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(54) **Coupling and blocking system for shelf supporting elements in bookcases, shelvings or the like**

Verbindungs- und Befestigungssystem für Regalbodenstützelemente in Bücherschränken, Regalen oder dergleichen

Système d'accouplement et de blocage pour les éléments de support d'étagères dans les bibliothèques et rayonnages ou similaire

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## Description

**[0001]** The present invention refers to a coupling and blocking system that is to be especially utilized to obtain shelf supporting elements for bookcases, shelvings or the like. A similar coupling and blocking system is already disclosed by 4 750 626.

**[0002]** A coupling and blocking system for shelves of bookcases, shelvings or the like is proposed.

**[0003]** The present system permits supporting elements to be coupled together and takes advantage of the principle of the cone connection, already utilized in the present field, by using new technical measures that improve both the way of production and the assembling techniques. Thus, it is possible to obtain a finished product that guarantees a great quality and, above all, an excellent stability.

**[0004]** As is known, in the field of furniture and shelving as well as in the field of building accessories several constructive techniques are known and consist in mounting shelves that are fixed in several ways on their respective uprights, for instance to assemble bookcases, shelvings or the like.

**[0005]** The systems used to fix shelves on their uprights are therefore several such as the conventional bolt-nut pair and the complex joint devices utilized in industry. The use of these devices permits a higher mounting and assembling speed, which is the most required quality in this field.

**[0006]** One of the systems used in this field is the blocking system that utilizes supporting elements through cone connections or inclined surfaces. The advantage of these systems is to obtain connections with increasing tight joint, at least in theory, as the supported weight increases. In addition, this system involves an improvement in the assembling techniques.

**[0007]** One of these systems is shown in the schematic representation of Figure A. Otherwise, according to another constructive technique with a circular cone lock, inside the shelf, it is possible to obtain solutions as represented in Figures B and C.

**[0008]** In other appliances, there are groove and tongue systems that are provided with two cones instead of one cone, a cone being longitudinal while the other cone acting deeply. In this way, it is possible to obtain the solutions as represented in Figures D and E.

**[0009]** On the one hand the foregoing solutions simplify the assembling system because it is sufficient to insert the lock in its respective seat but on the other hand the foregoing solutions do not give the system sufficient solidity and stability. However, solidity and stability are fundamental parameters in the present field as well as the assembling speed.

**[0010]** The aim of the present invention is to remove the foregoing drawbacks by utilizing a conical coupling system conceived with multiple contact points associated with an upright circular shape.

**[0011]** The present solution offers a twofold advantage: it is economic and the so-obtained structure has an excellent solidity.

**[0012]** Concerning the economy, the advantage of this invention consists in an excellent constructive simplicity because very cheap components and elements are utilized.

**[0013]** In addition, these components and elements are produced with simple techniques such as pressing or moulding techniques or coupling techniques that utilize spot-welding. In this way, the costs are much reduced.

**[0014]** The solidity is obtained by utilizing coupling units with multiple cone or conical circular uprights instead of square or triangular uprights. In this way, it is possible to obtain an increase in the stability.

**[0015]** All the above-described aims and advantages are reached according to the present invention with a coupling and blocking system that is especially to be used to form shelf supporting elements in bookcases, shelvings or the like, characterized by the fact that a cavity shaped like an arc of circle of about 90 degrees is obtained on each corner, in which cavity at least a bracket is installed and is provided with a pair of tongues showing a conical shape, which tongues are opposite each other and form conical male projections, and by the fact that each corner is connected with a supporting element consisting of an essentially frustum-conical piece and at least a bracket is fixed on a side of the supporting element and consists of a structural shape which shows a plurality of walls with planes showing a conical arrangement and forming tongue and groove sectors to be coupled with the said brackets which are provided at the corners of the shelf.

**[0016]** The coupling between shelf and supporting frustum-cone develops in eight points following a conical course so as to permit a perfect coupling of the shelf through a frustum-conical key, any possibility of play being geometrically removed.

