(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 398 426 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.03.2004 Bulletin 2004/12

(51) Int Cl.[7]: **E04C 5/065**, E04C 5/18, E04C 5/06

(21) Application number: **03425579.4**

(22) Date of filing: **09.09.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **11.09.2002 IT CR20020017**

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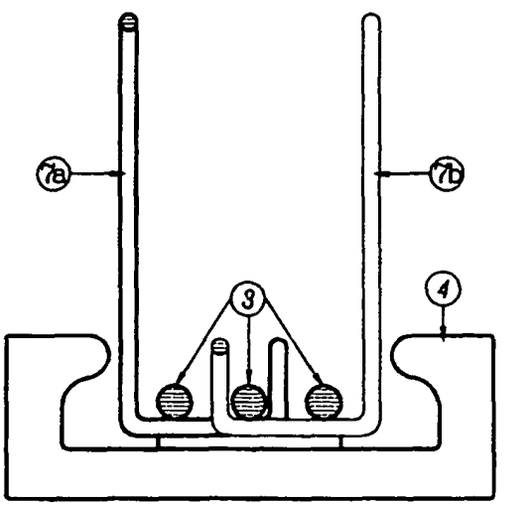
(54) A profile in metal or in another material for the formation of trestles for use in making joists

(57) A metal profile for making both in the factory and on the work site beams for floors, decking or other structures, that ensures the exact positioning of the longitudinal reinforcing iron or irons during the assembly, casting, vibrating and seasoning phases.

Fig. 15



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Description

[0001] This invention concerns the construction of a profile in metal or in another material for the formation of trestles to be used to make joists in cement brick, concrete or another material, either manufactured in the factory, prefabricated or made and cast during work for use in the building trade for the construction of floors, decking, or other structures, the relative constructional and applicational system.

[0002] The prior-art joists that are generally used in building have the shape of an equilateral or isosceles triangle and the most commonly used are those in cement brick.

[0003] To make prior-art joists in cement brick certain components are assembled, namely a series of bases, generally in brick, until the necessary length is reached, longitudinal reinforcing irons and the metal trestle are inserted therein and concrete is then cast to unite everything.

[0004] The sequence of the phases described above clearly shows the disadvantages of the prior art that one wishes to overcome, namely the impossibility of checking and keeping immobile exact position of the longitudinal reinforcing irons placed inside the notch of the base during the phases of assembly, casting, vibration and seasoning.

[0005] This is due to three reasons:

1. during the assembly phases the reinforcing iron may shift because it is merely resting in the notch of the bases and can therefore move diagonally in relation to the axis of the joist, move against a side of the trestle or in the case of two or more irons they may move against one another;
2. during the phase of casting the concrete between the bases the same disadvantages may occur again due to the stress caused by processing;
3. to homogenise and compact the concrete poured into the bases, it is all subjected to a period of strong vibrations; and it is during this period that all the elements that make up the joist move as do the reinforcing irons, which are free to move, so that the disadvantages described above occur again.

[0006] The aim of this invention is to provide an element that ensures that the reinforcing irons are positioned in their optimal position both during the assembly phase, the casting phase, the vibration phase and the seasoning phase.

[0007] The invention also enables other aims to be achieved, namely:

1. ensuring and maintaining precise positioning of the longitudinal reinforcing irons in relation to their theoretical position;
2. ensuring correct positioning of the trestle that makes up the joist;
3. ensuring the required covering of concrete in all directions both around the individual longitudinal reinforcing irons and around the trestle;
4. ensuring the distance between the single reinforcing irons and the trestle;
5. fully integrating the invention with the bases.

[0008] All these aims ensure that the joist thereby obtained is at the maximum level of good art, efficacy and efficiency.

[0009] According to the invention, this result is achieved by simple conformation of the invention, inasmuch as from the opposing union of two profiles and from the installation of the reinforcing irons both the trestle that is resistant to cutting and locking in the appropriate seat of the reinforcing irons are achieved.

