



(11) **EP 1 979 685 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
06.10.2010 Bulletin 2010/40

(51) Int Cl.:
F24C 15/02 ^(2006.01) **E05F 1/12** ^(2006.01)
E05D 11/10 ^(2006.01)

(21) Application number: **07704178.8**

(86) International application number:
PCT/EP2007/050788

(22) Date of filing: **26.01.2007**

(87) International publication number:
WO 2007/088141 (09.08.2007 Gazette 2007/32)

(54) **HINGE FOR OVEN DOORS OR THE LIKE**

SCHARNIER FÜR OFENTÜREN ODER ÄHNLICHES

CHARNIERE POUR PORTE DE FOUR OU EQUIVALENT

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(30) Priority: **02.02.2006 IT PD20060034**

(43) Date of publication of application:
15.10.2008 Bulletin 2008/42

(73) Proprietor: **Zanovello S.R.L.**
35010 Limena (IT)

(72) Inventors:
• **SANTELLLO, Giovanni**
I-30036 S. Maria Di Sala (IT)
• **ZANOVELLO, Paolo**
I-35141 Padova (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Dr. Modiano & Associati SpA
Via Meravigli 16
20123 Milano (IT)

(56) References cited:
EP-A- 0 589 853 WO-A-2005/108724

EP 1 979 685 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Technical Field

[0001] The present invention relates to a hinge for oven doors or the like.

Background Art

[0002] In the field of the production of hinges for ovens or other similar devices, one of the main problems is linked to the structural complexity of said hinges, which inevitably affects production costs.

[0003] Hinges for doors of ovens or other similar devices are constituted generally by a first arm, to be fixed to the door for closing the chamber of the oven, and a second arm, which is articulated in some way to the first arm and is designed to be fixed to the structure of the oven.

[0004] A mechanism (generally also comprising a spring with a high elastic constant) is interposed between the first arm and the second arm and is adapted to allow the rotation of the first arm on the second arm according to a controlled motion, ensuring positions of stable equilibrium for the door when it is closed onto the chamber of the oven and when it is open thereon, as well as on intermediate positions.

[0005] The mechanism that manages the relative movement of the two arms of the hinge is generally very complicated, since it is constituted by many components, some of which also have a complex geometry.

[0006] This structural complexity of the hinges affects production costs significantly, in terms of cost for the provision of the individual components, in terms of cost of the equipment for providing such components, and in terms of assembly costs.

[0007] It should also be noted that, as regards assembly, known hinges generally have a drawback.

[0008] This drawback is linked to the fact that the spring of the mechanism of the hinge, which as mentioned has a high elastic constant, tends to keep the first arm closed on the second arm (typically at an angle of approximately 90°), so as to match the configuration of the door closed onto the chamber of the oven.

[0009] During assembly, this configuration of the hinge does not allow to fix it to the oven, since the first arm must be inclined with respect to the second arm by an angle comprised between 90° and 180°, in order to allow easy insertion of the end head of the second arm in a corresponding locking seat provided on the oven.

[0010] In view of the great force required to overcome the resistance of the spring and turn the first arm with respect to the second arm, many manufacturers are equipped with dedicated tools for "opening" the hinges during the assembly step.

[0011] Other manufacturers provide the hinge with a fork-like element which is pivoted, on the sides of the fork, to the second arm, surrounding part of the arm.

[0012] The fork-like element is used as an element for locking the rotation of the first arm on the second arm as an effect of the spring, since during the assembly step it is turned, interposing itself between the two arms.

[0013] The locking element, in addition to increasing the complexity of the structure, has the drawback of increasing the lateral space occupation of the second arm, with size problems which are not easy to solve, if one considers the need to try to reduce the dimensions of the hinge components (while of course maintaining the same mechanical strength).

[0014] EP-A-0 589 853 discloses a hinge for doors of ovens as defined in the preamble of claim 1.

[0015] The aim of the present invention is to provide a hinge for doors of ovens or the like which solves the problems noted in known types.

[0016] Within this aim, an object of the present invention is to provide a hinge for doors of ovens or the like which is structurally simple.

[0017] Another object of the present invention is to provide a hinge for doors of ovens or the like which allows easy association of the door with the structure of the oven during assembly.

[0018] Another object of the present invention is to provide a hinge for doors of ovens or the like which can be manufactured with known low-cost equipment.

[0019] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a hinge for doors of ovens or the like, as defined in claim 1.

