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(54) **METHOD FOR MANUFACTURING A BEAM FOR A STORAGE RACK AND ARRANGEMENT FOR BEAMS FOR STORAGE RACKS**

METHODE FÜR DIE PRODUKTION EINES BALKENS FÜR EIN SPEICHERREGAL UND ANORDNUNG FÜR BALKEN FÜR SPEICHERREGALE

PROCEDE DE FABRICATION DE POUTRELLE DESTINEE A UN CASIER DE STOCKAGE ET AGENCEMENT DE POUTRELLES DE CASIER DE STOCKAGE

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US-A- 5 432 989

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Description

[0001] The invention relates to a method for manufacturing a beam for a storage rack, in which method a profiled beam of suitable cross-section is pressed together or pressed flat at both ends and hooks are provided there for engagement with holes in uprights in the storage rack which are provided with rows of holes.

[0002] The invention also relates to an arrangement for beams for storage racks, which beams are designed to be fastened to uprights provided with rows of holes, each beam consisting of a section of suitable cross-section, the two ends of which are pressed together to form a plane surface in each case, which extends in the longitudinal direction of the beam, which plane surface is connected to a, preferably angle, section with hooks, bent out from the side connected to the plane surface, for engagement with holes in said rows of holes. A similar arrangement for beams is already known by US-A- 3 647 079.

[0003] One of the main components of a pallet rack system is a supporting beam which, together with a corresponding, parallel supporting beam, constitutes a horizontal "shelf" on which the pallets can rest. Such a supporting beam usually consists of three parts, namely a beam section of a given length and a fitting (end attachment/locking piece) at each end of the beam. Said fittings are equipped with a form of hook/lip for fixing into corresponding holes in vertical frames/uprights. The fittings are normally joined to the beam sections by welding. A disadvantage of this is that the weld has to be lacquered or painted afterwards, which involves a considerable production cost. Nor is it particularly advantageous to use galvanized sections and end attachments, because the welding destroys the thin zinc layer, so that the weld is susceptible to corrosion. The weld thus needs to be lacquered or painted afterwards, which increases the production costs of supporting beams.

[0004] Another embodiment of supporting beams in pallet racks is one where the supporting beam is made in one piece and the section itself of the supporting beams is flattened at each end and hooks are formed directly in the flattened section material. A disadvantage of such an embodiment is that it is then necessary to have the same material thickness and quality in both the beam section itself and the end attachments, with the result that, by optimizing the material in the beam section itself, that is, to use the minimum amount of material to give the desired load bearing capacity, too little strength is obtained in the end attachments, or that, by optimizing with regard to the end attachments, the material consumption in the beam section is excessive and uneconomical.

[0005] The present invention relates to pallet racks in which the supporting beams consist of a number of parts, that is to say the beam section itself and the associated fittings. The advantage of this is that it is possible to select different thickness and qualities for the fittings or end attachments in relation to the beam section itself.

[0006] It is a particular aim of the invention to make it possible to use materials which are surface-treated in advance, for example pre-lacquered/painted or pre-galvanized materials, for both the beam section and the fittings.

[0007] It is a particular aim to use a joining technique which provides the desired load capacity and load rigidity in the connection between the beam sections and the end attachments and between the end attachments and the uprights.

[0008] According to the invention, a method as mentioned in the introduction is therefore proposed, which is characterized in that each of the pressed-flat ends is brought into contact with an end section, which end section is provided with hooks for engagement with the holes in the uprights, and in that the pressed-flat beam end and said end section are interconnected by discrete material portions, which form rivets, being pressed through the pressed-flat beam end from the angle side.

[0009] According to the invention, an arrangement as mentioned in the introduction is also proposed, which arrangement is characterized in that the plane surface and said end section are in mutual contact and are interconnected by discrete material portions, which form rivets, pressed through the plane surface from the angle side.

[0010] The pressed-together or pressed-flat beam portions are located at the two beam ends, but it is also possible to imagine beam embodiments in which one or more pressed-flat or pressed-together beam portion(s) is or are present between the two beam ends, which beam portion or beam portions is or are provided with one or two end sections as mentioned, if appropriate a U section with hooks bent out in the U bottom.

[0011] It will be understood that what distinguishes the invention is that the components are joined together mechanically without the use of heat (welding) or any form of additional material/components. In this way, the advantage is obtained of being able to select different thicknesses and qualities for the end attachments in relation to the beam section itself, and possibilities are afforded for using materials which are surface-treated in advance. A considerable advantage in this connection is an environmental advantage which is obtained by avoiding the heating/melting of the materials.

