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(54) **Heat-adjustable diffuser for heating/air conditioning installations**

Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlageinstallationen

Diffuseur à chaleur réglable pour installations de chauffage/climatisation

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(73) Proprietor: **Koolair, S.A.
28936 Mostoles (Madrid) (ES)**

(72) Inventor: **Susarte Torrijos, José Tomás
28936 Mostoles (Madrid) (ES)**

(74) Representative: **Carpintero Lopez, Francisco et al
Herrero & Asociados, S.L.
Cedaceros 1
28014 Madrid (ES)**

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**ES-U- 1 063 488 ES-U- 1 067 472
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Description

Object of the Invention

[0001] The present invention relates to a heat-adjustable diffuser for heating/air conditioning installations, provided to automatically perform the orientation of the body in which the finned core of the air diffuser is arranged, which orientation will be performed depending on the air exiting through said fins.

[0002] The object of the invention is to simply and effectively achieve the pivoting limits in either direction of the body of the finned core of the diffuser.

[0003] Obviously, the field of application of the invention is comprised within the industrial sector dedicated to the manufacture and installation of air conditioning apparatuses, used indistinctly for heating and/or cooling.

Background of the Invention

[0004] The equipment and/or apparatuses used indistinctly for heating and cooling include a pivoting body in which the finned core of the air diffuser is arranged, which body is assembled on a casing or frame which is fixed in an opening of the wall or conduit. Said body with fins allows, in its pivoting, orienting the air flow outlet upwards or downwards, with a certain inclination, depending on whether the apparatus works as a cooler or as a heater.

[0005] Said orientation was performed manually with the drawbacks and problems which may arise and which are not necessary to mention.

[0006] Currently, this pivoting and corresponding adjustment of the body of the diffuser is performed automatically, depending on the temperature of the air exiting through the finned core of the diffuser, and in this sense, Spanish utility models U 200601710 and U 200800465 of the same applicant can be mentioned. Specifically, utility model 200601710 essentially describes an automatic positioning mechanism for the body with the fins, according to the outlet temperature, the mechanism being provided to detect the outlet air temperature and, in combination with a heat-expandable element, to be able to carry out the impingement of the latter on a lever connected with the body with the fins to establish the greater or lesser pivoting of the latter and thus cause one orientation or another of the outlet fins.

[0007] In addition, utility model ES 1 067 472 U essentially describes a specific and advantageous embodiment of a stop element for limiting the inclination in either direction of the mentioned body with fins.

Description of the Invention

[0008] The proposed diffuser, following the structural and conceptual line established in the two utility models mentioned in the previous section and belonging to the same applicant, has a series of particularities and innovations which affect the way to assemble the automatic

positioning mechanism and the means for limiting the pivoting of the finned core corresponding to the diffuser itself.

[0009] Specifically, the diffuser is of the type in which its finned core is pivotably assembled on a casing or frame fixed to the wall or conduit, and is connected with the automatic positioning mechanism for said finned core, having as a first novelty feature the incorporation of a pair of side and rear plates fixed to the frame by means of any suitable system, between which plates a transverse profile is integrally joined, together forming a support for the mentioned automatic positioning mechanism.

[0010] Another novelty feature relates to stop means for limiting the pivoting of the body with fins, said means being formed, for limiting the pivoting in a heating operation, by a screw with a checknut which is fitted in a groove provided in one of the side plates of the support, which screw can move along this groove and impinge on the body with fins to establish the limit of the pivoting of the latter, the definitive position of the screw being consolidated by means of tightening the checknut provided therein.

[0011] In relation to the means for limiting the pivoting of the finned core in the cooler function, they are formed by another screw with a checknut, assembled in this case in a profile belonging to the support of the automatic operation mechanism, which screw at its free end is opposite a lever belonging to this automatic positioning mechanism, such that in the pivoting in the cooler function, the end of said screw will form a stop against the mentioned lever, thus limiting said pivoting of the finned core.