[0010] Ensuring the correct depth of concrete around the irons not only preserves them from rust and from corrosion by chemical agents in the environment but also fulfils the basic condition and principle on which collaboration between the concrete and the iron is based.

[0011] This is an essential condition for optimising adhesion tension between the reinforcing iron and the concrete that makes up the joist; the bond thereby achieves maximum adhesion in order to counter the tangential tensions along the reinforcing irons and the respective slipping in relation to the surrounding conglomeration.

[0012] It is equally important to accurately position the trestle that makes up the joist.

[0013] A simple example will now be given to better explain the problem.

[0014] If a joist has to be made wherein a reinforced section of more than 1000 cm2 is required a iron with a 12 mm diameter with a circumference of 37.704 mm or two irons with a 8 mm diameter with a circumference of 25.136 mm can be used that together amount to 50.272 mm.

[0015] However, if the reinforcing iron with a diameter of 12 m/m adheres to the trestle as in Fig. 7 its surface wetted by the concrete will be reduced from 37.704 mm to 30.852 mm; if the two irons with a diameter of 8 mm rest against one another as in Fig. 8 there will be a surface wetted by the concrete equal to 41.136 mm, thereby in both cases noticeably reducing the adhesion surface between the iron and the concrete, reducing the surface respectively to an iron with a diameter of 9.57 mm in the first case and to 2 irons of 6.55 mm in diameter in the second case.

[0016] The above exposition proves that the aim of the invention has been fully achieved without particular, burdensome or additional work, in a simple and economical manner.

[0017] The trestles that are used in prior-art joists consist of three longitudinal irons placed at the top of an upturned 'V' that are connected together by V-shaped brackets by means of welding or another prior-art technique according to custom whereas the reinforcing irons rest in the chamber of the base, where the trestle formed

as above is also inserted.

[0018] The profile that is the subject of the invention consists of a wire that is suitably bent in order to obtain a series of upturned V-shaped profiles with different dimensions and functions that are nevertheless connected together.

[0019] Through the simple frontal fixing of the two profiles without additional welding or processing two series of large upturned Vs are obtained with the function of withstanding cutting forces and two series of small upturned Vs are obtained with the specific scope of acting together with the connecting arms as a rest, fixture or bind for the reinforcing iron or irons.

[0020] Further advantages and characteristics of the invention and the procedure for making the products are clear from the detailed disclosure that follows, which is provided merely by way of non-restrictive example referring to the attached drawings wherein:

