfer 15a which imparts a specific discharge cone K to the foamable material comprised of the intermixed components A,B.

Inside the closing member 17 which is retained so as to be resistant to rotation on the driving means 12, a bearing 18 is disposed in which the floating shaft 19 is supported. Below the bearing 18, the shaft 19 carries the agitator body 20, in which case the shaft 19 and the agitator body 20 extend as far as into the area of the discharge aperture 15 of the mixing tube 13. In this case the agitator body 20 is provided with a longitudinal drilled hole 120 by means of which it is mounted on the shaft 19. Moreover, the shaft 19 is provided with a shaft recess 19a, while the longitudinal drilled hole 120 is provided with a step 20a in such a way that the agitator body 20 is slideable on to the shaft 19 as far as up to the limit stop formed by the recess 19a and the step 20a.

The agitator body itself which is constructed in the form of a cylinder, possesses two sections 21,22, the upper section 21 being provided with pins 23 disposed on the surface 20b of the agitator body 20 and having the configuration of e.g. a frustum of a cylinder, while the second section is constructed in the form of a conveyer screw 24 for conveying the material A,B through the screw channels 25 of the conveyer screw 24.

Between the disk-like upper terminal surface 121 of the agitator body 20 which is provided with a circumferential outer rim 121a projecting in the longitudinal direction L of the shaft and the oppositely disposed closing member 17 carrying the bearing 18, a gap-like interspace 26 is constructed in which case a first feed channel 28 is constructed inside the closing means 17 terminating within the area of the gap-like interspace 26 and/or of the circumferential rim 121 delimiting the same,

through which the component A can be supplied into this area. Below the circumferential rim 121a, on the surface 20b of the agitator body 20, before the start of the section 21 carrying the pins 23, an area devoid of pins 21a is constructed which has a distance predetermined by the height of the pins 23 from the inner wall 13a of the mixing tube 13 and which forms the first mixing chamber 27. Owing to the centrifugal force, the component A introduced into the gap-like interspace 26 is transferred into said mixing chamber. At the same time, a second feed channel 297 intended to supply the component B terminates within the area of the mixing chamber 27 on the inner wall 13a of the mixing tube 13. That is why the components A and B are mixed in the mixing chamber 27, the actual intermixing being brought about by the pins 23. Since the components A and B are supplied while acted upon by pressure via the supply channels 28,29, the component mixture produced in the mixing chamber 27 are mixed thoroughly by the pins 23, is conveyed by into the area of the conveyer screw 24 and received by the screw channels 25.

In adaptation to the different factors and influencing variables as well as to the components A and B, the spatial dimensions of the gap-like interspace can be adjusted or modified in that one or more disks 30 having the same or differing thicknesses are slid on to the shaft 19 and advanced up to the recess 19a before the agitator body 20 is mounted and screwed down by means of the nut 31 on the shaft 19. By the step 20a striking the disks 30, a longitudinal displacement of the agitator body 20 is achieved so that the size of the gap-like interspace 26 is adjusted so as to be accordingly enlarged.

A number of the screw channels 25 of the conveyer screw 24 intercommunicate with the aid of gaps or interruptions 132 in the screw 24 so that one or several connections extending in the longitudinal direction of the shaft L result between the

screw channels 25 of the conveyer screw 24. These may also be constructed in the form of casing grooves 32. in this case it is provided that the screw channels 25 within the area of the discharge aperture 15 do not intercommunicate with the aid of gaps or interruptions 132 or casing grooves 32.

On its outer wall 13b, the mixing tube 13, within the area of the discharge aperture 15, is provided with a ring that embraces the mixing tube 13 which thus serves as a wiper 33. The wiper 33 is mounted so as to be displaceable in the longitudinal direction of the shaft L on the mixing tube 13 or on the outer wall 13b of the mixing tube 13, while, in the drawing, at I., an operating position of the wiper 33 and, at II., a rest position of the wiper 33 is depicted.

As is illustrated in Fig.2, the intermixed and reacting components A and B of the foamable mixture are delivered by the interaction of the agitator 20, the arising centrifugal forces and the chamfer 15a in a discharge cone K. Hereby a discharge of a material located or moved underneath the mixing head 10 results, it being also possible in this case for the chamfer 15a to be provided with a radius so that the emerging material forms a steeper dispersion cone K. At 34, the approximately rectangular foam delivery is indicated which is produced when the mixing head 10 assumes the position illustrated in Fig.2. When the mixing head, as is shown in Fig.3, is swivelled by one angle with respect to the vertical and is laterall displaced in the longitudinal direction of the shaft, a rising foam 134 results which has an ascending gradient St, as is likewise indicated in Fig.3. It is possible hereby to construct foamable materials and, in particular, strips of insulation materials which possess a wedge-shaped cross-section.