[0012] The joining technique employed is a "riveting" technique which can be performed by a pressing tool being introduced partly into the two plates which have been placed together and pressing out a discrete material portion in such a manner that a type of rivet connection is formed.

[0013] By virtue of the pressing-out of the material taking place from the end sections where the bent-out hooks are pressed out, the surface, which is otherwise smooth there and is designed for contact with the respective upright, is retained.

[0014] The invention results in the production costs of pallet racks being reduced considerably, especially when

compared with welded and lacquered solutions.

[0015] The invention will now be explained in greater detail with reference to the drawings, in which:-

Fig. 1 shows a front view of a supporting beam according to the invention;
Fig. 2 shows a section through the supporting beam in Fig. 1 along section line II;
Fig. 3 shows an example of a pallet rack with supporting beams according to the invention;
Fig. 4 shows a pressed-flat beam section end and an angle section before joining together;
Fig. 5 shows the two components shown in Fig. 4 joined together;
Fig. 6 shows an end view of the supporting beam in Figs 1 and 5;
Fig. 7 shows a top view of the end detail in Fig. 5;
Fig. 8 shows a front view of a possible beam embodiment according to the invention, and
Fig. 9 shows a section through a typical "rivet" connection.

[0016] The supporting beam 1 shown in Fig. 1 consists of three components, namely a beam section 2 and an end section for each end, the end sections being in the form of angle sections 3 and 4 having in cross-section two arms substantially at right angles to each other.

[0017] The beam section 2 has a cross-sectional shape known per se as shown in Fig. 2, and the beam section is shaped like this by bending a plate into the shape shown in Fig. 2. Alternative cross-sections may be provided to suit required sizes and load capacities. Reference number 5 indicates suitable connections made by a joining technique as described hereinafter with reference to Fig. 9.

[0018] The beam section 2 is pressed flat at each end, that is to say it is designed with a pressed-together portion 6, 7 in such a manner that, at each end of the supporting beam 1, a plane surface is formed, which extends in the longitudinal direction of the beam.

[0019] Each angle section 3, 4, see in particular the angle section 4 in Figs 4 to 7, is provided on one angle side 8 with a number of pressed-out hooks 9, designed to be hung in a manner known per se in holes in rows of holes in uprights 10 in a pallet rack, see Fig. 3. In Fig. 3, the rows of holes in the uprights 10 are not shown in greater detail, however, as this technique is well known to the person skilled in the art.

[0020] The angle side 8 provided with the hooks or the claws 9 is placed against the pressed-together beam end portion 7 and is connected thereto by discrete material portions 11, which will go into and through the plane surface 7 and each form a rivet connection, being pressed out from the angle side 8, more specifically from that side thereof where the hooks 9 are pressed out.

[0021] This joining technique is known. Fig. 9 shows a section through a typical "rivet" connection known per se which can be used. The angle side 8 bears against the pressed-together beam end portion 7. A pressing tool 20 presses the material of the angle 8 and of the end portion 7 against a female reaction member 21, by means of which a rivet connection as shown is formed.

[0022] In most cases, the individual beams 1 will be made as shown in Fig. 1, but it is also possible to imagine supporting beam embodiments in which pressed-flat portions are designed between the ends provided with fastening fittings, at which portions fittings are mounted, so that therefore, as shown in Fig. 8 for example, a supporting beam 1' can extend over and past an upright 14 arranged between two uprights 12, 13. Angle sections 16, 17 are then, like at the beam ends, fixed into the intermediate pressed-flat portion 15. If appropriate, the two angle sections 16, 17 can be designed as an integrated unit, and also as a U section. Beam embodiments such as that shown in Fig. 8 can suitably be used to produce a storage rack which is better held together and more stable, so that, for example, the storage rack shown in Fig. 3 then has longitudinal beams which thus extend from the upright 12 to the upright 18 in Fig. 3.

[0023] The advantages mentioned in the introduction are achieved by means of the invention. The individual elements can be treated in advance, for example galvanized or lacquered. The use of angle sections in the end fittings also provides increased stability in the storage rack.