Fig. 1 is a diagrammatic representation of a portion of prior-art trestle wherein 1 indicates the longitudinal reinforcing irons and 2 indicates the brackets;
Fig. 2 is a diagrammatic representation of the longitudinal reinforcing iron identified by 3;
Fig. 3 shows a diagrammatic representation of a prior-art base identified by 4, which can be made from different materials, preferably brick, wherein 6 identifies the chamber of the base, wherein the components of the prior-art joist are placed;
Fig. 4 shows a prior-art joist assembled ready to receive the concrete cast;
Fig. 5 shows a prior-art joist assembled and completed with a cast identified by 5;
Fig. 6 shows a transversal section of prior-art joist assembled and completed with casting;
Figs. 7 and 8 show two of the possible disadvantages that may occur in a prior-art joist regarding the longitudinal reinforcing irons and the positioning of the prior-art trestle, which disadvantages we intend to eliminate;
Fig. 9 shows another further possible disadvantage that we intend to eliminate, i.e. the possibility that the reinforcement iron 3 is arranged transversally in relation to the chamber of the base 6 and is therefore not aligned on the joist, furthermore resting on the bottom of the chamber 6 of the base as in the other Figs 7 and 8;
Fig. 10 shows the means of making the profile that is the subject of the invention, identified by 7, more precisely once the series of Vs is made until the set dimension is reached, keeping immobile the stretches of each V comprised between the axes 8 and 10, the apices identified by 9 are rotated by 90° as are the apices of the Vs identified by 11;
Figs 11 and 12 respectively show a longitudinal view and a front view of the profile that is the subject of the invention, identified by 7;
Figs. 13 and 14 show a longitudinal and front view of the assembled profile and how it should be installed, where 7a and 7b indicate the two profiles previously identified by 7, only to show that they are the same profile but installed in a mirrored manner and 12 identifies the seats for the longitudinal irons;
Fig. 15 shows the profiles located in the base and the reinforcement iron 3 inside the seats, which iron can be reduced to a single, two or three irons indifferently, according to requirements, ready to receive the cast of concrete for completion;
Fig. 16 shows the profiles used to make panels in cement brick or floors installed by means of the use of hollow floor bricks;
Fig. 17 uses the profiles used to create trestle slabs with the most various lightening elements;
Fig. 18 shows a further manner of making the profile that is the subject of the invention, wherein, after making the V element identified by 13, keeping the two stretches 14-15 and 17-18 still, both the apex identified by 16 and the point identified by 19 are rotated by 90° in the opposite direction; Figs. 19 and 20 respectively show a front view and a side view of the profile that is the subject of the invention identified by 13;
Fig. 21 shows a front view of the profile that is the subject of the invention identified by 13, assembled by means of welding or another prior-art system, until the necessary length of the trestle is reached; after which one can proceed to make the products as in Figs 13-14 and 15; the same element and principle can be applied to make products with a trestle slab, panels in cement brick or cast floors as shown in Figs 16 and 17;
Fig. 22 shows the front view of another embodiment of the product consisting of a series of continuous Vs identified by 20, made by bending a round bar in metal or another material as shown in the fig. until the necessary length is reached;
Fig. 23 shows an element in metal or in another material identified by 21, consisting of two seats 22 for housing the profile 20 that will be welded or united thereto in another manner in order to constitute the trestle, and the seats 23 for receiving the horizontal irons, a general element 21, which will be placed to adhere between two bases or will be incorporated therein at the moment of extrusion or die-casting;
Fig. 24 shows the profiles 20 that are placed inside the seats 22 and united to them, the seats 23 for the reinforcing iron, whilst 24 shows the base with the element 21 incorporated inside it, everything being ready for being handled or for being completed and used.

[0021] The dimensions and the materials used may obviously vary according to requirements.

[0022] Those having ordinary skill in the art will recognise additional modifications, applications and embodiments within the scope of the claim.

Claims

1. A metal profile for making both in the factory and on the work site beams for floors, decking or other structures, **characterised in that** it ensures the exact positioning of the longitudinal reinforcing iron or irons during the assembly, casting, vibrating and seasoning phases.

2. A profile according to claim 1 **characterised in that** said element consists of an appropriately modelled profiled section in iron, steel or another material.

3. A profile according to claims 1 and 2 **characterised in that** said profile serves the double function of being resisting the force of cutting and of the seat of the longitudinal reinforcement iron or irons.

4. A profile according to the previous claims **characterised in that** it comprises opposed tilted stretches, connected with horizontal stretches to other tilted opposed stretches.

5. A profile according to claim 4, wherein the tilted stretches can be vertical and be connected with horizontal stretches.

6. A profile according to the previous claims **characterised by** the fact that it can be assembled simply by contact.

7. A profile according to the previous claims **characterised in that** it is assembled by electro-welding or other procedures.

8. A profile according to the previous claims **characterised in that** it ensures longitudinal continuity by means of simple overlapping thereof.

9. A profile according to the previous claims **characterised in that** it ensures longitudinal continuity by means of simple contact therewith.

10. A trestle according to the previous claims **characterised in that** the inner part thereof constitutes the seat wherein the round bar or round reinforcing bar of the beam is deposited and exactly placed, which round bars can be inserted according to the calculations and at the moment of installation, even before partial or total casting is carried out.

11. A trestle according to the previous claims, **characterised in that** the form thereof is similar to a U and not to an upturned V.

12. A trestle according to the previous claims, **characterised in that** the top part thereof is open in order to permit subsequent working phases.

