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(54) **A roofing system having fretted slab-shaped elements**

Dachsystem mit abgenutzten plattenförmigen Elementen

Système de toiture disposant d'éléments en forme de plaque liés

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(73) Proprietors:
- **DOTT. GALLINA S.R.L.**
  10134 Torino (IT)
- **Aislux, S.A.**
  28032 Madrid (ES)

(72) Inventors:
- **Gallina, David**
  10133 Torino (IT)
- **Sanchez Grandia, Enrique**
  28032 Madrid (ES)

(74) Representative: **Jorio, Paolo et al**
STUDIO TORTA
Via Viotti 9
10121 Torino (IT)

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Description

[0001] The present invention relates to a roofing system having fretted slab-shaped elements.

[0002] Specifically, the present invention relates to a roofing system for making roofs of buildings or industrial facilities, to which the following description will explicitly refer without therefore loosing in generality.

[0003] In the building roofing field, it is known the use of fretted slabs made of thermoplastic or thermosetting material, which rest on supporting and fixing structures, and are connected to the supporting and fixing structures themselves by means of screws inserted into appropriate circular holes previously obtained in waved parts of the slabs and screwed into the structure underneath.

[0004] Although universally used, the known mode of connecting fretted slabs is poorly satisfactory from the functional point of view, firstly because the holes are breaking triggers, from which fractures and/or cracks originate and propagate due to the stresses transmitted to the slabs and to the thermal gradients to which the slabs themselves are normally subjected, which over time compromise the slab efficiency and stability.

[0005] Again due to thermal and mechanical stresses transmitted to the slabs and because of the presence of the screws placed in direct contact with the slabs, the slabs themselves are locally crushed in the screw-slab contact area, with the consequence that the original circular holes gradually take a slotted shape, thus severely compromising the resistance of the slabs and, consequently, the quality of the whole roof. Other kinds of roofing system are known from US-A-3 606 720, JP 2006 125163A, JP 54096006U, JP 60148421U, JP 11013217A and CH 382959 A. JP 2006 125163 A shows a roof system according to the preamble of claim 1.

[0006] It is the object of the present invention to provide a roofing system having fretted slabs which allows to simply and cost-effectively solve the aforesaid problems, while having an efficiency and a functional reliability at least comparable to those of the known solutions.

[0007] According to the present invention, a roofing system having fretted slab-shaped elements is realised as claimed in claim 1.

[0008] The invention will now be described with reference to the accompanying drawings illustrating some nonlimiting embodiments thereof, in which:

figure 1 diagrammatically shows a section of a preferred embodiment of a roofing system according to the present invention; and

figure 2 shows on a magnified scale a section of a variants of a detail of figure 1, and figures from 3 to 5 show a section of three different roof systems, which do not form part of the present invention.

[0009] In figure 1, numeral 1 indicates, as a whole, a roofing system comprising a resting and fixing structure 2 (intrinsically known) and comprising a plurality of resting and fixing crosspieces 4 parallel to and spaced from one another, only one of which is shown in the accompanying drawings. Furthermore, system 1 comprises one or more fretted slab-shaped elements 5 made of thermoplastic or thermosetting material, e.g. polycarbonate.

[0010] In the specific described example, each slab-shaped element 5 comprises a plurality of plate-like portions 6 resting to the structure 2 and a plurality of concave ribs or longitudinal waves, indicated at 7, which are alternated between the plate-like portions 6 and have a concavity facing the resting and fixing structure 2.

[0011] Again in the specific described example, each of the ribs 7 is flared in shape towards the structure 2, is delimited by an internal side surface 8 and comprises a bottom wall 9 facing, and spaced from, structure 2 and parallel to the plate-like portions 6, and two inclined flat side walls 10 converging towards each other and towards the bottom wall 9.

[0012] With reference to figure 1, each slab-shaped element 5 is connected to the structure 2 by means of a snap device 12 for a quick connection which comprises, for each of the ribs 7, a snap assembly 13 for a quick fixing accommodated in the corresponding rib 7 itself. Each assembly 13 comprises a fastening body 15 firmly connected to structure 2 by means of screws 16 and protruding into the corresponding rib 7. The fastening body 15 is conveniently made of bent harmonic steel and comprises a flat base or fixing portion 18 resting on the structure 2 and connected to the structure itself by means of screws 16, and two elastic hook-like side appendixes 20, which protrude towards the slab-shaped element 2 from the base portion 18 in reciprocally facing positions and converge towards each other and towards the corresponding wall 9 in order to define a retaining seat 21 therebetween. In the variant shown in figure 2, the side appendixes 20 extend reciprocally parallel.