**[0017]** Further features and details of the present invention will be better understood from the following description, given as a non-limiting example, with particular reference to the accompanying drawings wherein:

Figures from A to E represent schematic views of examples of known solutions;

Figure 1 represents a schematic front view of one of the circular frustum-conical elements that support the shelves;

Figure 2 is a schematic view of the same supporting element of Fig. 1 but represented from the top;

Figure 3 represents a schematic view of the same supporting element of Fig. 1 but represented from the bottom;

Figure 4 is a schematic view of one of the corners of the shelf to be mounted;

Figure 5 is a schematic view of a detail of a shelf with its own corner connected with one of the supporting elements;

Figure 6 is a schematic view of a constructive detail of the coupling between a structural shape and a supporting element;
Figure 7 represents a schematic view showing the position of a shelf in relation with a supporting element connected with one of its corners.

**[0018]** With reference to the accompanying drawings, number 1 denotes a shelf on the whole that shows a quadrilateral shape, in particular a rectangular shape, or another suitable shape. This shelf must be mounted together with other shelves in order to obtain a bookcase or a shelving or whatever similar vertical structure on which it is possible to put objects of any kind in the domestic and industrial fields.

**[0019]** The four edges or corners of each shelf must be connected with four respective uprights. To this end, bevels 2 are obtained at the shelf edges. The bevels 2 have a substantially rounded shape like an arc of circle of about 90°.

**[0020]** A bracket 3 is welded on each of the bevelled shelf edges. The bracket 3 is provided with surfaces apt to be coupled with a frustum-conical element 4. At least a removable bracket 5 is fixed on a side of the frustum-conical element 4.

**[0021]** The removable bracket 5 is formed by a structural shape showing a plurality of walls. The planes of the walls show a conical arrangement and form groove and tongue sectors to be connected with the bracket 3 of the shelf edge.

**[0022]** Each frustum-conical element 4 can be provided with one or more brackets 5 for supporting the shelf.

**[0023]** The bracket 5 has a particular shape as it is provided with tongues forming a double bend 6. The function of the tongues of the bracket 5 is to be coupled with the bracket 3.

**[0024]** More precisely, the bent tongues 6 are male elements in that they guarantee a vertical grasp and at the same time, the bent tongues 6 are female elements in that they permit a deep grasp and block the outer band of the support connected with the shelf.

**[0025]** In the phase of connection, the tongues 6 of the bracket 5 cooperate with particular bent tongues 7 of the bracket 3 fixed to the shelf, the tongues 7 showing a conical arrangement.

**[0026]** The bent tongues 7 are specular and form a conical connection sector in which the bracket 5 is inserted.

**[0027]** In this way, it is possible to obtain eight simultaneous blocking thrusts (four thrusts are indicated with the letters L, M, N and O while the other ones are specular). These thrusts are exercised among the contact points between the shelf bracket 3 and the shelf cone 4. In fact, the bent tongues 6 of the bracket 5 form two U-shaped keys that are conical with all their components. These keys face each other and their shape is slightly bent inwardly in a symmetric and specular way.

**[0028]** Each shelf is therefore provided at each corner with a support of reinforcement that receives eight simultaneous blocking thrusts and holds the two conical surfaces of the shelf (for a total of eight points) blocked on the shelf cone.

**[0029]** The present arrangement of the components permits to obtain a practically complete block and avoids any play between the shelf 1 and the supporting cone 4.

**[0030]** This kind of total block is made possible by cylindrical frustum-conical surfaces. In fact, only a cylindrical frustum-conical surface permits to creates a geometric tightness key and to discharge the blocking thrust to the two ends of contact with the shelf. In this way, shelf and cone become an only element.

**[0031]** It is evident that in spite of the deep thrust in a quadrangular and/or triangular support, the two surfaces in contrast for being on two parallel planes will never block. On the contrary, the two surfaces will give rise to plays if they are subjected to a load.

**[0032]** That is the reason why according to the present invention a cylindrical frustum-conical supporting system has been chosen to guarantee stability and capacity.