[0020] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a sectional side view of a hinge according to a first embodiment of the invention applied to an oven, illustrating the open configuration of the door of the oven;

Figure 2 is an enlarged-scale view of a detail of the hinge of Figure 1, with the door in the configuration for closure onto the oven;

Figure 3 is an exploded view of the hinge of the preceding figures;

Figure 4 is a perspective view of the hinge of the preceding figures, in an intermediate step of the opening action;

Figure 5 is a sectional side view of the hinge of the preceding figures in an intermediate step of the opening action, with a disk for locking the rotation of the two arms of the hinge associated therewith;

Figure 6 is a sectional side view of a hinge according to a second embodiment of the invention in an intermediate step of the opening action, with different means for locking the relative rotation of the hinge arms;

Figure 7 is a sectional side view of part of the hinge of Figure 6 in the open configuration.

Ways of carrying out the Invention

[0021] With reference to the figures, a hinge for oven doors, according to the invention, is generally designated by the reference numeral 10.

[0022] The structure of the oven is generally designated by the reference numeral 11, while the door of the oven is designated by the reference numeral 12.

[0023] The hinge 10 comprises a first elongated arm 13, to be fixed to the door 12 of the oven 11 (the oven and the door are shown schematically in broken lines), and a second arm 14, which is pivoted to the first arm 13, to be fixed to the structure of the oven 11; pivoting between the first arm 13 and the second arm 14 occurs by means of a first pivot 15.

[0024] A mechanism is also interposed between the first arm 13 and the second arm 14, is generally designated by the reference numeral 16, and is adapted to manage the relative angular position of the first arm 13 on the second arm 14.

[0025] In particular, according to a known type of configuration, the first arm 13 has a substantially C-shaped transverse cross-section which is adapted to form a longitudinal receptacle 17 for the components of the mechanism 16.

[0026] The second arm 14 is pivoted to the side walls 18 of the longitudinal receptacle 17 and is provided internally with a space 19 which is open upward.

[0027] In particular, the second arm 14 is constituted by two plates 20, which are symmetrical, correspondingly face each other; and are joined by a transverse bridge 21.

[0028] The plates 20 are formed monolithically, for example conveniently by blanking and U-shaped bending of a metallic lamina.

[0029] The contour of each plate 20 has an upper spur 22, which is suitable to be arranged for extraction-preventing abutment against the internal front wall 23 of a seat 24 provided in the structure of the oven 11, and a lower slot 25, which is suitable to accommodate a lower lip 26 of the seat 24.

[0030] The contour of each plate 19 also has a rear portion 27 at which the first arm 13 is pivoted.

[0031] The mechanism 16 comprises a slider 28, which can perform a translational motion substantially in the longitudinal direction of the first arm 13 by association with guiding means 29 provided on the first arm 13.

[0032] The slider 28 is constituted by a pivot, hereinafter referenced as second pivot 30, the ends of which are guided in parallel slots 31, which constitute the guiding means 29 and are formed symmetrically on the side walls 18 of the receptacle 17 provided in the first arm 13.

[0033] The mechanism 16 further comprises a plate-like linkage 32 which is pivoted respectively to the second arm 14 and to the slider 28.

[0034] The linkage 28 is arranged partly within the space 19 formed by the U-shaped bend of the second arm 14 and is pivoted to the second arm 14 by virtue of a third pivot, designated by the reference numeral 33,

which is arranged so as to pass through the plates 20.

[0035] The pivoting axis of the linkage element 32 on the second arm 14 is spaced upward with respect to the pivoting axis of the first arm 13 on the second arm 14; the straight line, designated schematically by the reference letter A in Figure 2, which connects the centers of rotation of the linkage element 32 on the second arm 14 and of the first arm 13 on the second arm 14, is incident with respect to the interface surface between the door and the oven when the door is closed on the chamber of the oven.

[0036] Moreover, the mechanism 16 comprises an intermediate body 34, which is pivoted to the slider 28 on the same axis by means of which the linkage 32 is pivoted to the slider 28, in practice the axis of the second pivot 30 which constitutes the slider 28.

[0037] The intermediate body 34 is constituted by a U-shaped lamina, between the lateral wings 35 of which the slider 28 is arranged.

[0038] The intermediate body 34 further has a cam-like coupling, designated by the reference numeral 36, with the second arm 14; the cam-like coupling 36 is suitable to ensure a position of stable balance of the first arm 13 on the second arm 14 which corresponds to the closed position of the door 12 on the chamber of the oven 11, as shown in Figure 2.

[0039] The cam-like coupling 36 is constituted by a roller, generally designated by the reference numeral 37, which is arranged so that it can rotate between the lateral wings 35 of the intermediate body 34 and is arranged in sliding contact, during part of the relative rotation of the first arm 13 on the second arm 14, with a cusp-shaped portion 38 provided on the upper edge 35 of the second arm 14.

[0040] The arrangement of the roller 37 on the part of the cusp-shaped portion 38 which is directed toward the bottom of the receptacle 17 formed in the first arm 13, as shown in Figure 2, corresponds to the closed position of the door 12 on the chamber of the oven 11.