The mixing head described hereinbefore which, in principle, represents the device for performing the novel method, is not

restricted to the embodiments described in the foregoing and illustrated in the drawings. Modifications in the type of of the mixing members on the surface of the agitator as well as in the construction of the discharge aperture, lie within the context of the invention just like another type of an adjustment means when the basic technical teaching is realized which consists in that the components A and B are first of all supplied separately to the mixing head and mixed in a room which is immune to contamination.

In the Figs. 4 to 6, an appropriately produced temperature insulation material is identified with 100 which is comprised of the foil web 150 in the form of a sealing layer and the strip of insulation material 140 disposed thereupon in the form of insulation material 40. in this case the foil web 150, in comparison with the strips of insulation material 140, is provided with projecting rims that serve as overlap sections 51,52 and which are in each case disposed on a longitudinal and a transversal edge. In the case of a side-by-side arrangement of the temperature insulation material web (shown in Fig.6), pertinent overlap sections 51,52 can be placed on the already laid insulating webs and be welded together so that a reliable protection against weather factors results. In this case the strips of insulation material 140 are comprised of the insulation material 40, for which polyurethane or polystyrene may be chosen. Also possible is the use of glass fiber or rockwool strips. Moreover, provision may also be made for the insulation material 40 to be provided with a stabilizing fabric 43. In this case, on the side of the strips of insulation material 140 which face away from the foil web 150, spherical projections 41 in a regular disposition are provided for the formation of diffusion channels 42. These are constructed in the form of flat cusps. it being also possible, however, to provide any other suitable construction and arrangement

by means of which it is ensured that, between the rood to be covered and the temperature insulation material 100, a dehumidification zone is provided in which a partial pressure ratio results which, owing to its relation to the partial pressure ratio of the ambient air, leads to an evacuation of the humidity from the surface of the building.

By means of the shown arrangement, especially wide and regular vapour expansion paths are provided which ensure a reliable dehumidification. In this case, a metal foil 60 is bonded on to the insulation material 40 on the surface located opposite the single-layer sealing layer laminate 50, the laminating material here being constructed in the form of a plastic foil, welding web or bitumen sealing web.

The insulation material 40 or the insulation material strips 140 have a constant cross-section in the longitudinal direction of the web which is cuneiformly ascending in the transverse direction of the web. In order to form a suitable slope, an ascending gradient of 1%, 2% or 3% is provided, it being also possible to provide desired intermediate values.

The sealing layer laminate 50 may also be comprised of a material reinforced by a fabric 53 or of a non-woven fabric pressed into a plastic foil, in which connection provision may be made for the sealing layer laminate 50, for the sake of a better adhesion of the insulation material strips 140 to be provided on the surface e.g. with a non-woven fabric or a fabric of polyester fibres or glass fibres or organic fibres, such as jute or the like.

The insulation material strips 140 are by preference bonded on in a laminator in the form of a strand and formed into subsequently cut insulation material 40, in which case provision may be made for the insulation material 40 to be manufactured

in plates and, when the insulation material strips 140 are cut, the plates are not cut through completely so that a coherence of the insulation material strips 140 still exists for their being bonded on in larger areas.

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PATENT CLAIMS

1. Method for delivering a foamable mixture, especially for a temperature insulation material, using a mixing head for at least two reactive components in a low-pressure method, comprising a tube within which an agitator rotates at high speed, in which the mixture ready for reaction is delivered by gravity and distributed on a substrate in order to react there completely and to expand, characterized in that the finished mixture is, in addition to the gravity, discharged by centrifugal force and that only one component (A) of materials which do not react by themselves is introduced close to an external bearing of a floating shaft upon which an agitator is mounted, and, in the proximity of the shaft, is introduced into a mixing chamber and, by the action of centrifugal force, conveyed on further by the same, in order to only then be intermixed with a further compound (B) which reacts with the components (A) introduced first so that the bearing, in order to avoid premature reactions, contaminations, heating of or damage to the bearing, does not come in joint contact with the interreacting materials.
2. Mixing head for the realization of the method according to Claim 1, in which the mixing head (10) is mounted within an engine frame (11) and the mixing head (10) is comprised of a casing-like mixing tube (13) which, at its upper extremity (16) located opposite the lower extremity (14) provided with the discharge aperture (15), possesses a lid-like closing member (17), characterized in that, in the closing member (17), a bearing (18) is disposed in which a shaft (19) drivable by a driving means (12) is floatingly supported, upon which is mounted an agitator body (20) extending as far as into the area of the discharge aperture (15) and which is constructed so as to extend right through the



entire mixing tube (13), in which, below the bearing (18), while forming a gap-like interspace (26), the cylindrically configured agitator body (20) is mounted on the shaft (19) while, in the closing member (17), a first feed channel (28) terminating in the interspace (26) is constructed and, in the mixing tube (13), a second feed channel (29) terminating in a mixing chamber (27) constructed between the mixing tube inner wall (13a) and the agitator surface (20b) is constructed.