13. A base in brick or concrete (with any type of material comprised in the body), or in another synthetic, natural or composite material, also with long dimensions, reinforced or not, extruded or cast in an appropriate mould, with or without bands, clips or other elements in order to accommodate and constitute the seat for the profile that is the subject of the invention and/or embodiments thereof.

14. A base in brick or concrete (with any type of material comprised in the body), or in another synthetic, natural or composite material, also with long dimensions, reinforced or not, extruded or cast in an appropriate mould, without additional other elements made in order to accommodate and constitute the seat for the profile that is the subject of the invention and/or embodiments thereof.

15. A trestle having the composition disclosed above, with references to the attached drawings and as illustrated therein.

16. A trestle having the composition disclosed above, with references to the attached drawings and as illustrated therein, assembled without the use of cement as the unifying element thereof, in order to have a subsequent single jet of concrete to form the trestle and the structure wherein they are used.

17. A trestle having the composition disclosed above, with reference to the attached drawings and as illustrated therein, complete with the reinforcing iron and assembled with the use of cement or another product as a unifying element.

18. Floors, decking and other structures as described above, with reference to the attached drawings and as illustrated therein.

19. Components for making floors, decking, or other structures, **characterised in that** the products and profiles according to the previous claims are used.

20. Structural elements made with the use of the profile or profiles according to any one of the previous claims.

21. Structural elements and a method for the production of the same as disclosed and illustrated in any one of the previous claims.