[0013] Seat 21 holds a head 23 of a fastening element 24, which is part of the corresponding assembly 15, is arrow-like and has a shank 25 extending from the corresponding bottom wall 9, integrally with the bottom wall 9 itself. The element 24 is made of the same material as the slab-shaped element 5 and, along with the slab-shaped element 5 itself, is part of an integrally made body.

[0014] In the roofing system shown in figure 5, the fastening element 24 is integrally connected to a fixing plate 27 connected to the structure by means of screws 28, while the hook-like side appendixes 20 are made of the same material as the slab-shaped element 5 and are integral therewith, extending towards structure 2 from the bottom wall 9.

[0015] The roofing system in figure 3 shows a fastening body 30, which differs from body 15 in that the hook-like side appendixes 20 extend reciprocally parallel in opposite positions and each delimits respective retaining seats 32 spaced from each other. Each of the side appendixes 20 cooperates with a corresponding fastening portion 34, which is part of the corresponding assembly

15, extends so as to protrude into the corresponding rib 7 from the corresponding plate-like portion 6, of which it is a corresponding extension, and ends with a segment 35 which is curved towards the corresponding bottom wall 9 and engaged into the corresponding seat 32.

[0016] In the roofing system shown in figure 4, each of the fastening portions 34 is replaced by a corresponding appendix 37 projecting so as to protrude from an intermediate portion of the corresponding side wall 10. Appendixes 37 converge towards each other and towards the bottom wall 9 to each positively engage a corresponding seat 32.

[0017] From the above it is apparent that the described roofing system 1 and slab-shaped element 5 are very efficient and functionally reliable, but especially so as to keep the original constructional features virtually unchanged. The above is essentially the consequence of the particular mode of manufacturing the connecting device 12, which avoids any drilling of the slab-shaped element, thus consequently eliminating all the problems of the known solutions caused by drilling, and the use of connecting screws passing through the slab-shaped element itself.

[0018] The snap connection enabled by the assemblies 15 thus allows an easy, rapid, firm connection of the slab-shaped elements 5 to structure 2, whereas manufacturing a part of the assemblies 15 themselves integrally with the slab-shaped element allows to reduce the number of details and therefore the manufacturing and assembling costs.

[0019] From the above it is apparent that the described system 1 and slab-shaped element 5 may be used either for making covers such as roofs or terraces, or for closing or coating side walls of buildings or general facilities. Indeed, the hook-like coupling allows to hold the used slab-shaped elements both when they are arranged in horizontal or inclined position and when they are arranged in vertical position.

[0020] Finally, from the above it is apparent that changes and variations may be made to the described system 1 and slab-shaped element 5 without therefore departing from the scope of protection defined by the claims.

[0021] Specifically, in system 1 the resting and fixing structure could be different from that indicated by way of example, as well as the slab-shaped elements 5 could be different, particularly slab-shaped elements 5 could comprise a different number of ribs and the ribs themselves could be geometrically different from those shown and, for example, with curved waves.

[0022] With regards to the groups 15, they could comprise fastening elements geometrically and/or dimensionally different from those shown. Specifically, hook-like portions 20 could be replaced by differently shaped portions and/or provided with appendixes or backings adapted to prevent longitudinal movements of the slab-shaped elements 5.

Claims

1. A roofing system (1) having fretted slab-shaped elements comprising a stationary fixing structure (2); at least one slab-shaped element (5) made of thermoplastic material having at least one concave portion (7), the concavity facing said fixing structure (2), and means (12) for connecting said slab-shaped element (5) to said fixing structure (2), said connecting means (12) being interposed between a side surface (8) internally delimiting said concave portion (7) and said stationary fixing structure (2),
said connecting means (12)
comprising at least a fastening portion (24) carried by one of either said slab-shaped element (5) or said fixing structure (2), and at least one retaining seat (21) carried by the other of either said slab-shaped element (5) or said fastening structure (2), and being positively engaged by said fastening portion (24),
said connecting means (12) comprise at least one hook-like element (20) at least partially delimiting said retaining seat (21),
said connecting means (12) comprising a pair of hook-like elements (20) facing each other to define a retaining seat (21) therebetween; said fastening portion (24) comprising an arrow-like element inserted into said retaining seat (21) and cooperating with both said hook-like elements (20),
characterized in that
said arrow-like element (20) integrally extends from a bottom wall (9) of the concave portion (7).