[0012] Another novelty feature consists of the finned core having in its outer surface, in correspondence with the upper part of one of its side parts, a scale indicating the degrees which the body can pivot in either direction, which scale has an intermediate mark "0" corresponding to the horizontal position of the body with fins, and from that intermediate mark it has two scales on both sides which will indicate the degrees which the body with fins can pivot to orient such fins with either inclination, downwards or upwards, depending on whether the air discharge is hot or cold, respectively. The angular pivoting movement will preferably be comprised between -20° and $+20^{\circ}$, with the possibility of occupying intermediate positions according to the temperature of the air exiting through the finned core.

Description of the Drawings

[0013] To complement the description which will be made below and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description, in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a depiction according to a general front perspective of the diffuser of the invention on the frame fixed to a wall or conduit. The scale with which the finned core is provided for the air outlet can be seen in this figure.

Figure 2 shows a perspective depiction of the assembly of the diffuser without the finned core, allowing the view of the novel essential parts thereof, with the exception, obviously, of the scale included in the finned core not depicted in this figure.

Figure 3 shows a depiction corresponding to a perspective view of the assembly of the previous figure anterior with the finned core assembled.

Figure 4 shows a side view of the assembly of the diffuser depicted in the previous figure.

Preferred Embodiment of the Invention

[0014] As can be seen in the mentioned figures, the heat-adjustable diffuser of the invention comprises, as is conventional, a frame (1) forming the casing for fixing to the wall or conduit (5), as depicted in Figures 1 and 2. A core (2) with air outlet diffuser fins (3) is pivotably assembled on said frame (1), the assembly being performed through two opposite side screws (4) acting as a pivoting shaft of the actual core (2).

[0015] Respective side plates (6) forming the actual support for the body (2) are integrally joined in a suitable manner on the frame (1), and in which plates (6) the screws (4) acting as a pivoting shaft for the body (2) are precisely arranged. These side plates (6) have a rear notch in a straight or curved dihedron (according to size), determining an "L" shape of the actual plates (6), being stiffened with one another through the smaller branches of this considered L-shaped configuration by means of a transverse profile (7).

[0016] As seen in Figure 1, the upper part of the body (2) includes a scale (8) corresponding to the pivoting degrees in either direction of the body (2), because as has already been mentioned, the diffuser is applicable in air conditioning installations for both hot air and cold air, and depending on whether the function is a heating function or a cooling function, the body (2) and with it the air outlet diffuser fins (3) must be oriented downwards or upwards, respectively, since hot air must be directed downwards so that it later moves upwards, and the cold air must be directed upwards so that it later moves downwards, due to the different density thereof and to achieve in both cases leveling and homogenizing the ambient temperature.

[0017] As a novelty feature of the invention, the mentioned scale (8) allows knowing the pivoting degree of the body (2) and therefore the inclination of the diffuser fins (3), in either direction, being able to be placed at the necessary inclination according to the outlet air temperature, between the intermediate point "0" corresponding to the horizontal and the points of, for example, +20° and -20° corresponding to the positions of operation as a cool-

er and as a heater, respectively.

[0018] The diffuser includes the automatic positioning mechanism which has already been mentioned in the previous section, which is formed by a support (9) fixed to one of the side plates (6) and to the transverse profile (7), this automatic positioning mechanism being complemented with a heat-expandable element (10) which, when heated, expands and impinges on a lever (11) to which a rod (12) acting on the body (2) is articulated, causing the pivoting of the latter in a downward direction, whereas when the air is cold, the heat-expandable element (10) contracts and stops acting on the lever (11), whereby the rod (12) stops acting on the body (2), the pivoting in the opposite direction of the body (2) being caused, based on a spring associated with the lever (11).

[0019] In addition to the side plates (6) and the transverse profile (7) as support means forming part of the novelty features of the diffuser which is being described, and the actual graduated scale (8), the stop means for limiting the pivoting in either direction of the core (2) with air outlet diffuser fins (3) are also included as a novelty.