22. Constructions made with structural elements according to any one of the previous claims.

Fig. 1

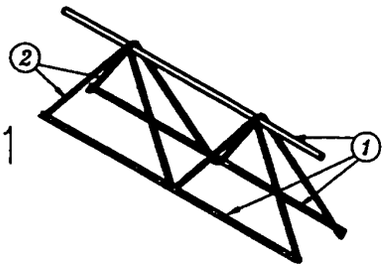


Fig. 2

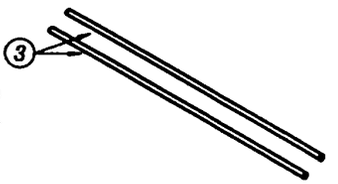


Fig. 3

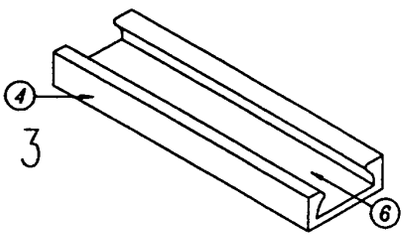


Fig. 4

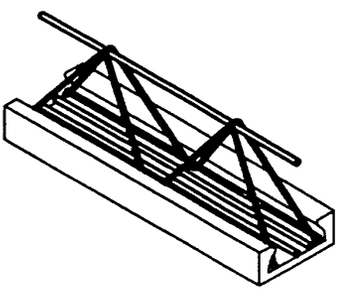


Fig. 5

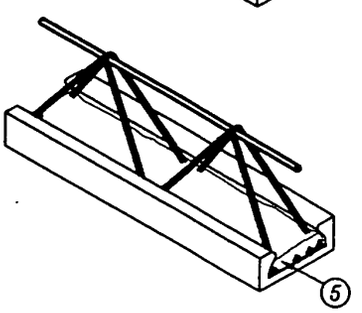


Fig. 6

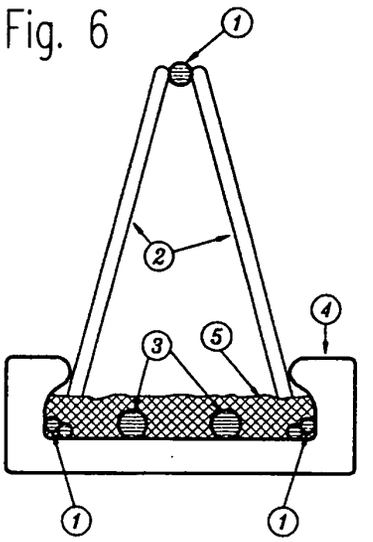


Fig. 7

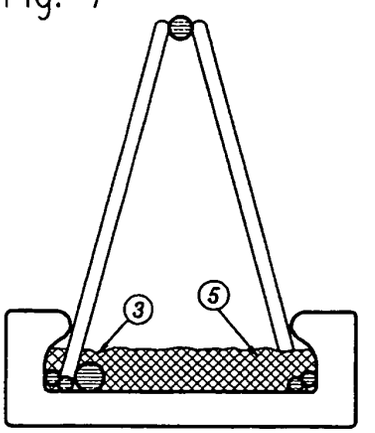


Fig. 8

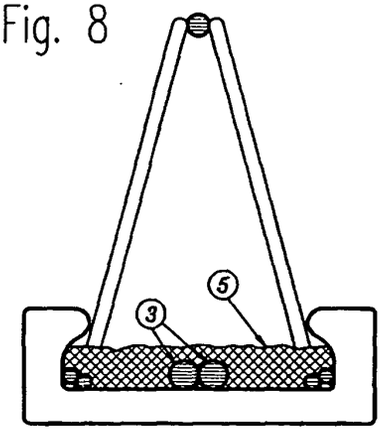


Fig. 9

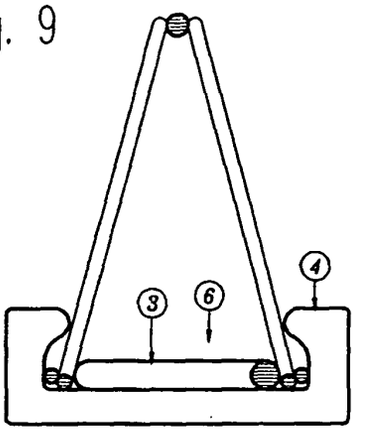


Fig. 10

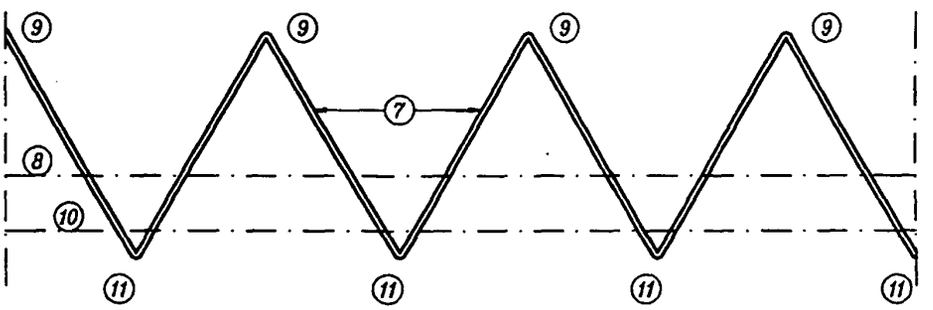
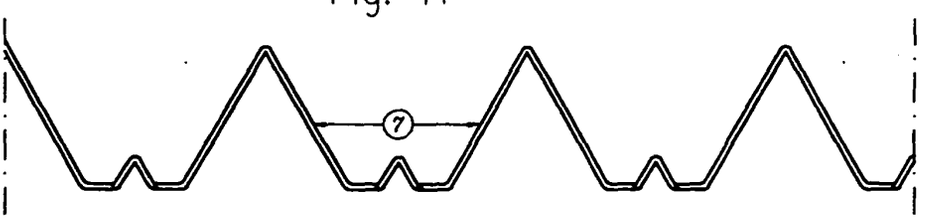