2. A system according to claim 1, **characterized in that** at least part of said connecting means is integral with said slab-shaped element (5).

3. A system according to claim 2, **characterized in that** at least part of said connecting means (24) is integrally made with said slab-shaped element (5)

4. A system according to any one of the preceding claims, **characterized in that** said connecting means comprise quick connecting means (20, 24)

5. A system according to any one of the preceding claims, **characterized in that** said connecting means comprise snap connecting means.

6. A system according to claim 1, **characterized in that** said connecting means comprise a pair of said opposite hook-like elements (20), each defining a corresponding retaining seat for a respective fastening portion.

7. A system according to claim 6 **characterized in that** said hook-like elements are connected to a common support anchored to the structure by means of screws.

Patentansprüche

1. Dachsystem (1) mit mit Bünden versehenen plattenförmigen Elementen, welches eine feste Befestigungsstruktur (2), mindestens ein aus einem thermoplastischen Material hergestelltes plattenförmiges Element (5), das mindestens einen der Befestigungsstruktur (2) zugewandten konkaven Abschnitt (7) aufweist, und Mittel (12) zur Verbindung des plattenförmigen Elements (5) mit der Befestigungsstruktur (2) umfasst, wobei die Verbindungsmittel (12) zwischen einer den konkaven Abschnitt (7) nach innen begrenzenden Seitenfläche (8) und der festen Befestigungsstruktur (2) eingefügt sind, wobei die Verbindungsmittel (12) mindestens einen Befestigungsabschnitt (24), der von einem Element ausgewählt zwischen dem plattenförmigen Element (5) und der Befestigungsstruktur (2) getragen wird, und mindestens einen Rückhaltesitz (21) umfassen, der von dem entsprechend anderen Element ausgewählt zwischen dem plattenförmigen Element (5) und der Befestigungsstruktur (2) getragen wird, und der durch den Befestigungsabschnitt (24) formschlüssig einrastbar ist, wobei die Verbindungsmittel (12) mindestens ein hakenförmiges Element (20) umfassen, welches zumindest partiell den Rückhaltesitz (21) abgrenzt,
wobei die Verbindungsmittel (12) ein Paar hakenförmige Elemente (20) umfassen, die gegenüberliegend angeordnet sind, um dazwischen einen Rückhaltesitz (21) zu definieren,
wobei der Befestigungsabschnitt (24) ein in den Rückhaltesitz (21) eingesetztes pfeilartiges Element umfasst, welches mit den beiden hakenförmigen Elementen (20) zusammenwirkt, **dadurch gekennzeichnet, dass**
sich das pfeilartige Element ganz von einer Bodenwand (9) des konkaven Abschnitts (7) erstreckt.

2. Dachsystem nach Anspruch 1, **dadurch gekennzeichnet, dass** wenigstens ein Teil der Verbindungsmittel (12) Teil des plattenförmigen Elements (5) ist.

3. Dachsystem nach Anspruch 2, **dadurch gekennzeichnet, dass** wenigstens ein Teil der Verbindungsmittel (24) einstückig mit dem plattenförmigen Element (5) hergestellt ist.

4. Dachsystem nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsmittel (12) Schnellverbindungsmittel (20, 24) umfassen.

5. Dachsystem nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsmittel (12) Schnappverbindungsmittel umfassen.

6. Dachsystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verbindungsmittel (12) ein Paar der gegenüberliegend angeordneten hakenförmigen Elemente (20) umfassen, wobei jedes Element einen entsprechenden Rückhaltesitz für einen jeweiligen Befestigungsabschnitt (24) definiert.

7. Dachsystem nach Anspruch 6, **dadurch gekennzeichnet, dass** die hakenförmige Elemente (20) zu einem gemeinsamen Träger verbunden sind, der über Schrauben an der Struktur befestigt ist.