[0020] Specifically, in the pivoting in the downward direction for the heating function, the means for limiting said pivoting are formed by a screw (13) with a fixing checknut, this screw (13) having play on a groove (14) provided to that effect in one of the side plates (6), such that by moving the screw through this groove, the end of the former will impinge on the body (2), establishing the pivoting limit, at which time the checknut of the screw (13) will be tightened to fix the latter in the mentioned position.

[0021] The pivoting in the opposite direction, for the cooling function, is performed by means of a screw (15), also with a checknut for locking it, which screw (15) will impinge on the lever (11) to form the limiting stop in the upward pivoting direction.

Claims

1. Heat-adjustable diffuser for heating/air conditioning installations, comprising a frame (1) for fixing to the wall (5) or conduit on which a finned core (2) with air outlet diffuser fins (3) is assembled, such that said finned core (2) can pivot in either direction, by means of which core (2) it is possible to automatically orient the outlet air flow depending on the temperature of said air, the automatic orientation being established by means of an automatic positioning mechanism based on a heat-expandable element (10) capable of impinging on a lever (11) acting on the core (2) with fins (3) to cause the pivoting in either direction of the latter, depending on the expansion or contraction of said heat-expandable element (10) and caused by the heating or cooling of the air; the heat-adjustable diffuser further comprises two L-shaped side plates (6), a graduation scale (8) indicating the pivoting degrees in either direction of the

core (2) with fins (3), and also having means for limiting the pivoting in both directions of the actual finned core (2), according to its operation as a heater or as a cooler;

characterized in that the L-shaped side plates (6) have screws (4) acting as a pivoting shaft of the core (2), said side plates (6) being fixed to the frame (1) and integrally joined to one another by means of a transverse profile (7) through the smaller branches of said L-shaped configuration of the plates (6), together determining a support for the automatic positioning mechanism.

2. Heat-adjustable diffuser for heating/air conditioning installations according to claim 1, **characterized in that** the graduation scale (8) is provided at the upper part of one of the ends of the finned core (2).

3. Heat-adjustable diffuser for heating/air conditioning installations according to claim 1, **characterized in that** the means for limiting the pivoting of the core (2) with fins (3), in its function as a heater, are formed by a screw (13) with a fixing checknut, which screw (13) is movable in a groove (14) provided to that effect in one of the side plates (6) fixed to the frame (1) of the diffuser, with the particularity that the free end of said screw (13) is opposite the actual core (2) with fins (3), abutting against the latter to establish the corresponding downward pivoting limiter of such body with fins.

4. Heat-adjustable diffuser for heating/air conditioning installations according to claim 1, **characterized in that** the means for limiting the pivoting of the core (2) with fins (3), in its function as a cooler, are formed by a screw (15) with a fixing checknut, which screw (15) is assembled on the respective support of the automatic positioning mechanism for the core (2) with fins (3), having the opposite free end of such screw (15) on the lever (11) acting as means for pivoting such core (2) with fins (3), said end of the screw (15) on the mentioned lever (11) acting as a stop to establish the upward pivoting limiter of the actual core (2) with fins (3).

5. Heat-adjustable diffuser for heating/air conditioning installations according to claim 1, **characterized in that** the automatic positioning mechanism additionally comprises a support (9) fixed to one of the side plates (6) and to the transverse profile (7), such that:

- when the heat-expandable element (10) is heated, expands and impinges on the lever (11) to which a rod (12) acting on the core (2) is articulated, causing the pivoting of the latter in a downward direction;
- whereas when the air is cold, the heat-expandable element (10) contracts and stops acting on

the lever (11), whereby the rod (12) stops acting on the core (2), causing the pivoting of the latter in the upwards pivoting direction.

6. Heat-adjustable diffuser for heating/air conditioning installations according to any of claims 1 or 2, **characterized in that** the graduation scale (8) comprises:

- an intermediate mark "0" corresponding to the horizontal position of the core (2) with fins (3), and
- two scales on both sides from that intermediate mark, which indicate the degrees which the core (2) with fins (3) can pivot to orient such fins (3) with either inclination, downwards or upwards, depending on whether the air discharge is hot or cold, respectively.