Fig. 11



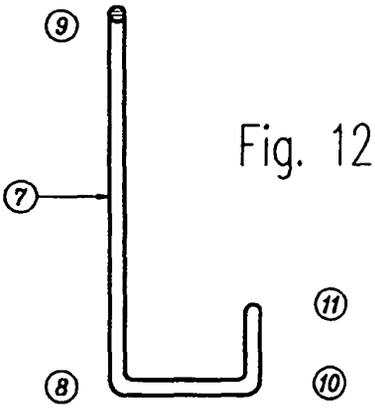


Fig. 12

Fig. 13

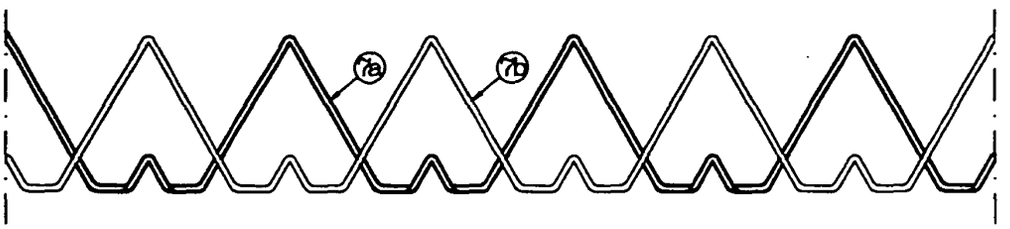


Fig. 14

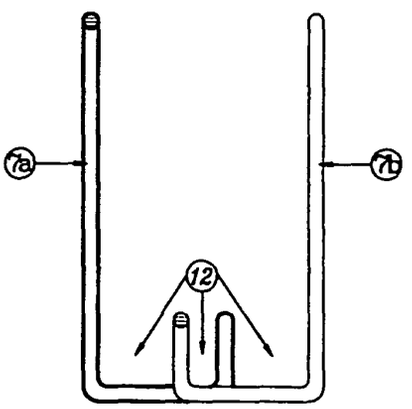
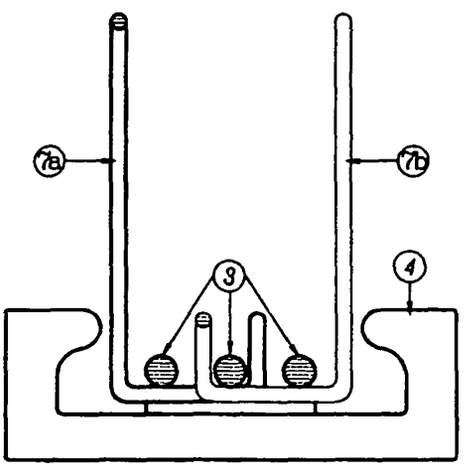