[0041] Finally, the mechanism 16 comprises elastic means 39, which are rigidly coupled to the first arm 13 and act by traction on the intermediate body 34.

[0042] The elastic means 39 are constituted by a traction spring 40, which is rigidly coupled at its ends respectively to a first engagement portion 41, such as a fourth pivot which lies transversely to the side walls 18 of the receptacle 17, and to a second engagement portion 42, such as a fifth pivot which is formed transversely between the wings 35 of the intermediate body 34.

[0043] The linkage 32 has, proximate to its axis of pivoting to the second arm 14, an extension tab 43 which is suitable to abut against a lower stroke limiting abutment 44 for the linkage 32 when the first arm 13 is turned in a position which corresponds to the fully open position of the door 12 with respect to the chamber of the oven 11, as clearly shown in Figure 1.

[0044] The lower stroke limit abutment 44 is formed on the second arm 14 inside the space 19 formed by the U-

shaped fold and is constituted for example by a sixth pivot 45, which is arranged so as to pass through at least one of the two plates 20.

[0045] When the tab 43 abuts against the lower stroke limit 44, the slider 28 is in abutment against the lower ends of the guiding slots 31.

[0046] The operation of the hinge is as follows.

[0047] The first arm 13 and the second arm 14 are mutually pivoted, while the spring 40 pulls the linkage 32, in practice acting on the slider 28.

[0048] The fact that the pivoting axis of the linkage 32 on the second arm 14 is spaced upward with respect to the axis of pivoting of the first arm 13 to the second arm 14 in practice causes the spring to pull eccentrically on the second arm 14, leading to a rotation of the first arm 13 on the second arm 14; the eccentric traction hypothetically ceases when the direction of traction of the spring is aligned with the straight line A that connects the centers of rotation of the linkage 32 on the second arm 14 and of the first arm 13 on the second arm 14.

[0049] Since the straight line A is incident to the surface that acts as interface between the door and the oven when the door is closed on the oven chamber, said alignment cannot occur; the first arm 13 turns until the door 12 abuts against the face of the chamber of the oven 11.

[0050] In order to increase safety, when the door 12 abuts against the face of the chamber of the oven 11, the roller 37 is positioned on the part of the cusp-shaped portion 38 which is directed toward the bottom of the receptacle 17 formed on the first arm 13, as shown in Figure 2, increasing the stability of the closure position of the door.

[0051] The door 12 opens simply by turning it downward; the mechanism 16 is structured so that the door 12, taking into account its center of gravity, is always balanced in any angular position comprised between the cusp-shaped portion 38 and the fully open position, which corresponds to the abutment of the tab 43 against the lower stroke limit abutment 44 and to the abutment of the slider 28 against the lower ends of the guiding slots 31.

[0052] Advantageously, the hinge 10 comprises means 46 for the angular locking of the rotation of the first arm 13 on the second arm 14 in an angular position which is suitable to allow the assembly of the second arm 14 to the structure of the oven 11 (Figure 5).

[0053] This angular position corresponds to a rotational position which is intermediate between the position in which the door is closed onto the chamber of the oven (as in Figure 2) and a position which corresponds to the maximum opening of the door (Figure 1).

[0054] The angular locking means 46 comprise a locking element 47 (shown in broken lines in Figure 5), which is suitable to be interposed under compression, due to an indirect effect of the thrust of the elastic means 39, between a first abutment 48, formed on the first arm 13, and a second abutment 49, which lies inside the space 19 formed by the U-shaped bending of the second arm 14.

[0055] In particular, the locking element 47 is constituted by a disk which can be inserted partially within the slot 50 for the upward opening of the space 19 formed by the U-shaped fold of the second arm 14; in the sectional figures, the slot 50 is shown with reference to its longitudinal edge.

[0056] The disk is inserted in the slot 50 by abutting laterally both against the first abutment 48, which corresponds to the base of the cutout 51 formed at the end of the first arm 13, in order to allow the exit of the front portion of the second arm 14 from the receptacle 17 of the first arm 13, and on the second abutment 49, constituted by a tab 52 which is monolithic with the edge of one of the two plates 20 and is folded at right angles thereto.

[0057] Further, said disk which constitutes the locking element 47 abuts against a lower support 53 which is formed within the space 19 and constitutes the upper part of the six pivot which provides the lower stroke limit 42.

[0058] The disk, which can be conveniently a coin of appropriate diameter, can therefore be inserted and removed easily from the slot 50.

[0059] A different embodiment of angular locking means, shown in Figures 6 and 7 and designated by the reference numeral 146, comprises a locking element 147, which is adapted to be interposed under compression, by indirect effect of the thrust of the elastic means 139, between a first abutment 148 formed on the first arm 13 and a second abutment 149 formed inside the space 19 formed by the U-shaped fold of the second arm 14.

