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(54) **Centering for realising cross vaults**

(57) A reinforcement centering (1) is disclosed for realising cross vaults, comprising a plurality (preferably four) of modular groins (3) adapted to be assembled one with the other for realising the final centering (1) and adapted to be disassembled one from the other to be transported and/or stored.

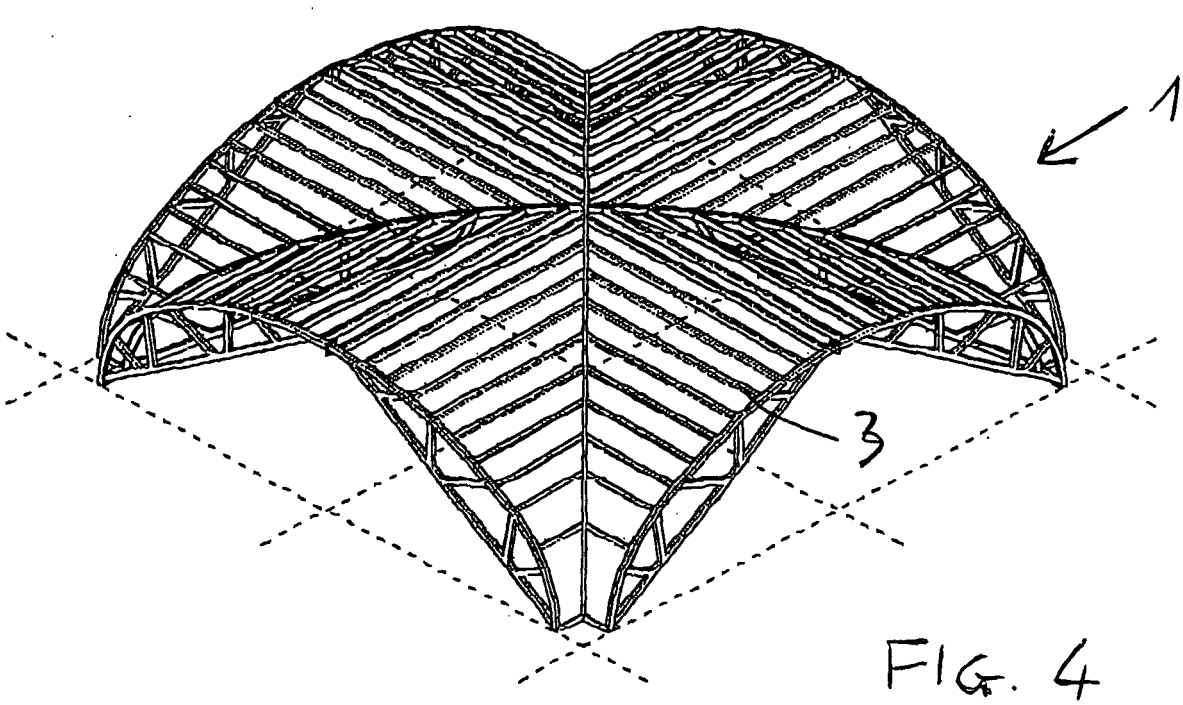

FIG. 4

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Description

[0001] The present invention refers to a reinforcement centering for realising cross vaults, in particular four-groin cross vaults.

[0002] In the current art, there are three types of most common arrangements for realising four-groin cross vaults.

[0003] The first type deals with the use of prefabricated vaults made of pre-compressed reinforced concrete. However, prefabricated vaults have a high cost, and, for moving and placing them, it is necessary to use very heavy and encumbrant transport and installation means, such that they limit their use in places having certain conditions: for example, they cannot be used in areas with mountains or hills, where in general there are narrow roads which can be travelled with difficulty.

[0004] The second type deals with the use of suitably shaped centerings made of polystyrene. However, centerings made of polystyrene, in addition to being very costly, need a scaffolding for supporting them, are single-use, since during laying of the bricks forming the vault or laying iron in case of work-cast vaults made of reinforced concrete, they get ruined; moreover, they create a big disposal problem for this type of material.

