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(54) **FOOD COOKING OVEN WITH A DOOR CLOSING DEVICE**

BACKOFEN MIT EINER SCHLIEßVORRICHTUNG

FOUR DE CUISSON AVEC UN DISPOSITIF DE FERMETURE

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Description

[0001] The present invention refers to an improved kind of oven for cooking food, preferably intended for home use, comprising a laterally opening door for gaining access into and closing the cooking cavity of such oven.

[0002] While reference is specially made throughout the following description to a food cooking oven of the built-in type, it will nevertheless be appreciated that what is being explained, illustrated and generally set forth in the same specification shall be understood as equally applying to - and thus used in - food cooking oven that is integrated in a free-standing cooking appliance that includes both a cooking oven and a cooking surface, i.e. a cooktop.

[0003] DE 20 2004 003 999 U1 describes a locking device for a door of a domestic appliance, especially of a baking oven, consisting of a bar which is pressed by spring forces into a locking position within a bar housing at the door or at the housing of the baking oven which bar interacts with a latching element at the housing or at the door in a latching manner, wherein the bar comprises a V-formed profile with asymmetrically differently inclined surfaces for the latching element.

[0004] The ovens, which the present invention refers to, are largely known as such in the art, as they are for instance described in the European patent application no. 07107936.2, to which reference should therefore be made for greater convenience and reasons of brevity.

[0005] The actual problem addressed and solved by the present invention concerns the possibility for the oven door to sink relative to, or either prove difficult to initially move into a perfectly lined-up, well-centered relationship with the aperture of the cooking cavity, which it is intended to close.

[0006] It may in fact occur that the door is assembled in such manner as to cause it to be poorly centered, in the sense that it turns out to be slightly inclined on the horizontal plane; this would of course give rise to the practical drawback deriving from the fact that the matching parts forming the door lock, i.e. the door locking parts or members, which are due to come into a perfect mutual alignment between the side edge of the door and the corresponding side edge of the cooking cavity of the oven, turn eventually out as being out of alignment relative to each other and this gives rise to clear difficulties when trying to close the door, or even makes it plainly impossible for the same door to be closed at all.

[0007] In a still worse case, it may occur that such out-of-alignment condition of the oven door takes place in the field, where the oven has been used for a certain time, thereby making it necessary for a serviceman to be called in view of having the problem removed by restoring the aligned condition of the door.

[0008] Known from the disclosure in the German utility model no. DE 20 2004 003 995 U1 is a solution aimed at ensuring the centered condition of a laterally hinged oven door by means of one or more appropriately shaped

supports provided along the lower edge of the access aperture into the cooking cavity.

[0009] Although effective, such solution has however a couple of main drawbacks, i.e.:

- a first drawback derives from the fact that such supports are made up by kind of "wedges", or shims, lying exposed to the sight of the user; this generates a clear impression of precariousness and poor quality, which is of course a particularly undesired fact in the case of ovens that are sold on the market as even quite sophisticated appliances capable of combining various different cooking modes, provided with advanced electronic programming and control means, featuring an elaborate stylish design, and so on;
- a second drawback lies in the fact that the above-cited solution may even occur to eventually prove or become inadequate, since said supports can in fact be quite easily removed and, anyway, for them to be able to work in the intended manner, they must intervene on, i.e. interfere with the closing travel of the door when the latter is still sufficiently open, thereby proving of hindrance to and braking the final part of the closing motion of the door.

From US 4,875,721 it divulged an invention which relates to a latch assembly for a cabinet door or window of a upright-type microwave range with a cavity or cooking cabinet.; the latch assembly is provided with a pivotal hook member engaged with a dog projection of a hook housing mounted in a door-opening frame of the main body of said MW range.

On a peripheral portion of the cooking cabinet is fixedly mounted a door opening frame on which is pivotally mounted a hook-operating lever in a lower-end portion of which is slidably mounted one end of an hook-operating rod, the other end of it being brought into contact with the pivotal hook member of the cabinet door.-

From DE 19728426 A1 it is divulged a door locking device for a domestic appliance, provided with a locking component in an housing for the automatic adjustment and command into locking and unlocking position; said command for lock/unlocking position is activated by hydraulic means.

[0010] It would therefore be desirable, and it is actually a main purpose of the present invention, to provide an oven for food cooking applications provided with a side-hinged door, in which the above-noted drawbacks are effectively done away with, and in which the parts making up the door lock arrangement are reliably allowed to automatically move into mutual alignment when the door is being closed.

[0011] According to the present invention, these aims, along with further ones that will become apparent from the following disclosure, are reached in a kind of food cooking oven provided with a sideways opening door that

incorporates the features and characteristics as defined and recited in the appended claims.

[0012] Advantages and features of the present invention will anyway be more readily understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective outer view of a half-open oven door and the related devices according to the present invention;
- Figure 2 is an outer perspective view of a side of a first device according to the present invention;
- Figure 2A is an exploded view of the parts making up the device shown in Figure 2;
- Figures 2B and 2C are median horizontal cross-sectional views of the device shown in Figure 2 in two operative states thereof, respectively;
- Figures 3 is a respective view of a second device according to the present invention, as shown in two different outer perspective views thereof;
- Figure 4 and the associated enlarged outsert are outer perspective views of the devices according to the present invention, as shown in the phase during which the door is being closed, however prior to its being fully shut;
- Figures 5A, 5B and 5C are views of the devices according to the present invention in three successive operative states thereof, respectively;
- Figures 6A, 6B and 6C are median horizontal cross-sectional views of the devices to the present invention in the states as they are shown in the corresponding Figures 5A, 5B and 5C, respectively;
- Figures 7 and 8 are plan elevational views from a point located inside the cooking cavity, i.e. from the inner side of the door, of the two corresponding positions of the door illustrated in Figures 5A, 6A and Figures 5C, 6C, respectively.

[0013] With reference to Figure 1, a food cooking oven according to the present invention comprises a cooking cavity 1 capable of being closed by a door 2 that is hinged on an upright side edge (not shown) thereof, and

- a) a recessed catching or locking device 30 located on the front upright side edge 3 of the cooking cavity, which most obviously lies opposite to the upright side edge on which the door is hinged, and
- b) an engagement or latching device 4 attached to

the outer side edge 5 of the door and adapted to engage said catching or locking device to retain the same door in the closed condition thereof.

[0014] With reference to Figures 2, 2A, 2B and 2C, the above-cited engagement or latching device 4 comprises a fixed member 6 that is firmly joined to said side edge 5 of the door, and a latch 7 that is capable of elastically sliding in a housing or accommodation provided within said fixed member 6 in a manner largely known as such in the art.

[0015] Said latch 7 can take, i.e. move into a plurality of different positions, among which a first position, as illustrated in Figure 2B, in which said latch is substantially introduced in said fixed member 6, and a second position, as illustrated in Figure 2C, in which said latch is substantially protruding with an outer portion thereof, which shall be illustrated and described in greater detail further on.

[0016] With reference to Figures 4, 5A, 5B, 5C, said recessed locking or catching device comprises in turn an outer portion and an inner portion; the outer portion has a bottom or lower surface 8, which is accessible from outside, and which is so positioned as to feature an outer edge 9 and an inner side 10 opposite thereto, wherein said surface has a substantially triangular shape and is inclined on the horizontal plane with a descending slope from said inner side 10 towards said outer edge 9 opposite thereto; the area above said inclined surface 8 is void, since it is due to accommodate the latch 7 as it fits thereinto.

[0017] From said inner side 10 there rises a vertical planar surface 11 that delimitates said upper zone, into which the latch 7 is due to fit, at both sides thereof. The latch 7 itself may be provided in a variety of different shapes. As shown in Figures 2, 2B and 2C, however, it is advantageously in the shape of a wedge, with an upright corner edge 12 dividing two opposite upright planar sides 13 and 14 from each other.

[0018] The inward facing side 13 is so oriented as to be able to couple in an almost parallel manner with said planar surface 11, so that, as the door is being closed, it is pressed by said surface with a substantially orthogonal force, thereby facilitating its being inserted in the fixed member 6.