[0060] In this embodiment, the locking element 147 is constituted by a lever 154, which is pivoted to the second arm 14 and partly contained within the slot 150 for upward opening of the space 19 formed by the U-shaped fold of the second arm 14.

[0061] The end 155 of the lever which lies opposite the end for pivoting to the second arm 14 abuts, during the locking step, against the first abutment 148.

[0062] In particular, the second abutment 149 is constituted by the pivot for the pivoting of the lever 154, while the first abutment 148 is constituted by the base of the cutout 51 formed at the end of the first arm 13 in order to allow the protrusion of the front portion of the second arm 14 from the receptacle 17 of the first arm 13.

[0063] The end 154 of the lever 153 is wider than the width of the slot 50, for example by way of a transverse folding of the end 154, in order to avoid complete insertion of the lever in the slot 50.

[0064] Figure 7 illustrates the position of the lever once the hinge has been associated with the oven 11.

[0065] In practice it has been found that the invention thus described solves the problems described above in known types of hinge for ovens.

[0066] In particular, the present invention provides a hinge for doors of ovens or the like which is simplified with respect to known types of hinge, since the number of components is reduced to a minimum.

[0067] The shape of the components also is simple and said components are substantially all obtainable by blanking and bending metallic plates.

[0068] Further, the use of locking means for angular locking of the relative rotation of the two arms of an extremely simple type, such as for example a coin, allows to simplify considerably the step of associating said hinge with the oven.

[0069] The variation of said angular locking means which has the lever reprises a per se known concept; the application of the individual lever accommodated between the plates that form the second arm is constructively simple and leads to smaller overall dimensions.

[0070] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0071] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0072] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A hinge for doors of ovens or the like, of the type which comprises:

- a first elongated arm (13), to be fixed to the structure of the door (12) of the oven (11);
- a second arm (14), which is pivoted to said first arm (13) and is designed to be fixed to the structure of the oven (11);
- a mechanism (16) which is adapted to manage the relative angular position of said first arm (13) on said second arm (14);

characterized in that said second arm (14) has an internal space (19) which is open upward and **in that** said mechanism (16) is constituted by:

- a slider (28) which can perform a translational motion substantially in the longitudinal direction of said first arm (13) by association with guiding means (29) formed on said first arm (13);
- a linkage (32) which is pivoted respectively to said second arm (14) and to said slider (28), said linkage (32) being arranged partly within said space (19) formed in said second arm (14);
- an intermediate body (34), which is pivoted to said slider (28) on the same axis on which said linkage (32) is pivoted to said slider (28), said

intermediate body (34) having a cam-like coupling (36) with said second arm (14) which is adapted to ensure a stable balance position of said first arm (13) on said second arm (14) which corresponds to the position in which the door (12) is closed onto the chamber of the oven, said cam-like coupling being constituted by a roller (37) mounted on the intermediate body (34) and arranged in sliding contact with a cusp-shaped portion (38) provided on the upper edge (35) of the second arm (14);

- elastic means (39), which are rigidly coupled to said first arm (13) and act by traction on said intermediate body (34).

2. The hinge according to one or more of the preceding claims, **characterized in that** said first arm (13) has a substantially C-shaped transverse cross-section which is adapted to form a longitudinal receptacle (17) for the components of said mechanism (16), said second arm (14) being pivoted to the side walls (18) of said longitudinal receptacle (17), said slider (28) being constituted by a pivot (30), the ends of which are guided on parallel slots (31), which constitute said guiding means (29) and are formed symmetrically on said side walls (18), said intermediate body (34) being constituted by a U-shaped lamina, between the lateral wings (35) of which said pivot (30) is arranged.

3. The hinge according to claim 2, **characterized in that** said roller (37) is interposed rotatably between said lateral wings (35) of said intermediate body (34) and is arranged in sliding contact, during part of the relative rotation of said first arm (13) on said second arm (14), with said cusp-shaped portion (38), the arrangement of said roller (37) on the part of said cusp-shaped portion (38) which is directed toward the bottom of said receptacle (17) formed on said first arm (13) corresponding to the position in which the door (12) is closed on the chamber of the oven (11).

4. The hinge according to one or more of the preceding claims, **characterized in that** said second arm (14) is constituted by two symmetrical plates (20) which face each other correspondingly and are joined by at least one transverse bridge (21), said plates (20) being formed in a single piece which is folded into a U-shape so as to form said space (19).

5. The hinge according to one of claims 2 to 4, **characterized in that** said linkage (32) has, proximate to the axis for pivoting to said second arm (14), an extension tab (43) which is suitable to abut against a lower stroke limit abutment (44) for said linkage (32) when the first arm (13) is rotated into a position which corresponds to the fully open position of the door (12) with respect to the chamber of the oven

(11), said lower stroke limit abutment (44) being formed on said second arm (14) inside said space (19), when said tab (43) is in abutment against said lower stroke limit (44), said slider (28) abutting against the lower ends of said guiding slots (31).