Revendications

1. Système de toiture (1) disposant d'éléments en forme de plaque liés, comprenant une structure de fixation stationnaire (2) ; au moins un élément en forme de plaque (5) constitué d'une matière thermoplastique et présentant au moins une partie concave (7), la concavité étant orientée face à ladite structure de fixation (2), et des moyens (12) pour connecter ledit élément en forme de plaque (5) à ladite structure de fixation (2), lesdits moyens de connexion (12) étant interposés entre une surface latérale (8) qui délimite intérieurement ladite partie concave (7) et ladite structure stationnaire (2),
lesdits moyens de connexion (12) comprenant au moins une partie de fixation (24) qui est supportée par un composant parmi ledit élément en forme de plaque (5) et ladite structure de fixation (2), et au moins un siège de retenue (21) qui est supporté par l'autre composant parmi ledit élément en forme de plaque (5) et ladite structure de fixation (2), et qui est engagée de façon positive par ladite partie de fixation (24),
lesdits moyens de connexion (12) comprenant au moins un élément en forme de crochet (20) qui délimite au moins partiellement ledit siège de retenue (21),
lesdits moyens de connexion (12) comprenant une paire d'éléments en forme de crochet (20) qui se font mutuellement face pour définir un siège de retenue (21) entre eux ; ladite partie de fixation (24) comprenant un élément en forme de flèche qui est inséré dans ledit siège de retenue (21) et qui coopère avec lesdits deux éléments en forme de crochet (20),
caractérisé en ce que ledit élément en forme de flèche (20) s'étend intégralement à partir d'une paroi de fond (9) de la partie concave (7).

2. Système selon la revendication 1, **caractérisé en ce qu'**au moins une partie desdits moyens de connexion est intégrée audit élément en forme de plaque (5).

3. Système selon la revendication 2, **caractérisé en ce qu'**au moins une partie desdits moyens de con-

nexion (24) est formée intégralement avec ledit élément en forme de plaque (5).

4. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits moyens de connexion comprennent des moyens de connexion rapide (20, 24).

5. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits moyens de connexion comprennent des moyens de connexion à pression.

6. Système selon la revendication 1, **caractérisé en ce que** lesdits moyens de connexion comprennent une paire desdits éléments en forme de crochet opposés (20) qui définissent chacun un siège de retenue correspondant pour une partie de fixation respective.

7. Système selon la revendication 6, **caractérisé en ce que** lesdits éléments en forme de crochet sont connectés à un support commun annexé à la structure à l'aide de vis.