[0019] With reference to Figures 5A, 5B, 7 and 8, the lower side 15 of said latch 7 is a planar one and is arranged at such height, relative to said inclined bottom surface 8, as to cause said lower side 15 of the latch 7 to come into interference with said inclined bottom surface 8 when the door is being closed; as a reaction thereto, the entire latch is urged upwards and, as a result, such reaction is passed on to the fixed member 6 and, from the latter, to the whole door, thereby raising it to the desired extent, i.e. by the desired amount.

[0020] It will be appreciated that the just described devices shall of course be so positioned relative to each other - as far as their height is concerned - as to ensure that, when the door is positioned in the correct manner,

said latch is able to fit into said upper zone, or void space above the bottom surface, and the inward facing side 13 thereof couples up with said upright planar surface 11 without any interference occurring therewith, since there is no need in this case for the inclination of the door to be corrected, actually. Quite at the contrary, if the door is undesirably inclined downwards with its edge 3, then the afore-cited interference would enable the required correction to automatically occur by a pre-established amount, i.e. to a pre-established extent, while this would anyway take place solely in the final phase of the door closing travel (Figures 5B, 5C, 7).

[0021] Basically, and with particular reference to Figures 5B and 8, the present invention is based on the fact that, with the above-described configuration, the lower extremities of an inner recess 20 and an upright corner edge 22 are positioned at the same height as the highest inner point 16 of said inclined surface 8.

[0022] The inner portion of said locking or catching device has an outwardly opening recess 20 that is sized and positioned so that, when the door is brought into its fully closed position, said latch is able to correctly fit into it and engage it in a stable and firm manner.

[0023] To such purpose, the outward facing upright side 14 of said latch is in turn oriented so that, when inserted in said recess 20, it couples up in an adequately angled manner with the side 21 of the same recess that is facing the front side of the oven, as this is clearly illustrated in Figure 6C; it should in fact be suitably reminded that the force needed for the door to be released and pulled open most obviously depends not only on the force of reaction of the spring 31, but also on the extent of the angle "n" comprised between the tangent line "a" meeting said outward facing side 14 and the straight line "b" extending orthogonally to the radial straight line "r" between the hinging axis of the same door and the point of contact of said sides 14 and 21 with each other.

[0024] This improvement has the purpose of ensuring that - once the latch is fully inserted in said recess 20 - the same latch is firmly and stably retained therein and, at the same time, the possibility is given for it to be released and removed from said recess by normally pulling the door, so as to enable the latter to be opened.

[0025] The orientation of said inner side 21 of the recess 20 and the outward facing side 14 of the latch shall of course be such as to allow for a force to be exerted in a direction that will cause the latch to be inserted in the fixed member 6 by simply pulling the door into opening.

[0026] In order to ensure that the latch 7 is able to fit into said recess 20 immediately upon the inclination of the door having possibly been corrected, between said upright surface 11 and said recess 20 or, better, said side 21 there is advantageously provided an adequately narrow upright corner edge 22 (Figures 3, 7, 6A-6C); this is effective in ensuring that, upon the inclination of the door having possibly been corrected, the latch 7 engages the recess 20 immediately, thereby preventing the door from inclining downwards again.

Claims

1. Food cooking oven comprising:

- a) a cooking cavity (1),
- b) a door (2) provided to close said cooking cavity (1) and hinged on an upright side edge thereof,
- c) a recessed catching and locking device (30) provided on a front upright corner edge (3) of said cooking cavity (1),
- d) an engagement or latching device (4) attached to the corresponding upright corner edge (5) of said door (2), wherein said engagement or latching device (4) comprises:
- e) a fixed member (6) connected in a firmly joined manner to said upright corner edge (5) of said door (2),
- f) a latch (7) that elastically engages a receptacle provided within said fixed member (6), and is adapted to slide therewithin so as to be able to move into and take a plurality of different positions, among which a first position, in which said latch (7) is substantially introduced in said fixed member (6), and a second position, in which said latch (7) is substantially protruding with at least an outer portion (13, 14) thereof,
- characterized in that** said recessed catching and locking device (30) comprises:
- g) a first lower portion provided with a surface (8) that has a triangular shape, is accessible from outside, is so positioned as to feature an outer corner edge (9) and an inner side (10) opposite thereto, and is further inclined on the horizontal plane with a descending slope from said inner side (10) towards said outer corner edge (9) opposite thereto,
- h) a vertical planar surface (11) extending through said inner side (10),
- i) an inner recess (20) provided right behind said first portion towards the interior of said cooking cavity (1),
- j) **in that** said opposite inner side (10) and said vertical surface (11) are inclined relative to a plane extending parallel to the aperture which said door (2) is intended to close,
- k) **In that** an upright corner edge (22) separates said vertical surface (11) from said inner recess (20),
- l) and **in that** the lower extremities of said inner recess (20) and said upright corner edge (22) are positioned at the same height as the highest inner position (16) of said inclined surface (8).

2. Cooking oven according to claim 1, **characterized in that** the outward-facing portion of said latch (7) is in the shape of a wedge provided with a respective

upright corner edge (12).

3. Cooking oven according to claim 2, **characterized in that** the inner side (13) of said wedge is oriented vertically and is so inclined as to be able to move into contact with said vertical surface (11) in a substantially parallel manner when the door is being closed. 5
4. Cooking oven according to claim 2 or 3, **characterized in that** the outer side (14) of said wedge is oriented vertically and is so inclined as to be able to move into contact in a substantially parallel manner with the outward-facing side (21) of said inner recess (20) when the door is fully closed. 10 15

Patentansprüche

1. Kochherd, Folgendes umfassend: 20
 - a) einen Kochraum (1),
 - b) eine Tür (2), die dazu vorgesehen ist, den Kochraum (1) zu schließen, und an einer aufrecht stehenden Seitenkante desselben drehbar befestigt ist, 25
 - c) eine zurück versetzte Schließ- und Sperrvorrichtung (30), die an einer vorderen, aufrechten Eckkante (3) des Kochraums (1) vorgesehen ist,
 - d) eine Eingriff- oder Klinkenvorrichtung (4), die an der entsprechenden aufrechten Eckkante (5) der Tür (2) befestigt ist, 30

wobei die Eingriff- oder Klinkenvorrichtung (4) Folgendes umfasst: 35

- e) ein fixiertes Element (6), das fest mit der aufrechten Eckkante (5) der Tür (2) verbunden ist,
- f) eine Klinke (7), die elastisch in eine Öffnung in dem fixierten Element (6) eingreift und dazu ausgeführt ist, darin so zu gleiten, dass sie sich in diese hinein bewegen und darin eine Mehrzahl von Positionen einnehmen kann, darunter eine erste Position, in der die Klinke (7) im wesentlichen in das fixierte Element (6) eingeführt ist, und eine zweite Position, in der die Klinke (7) im wesentlichen mit einem äußeren Abschnitt (13, 14) derselben vorragt, 40 45

dadurch gekennzeichnet, dass die zurück versetzte Schließ- und Sperrvorrichtung (30) Folgendes umfasst: 50

- g) einen ersten unteren Abschnitt, der eine Oberfläche (8) in Dreiecksform aufweist, von außen zugänglich ist, so positioniert ist, dass er eine äußere Eckkante (9) und eine dieser gegenüber angeordnete Innenseite (10) abgibt, 55

und ferner auf der horizontalen Ebene von der Innenseite (10) zur gegenüber angeordneten äußeren Eckkante (9) abfallend geneigt ist, h) eine vertikale, plane Oberfläche (11), die sich durch die Innenseite (10) erstreckt, i) eine innere Aussparung (20), die unmittelbar hinter dem ersten Abschnitt gegen die Innenseite des Kochraumes (1) vorgesehen ist, j) wobei die gegenüber angeordnete Innenseite (10) und die vertikale Oberfläche (11) im Verhältnis zu einer Ebene parallel zu der Öffnung, die von der Tür (2) geschlossen werden soll, geneigt sind, k) wobei eine aufrechte Eckkante (22) die vertikale Oberfläche (11) von der inneren Aussparung (20) trennt, l) und wobei die unteren Extremitäten der inneren Aussparung (20) und der aufrechten Eckkante (22) auf derselben Höhe wie die höchste innere Position (16) der geneigten Oberfläche (8) angeordnet sind.