Claims

1. Method for manufacturing a supporting beam (1) for a storage rack, in which method a beam section (2) of suitable cross-section is pressed flat (6, 7) at both ends and hooks (9) are provided there for engagement with holes in uprights (10, 13) in the storage rack which are provided with rows of holes, **characterized in that** each such pressed-flat end (6, 7) is brought into contact with an end-section (8) which end section (8) is provided with hooks (9) for engagement with said holes, and **in that** the pressed-flat beam end (7) and said end section (8) are interconnected by discrete material portions (11), which form rivets, being pressed through the pressed-flat beam end (7) from the angle side (8).

2. Arrangement for supporting beams (1) for storage racks, which beams (1) are designed to be fastened to uprights (10, 13) provided with rows of holes, each beam (1) consisting of a beam section (2) of suitable cross-section, the two ends of which are pressed together to form a plane surface (6, 7) in each case, which extends in the longitudinal direction of the beam, which plane surface (7) is connected to an end section (8) with hooks (9), formed out from the end section connected to the plane surface (7), for engagement with holes in said rows of holes, **characterized in that** the plane surface (7) and said end

section (8) are in mutual contact and are interconnected by discrete material portions (11), which form rivets, pressed through the plane surface (7) from the end section (8).

3. Arrangement according to Claim 2, **characterized by** one or more pressed-flat beam portions (15) between the two beam ends, which beam portion (15) is provided with one or two mid-sections (16, 17).

4. Arrangement according to Claim 3, wherein the mid-sections have a U-shaped cross-section with hooks formed out in the U bottom.

5. Arrangement according to Claims 2, 3 or 4, wherein the end sections comprise an angle section (4).

Patentansprüche

1. Verfahren zur Herstellung eines Tragbalkens (1) für ein Regal, wobei ein Balkenabschnitt (2) geeigneten Querschnitts an beiden Enden flach gepresst wird (6, 7) und dort Haken (9) vorgesehen sind, die mit Löchern in mit Reihen von Löchern versehenen Ständern (10, 13) im Regal zum Eingriff kommen, **dadurch gekennzeichnet, dass** die flachen Enden (6, 7) jeweils mit einem Endabschnitt (8) zur Anlage gebracht werden, der mit Haken (9) zum Eingriff in die besagten Löcher ausgestattet ist, und dass das flach gepresste Balkenende (7) und der besagte Endabschnitt (8) durch einzelne Materialteile (11) miteinander verbunden sind, die in Form von Nieten von der Winkelseite (8) aus durch das flach gepresste Balkenende gepresst werden.

2. Anordnung für Tragbalken (1) für Regale, wobei die besagten Balken (1) für Befestigung an mit Reihen von Löchern versehenen Ständern (10, 13) ausgelegt sind und jeder Balken (1) aus einem Balkenabschnitt (2) geeigneten Querschnitts besteht, dessen beide Enden jeweils zur Bildung einer ebenen Fläche (6, 7) zusammen gepresst werden, die sich in der Längsrichtung des Balkens erstreckt, wobei die ebene Fläche (7) mit einem Endabschnitt (8) mit Haken (9) verbunden ist, die aus dem mit der ebenen Fläche (7) verbundenen Endabschnitt zum Eingriff in die besagte Reihe von Löchern heraus geformt wurden, **dadurch gekennzeichnet, dass** die ebene Fläche (7) und der besagte Endabschnitt (8) aneinander anliegen und durch einzelne Materialteile (11) miteinander verbunden sind, die in Form von Nieten vom Endabschnitt (8) aus durch die ebene Fläche (7) gepresst werden.

3. Anordnung nach Anspruch 2, **gekennzeichnet durch** mindestens ein flach gepresstes Balkenteilstück (15) zwischen den beiden Balkenenden, das mit ein oder zwei Mittelabschnitten (16, 17) versehen ist.

4. Anordnung nach Anspruch 3, wobei die Mittelabschnitte einen U-förmigen Querschnitt mit aus dem Unterteil des U heraus geformten Haken aufweisen.

