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54 **Bituminous covering structure.**

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**EP-A- 0 123 141**  
**FR-A- 1 459 264**

56 References cited :  
**FR-A- 2 464 333**  
**FR-A- 2 488 630**  
**US-A- 4 276 342**  
**US-A- 4 368 228**

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## Description

The present invention relates to a bituminous covering structure. Special bituminous coverings are currently extensively used for the industrial and civil waterproofing of prefabricated buildings, foundations, channels, tunnels, hydraulic systems, bridges etc.

Said bituminous coverings, which are normally produced in sheets and packaged in rolls, are constituted by a reinforcement of glass veil and/or fabric and/or polyester non-woven fabric, impregnated by a mixture of bitumen and/or elastomer resins and calendered to the different thicknesses of use. FR-A-2 464 333 shows a composite covering comprising a bituminous mass and a non-woven polyester reinforcement.

The installation of the impermeable covering is performed by slowly unrolling each sheet onto the surface to be treated, simultaneously heating, with a flame, the bituminous layer, which thus firmly adheres to the underlying surface.

The sheets overlap one another in their perimetric regions in order to give continuity to the entire covering.

Though they perform their specific tasks, the above described known bituminous coverings are however not free from disadvantages, including those deriving from their characteristics of low mechanical strength which are in practice determined by the internal reinforcement.

A reduction in the mechanical strength has furthermore been observed after exposure to the sun if said reinforcement is made of polyester non-woven fabric.

Furthermore, since the treated surfaces are normally outdoors, the regions exposed to the sun have, during periods of irradiation, much higher temperatures than the regions in the shade. This occurs because the materials which constitute them are not good thermal conductors.

The temperature difference between various regions of a same covering produce stresses in its structure which, in the course of time, cause the onset of wrinkles, cracks and splits which compromise its impermeableness. FR-A-1 459 264 discloses a covering accessory comprising a bitumen extract which is reinforced by a metallic grid. FR-A-2 488 630 shows a mixture for paving roads which comprises bitumen and fragmented wire wool.

The aim of the present invention is to provide a new bituminous covering which has a structure adapted to eliminate the disadvantages described above in the known art.

Within the scope of the above described aim, an important object is to provide a bituminous covering the structure whereof has improved characteristics of mechanical strength, in particular tensile-strength, with respect to current ones.

Another important object is to provide a new bituminous covering which has good thermal conductivity, thereby creating uniform temperatures during its use.

Not least object is to provide a structure of bituminous covering which can be produced with conventional production systems.

This aim, these objects and others which will become apparent hereinafter are achieved by a bituminous covering structure as defined in the appended claims.

Further characteristics and advantages of the invention will become apparent from the detailed description of a preferred embodiment, described hereinafter by way of non-limitative example.

According to a preferred embodiment, the bituminous covering structure according to the invention is constituted by a reinforcement which comprises a mat made of metallic-wool, pressed to the desired thickness.

The dimensions of the mat are determined such as to satisfy the requirements of the users, and the thickness can be varied according to the required mechanical properties.

Said mat may be reinforced with metallic wires uniformly distributed along mutually orthogonal directions, so as to increase the tensile-strength in both directions.

Appropriate materials can be used to size the mat, so as to improve, besides its mechanical characteristics, also its physical-chemical characteristics.

According to the invention, the reinforcement of said bituminous covering can comprise a sheet made of a material of metallic origin which co-operates with the mat; the mechanical strength of said sheet depend on the nature of the metal used and are proportional to the diameter of the wires which compose it.

The bituminous covering according to the invention is completed by a bitumen mixture combined with elastomer resins which, by impregnating the reinforcement and with the consequent calendering to the required thickness, gives the assembly characteristics of impermeableness, adhesiveness and stability, besides ensuring uniformity and compactness.

The preferred metallic materials for the execution of the reinforcement of the covering are comprised within a vast range of steels with variable carbon content, from very soft steels to very hard ones, for example C10, C30, C50, C85, and within a vast range of other metals, such as aluminum, lead, copper, zinc and alloys thereof.