Fig. 15



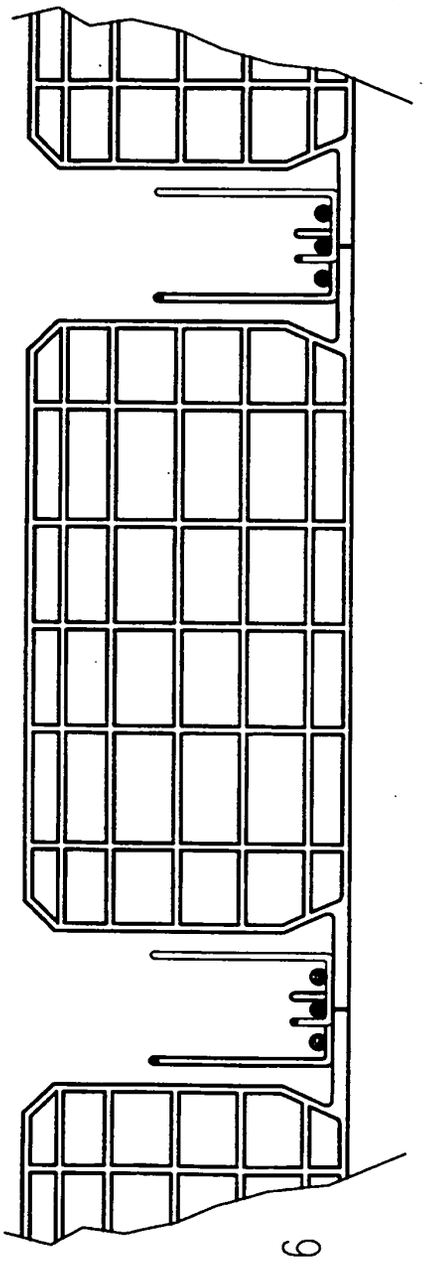


Fig. 16

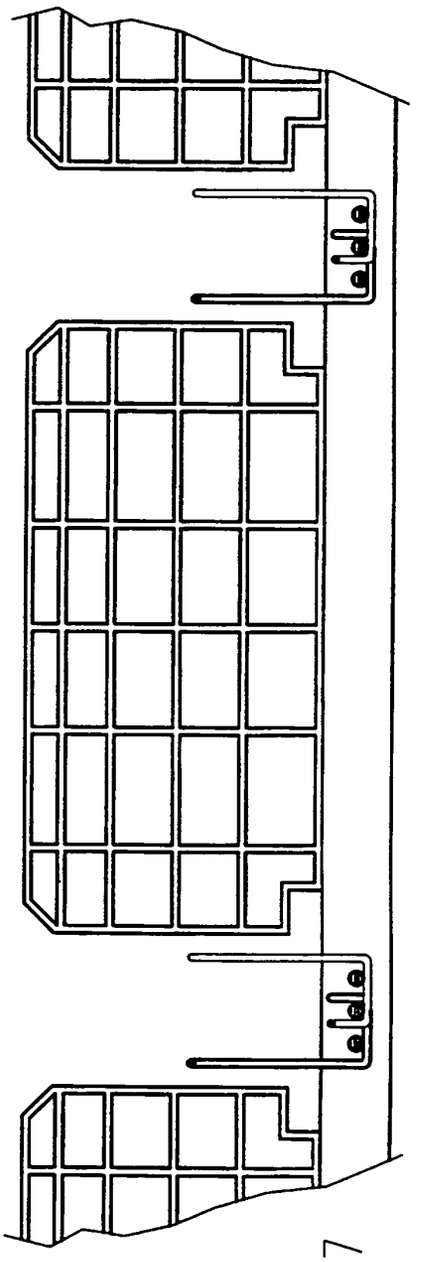


Fig. 17

Fig. 18

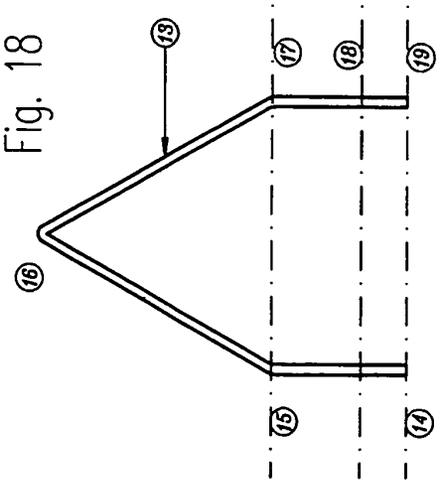


Fig. 19

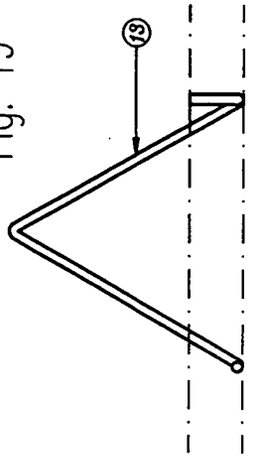


Fig. 20

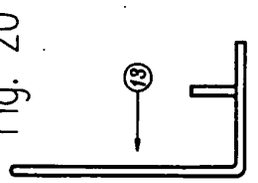
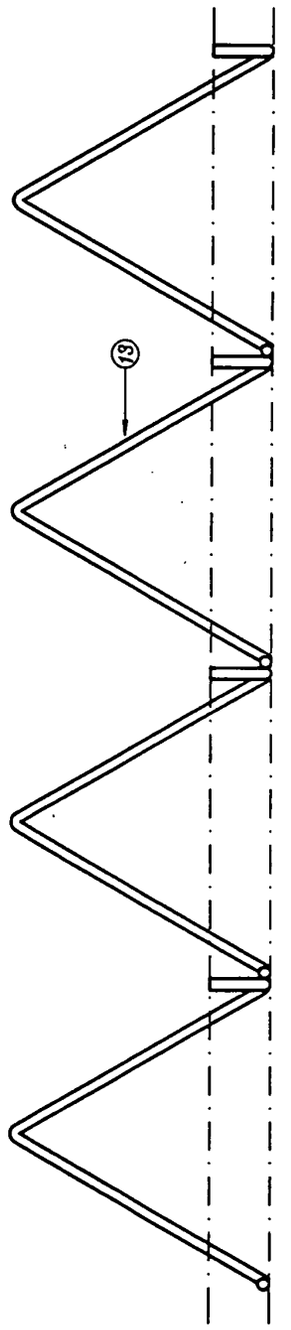


Fig. 21



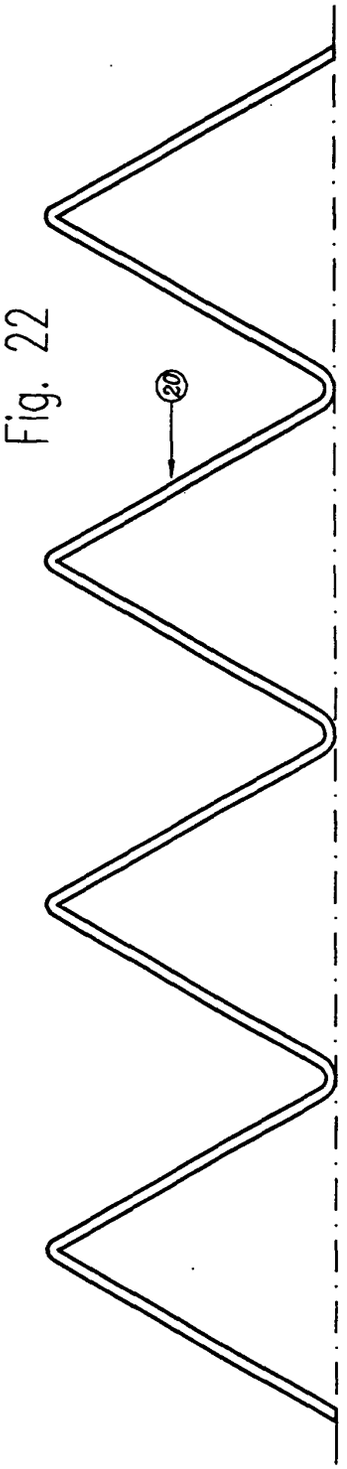


Fig. 22