**[0033]** The shelf support is also a male component since it receives the female fixing support centrally and incorporate the inner part of the fixing support itself.

**[0034]** The features of the present invention consists in that sixteen conical points connect each other at each corner as concerns the profile of contact, which permits a nearly complete absence of plays, a considerable load thrust and a great capacity of compensation.

**[0035]** Advantageously, the frustum-conical element 4 can be provided with more supporting brackets 5 in order to connect several adjacent shelves, for instance in case of angular junctions of shelves or in case several shelves are to be arranged near each other.

**[0036]** A technician of the present art can make changes and variants in the so-described invention and obtain solutions that are to be considered as included in the scope of protection of the present invention as further defined in its peculiar features by the following claims.

## Claims

1. A coupling and blocking system that is especially to be used to form shelf supporting elements in bookcases, shelvings or the like, comprising a cavity (2) shaped like an arc of circle of about 90 degrees is obtained on each corner of the shelf (1), in which cavity at least a bracket (3) is installed and is provided with a pair of tongues (7) showing a conical shape, which tongues are opposite each other and form conical male projections, and wherein each corner is connected with a supporting element consisting of an essentially frustum-conical piece (4) and at least a bracket (5) is fixed on a side of the supporting element and consists of a structural

shape which shows a plurality of walls with planes showing a conical arrangement and forming tongue and groove sectors to be coupled with the said bracket (3) which are provided at the corners of the shelf (1).

2. A coupling and blocking system to as claimed in the foregoing claim, **characterized by** the fact that the coupling between shelf (1) and supporting frustum-cone (4) develops in eight points following a conical course so as to permit a perfect coupling of the shelf (1) through a frustum-conical key, any possibility of play being geometrically removed.

3. A coupling and blocking system as claimed in the foregoing claims, **characterized by** the fact that a bracket (3) is welded on each of the bevelled shelf edges and is provided with surfaces (7) apt to be coupled with a frustum-conical element (4) and at least a removable bracket (5) is fixed on a side of the frustum-conical element (4), the removable bracket (5) being formed by a structural shape showing a plurality of walls the planes of the walls showing a conical arrangement and forming groove and tongue sectors.

4. A coupling and blocking system as claimed in the foregoing claims, **characterized by** the fact that the bracket (5) has a particular shape as it is provided with tongues forming a double bend (6), the function of the tongues of the bracket (5) being that of being coupled with the bracket (3).

5. A coupling and blocking system as claimed in the foregoing claims, **characterized by** the fact that the bent tongues (6) are male elements in that they guarantee a vertical grasp and at the same time, the bent tongues (6) are female elements in that they permit a deep grasp and block the outer band of the support connected with the shelf (1).

6. A coupling and blocking system as claimed in the foregoing claims, **characterized by** the fact that each of the brackets (3) is provided with two tongues (7) that face each other and their shape is slightly bent inwardly in a symmetric and specular way.

7. A coupling and blocking system as claimed in the foregoing claims, in which each shelf (1) is therefore provided at each corner with a support of reinforcement, **characterized by** the fact that it receives simultaneous blocking thrusts and holds the two conical surfaces of the shelf blocked on the shelf cone.

**Patentansprüche**

1. Verbindungs- und Befestigungssystem, insbesondere zur Verwendung für die Ausbildung von Regalboden-Stützelementen in Bücherschränken, Regalen oder dergleichen, mit einer Aussparung bzw. einem Hohlraum (2), die bzw. der wie ein Kreisbogen von 90° geformt ist und an jeder Ecke des Regalbodens (1) erhalten wird, wobei in dieser Aussparung bzw. diesem Hohlraum mindestens eine Klammer (3) installiert ist und mit zwei eine konische Form aufweisenden Zungen (7) ausgestattet ist, die einander gegenüberliegend angeordnet sind und konische Vorsprünge bilden, wobei jede Ecke mit einem Stützelement verbunden ist, das aus einem im wesentlichen kegelstumpfförmigen Teil (4) besteht, und wobei mindestens eine Klammer (5) an einer Seite des Stützelements befestigt ist und einen Aufbau hat, der eine Vielzahl von Wänden mit Ebenen aufweist, die eine konische Anordnung haben und mit der Klammer (3) zu verbindende Zungen- und Rillensektoren bilden, die an den Ecken des Regalbodens (1) vorgesehen sind.