2. Kochherd gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der auswärts gewandte Abschnitt der Klinke (7) die Form eines Keils hat, der mit einer entsprechenden aufrechten Eckkante (12) versehen ist.
3. Kochherd gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Innenseite (13) des Keils vertikal ausgerichtet und so geneigt ist, dass sie sich auf eine im wesentlichen parallele Weise in Kontakt mit der vertikalen Oberfläche (11) bewegen kann, wenn die Tür geschlossen wird.
4. Kochherd gemäß Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** die Außenseite (14) des Keils vertikal angeordnet ist, und so geneigt ist, dass sie sich auf eine im wesentlichen parallele Weise in Kontakt mit der auswärts gewandten Seite (21) der inneren Aussparung (20) bewegen kann, wenn die Tür vollständig geschlossen ist.

Revendications

1. Four de cuisson de nourriture comprenant:

- a) une cavité de cuisson (1),
- b) une porte (2) réalisée pour fermer ladite cavité de cuisson (1) et articulée à son bord latéral vertical,
- c) un dispositif de prise et de verrouillage évidé (30) réalisé sur un bord de coin vertical avant (3) de ladite cavité de cuisson (1),
- d) un dispositif de prise ou de verrouillage (4) fixé au bord de coin vertical correspondant (5) de ladite porte (2),

où ledit dispositif de prise ou de verrouillage (4) comprend:

- e) un élément fixe (6) relié d'une manière solidement jointe audit bord de coin vertical (5) de ladite porte (2), 5
- f) un taquet (7) qui vient en prise élastiquement avec un réceptacle réalisé dans ledit élément fixe (6) et est apte à coulisser dans celui-ci de manière à se déplacer vers et à prendre une pluralité de positions différentes, parmi lesquelles une première position, dans laquelle ledit taquet (7) est sensiblement introduit dans ledit élément fixe (6), et une seconde position dans laquelle ledit taquet (7) fait sensiblement saillie avec au moins une portion extérieure (13, 14) de celui-ci, 10 15

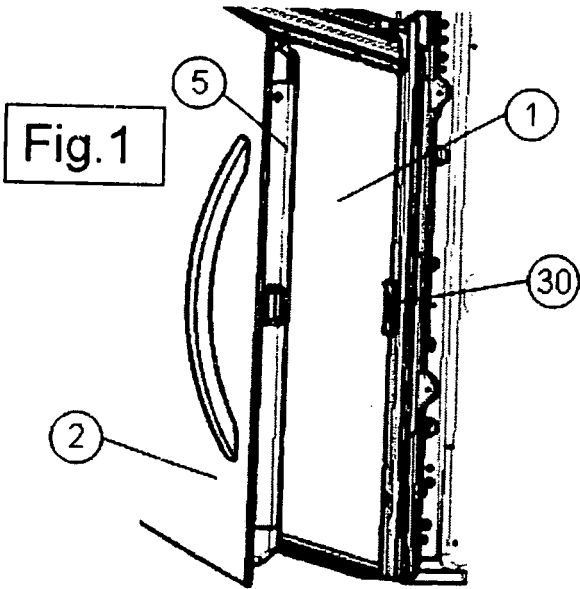
caractérisé en ce que ledit dispositif de prise et de verrouillage évidé (30) comprend: 20

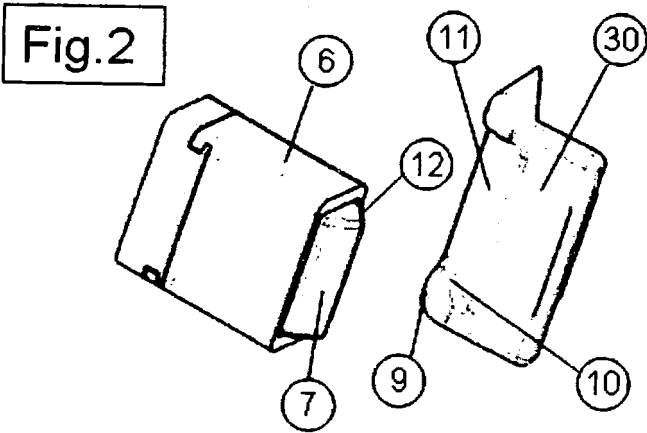
- g) une première portion inférieure pourvue d'une surface (8) qui a une forme triangulaire, qui est accessible depuis l'extérieur, qui est positionnée de façon à réaliser un bord de coin extérieur (9) et un côté intérieur (10) opposé à celui-ci, et qui est inclinée en outre sur le plan horizontal avec une pente descendante dudit côté intérieur (10) vers ledit bord de coin extérieur (9) opposé à celui-ci, 25 30
- h) une surface verticale plane (11) s'étendant à travers ledit côté intérieur (10),
- i) un évidement intérieur (20) réalisé directement derrière ladite première portion vers l'intérieur de ladite cavité de cuisson (1), 35
- j) **en ce que** ledit côté intérieur opposé (10) et ladite surface verticale (11) sont inclinés relativement à un plan s'étendant parallèlement à l'ouverture que ladite porte (2) est sensée fermer, 40
- k) **en ce qu'**un bord de coin vertical (22) sépare ladite surface verticale (11) dudit évidement intérieur (20),
- l) et **en ce que** les extrémités inférieures dudit évidement intérieur (20) et dudit bord de coin vertical (22) sont positionnées à la même hauteur que la position intérieure la plus élevée (16) de ladite surface inclinée (8). 45

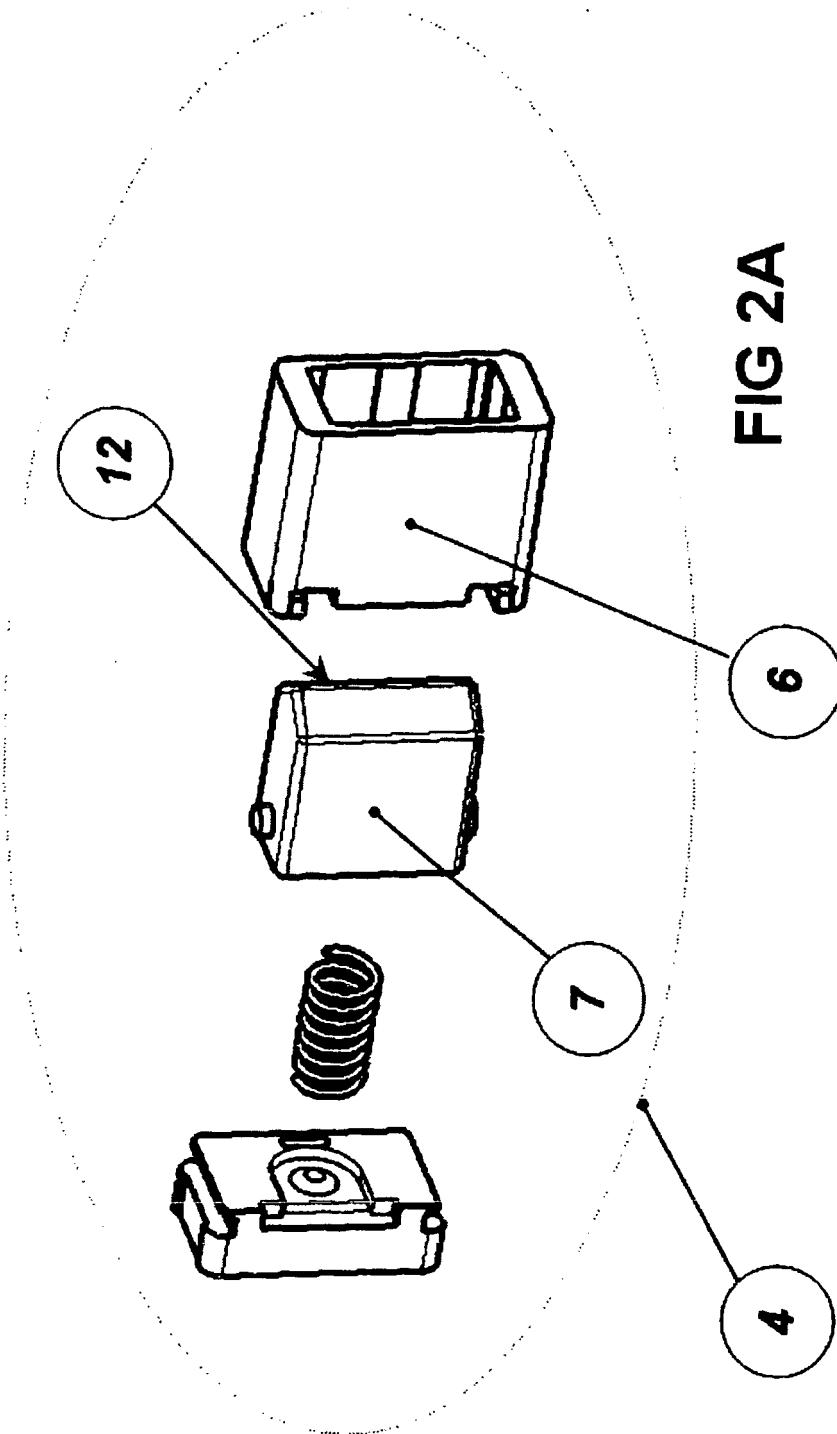
- 2. Four de cuisson selon la revendication 1, **caractérisé en ce que** la portion orientée vers l'extérieur dudit taquet (7) se présente sous la forme d'un coin muni d'un bord de coin vertical respectif (12). 50
- 3. Four de cuisson selon la revendication 2, **caractérisé en ce que** le côté intérieur (13) dudit coin est orienté verticalement et est incliné de façon à pouvoir venir en contact avec ladite surface verticale (11) 55

d'une manière sensiblement parallèle lorsque la porte est en train d'être fermée.