6. The hinge according to one or more of the preceding claims, **characterized in that** said elastic means (39) are constituted by a traction spring (40), which is rigidly coupled at its ends respectively to a first engagement portion (41) arranged transversely to the side walls (18) of said receptacle (17) formed on said first arm (13) and to a second engagement portion (42) formed on said intermediate body (34).

7. The hinge according to one or more of the preceding claims, **characterized in that** the pivoting axis of said linkage (32) on said second arm (14) is spaced upward with respect to the pivoting axis of said first arm (13) with respect to said second arm (14), the straight line (A) that connects the center of rotation of said linkage element (32) on said second arm (14) and the center of rotation of the first arm (13) on the second arm (14) being incident to the surface that acts as interface between the door (12) and the oven (11) when said door (12) is closed on to the chamber of the oven (11).

8. The hinge according to claim 7, **characterized in that** it comprises means (46, 146) for angular locking of the rotation of said first arm (13) on said second arm (14) in an angular position which is suitable to allow the assembly of said second arm (14) to the structure of the oven (11), said angular locking means (46, 146) comprising a locking element (47, 147), which is adapted to be interposed under compression, as an effect of the thrust of said elastic means (39), between a first abutment (48, 148), which is formed on said first arm (13), and a second abutment (49, 149) which lies within the space (19) provided inside said second arm (14).

9. The hinge according to claim 8, **characterized in that** said locking element (47) is constituted by a disk which can be inserted partly in the slot (50) for the upward opening of the space (19) formed inside said second arm (14), said disk being removable from said slot (50) and disengaged from the structure of said hinge (10).

10. The hinge according to claim 9, **characterized in that** a lower support (53) for said disk is provided on said second arm (14) within the space (19) formed inside said second arm (14).

11. The hinge according to claim 3 or 4, **characterized in that** said first abutment (48) is constituted by the base of the cutout (51) formed at the end of said first

arm (13) in order to allow the exit of the front portion of said second arm (14) and said second abutment (49) is constituted by a tab (52) which is monolithic with respect to said second arm (14) and lies inside said space (19).

12. The hinge according to claim 2, **characterized in that** said locking element (147) is constituted by a lever (154) which is hinged to said second arm (14) and is partly contained within the slot (50) for the upward opening of the space (19) formed inside said second arm (14), the end (155) of said lever (154) which lies opposite the end for pivoting to said second arm (14) abutting, during the locking step, against said first abutment (148).

13. The hinge according to claim 12, **characterized in that** said end (155) of said lever (154) which lies opposite the end for pivoting to said second arm (14), is wider than the width of said slot (50).

14. The hinge according to claim 6 or 7, **characterized in that** said second abutment (149) is constituted by the pivot for the pivoting of said lever (154) to said second arm (14), while said first abutment (148) is constituted by the base of the cutout (51) formed at the end of the first arm (13) in order to allow the exit of the front portion of the second arm (14).

Patentansprüche

1. Ein Scharnier für Türen von Öfen oder Ähnliches, von der Art, die Folgendes umfasst:

- einen ersten lang gestreckten Arm (13), zu befestigen an der Struktur der Tür (12) des Ofens (11),
- einen zweiten Arm (14), der drehgelenkig an dem ersten Arm (13) angeordnet ist und ausgestaltet ist, um an der Struktur des Ofens (11) befestigt zu werden,
- einen Mechanismus (16), der ausgebildet ist, um die relative Winkelposition des ersten Arms (13) an dem zweiten Arm (14) einzustellen, **dadurch gekennzeichnet, dass** der zweite Arm (14) einen Innenraum (19) hat, der nach oben offen ist, und **dadurch**, dass der Mechanismus (16) aus Folgendem besteht:
- einem Schieber (28), der eine translatorische Bewegung im Wesentlichen in die Längsrichtung des ersten Arms (13) durch Verknüpfung mit Führungsmitteln (29) ausführen kann, die an dem ersten Arm (13) geformt sind,
- einem Verbindungsstück (32), das drehgelenkig jeweils an dem zweiten Arm (14) und an dem Schieber (28) angeordnet ist, wobei das Verbindungsstück (32) teilweise innerhalb des Raums