[0005] The third type deals with the manufacture of wooden customised centerings, made for example by a carpenter. However, centerings made of wood, also very costly and having the need of a supporting scaffolding, upon disassembling them, get ruined or become unusable, and therefore they can be used only once, while afterwards it is necessary to dispose of them.

[0006] Therefore, object of the present invention is solving the above prior art problems, by providing a new type of centering, that can be modular and able to be decomposed, and therefore can be easily assembled and disassembled. Moreover, the centering of the invention is made of inexpensive materials, such as iron, aluminium or pressed recycled plastics, and can have different shapes. All this allows realising a centering that is easy to be transported, due to its reduced weight and sizes, in any place, even on mountains or hills. With the centering of the invention, it is thereby possible to realise cross vaults with necessary sizes for every design need, with reduced costs with respect to current costs.

[0007] The above and other objects and advantages of the invention, as will appear from the following description, are obtained with a reinforcement centering as described in claim 1. Preferred embodiments and non trivial variations of the present invention are the subject matter of the dependent claims.

[0008] The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which:

- FIG. 1 is a plan view of the inventive centering composed of four groins;
- FIG. 2 is a plan view of a single groin of the centering in FIG. 1;
- FIG. 3 is an axonometric view of the groin in FIG. 2;
- FIG. 4 is an axonometric diagonal view of the centering in FIG. 1; and
- FIG. 5 is an axonometric front view of the centering in FIG. 1.

[0009] With reference to the Figures, a preferred embodiment of the reinforcement centering 1 of the invention for realising cross vaults is shown. The Figures show the arrangement of a cross vault with four groins 3, but it will be immediately obvious for the skilled people in the art that the inventive centering 1 can be composed of any number of groins 3 and can be applied for realising any type of cross vault.

[0010] The inventive centering 1 is necessary for realising cross vaults for rooms, wine cellars, tavernes, cloisters, arcades, halls, etc. and can be made of sturdy and inexpensive materials, such as iron, aluminium, pressed recycled plastics, etc.

[0011] The centering 1 can have different shapes, such as for example lowered round, round or acute round.

[0012] The innovative aspect of the centering 1 of the present invention consists in the capability of the centering 1 to be decomposed in a plurality (preferably four) of modular groins 3, which, mutually assembled through adequate bolts (as will be described below) form the whole centering 1. These modular goinrs 3 are adapted to be assembled one with the other for realising the final centering 1 and are adapted to be disassembled one from the other to be transported and/or stored.

[0013] If such centering 1 is made of iron or aluminium tubing, it will be completed with a sheet covering (not shown), while if it is made of pressed recycled plastics, it will already be ready for use.

[0014] Figure 3 shows a detail of one of the modular groins 3 adapted to be composed: in such Figure, part 2-1 is the junction point, commonly called boss or keystone, that joints the four groins 3 forming the complete centering. Instead, part 2-2 shows the part that will be abutted against a bearing pillar (not shown), while part 2-3 is the joining point with a similar part 2-3 of another groin 3.

[0015] In the process for assembling the four groins 3 that form the complete centering 1, in addition to placing the bolts for the various unions, it will be necessary to insert, between centering 1 bases and bearing pillars, an iron shim (not shown) whose height is at least equal to 6 cm, as spacer from the bases by a few millimeters, through four bolts (not shown) for every base. In this way, upon disassembling, it will be enough to loosen and remove the bolts that join a groin 3 to the other two nearby groins 3, remove the keystone bolts, loosen the four bolts of the groin 3 base, remove the shim between base and pillar, so that the groin lowers by the shim height (here 6 cm), and it will then be possible to thereby withdraw and remove this and all the other groins 3.

[0016] With the centering 1 thereby composed and able to be decomposed, easy, quick and safe assembling and disassembling operations are enabled. Transporting of the inventive centering 1 is made easier by its small sizes and weight, and therefore an accessibility is guaranteed to any type of installation site, even on hills or mountains.