2. Verbindungs- und Befestigungssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verbindung zwischen dem Regalboden (1) und dem stützenden Kegelstumpf (4) sich in acht Punkten entfaltet, die einem konischen Verlauf folgen, um eine vollkommene Verbindung des Regalbodens (1) durch einen kegelstumpfförmigen Schlüssel zu ermöglichen, wobei jegliche Möglichkeit eines Spiels geometrisch verhindert wird.

3. Verbindungs- und Befestigungssystem nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Klammer (3) an jeder der abgeschrägten Regalboden-Kanten angeschweißt ist und mit Oberflächen (7) ausgestattet ist, die mit einem kegelstumpfförmigen Element (4) verbunden werden können, wobei mindestens eine abnehmbare Klammer (5) auf einer Seite des kegelstumpfförmigen Elements (4) befestigt ist, wobei die abnehmbare Klammer (5) durch einen Aufbau gebildet ist, der eine Vielzahl von Wänden hat, wobei die Ebenen der Wände eine konische Anordnung haben und Rillen- und Zungensektoren bilden.

4. Verbindungs- und Befestigungssystem nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Klammer (5) eine besondere Form hat, da sie mit Zungen ausgestattet ist, die eine doppelte Biegung (6) bilden, wobei die Funktion der Zungen der Klammer (5) darin besteht, mit der Klammer (3) verbunden zu werden.

5. Verbindungs- und Befestigungssystem nach einem der vorhergehenden Ansprüche, **dadurch gekenn-**

**zeichnet, dass** die gebogenen Zungen (6) hervorstehende Elemente sind, wodurch sie einen vertikalen Griff gewährleisten, und dass die gebogenen Zungen (6) gleichzeitig Elemente mit Vertiefungen sind, wodurch sie einen tiefen Griff ermöglichen und das äußere Band der mit dem Regalboden (1) verbundenen Abstützung blockieren.

6. Verbindungs- und Befestigungssystem nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jede der Klammern (3) mit zwei Zungen (7) ausgestattet ist, die gegenÜber voneinander angeordnet sind und symmetrisch und spiegelbildlich nach innen gebogen sind.

7. Verbindungs- und Befestigungssystem nach einem der vorhergehenden Ansprüche, bei dem jeder Regalboden (1) an jeder Ecke mit einer Verstärkungs-Abstützung ausgestattet ist, **dadurch gekennzeichnet, dass** er gleichzeitig Befestigungsbolzen aufnimmt und die beiden konischen Flächen des Regalbodens auf dem Regalboden-Kegel in befestigtem bzw. blockiertem Zustand hält.

**Revendications**

1. Système de couplage et de blocage à utiliser en particulier pour former des éléments de support d'étagères dans des bibliothèques, rayonnages ou similaires, comprenant une cavité (2) en forme d'arc de cercle d'environ 90 degrés qui est obtenue sur chaque angle de l'étagère (1), dans cette cavité au moins un support (3) est installé et est doté d'une paire de languettes (7) montrant une forme conique, lesquelles languettes sont opposées l'une à l'autre et forment des projections mâles coniques, et où chaque angle est relié à un élément de support constitué d'une pièce essentiellement tronconique (4) et au moins un support (5) est fixé sur un côté de l'élément de support et est constitué d'une forme structurale qui présente une pluralité de parois avec des plans illustrant un agencement conique et formant des secteurs de languettes et rainures à coupler avec ledit support (3) qui sont disposés aux angles de l'étagère (1).

2. Système de couplage et de blocage selon la revendication précédente, **caractérisé par le fait que** le couplage entre l'étagère (1) et la pièce tronconique de support (4) se développe en huit points suivant un parcours conique de façon à permettre un couplage parfait de l'étagère (1) par l'intermédiaire d'une clavette tronconique, toute possibilité de jeu étant géométriquement retirée.