This allows to obtain coverings which have mechanical properties peculiar to the materials which constitute the reinforcement and therefore have higher tensile strength, piercing resistance, tearing resistance, shock resistance, resistance to hydrostatic pressure, to dynamic perforation, etc.

At this point it should be noted that the high ther-

mal conductivity which characterizes metallic materials in general gives the entire covering, in this case, characteristics of good thermal conductivity. Therefore, if some regions are exposed to the rays of the sun and some are in the shade when installed, these regions have nearly uniform temperatures.

This uniformity of the temperatures of the various regions eliminates the stresses which occur in current coverings and cause wrinkles, cracks, tears and deteriorations thereof.

A not negligible characteristic is that the metallic reinforcement combined with the bituminous mixture gives the structure a sort of thermal buffer between daytime and nighttime.

From what has been described above, the intended aim and purposes of the present invention are therefore achieved, since a covering has been provided whose structure has mechanical and physical characteristics with a higher technological standard than the current ones.

The particular execution of the internal reinforcement allows to obtain coverings with mechanical-physical characteristics comprised within a vast range and therefore suitable for satisfying the most different design and applicative requirements.

In practice, the metallic materials used for the reinforcement, so long as compatible with the contingent use, may be any according to the requirements.

The dimensions of the bituminous covering, as well as of the materials constituting the bitumen mixture which covers the reinforcement, may be any.

### Claims

1. Bituminous covering structure comprising a reinforcement and a mixture of bitumen and elastomer resins, said reinforcement being impregnated with said mixture of bitumen and elastomer resins to thereby form said bituminous covering structure, characterized in that said reinforcement comprises a metallic-wool mat and a metallic grid which reinforces said metallic-wool mat.
2. Bituminous covering structure according to claim 1, characterized in that said metallic grid is made of metallic wires which are uniformly distributed along mutually orthogonal directions.
3. Bituminous covering structure according to the preceding claims, characterized in that the metallic material is preferably steel with a variable content of carbon and/or aluminum and/or lead and/or copper and/or zinc.

### Patentansprüche

1. Bituminöse Abdeckungsstruktur umfassend eine Verstärkung und eine Mischung aus Bitumen und Elastomerharzen, wobei die Verstärkung mit der Mischung aus Bitumen und Elastomerharzen imprägniert ist, um dadurch die bituminöse Abdeckungsstruktur zu bilden, dadurch gekennzeichnet, daß die Verstärkung eine Matte aus Metallwolle aufweist und ein Metallgitter, das die Matte aus Metallwolle verstärkt.
2. Bituminöse Abdeckungsstruktur nach Anspruch 1, dadurch gekennzeichnet, daß das Metallgitter aus Metalldrähten gebildet ist, die rechtwinklig zueinander gleichmäßig verteilt sind.
3. Bituminöse Abdeckungsstruktur nach den vorhergehenden Ansprüchen, dadurch gekennzeichnet, daß das metallische Material bevorzugt Stahl ist mit einem variablen Gehalt an Kohlenstoff und/oder Aluminium und/oder Blei und/oder Kupfer und/oder Zink.

### Revendications

1. Structure de revêtement bitumineux comprenant un renfort et un mélange de bitume et de résines élastomères, ledit renfort étant imprégné dudit mélange de bitume et de résines élastomères pour former ainsi ladite structure de revêtement bitumineux, **caractérisé en ce que** ledit renfort comprend un mat de laine métallique et une grille métallique qui renforce le dit mat de laine métallique.
2. Structure de revêtement bitumineux selon la revendication 1, **caractérisé en ce que** ladite grille métallique est faite de fils métalliques uniformément répartis selon des directions orthogonales.
3. Structure de revêtement bitumineux selon les précédentes revendications, **caractérisé en ce que** le matériau métallique est de préférence de l'acier avec une teneur variable en carbone et/ou aluminium et/ou plomb et/ou cuivre et/ou zinc.