- (19) angeordnet ist, der in dem zweiten Arm (14) geformt ist,
 - einem intermediären Körper (34), der drehgelenkig an dem Schieber (28) auf derselben Achse angeordnet ist, auf der das Verbindungsstück (32) drehgelenkig an dem Schieber (28) angeordnet ist, wobei der intermediäre Körper (34) eine nokkenartige Kopplung (36) mit dem zweiten Arm (14) hat, die ausgebildet ist, um eine stabile Gleichgewichtsposition des ersten Arms (13) an dem zweiten Arm (14) sicherzustellen, welche der Position entspricht, in welcher die Tür (12) auf die Kammer des Ofens geschlossen wird, wobei die nokkenartige Kopplung aus einer Rolle (37) besteht, die am intermediären Körper (34) montiert ist und die in Gleitkontakt mit einem spitzenförmigen Abschnitt (38) angeordnet ist, der an dem oberen Rand (35) des zweiten Arms (14) bereitgestellt ist,
 - elastischen Mitteln (39), die starr mit dem ersten Arm (13) gekoppelt sind und durch Zug auf den intermediären Körper (34) wirken.
2. Das Scharnier gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der erste Arm (13) einen im Wesentlichen C-förmigen transversalen Querschnitt hat, der ausgebildet ist, um ein längliches Behältnis (17) für die Bestandteile des Mechanismus (16) zu bilden, wobei der zweite Arm (14) drehgelenkig an den Seitenwänden (18) des länglichen Behältnisses (17) angeordnet ist und der Schieber (28) aus einem Drehzapfen (30) besteht, dessen Enden auf parallelen Schlitten (31) geführt werden, welche die Führungsmittel (29) bilden und symmetrisch an den Seitenwänden (18) geformt sind, wobei der intermediäre Körper (34) aus einem U-förmigen Plättchen besteht, zwischen dessen seitlichen Flügeln (35) der Drehzapfen (30) angeordnet ist.
3. Das Scharnier gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Rolle (37) drehbar zwischen den seitlichen Flügeln (35) des intermediären Körpers (34) angeordnet ist und während eines Teils der relativen Drehung des ersten Arms (13) auf dem zweiten Arm (14) in Gleitkontakt mit dem spitzenförmigen Abschnitt (38) angeordnet ist, wobei die Anordnung der Rolle (37) an dem Teil des spitzenförmigen Abschnitts (38), der zum Boden des Behältnisses (17) hin gerichtet ist, welches an dem ersten Arm (13) geformt ist, der Position entspricht, in der die Tür (12) auf die Kammer des Ofens (11) hin geschlossen wird.
4. Das Scharnier gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der zweite Arm (14) aus zwei symmetrischen Platten (20) besteht, die einander entsprechend gegenüber-
- liegen und durch mindestens eine transversale Brücke (21) verbunden sind, wobei die Platten (20) in einem einzigen Stück geformt sind, welches in eine U-Form geknickt ist, um den Raum (19) zu bilden.
5. Das Scharnier gemäß einem der Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** das Verbindungsstück (32), nahe der Achse zur drehgelenkigen Anordnung an dem zweiten Arm (14), eine Verlängerungslasche (43) hat, die geeignet ist, um an ein unteres Hubbegrenzungs-Widerlager (44) für das Verbindungsstück (32) anzustoßen, wenn der erste Arm (13) in eine Position gedreht wird, die der vollständig offenen Position der Tür (12) in Bezug zur Kammer des Ofens (11) entspricht, wobei das untere Hubbegrenzungs-Widerlager (44) an dem zweiten Arm (14) in dem Raum (19) geformt ist, wenn die Lasche (43) gegen die untere Hubbegrenzung (44) anstößt, wobei der Schieber (28) an die unteren Enden der Führungsschlitze (31) anstößt.
6. Das Scharnier gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die elastischen Mittel (39) aus einer Zugfeder (40) bestehen, die an ihren Enden jeweils mit einem ersten Eingriffsabschnitt (41), der transversal an den Seitenwänden (18) des Behältnisses (17) angeordnet ist, das an dem ersten Arm (13) geformt ist, und mit einem zweiten Eingriffsabschnitt (42) starr gekoppelt ist, der an dem intermediären Körper (34) geformt ist.
7. Das Scharnier gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Drehachse des Verbindungsstücks (32) an dem zweiten Arm (14) nach oben in Bezug zu der Drehachse des ersten Arms (13) in Bezug zu dem zweiten Arm (14) beabstandet ist, wobei die gerade Linie (A), die das Rotationszentrum des Verbindungselements (32) an dem zweiten Arm (14) und das Rotationszentrum des ersten Arms (13) am zweiten Arm (14) verbindet, mit der Oberfläche zusammenfällt, die als Grenzfläche zwischen der Tür (12) und dem Ofen (11) fungiert, wenn die Tür (12) auf die Kammer des Ofens (11) hin geschlossen wird.
8. Das Scharnier gemäß Anspruch 7, **dadurch gekennzeichnet, dass** es Mittel (46, 146) zur Winkelverriegelung der Drehung des ersten Arms (13) an dem zweiten Arm (14) in einer Winkelposition umfasst, die geeignet ist, die Montage des zweiten Arms (14) an der Struktur des Ofens (11) zu ermöglichen, wobei die Winkelverriegelungsmittel (46, 146) ein Verriegelungselement (47, 147) umfassen, das ausgebildet ist, um unter Zusammendrücken, als Wirkung des Drucks des elastischen Mittels (39), zwischen einem ersten Widerlager (48, 148), welches an dem ersten Arm (13) geformt ist, und einem zwei-

ten Widerlager (49, 149) angeordnet zu werden, das innerhalb des in dem zweiten Arm (14) bereitgestellten Raums (19) liegt.