3. Système de couplage et de blocage selon les revendications précédentes, **caractérisé par le fait qu'**un support (3) est soudé sur chacun des bords d'étagère biseautés et est doté de surfaces (7) aptes à être couplées avec un élément tronconique (4) et au moins un élément amovible (5) est fixé sur un côté de l'élément tronconique (4), le support amovible (5) étant formé par une forme structurale présentant une pluralité de parois, les plans des parois présentant un agencement conique et formant des secteurs de rainures et de languettes.

4. Système de couplage et de blocage selon les revendications précédentes, **caractérisé par le fait que** le support (5) a une forme particulière lorsqu'il est doté de languettes formant un double pli (6), la fonction des languettes du support (5) étant celle d'être couplées au support (3).

5. Système de couplage et de blocage selon les revendications précédentes, **caractérisé par le fait que** les languettes pliées (6) sont des éléments mâles en ce qu'elles garantissent une prise verticale et en même temps, les languettes pliées (6) sont des éléments femelles en ce qu'elles permettent une prise profonde et bloquent la bande extérieure du support relié à l'étagère (1).

6. Système de couplage et de blocage selon les revendications précédentes, **caractérisé par le fait que** chacun des supports (3) est doté de deux languettes (7) qui sont face l'une à l'autre et leur forme est légèrement pliée vers l'intérieur d'une façon symétrique et spéculaire.

7. Système de couplage et de blocage selon les revendications précédentes, dans lequel chaque étagère (1) est par conséquent dotée à chaque angle d'un support de renforcement, **caractérisé par le fait qu'**il reçoit simultanément des poussées de blocage et maintient les deux surfaces coniques de l'étagère bloquées sur le cône de l'étagère.