[0017] It will be possible, through the centering 1, to realise cross vaults of the necessary sizes for every particular design need, with reduced costs with respect to currently marketed centerings.

Claims

1. Reinforcement centering (1) for realising cross vaults, **characterised in** it comprises a plurality of modular groins (3) adapted to be assembled one with the other for realising the final centering (1) and adapted to be disassembled one from the other to be transported and/or stored.

2. Reinforcement centering (1) according to claim 1, **characterised in that** said modular groins (3) are four.

3. Reinforcement centering (1) according to claim 1 or 2, **characterised in that** each one of said groins (3) is equipped with a junction point, or boss or keystone (2-1) adapted to allow its junction with all other groins (3), and with a joining point (2-3) adapted to allow its union with another groin (3).

4. Reinforcement centering (1) according to claim 1, **characterised in that** it is made of sturdy and inexpensive materials, such as iron, aluminium, or pressed recycled plastics.

5. Reinforcement centering (1) according to claim 1, **characterised in that** it has a lowered round shape.

6. Reinforcement centering (1) according to claim 1, **characterised in that** it has a round shape.

7. Reinforcement centering (1) according to claim 1, **characterised in that** it has an acute round shape.

8. Reinforcement centering (1) according to claim 1, **characterised in that** it is further equipped with a sheet covering.

9. Process for assembling the centering (1) according to claim 3, **characterised in that** it comprises the steps of:

   - providing a plurality of groins (3) adapted to be composed;
   - joining said groins (3) in the junction point (2-1) and joining said groins (3) in the union point (2-3);
   - inserting, between centering (1) bases and bearing pillars, an iron shim as spacer from the bases.

10. Process for disassembling the centering (1) according to claim 3, **characterised in that** it comprises the steps of:

    - loosening and removing the bolts that join (in 2-3) a groin (3) to the other groins (3);
    - removing the keystone (2-1) bolts;
    - loosening the groin (3) base bolts;
    - removing the shim inserted between base and pillar, in order to lower the groin (3) by the shim height;
    - withdrawing and removing the groin (3);
    - repeating the above steps for withdrawing and removing all other groins (3).