3. Mixing head according to Claim 2, characterized in that the agitator body (20), on its surface (20b) within the first section (21), is provided with several rows of pins (23) and, in within a second section (22), with a conveyer screw (24) for the discharge of the mixed material (A,B).
4. Mixing head according to either Claim 2 or 3, characterized in that the gap-like interspace (26) from which the component (A) supplied through the first feed channel (28) is centrifuged out, by the disposition of interchangeable disks (30) possessing different thicknesses between a shaft recess (19a) in the shaft (19) and a corresponding step (20a) within the longitudinal drilled hole (120) of the agitator body (20), is vertically adjustable.
5. Mixing head according to any of Claims 2 to 4, characterized in that the mixing tube (13) inside which the agitator body (20) rotates, at the discharge aperture (15), is provided with a chamfer (15a), which imparts a specific discharge cone (K) to the material comprised of the intermixed components (A,B).
6. Mixing head according to any of Claims 2 to 6, characterized in that the speed of the driving means (12) is controllable.



8. Mixing head according to any of Claims 2 to 7, characterized in that the screw (24), on the surface (20b) of the agitator body (20), is constructed so as to be multiply channeled.
9. Mixing head according to any of Claims 2 to 8, characterized in that the screw courses (25) proceeding spirally around the surface (20b) of the agitator body (20), intercommunicate at least in part with the aid of a plurality of casing grooves (32) which are disposed spaced apart from each other and extend in the longitudinal direction (L) of the shaft.
10. Mixing head according to Claim 9, characterized in that the casing grooves (32) on the surface (20b) of the agitator body (20) do not extend as far as to the end of the agitator (20) on the side of the discharge aperture (15) and in that the screw channels (25) of the screw (24) to be found within the area of the discharge aperture (15) do not intercommunicate with the aid of casing grooves (32).
11. Mixing head according to any of Claims 2 to 10, characterized in that the mixing head (10) is mounted in the machine frame (11) out of the vertical (S), perpendicularly to the longitudinal direction (L) of the shaft and so as to be vertically adjustable.
12. Mixing head according to any of Claims 2 to 11, characterized in that the outer wall (13b) of the mixing tube (13) is provided with a ring embracing the mixing tube (13) which, with respect to the mixing tube (13), is displaceable in the longitudinal direction of the shaft (L), thus acting as a wiper (33).
13. Temperature insulation material comprising strips of insulation material of a foamable mixture delivered according



to the method as per Claim 1 bonded on to a substrate, characterized in that, for the formation of a temperature insulation material in the form of an insulating and sealing layer for roof areas which makes it possible to cover larger areas of several square metres at a time, the insulation material strips (140) being bonded on to a suitable foil web in the form of a sealing layer (159) in such a way that the temperature insulation material is constructed in the form of a temperature-insulating and sealing layer so that, when being laid, no necessity exists for the application of a further sealing web, wherein the laminating material (50) is comprised of a plastic foil, a metal foil, a metal foil or of a bitumen sealing web, the strips of insulating material are comprised of polyurethane strips, of polystyrene particle foam or of extruded polystyrene, and the strips of insulation material (140) are constructed in the form of insulating material (40) bonded on in a laminator in the form of a strand and are subsequently cut, or in that the insulating material (40) is bonded on cut into strips of insulation material (140), in that the strips of insulating material (140) have a rectangular or wedge-shaped cross-section, in that, in the insulation material (40), on the surface located opposite the single-layer sealing layer lamination (50), diffusion channels (42) are incorporated, and in that a metal foil (60) is bonded on to the surface located opposite the single-layer sealing layer lamination (50).

14. Temperature insulation material according to Claim 13, characterized in that the ascending gradient of the wedge shape, transversally to the longitudinal direction of the web roll (R) corresponds to an ascending gradient (St) of 1%, 2% or 3%.



15. Temperature insulation material according to either of Claims 13 or 14, characterized in that the insulating material (40) is provided with a stabilizing fabric (43).
16. Temperature insulation material according to any of Claims 13 to 15, characterized in that the sealing layer lamination (50) is comprised of a material reinforced by a fabric (53) or of a non-woven fabric pressed into a plastic foil.
17. Temperature insulation material according to any of Claims 13 to 16, characterized in that the insulation material (40) is manufactured in the form of plates and in that, when the strips of insulation material (140) are cut, the plates are not cut through completely so that a coherence of the strips of insulation material (140) still exists for being bonded in larger areas.
18. Temperature insulation material according to any of Claims 13 to 17, characterized in that the sealing layer lamination (50), for a better adhesion of the strips of insulation material (140), on its surface, is provided with e.g. a non-woven fabric or a fabric of polyester fibres or glass fibres or of organic fibres, such as jute or the like.