5. Anordnung nach Anspruch 2, 3 oder 4, wobei die Endabschnitte ein Winkelprofil (4) aufweisen.

Revendications

1. Procédé de fabrication d'une poutrelle de support (1) destinée à un casier de stockage, dans lequel procédé une section de poutrelle (2) ayant une coupe transversale appropriée est pressée de manière à être aplatie (6, 7) aux deux extrémités et des crochets (9) sont prévus à ces emplacements pour l'engagement avec des trous pratiqués dans les montants (10, 13) du casier de stockage qui sont pourvus de rangées de trous, **caractérisé en ce que** chaque extrémité ainsi aplatie (6, 7) est mise en contact avec une section d'extrémité (8) laquelle section d'extrémité (8) est pourvue de crochets (9) pour l'engagement avec lesdits trous, et **en ce que** l'extrémité aplatie de la poutrelle (7) et ladite section d'extrémité (8) sont interconnectées par des parties en matériau discret (11), qui constituent des rivets, pressés à travers l'extrémité aplatie de la poutrelle (7) depuis le côté cornière (8).

2. Agencement de poutrelles de support (1) destiné à des casiers de stockage, lesquelles poutrelles (1) sont conçues pour être fixées à des montants (10, 13) pourvus de rangées de trous, chaque poutrelle (1) consistant en une section de poutrelle (2) ayant une coupe transversale appropriée, dont les deux extrémités sont aplaties pour former une surface plane (6, 7) dans chaque cas, qui s'étend dans la direction longitudinale de la poutrelle, laquelle surface plane (7) est connectée à une section d'extrémité (8) avec des crochets (9), formés à partir des section d'extrémité connectées à la surface plane (7), pour l'engagement avec les trous dans lesdites rangées de trous, **caractérisé en ce que** la surface plane (7) et ladite section d'extrémité (8) sont en contact mutuel et sont interconnectées par des parties en matériau discret (11), qui constituent des rivets, pressés à travers la surface plane (7) depuis la section d'extrémité (8).

3. Agencement selon la revendication 2, **caractérisé par** une ou plusieurs parties de poutrelles de support pressées de manière à être aplaties (15) entre les deux extrémités de poutrelle, laquelle partie de poutrelle (15) est pourvue d'une ou de deux sections intermédiaires (16, 17).

4. Agencement selon la revendication 3, dans lequel les sections intermédiaires ont une coupe transversale en forme de U avec des crochets aménagés dans le fond du U.

5. Agencement selon les revendications 2, 3 ou 4, dans lequel les sections d'extrémité comprennent une section de cornière (4).