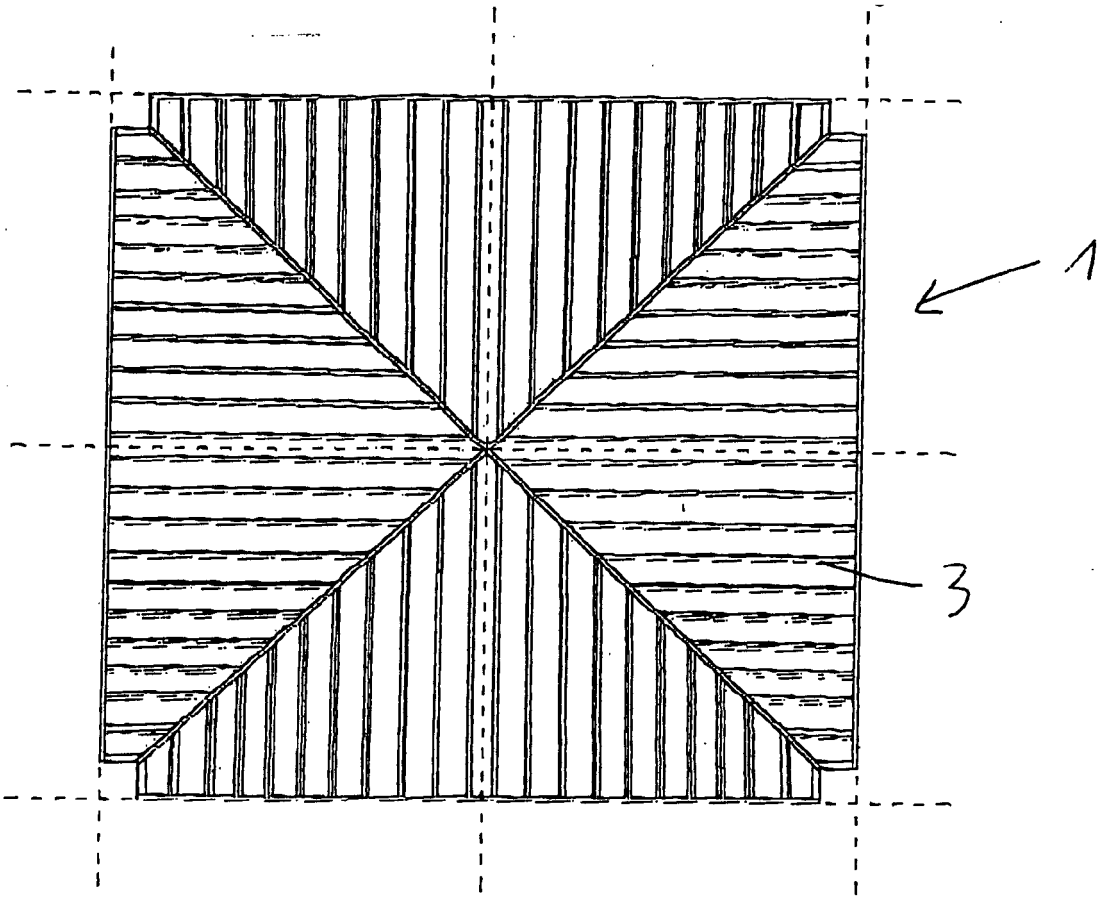

FIG. 1

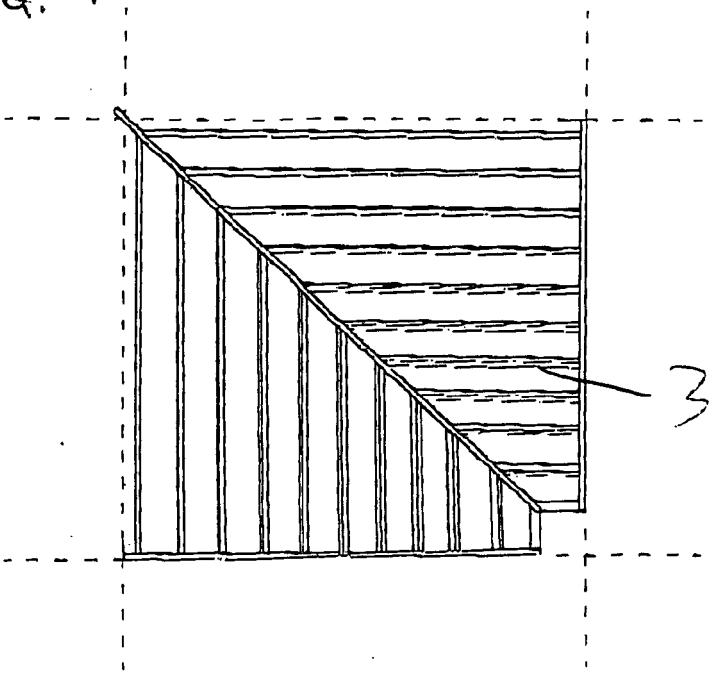