- 4. Four de cuisson selon la revendication 2 ou 3, **caractérisé en ce que** le côté extérieur (14) dudit coin est orienté verticalement et est incliné de façon à pouvoir venir en contact d'une manière sensiblement parallèle avec le côté orienté vers l'extérieur (21) dudit évidement intérieur (20) lorsque la porte est entièrement fermée.







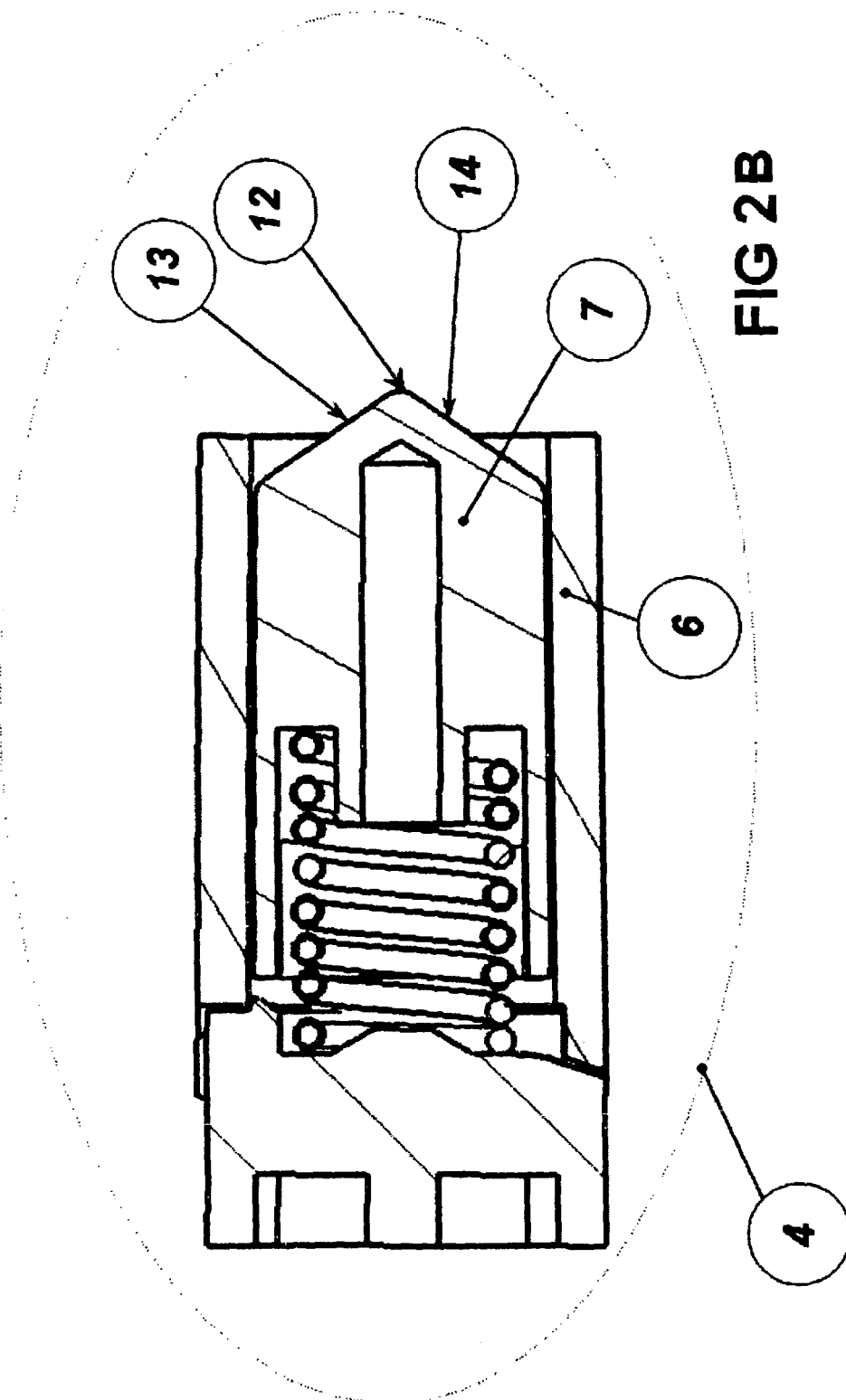


FIG 2B

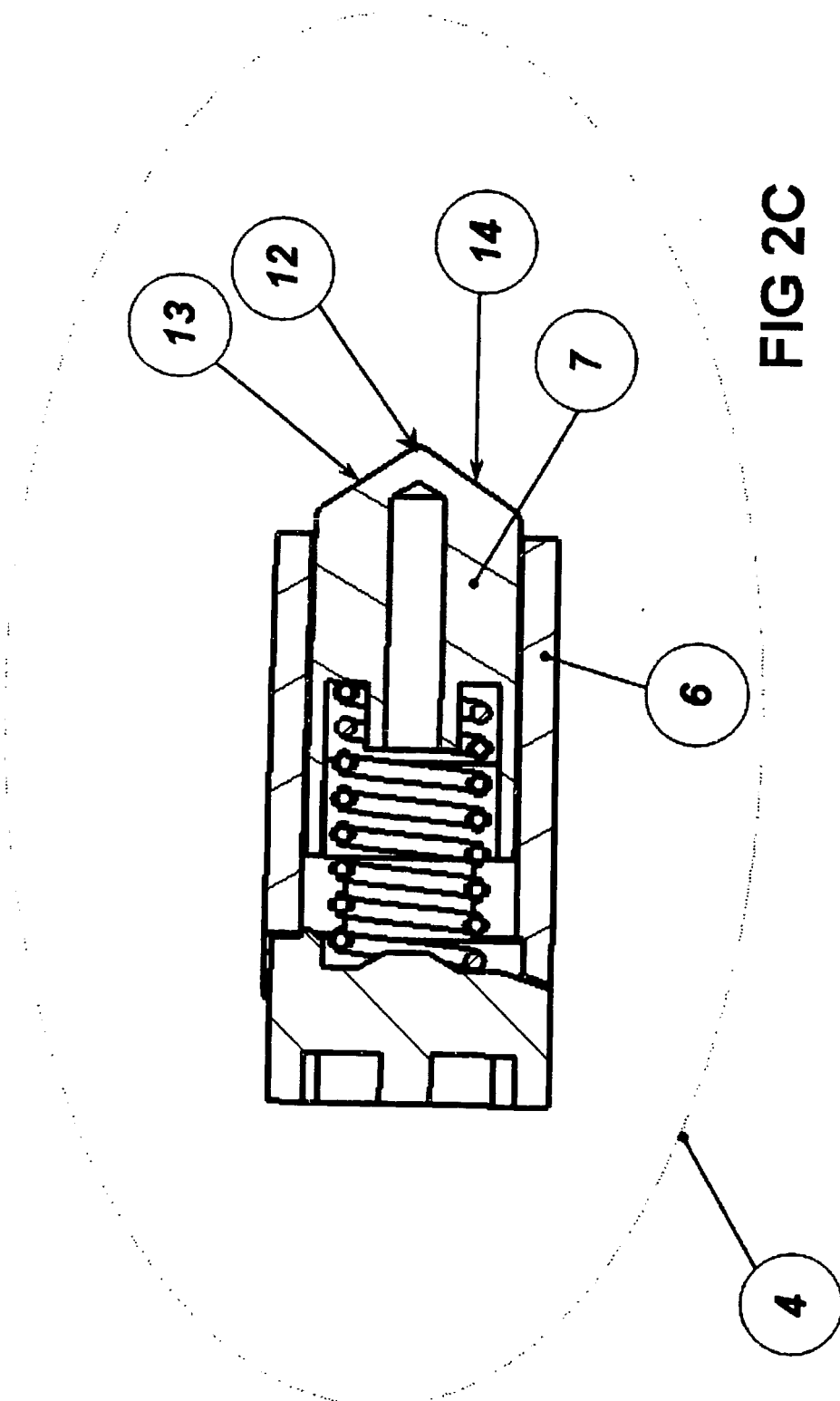
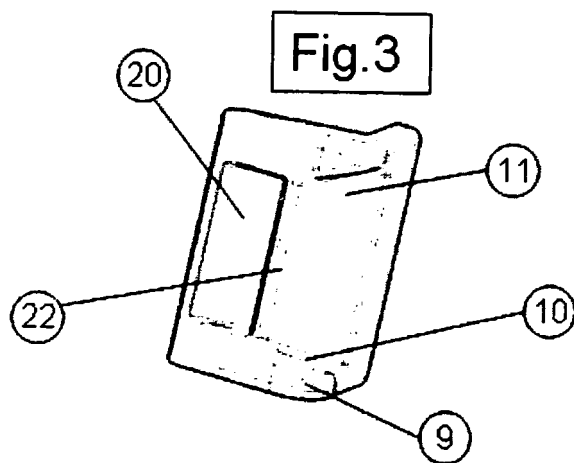
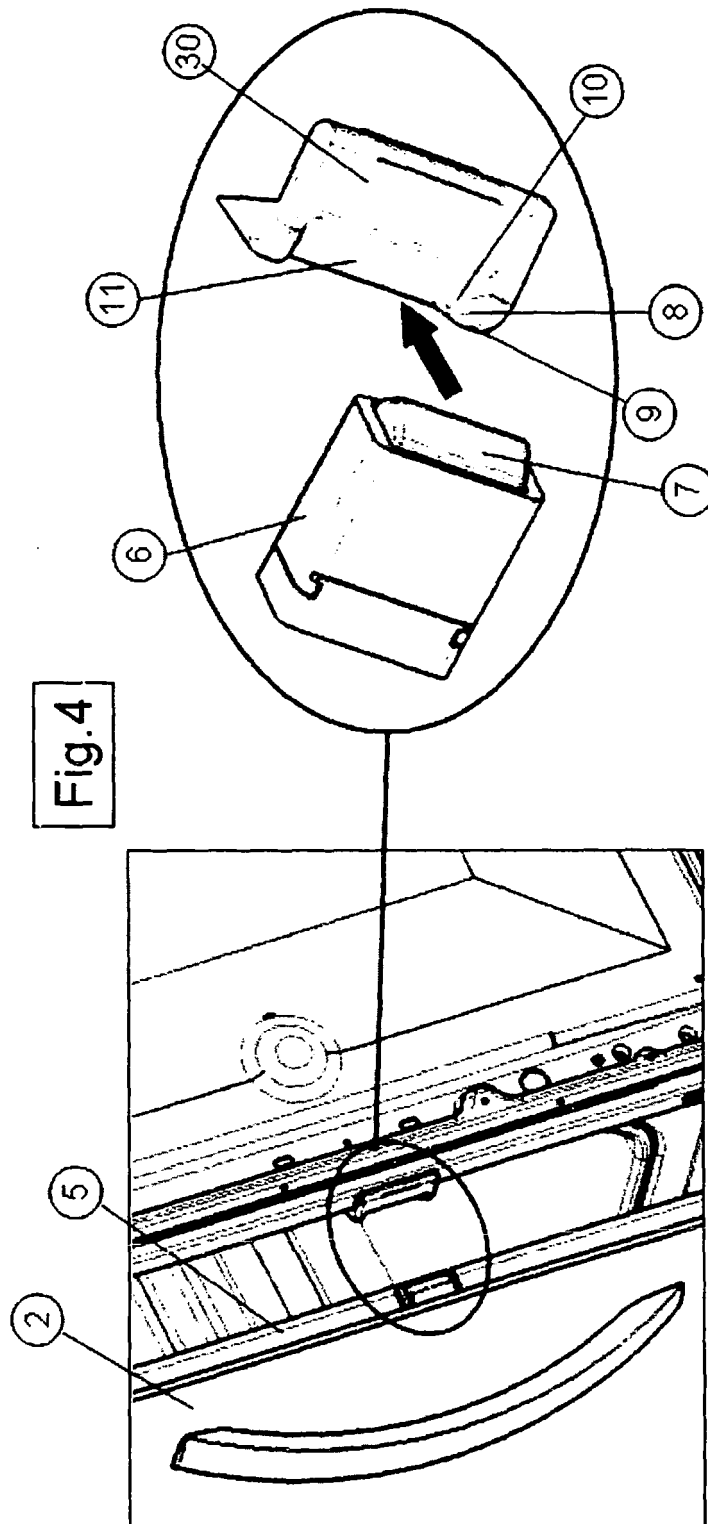
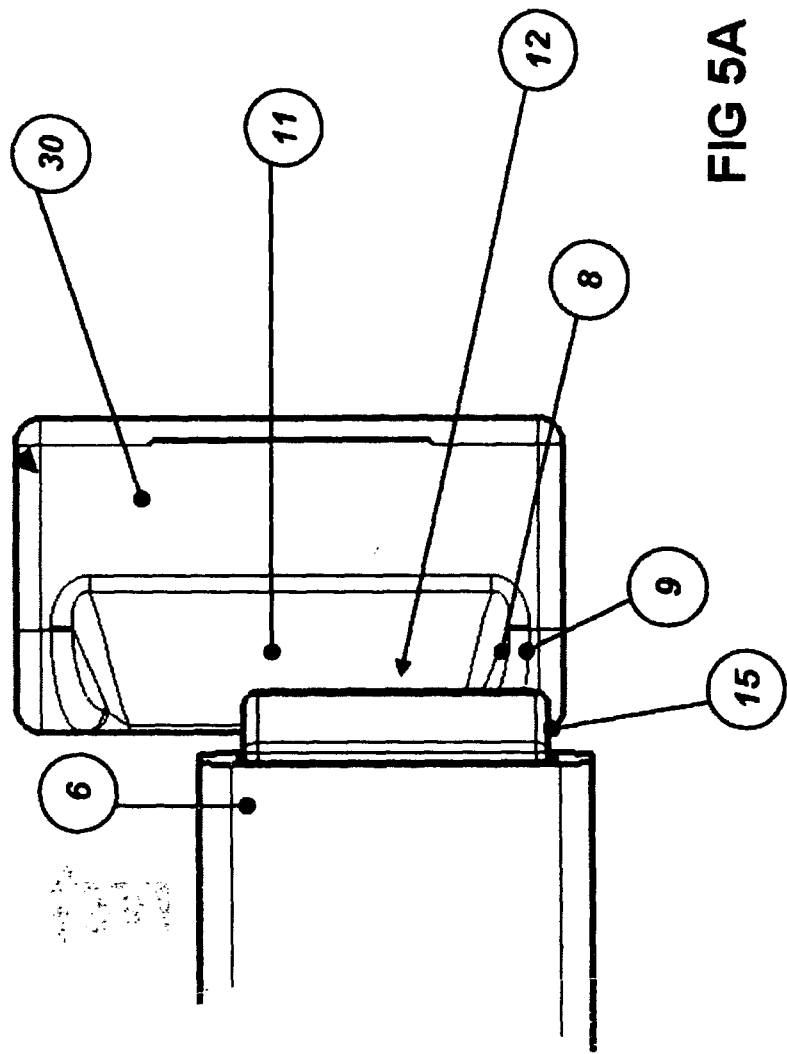
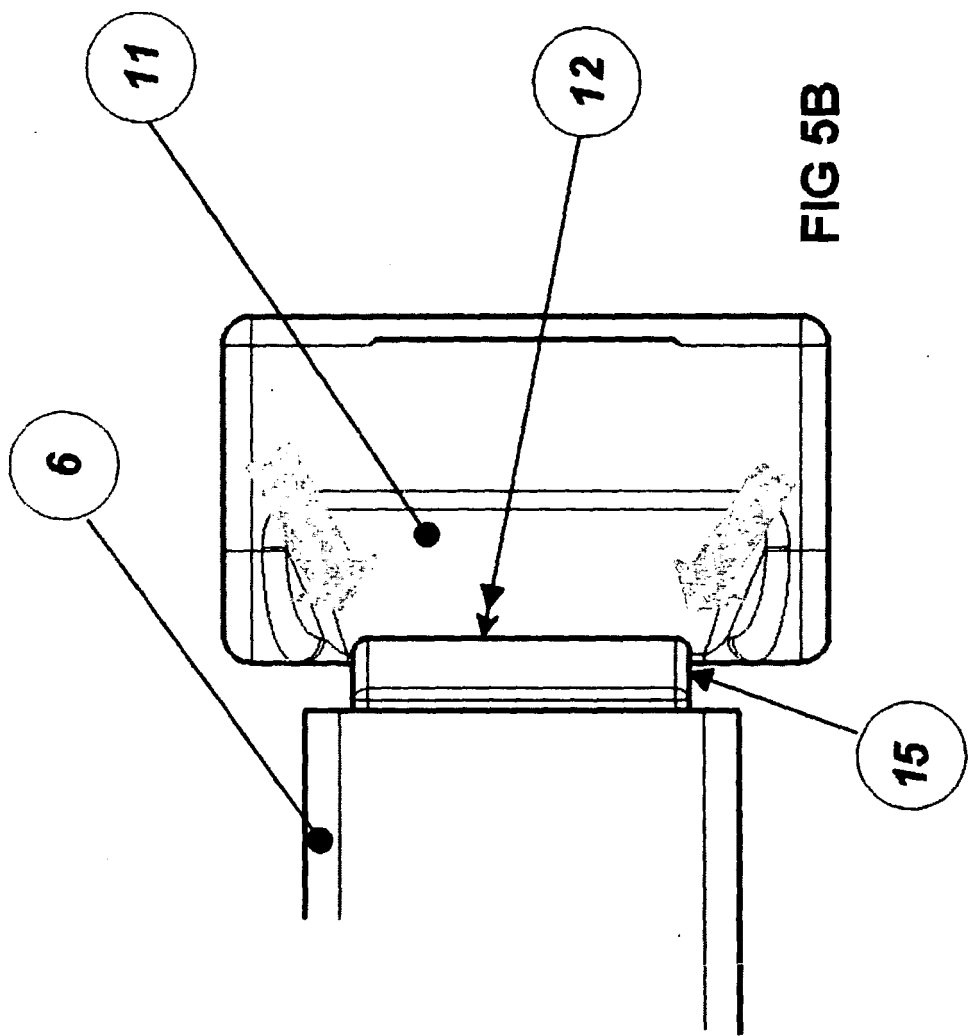