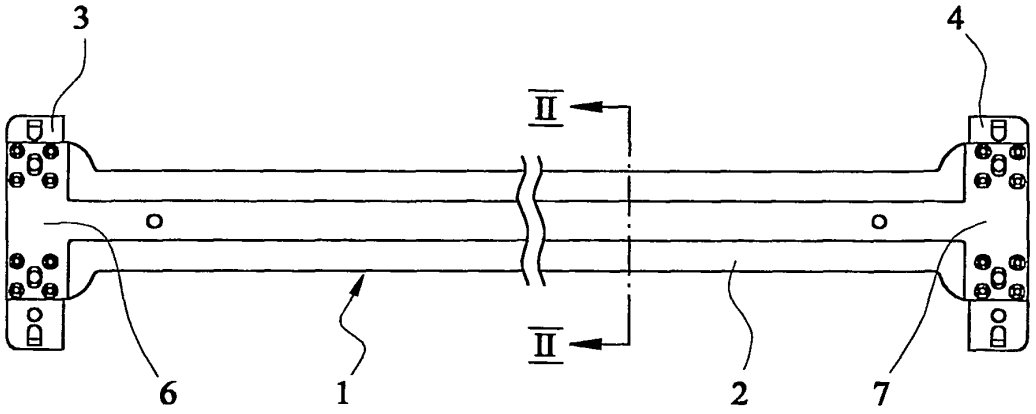


FIG. 1

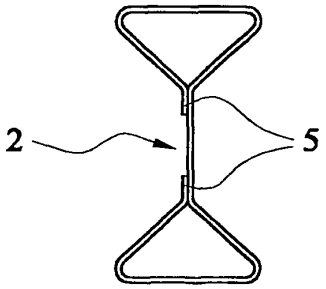


FIG. 2

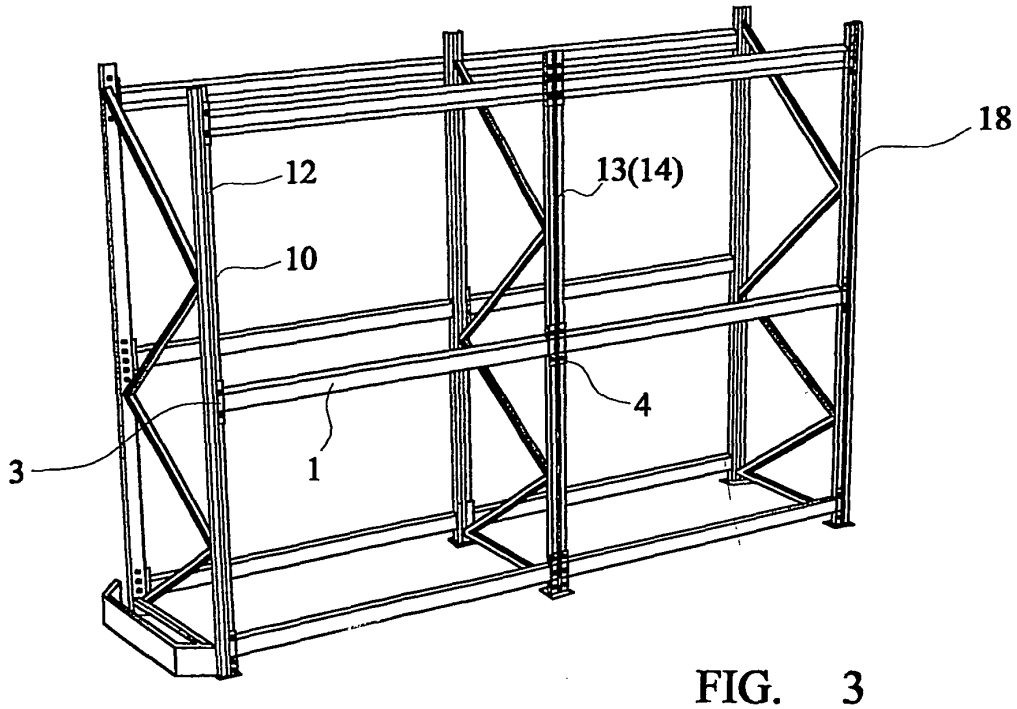


FIG. 3

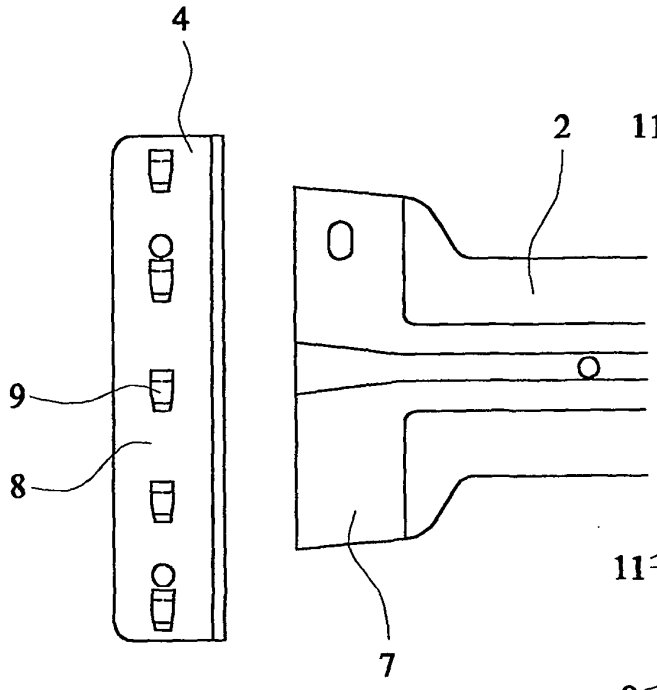


FIG. 4

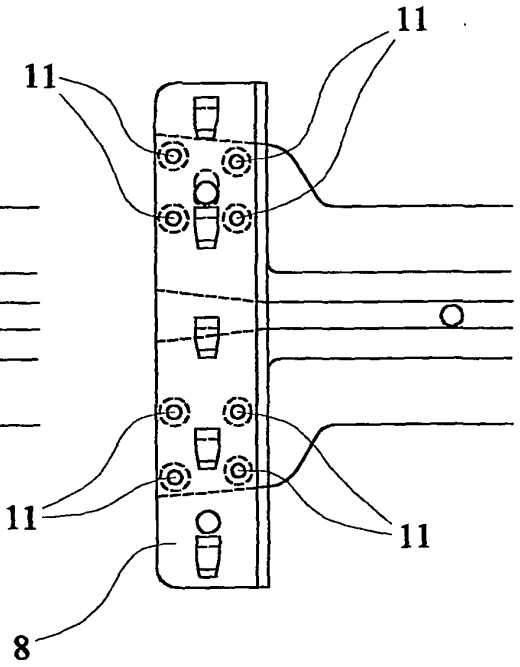