9. Das Scharnier gemäß Anspruch 8, **dadurch gekennzeichnet, dass** das Verriegelungselement (47) aus einer Scheibe besteht, die teilweise in den Schlitz (50) zum Öffnen des Raums (19), der in dem zweiten Arm (14) geformt ist, nach oben eingeführt werden kann, wobei die Scheibe aus dem Schlitz (50) entfernt werden kann und von der Struktur des Scharniers (10) gelöst ist. 5 10
10. Das Scharnier gemäß Anspruch 9, **dadurch gekennzeichnet, dass** eine untere Stütze (53) für die Scheibe an dem zweiten Arm (14) innerhalb des Raums (19) bereitgestellt ist, der in dem zweiten Arm (14) geformt ist. 15
11. Das Scharnier gemäß Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** das erste Widerlager (48) aus der Basis der Aussparung (51) besteht, die am Ende des ersten Arms (13) geformt ist, um den Austritt des vorderen Abschnitts des zweiten Arms (14) zu ermöglichen, und das zweite Widerlager (49) aus einer Lasche (52) besteht, die monolithisch mit dem zweiten Arm (14) ist und innerhalb des Raums (19) liegt. 20 25
12. Das Scharnier gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das Verriegelungselement (147) aus einem Hebel (154) besteht, der drehgelenkig an dem zweiten Arm (14) angeordnet ist und der teilweise in dem Schlitz (50) befindlich ist, zum Öffnen des Raums (19), der in dem zweiten Arm (14) geformt ist, nach oben, wobei das Ende (155) des Hebels (154), das gegenüber dem Ende zur drehgelenkigen Verbindung mit dem zweiten Arm (14) liegt, während des Verriegelungsschritts an das erste Widerlager (148) anstößt. 30 35 40
13. Das Scharnier gemäß Anspruch 12, **dadurch gekennzeichnet, dass** das Ende (155) des Hebels (154), das gegenüber dem Ende zur drehgelenkigen Verbindung mit dem zweiten Arm (14) liegt, breiter ist als der Schlitz (50). 45
14. Das Scharnier gemäß Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** das zweite Widerlager (149) aus dem Drehzapfen zur drehgelenkigen Verbindung des Hebels (154) mit dem zweiten Arm (14) besteht, während das erste Widerlager (148) aus der Basis der Aussparung (51) besteht, die am Ende des ersten Arms (13) geformt ist, um den Austritt des vorderen Abschnitts des zweiten Arms (14) zu ermöglichen. 50 55

Revendications

1. Charnière pour portes de fours, ou analogues, du type qui comprend :
 - un premier bras allongé (13), destiné à être fixé à la structure de la porte (12) du four (11) ;
 - un deuxième bras (14), qui pivote par rapport audit premier bras (13), et qui est conçu pour être fixé à la structure du four (11) ;
 - un mécanisme (16) qui est adapté pour gérer la position angulaire relative dudit premier bras (13) sur ledit deuxième bras (14) ;
 - caractérisée en ce que** ledit deuxième bras (14) comporte un espace intérieur (19) qui est ouvert vers le haut et **en ce que** ledit mécanisme (16) est constitué par ;
 - une coulisse (28) qui peut effectuer un mouvement de translation sensiblement dans la direction longitudinale dudit premier bras (13) par association avec des moyens de guidage (29) formés sur ledit premier bras (13) ;
 - une liaison (32) qui pivote par rapport audit deuxième bras (14) et à ladite coulisse (28), ladite liaison (32) étant partiellement disposée à l'intérieur dudit espace (19) formé dans ledit deuxième bras (14) ;
 - un corps intermédiaire (34), qui pivote par rapport à ladite glissière (28) sur le même axe que celui sur lequel ladite liaison (32) pivote par rapport à ladite glissière (28), ledit corps intermédiaire (34) comportant un accouplement de type came (36) avec ledit deuxième bras (14), adapté pour assurer une position d'équilibre stable dudit premier bras (13) sur ledit deuxième bras (14), qui correspond à la position dans laquelle la porte (12) est fermée sur la chambre du four, ledit accouplement de type came étant constitué par un galet (37) monté sur le corps intermédiaire (34) et disposé en contact de coulissement avec une partie en forme de point de rebroussement (38) disposée sur le bord supérieur (35) du deuxième bras (14) ;
 - des moyens élastiques (39), qui sont rigidement couplés audit premier bras (13) et qui agissent par traction sur ledit corps intermédiaire (34).
2. Charnière selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit premier bras (13) a une section transversale sensiblement en forme de C qui est adaptée de façon à former un réceptacle longitudinal (17) pour les composants dudit mécanisme (16), ledit deuxième bras (14) pivotant par rapport aux parois latérales (18) dudit réceptacle longitudinal (17), ladite coulisse (28) étant constituée par un pivot (30) dont les extrémités sont guidées sur des fentes parallèles (31), qui consti-