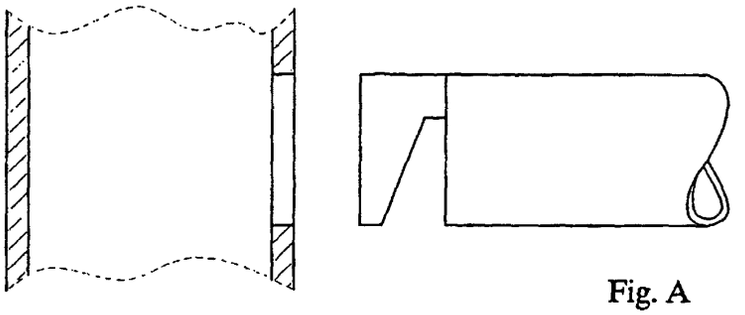


Fig. A

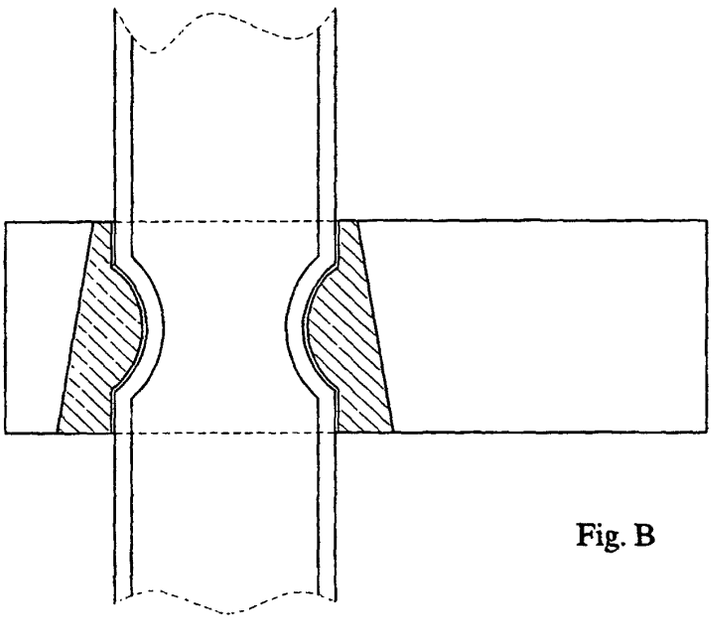


Fig. B

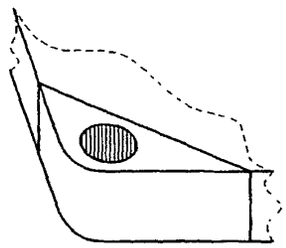


Fig. C

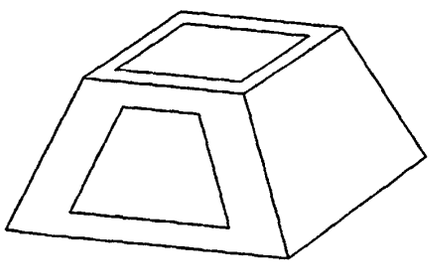


Fig. D

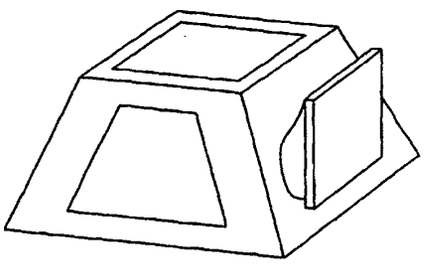


Fig. E