FIG. 2

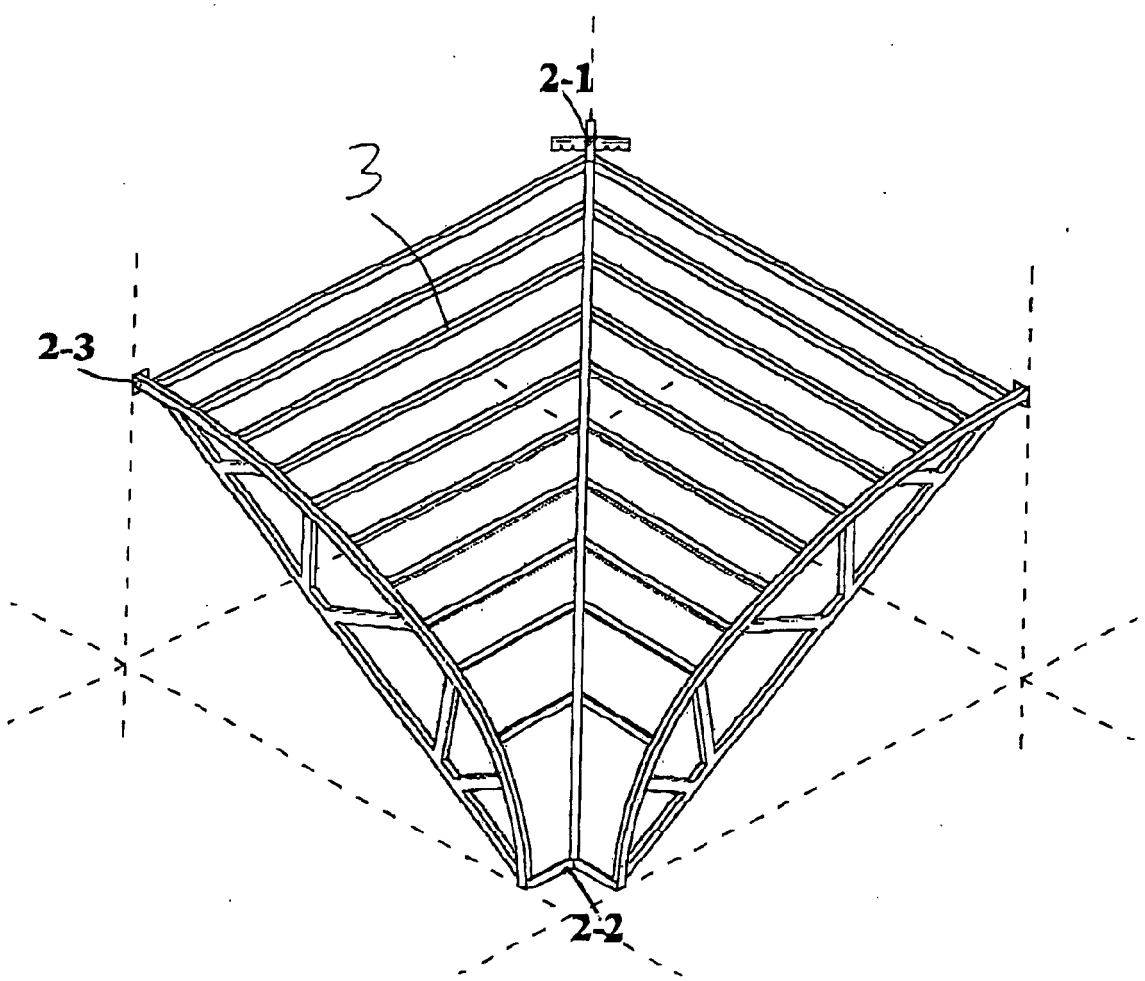

FIG. 3