FIG 2C









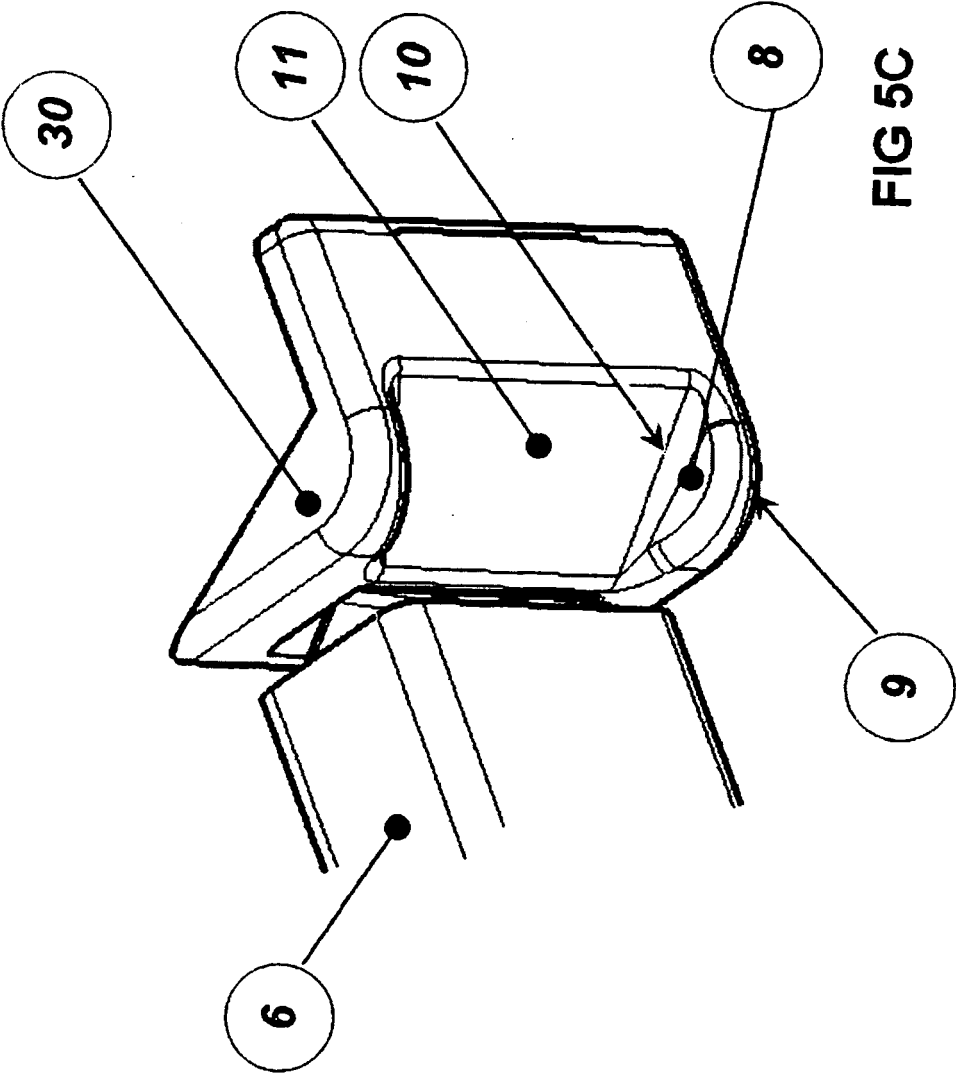


FIG 5C

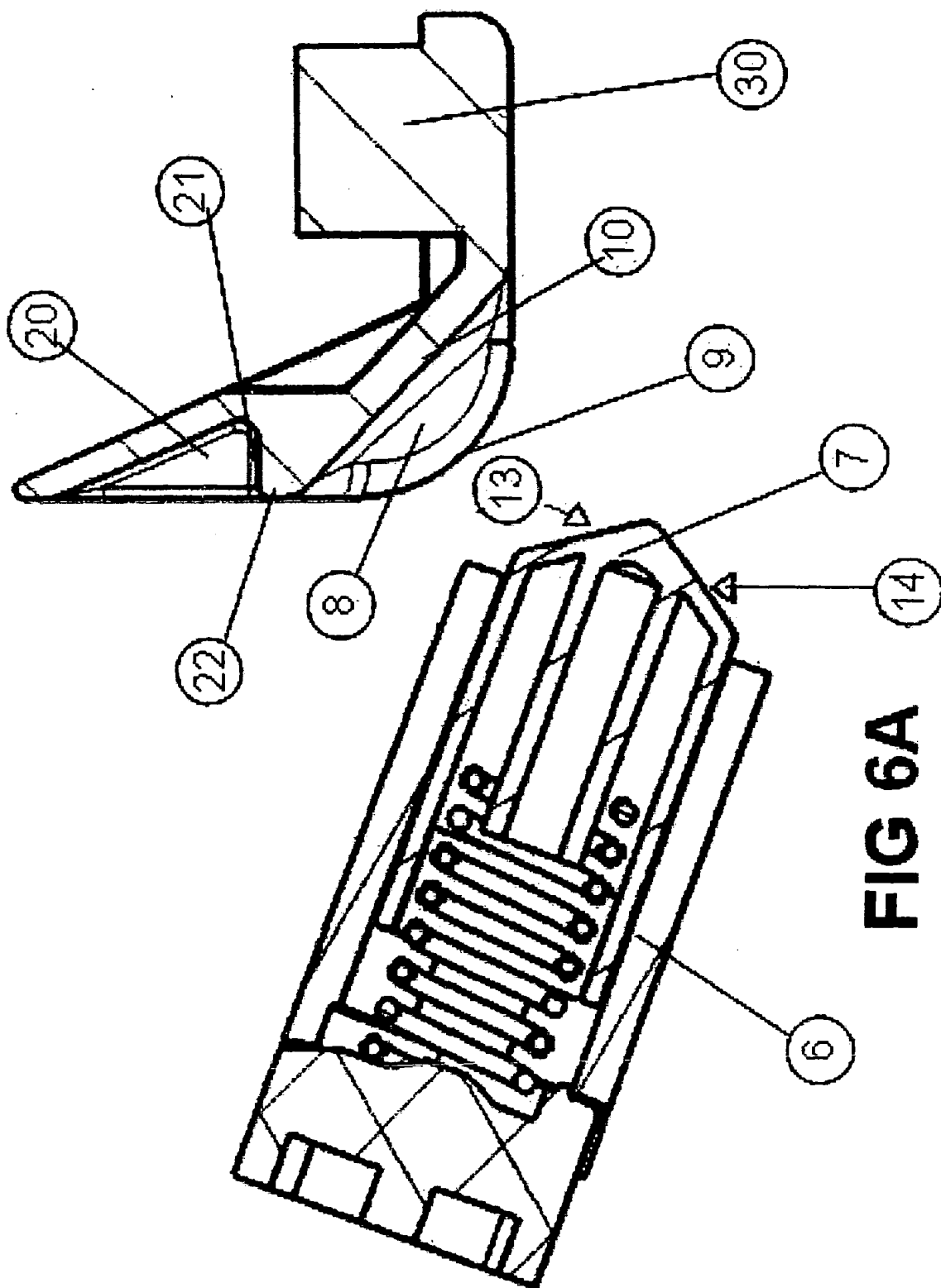