FIG. 5

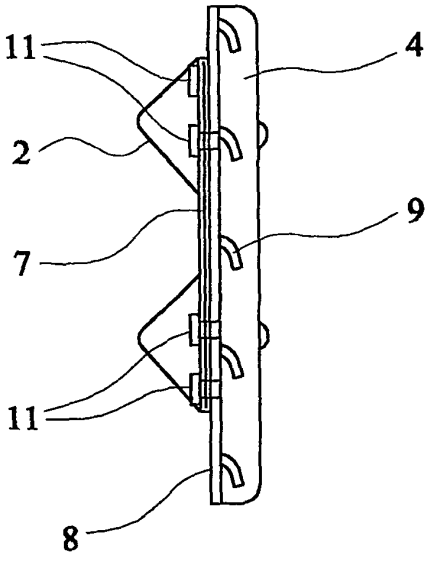


FIG. 6

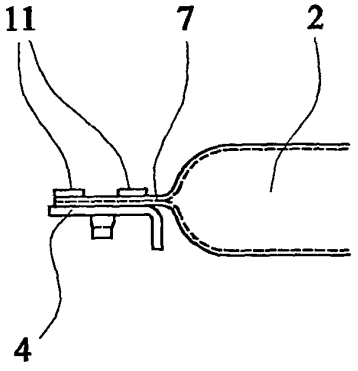


FIG. 7

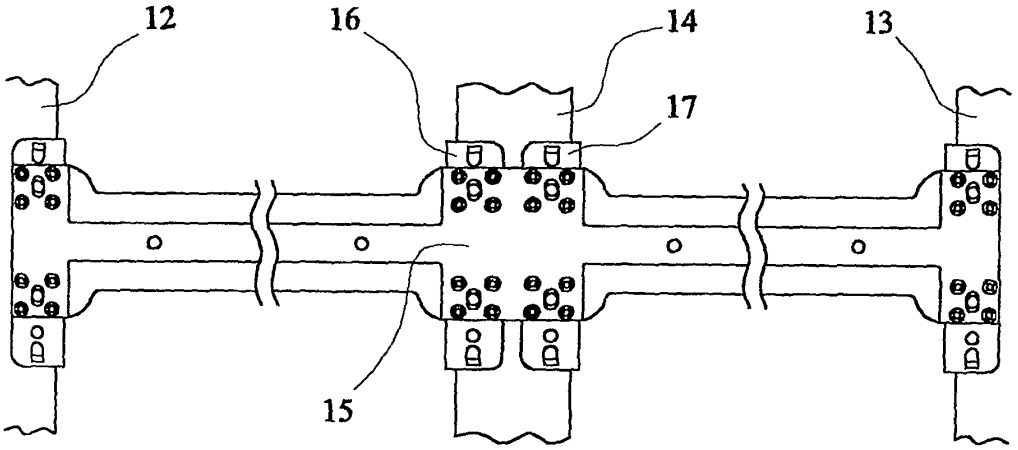


FIG. 8

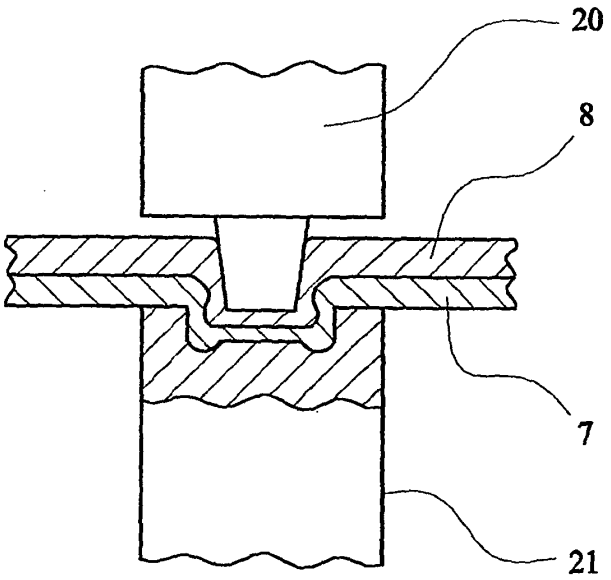


FIG. 9