FIG. 1

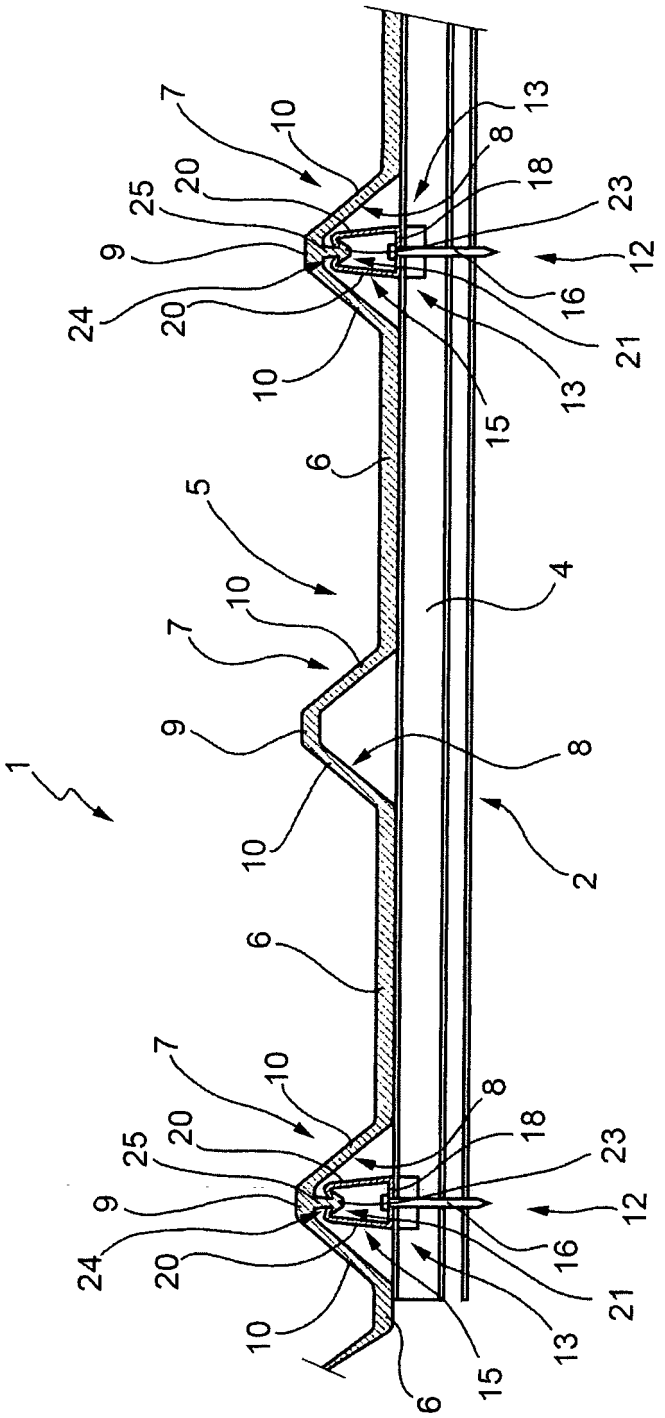


FIG. 2

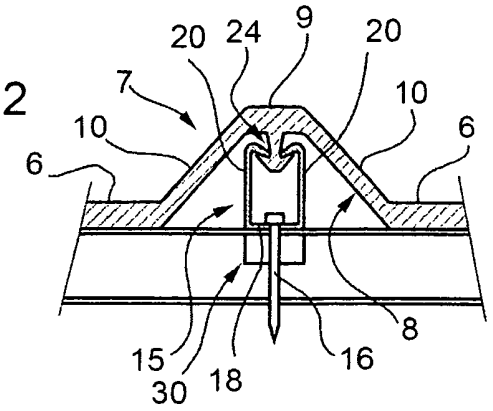


FIG. 3

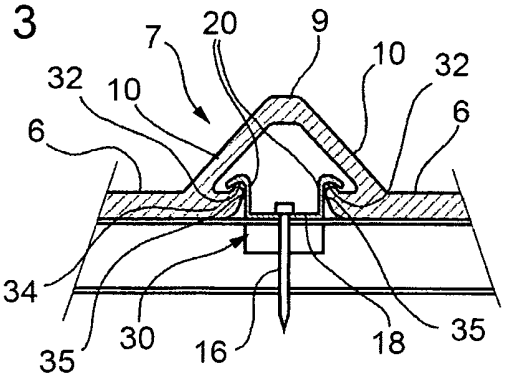


FIG. 4

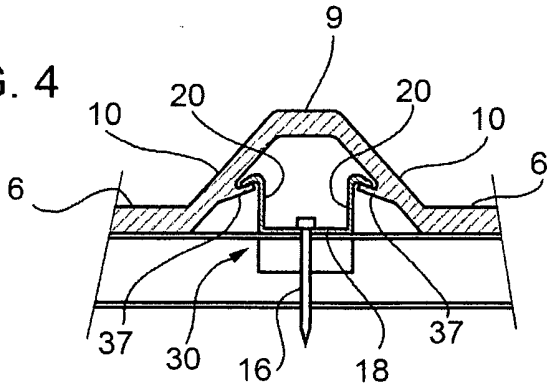
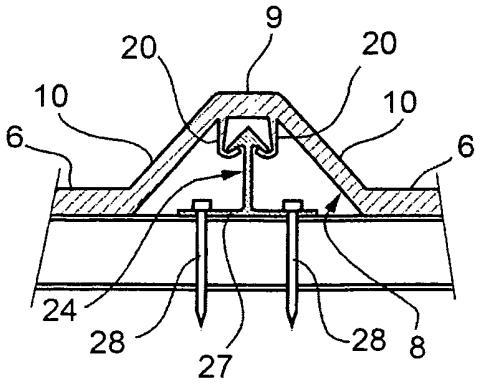


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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