7. Heat-adjustable diffuser for heating/air conditioning installations according to claim 6, **characterized in that** the angular pivoting movement is comprised between -20° and $+20^{\circ}$.

25 Patentansprüche

1. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen mit einem Rahmen (1) zum Befestigen an der Wand (5) oder Leitung, an dem ein Lamellenkern (2) mit Luftauslass-Diffusorlamellen (3) vorgesehen ist, so dass der Lamellenkern (2) in jeder Richtung schwenken kann, wobei es mit Hilfe des Kerns (2) möglich ist, den Auslassluftstrom in Abhängigkeit von der Temperatur der Luft automatisch zu orientieren, wobei die automatische Orientierung mit Hilfe eines automatischen Positioniermechanismus auf der Grundlage eines wärmeexpandierbaren Elements (10) hergestellt wird, das auf einen Hebel (11) auftreffen kann, der auf den Kern (2) mit Lamellen (3) wirkt, um dessen Schwenken in jeder Richtung in Abhängigkeit von der Expansion oder Kontraktion des wärmeexpandierbaren Elements (10) und verursacht durch die Erwärmung oder Abkühlung der Luft zu bewirken,
- wobei der wärmeeinstellbare Diffusor ferner zwei L-förmige Seitenplatten (6), eine Gradeinteilung (8) als Angabe der Schwenkgrade des Kerns (2) mit Lamellen (3) in jeder Richtung aufweist und auch eine Einrichtung zum Begrenzen des Schwenkens des eigentlichen Lamellenkerns (2) in beiden Richtungen gemäß seinem Betrieb als Heizer oder Kühler hat, **dadurch gekennzeichnet, dass** die L-förmigen Seitenplatten (6) Schrauben (4) haben, die als Schwenkachse des Kerns (2) wirken, wobei die Seitenplatten (6) am Rahmen (1) befestigt und mit Hilfe eines Querprofils (7) durch die kleineren Schenkel der L-förmigen Konfiguration der Platten (6) in einem Stück miteinander verbunden sind, was gemeinsam

eine Stütze für den automatischen Positioniermechanismus bestimmt.

2. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 1, **dadurch gekennzeichnet, dass** die Gradeinteilung (8) am Oberteil eines der Enden des Lamellenkerns (2) vorgesehen ist. 5
3. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 1, **dadurch gekennzeichnet, dass** die Einrichtung zum Begrenzen des Schwenkens des Kerns (2) mit Lamellen (3) in seiner Funktion als Heizer durch eine Schraube (13) mit einer Befestigungsgegenmutter gebildet ist, wobei die Schraube (13) in einer Nut (14) beweglich ist, die für diesen Zweck in einer der Seitenplatten (6) vorgesehen ist, die am Rahmen (1) des Diffusors befestigt sind, wobei insbesondere das freie Ende der Schraube (13) entgegengesetzt zum eigentlichen Kern (2) mit Lamellen (3) liegt und daran anstößt, um den entsprechenden Abwärtsschwenkbegrenzer eines solchen Körpers mit Lamellen zu bilden. 10 15 20
4. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 1, **dadurch gekennzeichnet, dass** die Einrichtung zum Begrenzen des Schwenkens des Kerns (2) mit Lamellen (3) in seiner Funktion als Kühler durch eine Schraube (15) mit einer Befestigungsgegenmutter gebildet ist, wobei die Schraube (15) an der jeweiligen Stütze des automatischen Positioniermechanismus für den Kern (2) mit Lamellen (3) angebaut ist, wobei das entgegengesetzte freie Ende einer solchen Schraube (15) auf dem Hebel (11) liegt, was als Einrichtung zum Schwenken eines solchen Kerns (2) mit Lamellen (3) wirkt, und das Ende der Schraube (15) auf dem genannten Hebel (11) als Anschlag wirkt, um den Aufwärtsschwenkbegrenzer des eigentlichen Kerns (2) mit Lamellen (3) zu bilden. 25 30 35 40
5. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 1, **dadurch gekennzeichnet, dass** der automatische Positioniermechanismus zusätzlich eine Stütze (9) aufweist, die an einer der Seitenplatten (6) und am Querprofil (7) befestigt ist, so dass: 45
 - das wärmeexpandierbare Element (10) bei Erwärmung expandiert und auf den Hebel (11) auftrifft, an dem eine auf den Kern (2) wirkende Stange (12) gelenkig angebracht ist, was dessen Schwenken in Abwärtsrichtung bewirkt;
 - wogegen bei kalter Luft das wärmeexpandierbare Element (10) kontrahiert und nicht mehr auf den Hebel (11) wirkt, wodurch die Stange (12) nicht mehr auf den Kern (2) wirkt, was dessen Schwenken in Aufwärtsschwenkrichtung bewirkt. 50 55

6. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Gradeinteilung (8) aufweist:
 - eine Zwischenmarkierung "0" in Entsprechung zur waagerechten Position des Kerns (2) mit Lamellen (3) und
 - zwei Einteilungen auf beiden Seiten von dieser Zwischenmarkierung, die die Grade angeben, in denen der Kern (2) mit Lamellen (3) schwenken kann, um solche Lamellen (3) mit jeder Abwärts- oder Aufwärtsneigung in Abhängigkeit davon zu orientieren, ob die Luftabgabe warm bzw. kalt ist.

7. Wärmeeinstellbarer Diffusor für Heizungs-/Klimaanlagen nach Anspruch 6, **dadurch gekennzeichnet, dass** die Winkelschwenkbewegung zwischen -20° und +20° aufweist.

Revendications

1. Diffuseur à chaleur réglable pour installations de chauffage/climatisation, comprenant un cadre (1) pour la fixation au mur (5) ou à un conduit sur lequel un noyau à ailettes (2) avec des ailettes diffuseuses de sortie d'air (3) est assemblé, de façon que ledit noyau à ailettes (2) peut pivoter dans les deux sens, au moyen duquel noyau (2), d'orienter automatiquement le flux d'air de sortie en fonction de la température dudit air, l'orientation automatique étant établie au moyen d'un mécanisme de positionnement automatique sur la base d'un élément expansible à la chaleur (10) capable d'entrer en contact avec un levier (11) agissant sur le noyau (2) avec ailettes (3) pour provoquer le pivotement dans l'un ou l'autre sens de ce dernier, en fonction de l'expansion ou de la contraction dudit élément expansible à la chaleur (10) et provoqué par le chauffage ou le refroidissement de l'air ;
le diffuseur à chaleur réglable en température comprend en outre deux plaques latérales en forme de L (6), une échelle de graduation (8) indiquant les degrés de pivotement dans l'un ou l'autre sens du noyau (2) avec ailettes (3), ainsi que des moyens pour limiter le pivotement dans les deux sens du noyau à ailettes réel (2), selon son fonctionnement comme réchauffeur ou comme refroidisseur ;
caractérisé en ce que les plaques latérales en forme de L (6) comportent des vis (4) agissant comme un arbre pivotant du noyau (2), lesdites plaques latérales (6) étant fixées au cadre (1) et rendues complètement solidaires l'une de l'autre au moyen d'un profilé transversal (7) à travers les branches plus petites de ladite configuration en forme de L des plaques (6), déterminant ensemble un support pour le mécanisme de positionnement automatique.