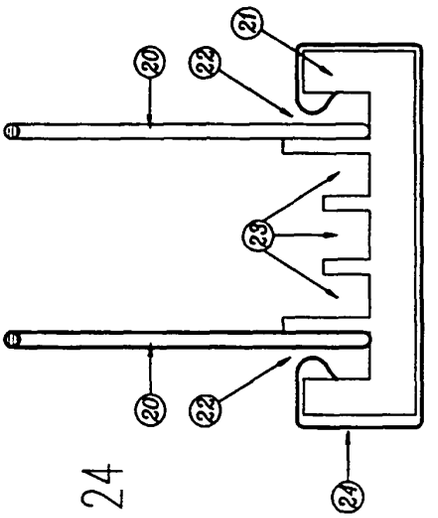


Fig. 24

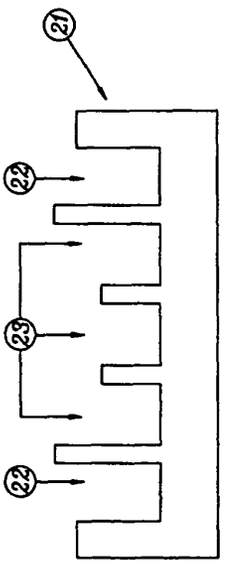


Fig. 23

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5579

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 December 2003	Righetti, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 42 5579

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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