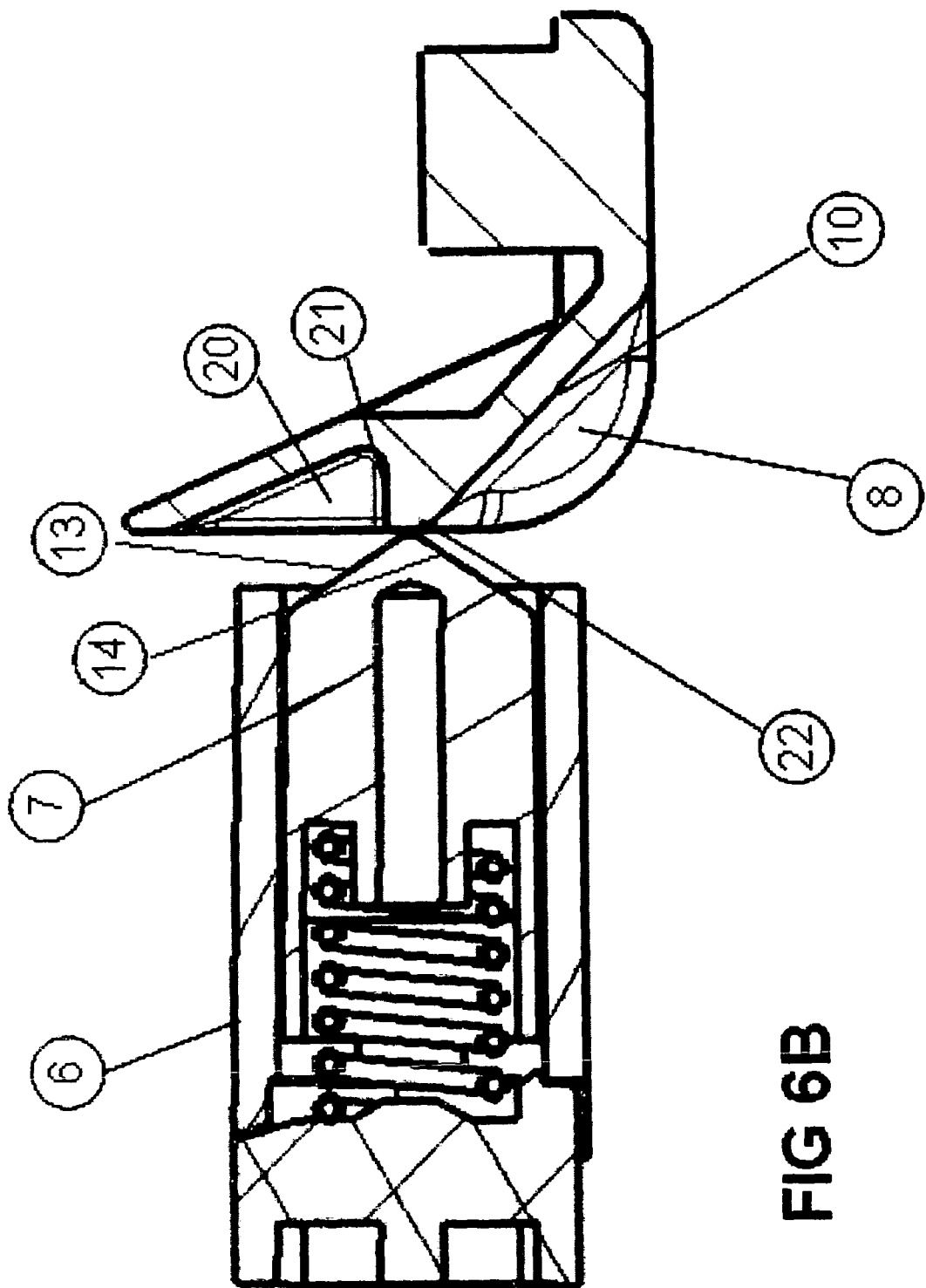
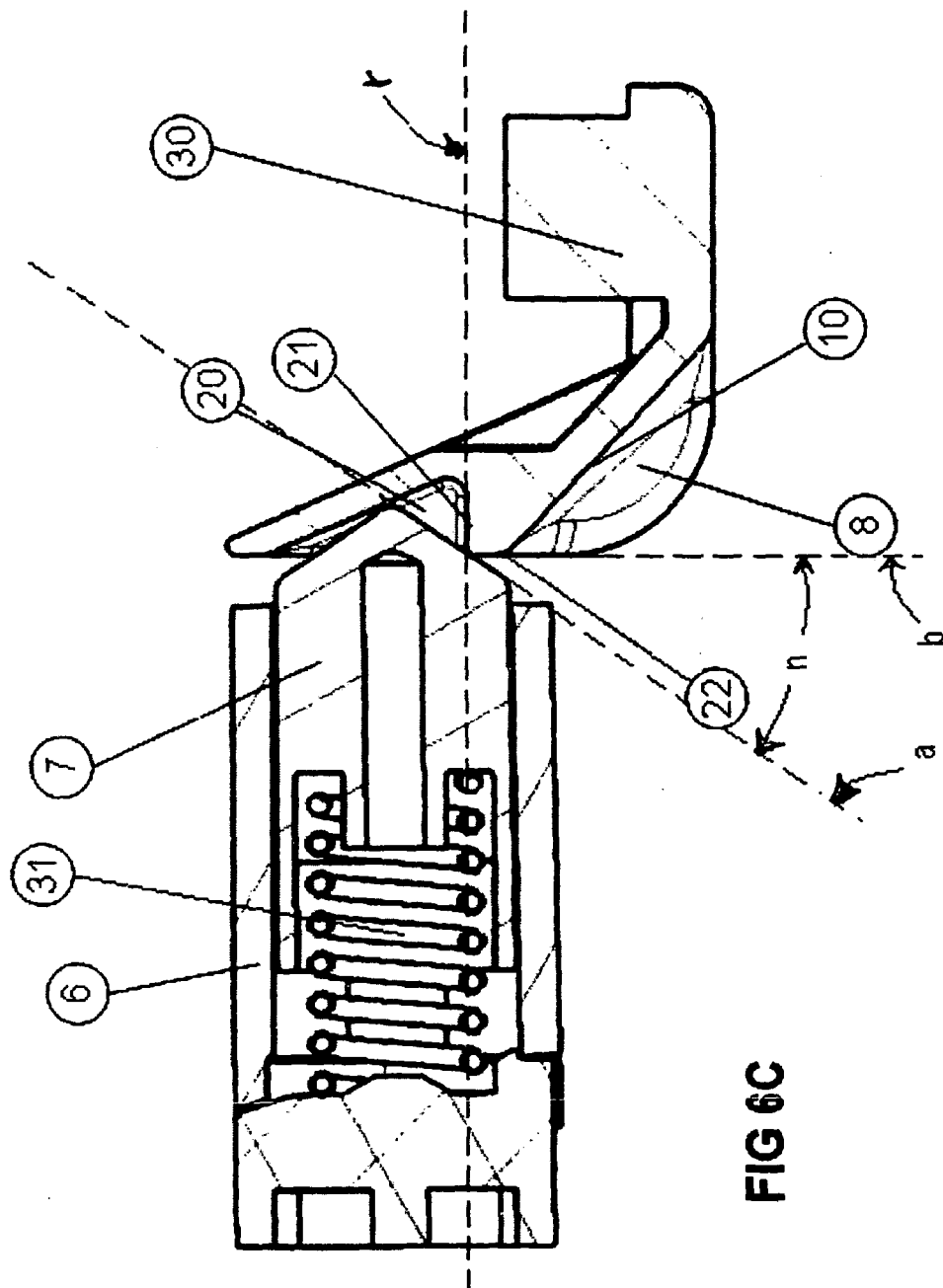
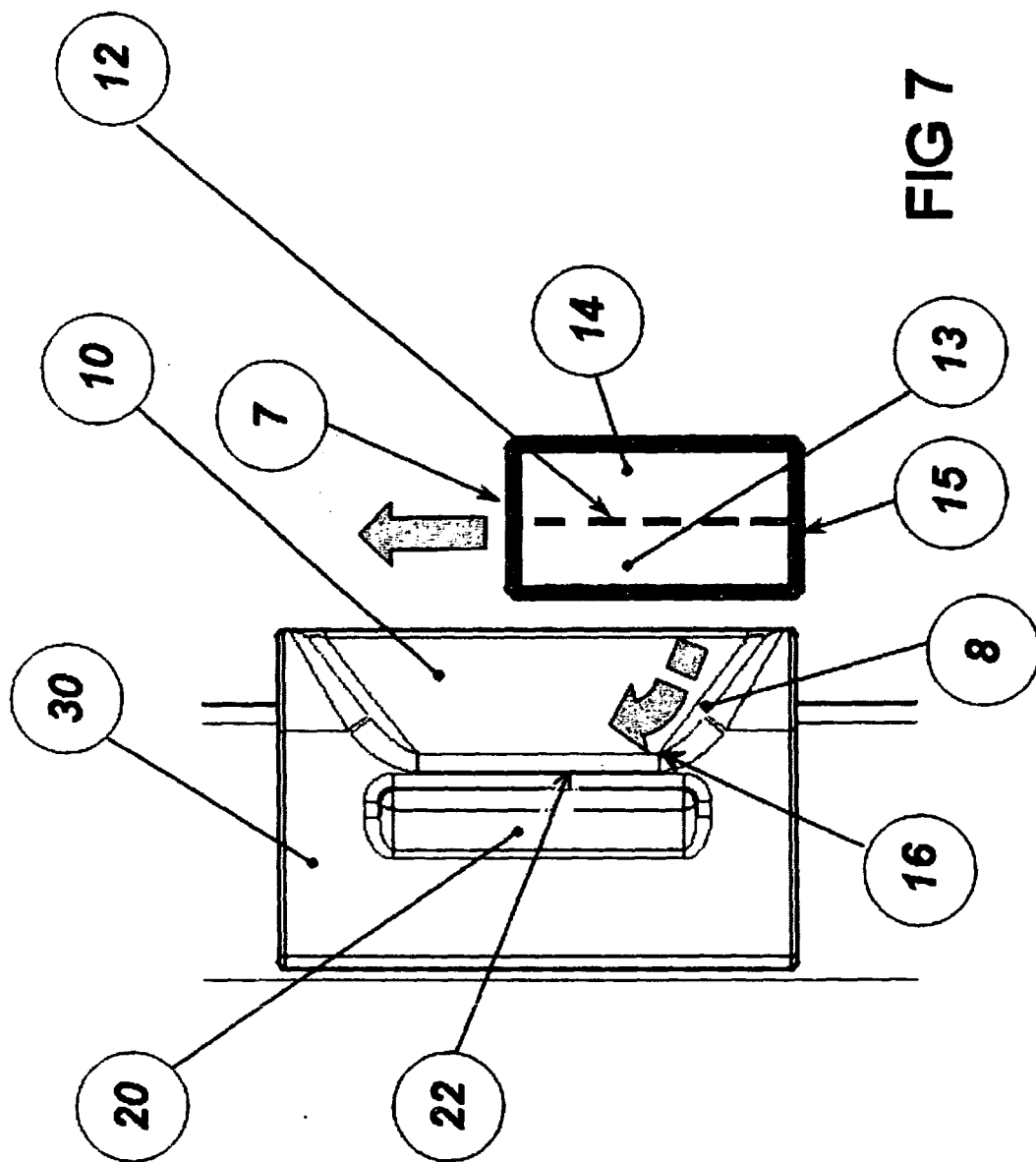
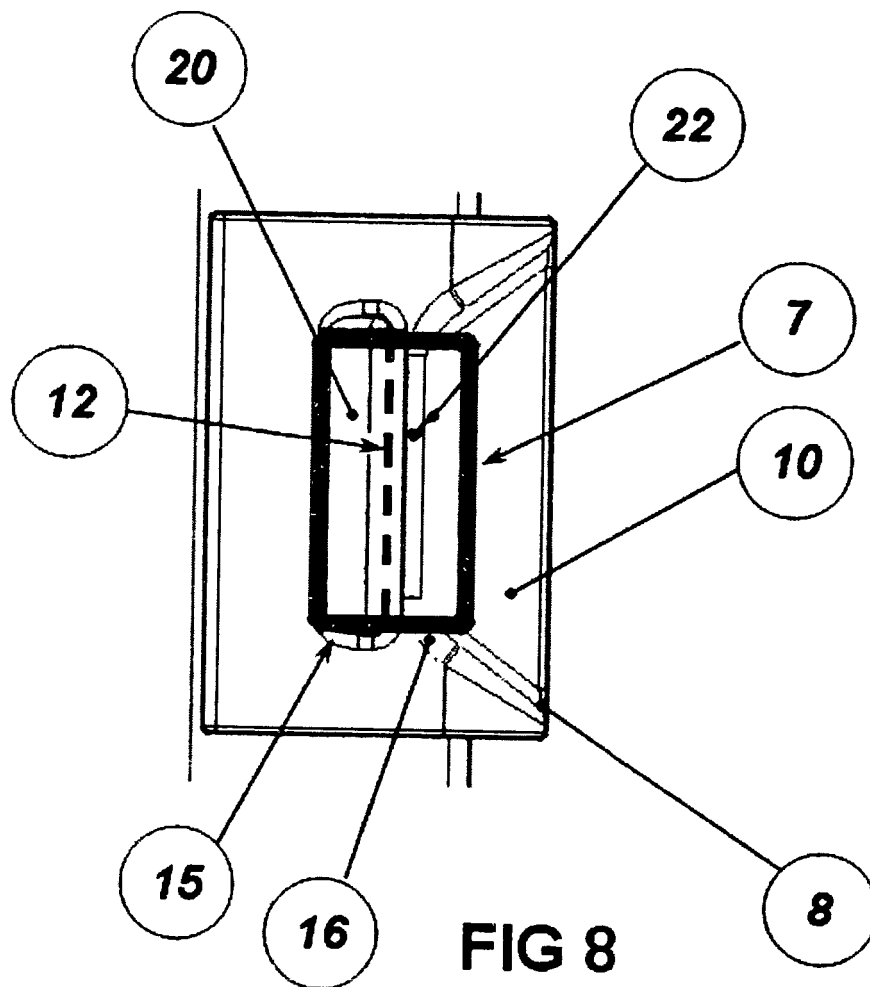


FIG 6A









REFERENCES CITED IN THE DESCRIPTION

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