2. Diffuseur réglable en température pour installations de chauffage/climatisation selon la revendication 1, **caractérisé en ce que** l'échelle de graduation (8) est prévue au niveau de la partie supérieure de l'une des extrémités du noyau à ailettes (2). 5
 - une marque intermédiaire "0" correspondant à la position horizontale du noyau (2) avec ailettes (3), et
 - deux échelles des deux côtés de cette marque intermédiaire, qui indiquent les degrés suivant lesquels le noyau (2) avec ailettes (3) peut pivoter pour orienter ces ailettes (3) avec l'une ou l'autre inclinaison, descendante ou montante, selon que l'évacuation d'air est chaude ou froide, respectivement.
3. Diffuseur à chaleur réglable pour installations de chauffage/climatisation selon la revendication 1, **caractérisé en ce que** les moyens pour limiter le pivotement du noyau (2) avec ailettes (3), dans sa fonction de réchauffeur, sont formés par une vis (13) avec un contre-écrou de fixation, laquelle vis (13) étant mobile dans une rainure (14) prévue à cet effet dans l'une des plaques latérales (6) fixées au cadre (1) du diffuseur, avec la particularité que l'extrémité libre de ladite vis (13) est en regard du noyau réel (2) avec ailettes (3), venant en butée contre celui-ci pour établir le limiteur correspondant de pivotement montant de ce corps avec ailettes. 10

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4. Diffuseur à chaleur réglable pour installations de chauffage/climatisation selon la revendication 1, **caractérisé en ce que** les moyens pour limiter le pivotement du noyau (2) avec ailettes (3), dans sa fonction de refroidisseur, sont formés par une vis (15) avec un contre-écrou de fixation, ladite vis (15) étant assemblée sur le support respectif du mécanisme de positionnement automatique du noyau (2) avec ailettes (3), l'extrémité libre opposée de cette vis (15) sur le levier (11) agissant en tant que moyen de pivotement de ce noyau (2) avec ailettes (3), ladite extrémité de la vis (15) sur le levier mentionné (11) agissant comme une butée pour établir le limiteur de pivotement montant du noyau réel (2) avec ailettes (3). 20

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5. Diffuseur à chaleur réglable pour installations de chauffage/climatisation selon la revendication 1, **caractérisé en ce que** le mécanisme de positionnement automatique comprend en outre un support (9) fixé à l'une des plaques latérales (6) et au profilé transversal (7), tel que : 40
 - lorsque l'élément expansible à la chaleur (10) est chauffé, il se dilate et vient en contact avec le levier (11) auquel est articulée une tige (12) agissant sur le noyau (2), entraînant le pivotement de ce dernier dans un sens descendant ;
 - alors que lorsque l'air est froid, l'élément expansible à la chaleur (10) se contracte et cesse d'agir sur le levier (11), la tige (12) cessant d'agir sur le noyau (2), entraînant le pivotement de ce dernier dans le sens de pivotement montant. 45

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6. Diffuseur à chaleur réglable pour installations de chauffage/climatisation selon l'une quelconque des revendications 1 ou 2, **caractérisé en ce que** l'échelle de graduation (8) comprend : 55

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7. Diffuseur à chaleur réglable pour installations de chauffage/climatisation selon la revendication 6, **caractérisé en ce que** le mouvement de pivotement angulaire est compris entre -20° et +20°.