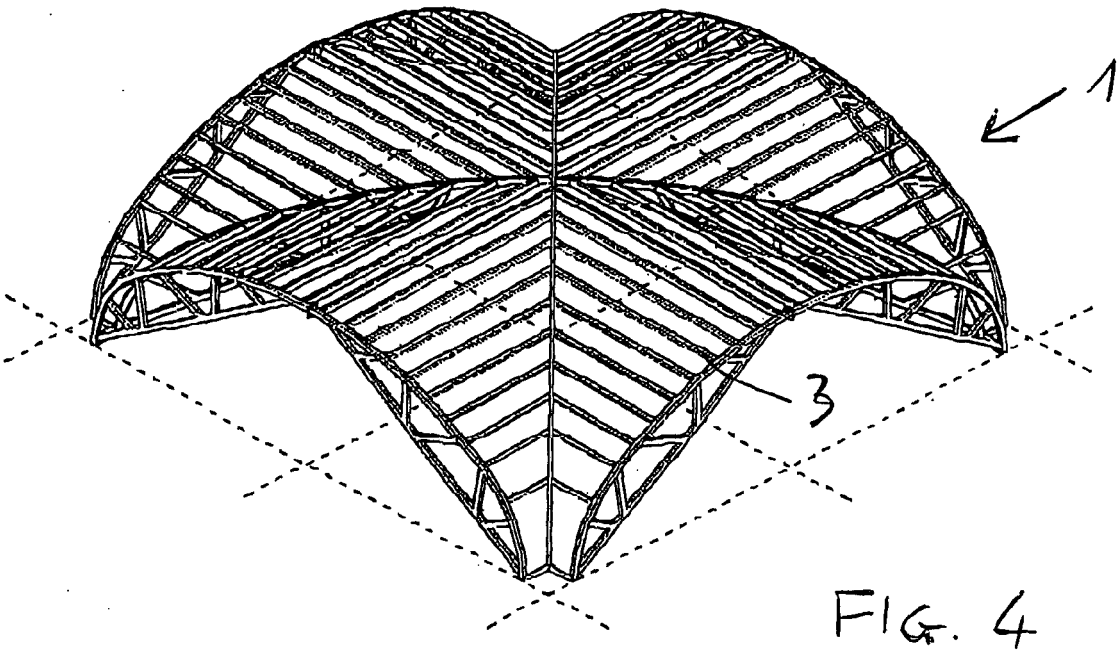

FIG. 4

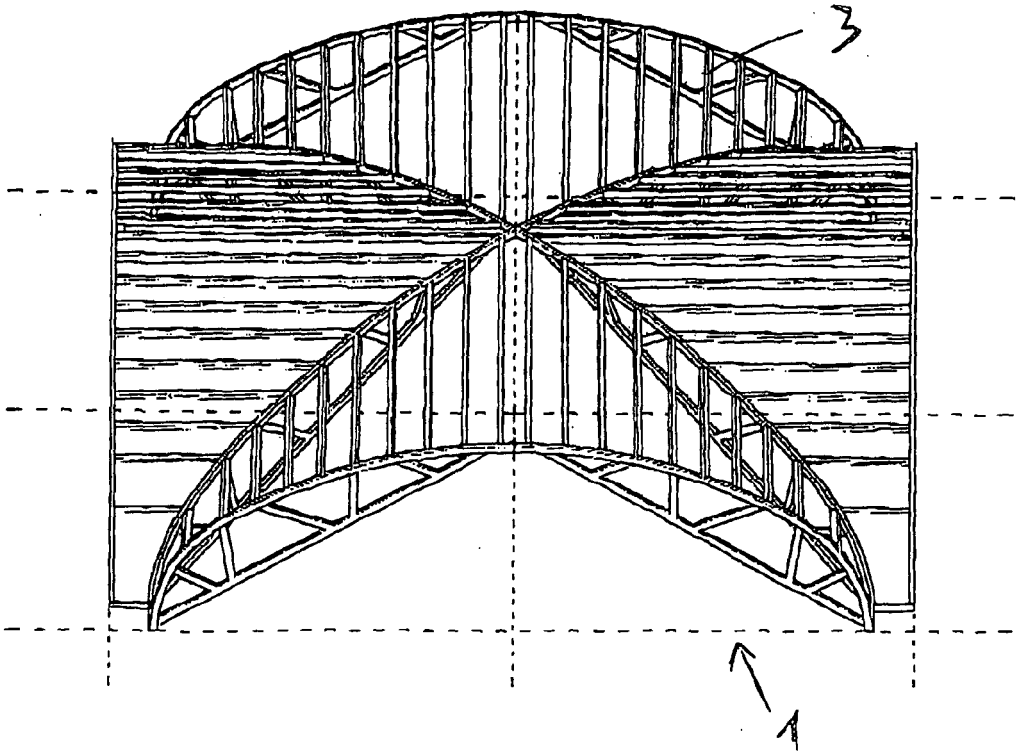

FIG. 5