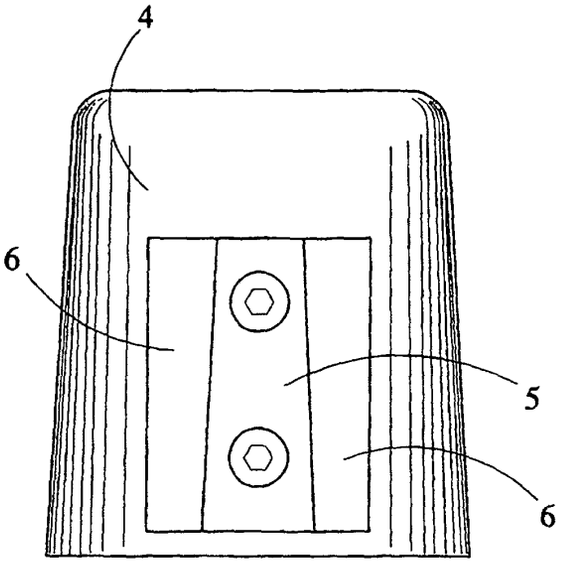



Fig. 1

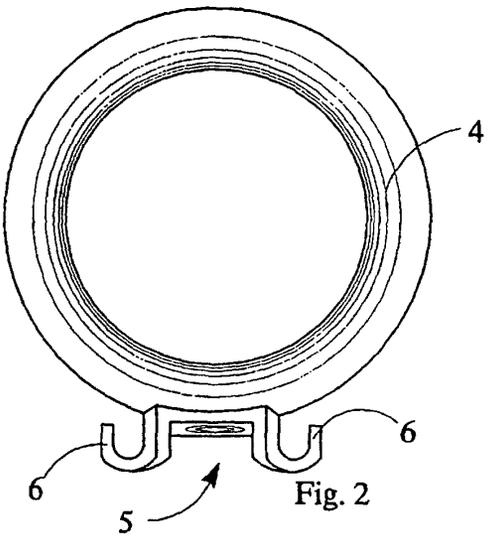



Fig. 2

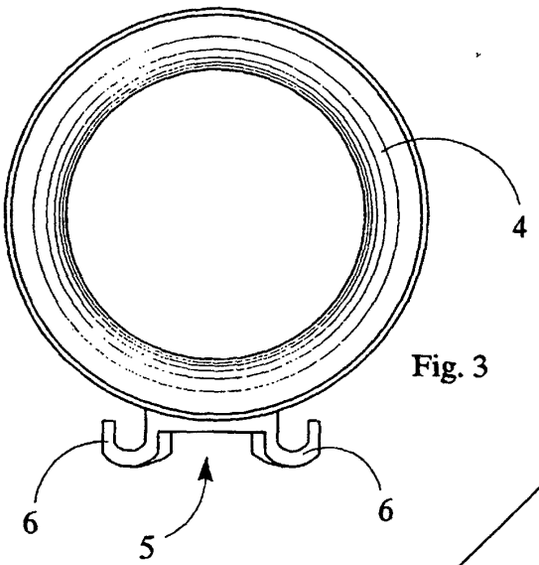



Fig. 3




Fig. 4

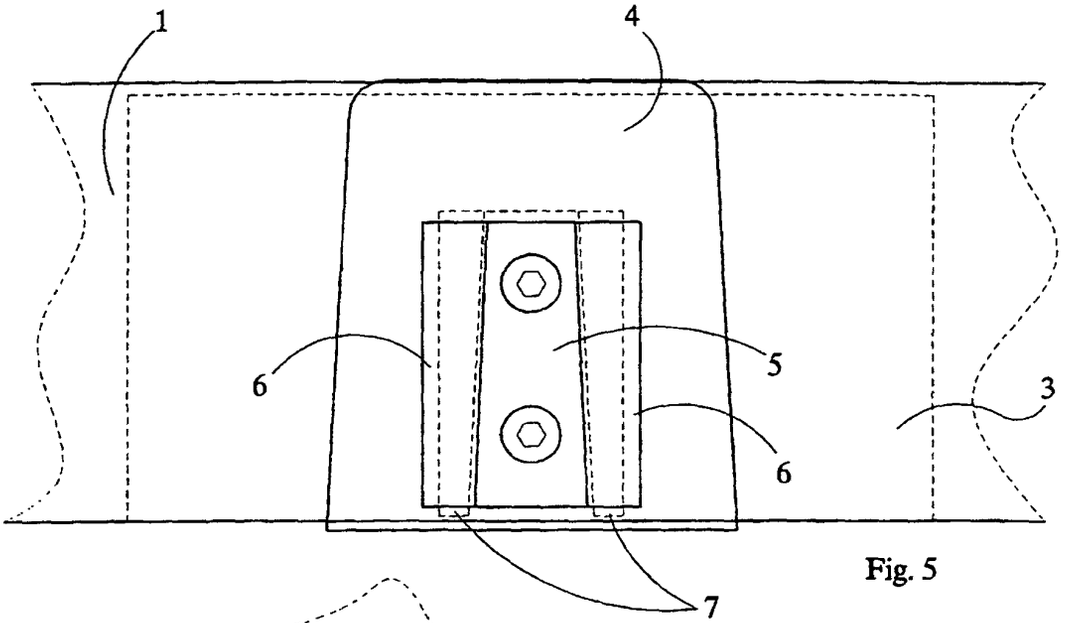



Fig. 5

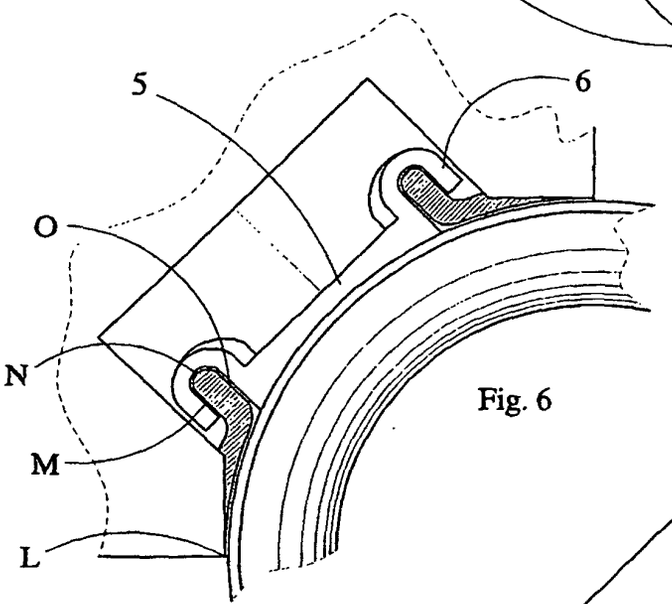



Fig. 6




Fig. 7