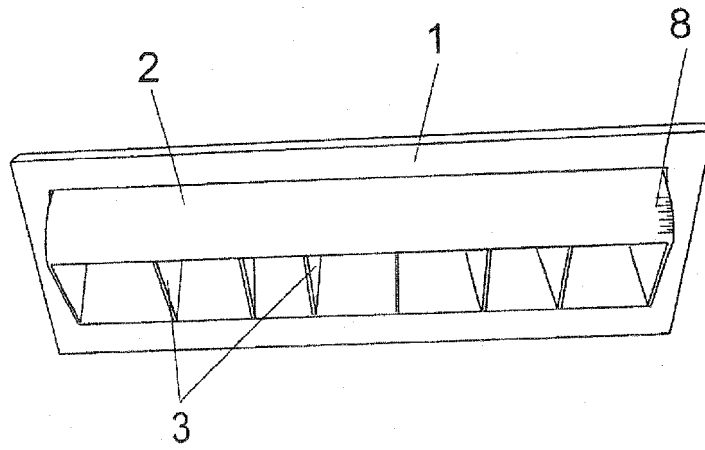


FIG. 1

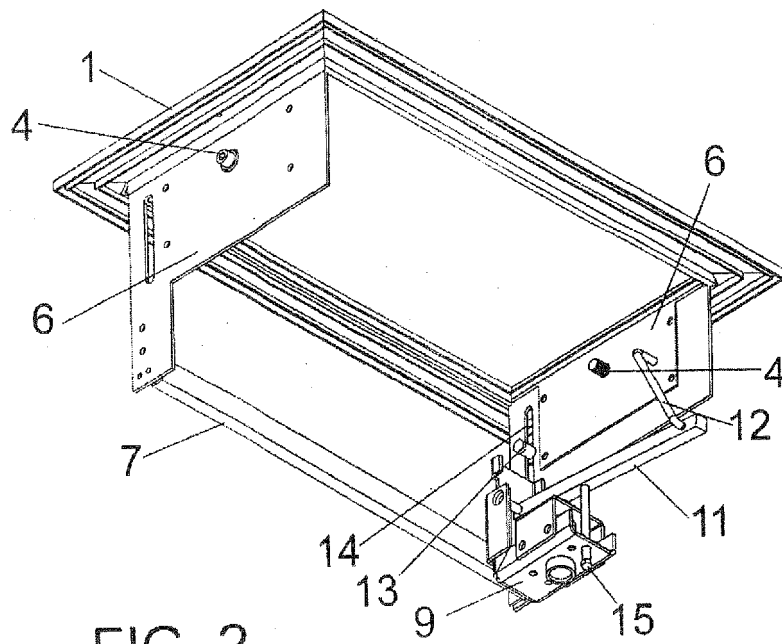


FIG. 2

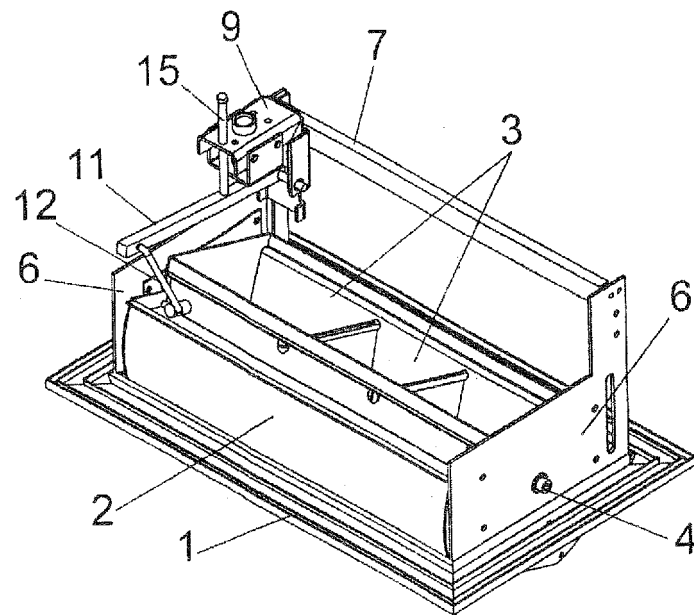


FIG. 3

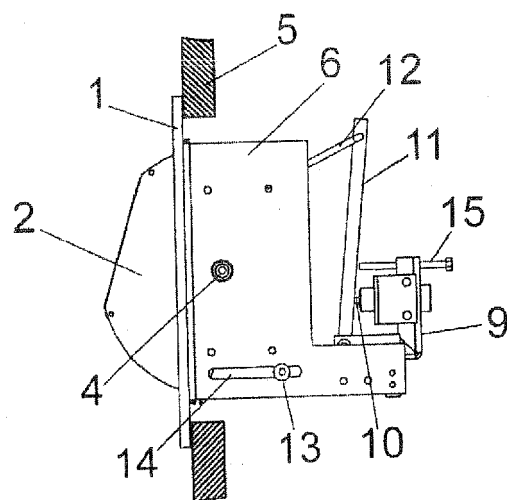


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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- ES 200601710 [0006]
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