- tuent lesdits moyens de guidage (29) et qui sont formées de façon symétrique sur lesdites parois latérales (18), ledit corps intermédiaire (34) étant constitué par une lamelle en forme de U entre les ailes latérales (35) de laquelle est disposé ledit pivot (30) .
3. Charnière selon la revendication 2, **caractérisée en ce que** ledit galet (37) est interposé de façon à pouvoir tourner entre lesdites ailes latérales (35) dudit corps intermédiaire (34) et est disposé en contact de coulissement, durant une partie de la rotation relative dudit premier bras (13) sur ledit deuxième bras (14), avec ladite partie en forme de cuspide (38), la disposition dudit galet (37) sur la partie de ladite partie en forme de cuspide (38) qui est dirigée vers le fond dudit réceptacle (17) formé sur ledit premier bras (13) correspondant à la position dans laquelle la porte (12) est fermée sur la chambre du four (11).
 4. Charnière selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit deuxième bras (14) est constitué par deux plaques symétriques (20) qui se font mutuellement face de façon correspondante et qui sont réunies par au moins un pont transversal (21), lesdites plaques (20) étant formées d'une seule pièce qui est pliée en forme de U de façon à former ledit espace (19).
 5. Charnière selon l'une des revendications 2 à 4, **caractérisée en ce que** ladite liaison (32) comporte, à proximité de l'axe pour le pivotement dudit deuxième bras (14), une patte d'extension (43) qui est appropriée pour buter contre une butée de limite de course inférieure (44) pour ladite liaison (32) lorsque le premier bras (13) tourne dans une position qui correspond à la position complètement ouverte de la porte (12) par rapport à la chambre du four (11), ladite butée de limite de course inférieure (44) étant formée sur ledit deuxième bras (14) à l'intérieur dudit espace (19), lorsque ladite patte (43) est en butée contre ladite limite de course inférieure (44), ladite coulisse (28) butant contre les extrémités inférieures desdites fentes de guidage (31).
 6. Charnière selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits moyens élastiques (39) sont constitués par un ressort de traction (40), qui est rigidement couplé à ses extrémités, respectivement, à une première partie de prise (41) disposée transversalement aux parois latérales (18) dudit réceptacle (17) formé sur ledit premier bras (13), et à une deuxième partie de prise (42) formée sur ledit corps intermédiaire (34).
 7. Charnière selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** l'axe de pivotement de ladite liaison (32) sur ledit deuxième bras (14) est espacé vers le haut vis-à-vis de l'axe de pivotement dudit premier bras (13) par rapport audit deuxième bras (14), la ligne droite (A) qui relie le centre de rotation dudit élément de liaison (32) sur ledit deuxième bras (14) et le centre de rotation du premier bras (13) sur le deuxième bras (14) étant incidente à la surface qui joue le rôle d'interface entre la porte (12) et le four (11) lorsque ladite porte (12) est fermée sur la chambre du four (11).
 8. Charnière selon la revendication 7, **caractérisée en ce qu'elle** comprend des moyens (46, 146) pour un verrouillage angulaire de la rotation dudit premier bras (13) sur ledit deuxième bras (14) dans une position angulaire qui est appropriée pour permettre l'assemblage dudit deuxième bras (14) à la structure du four (11), lesdits moyens de verrouillage angulaire (46, 146) comprenant un élément de verrouillage (47, 147), qui est adapté de façon à être interposé sous une compression, en conséquence de la poussée desdits moyens élastiques (39), entre une première butée (48, 148), qui est formée sur ledit premier bras (13), et une deuxième butée (49, 149) qui se trouve à l'intérieur de l'espace (19) situé à l'intérieur dudit deuxième bras (14).
 9. Charnière selon la revendication 8, **caractérisée en ce que** ledit élément de verrouillage (47) est constitué par un disque qui peut être partiellement inséré dans la fente (50) pour l'ouverture vers le haut de l'espace (19) formé à l'intérieur dudit deuxième bras (14), ledit disque pouvant être retiré de ladite fente (50) et dégagé de la structure de ladite charnière (10).
 10. Charnière selon la revendication 9, **caractérisée en ce qu'un** support inférieur (53) pour ledit disque est disposé sur ledit deuxième bras (14) à l'intérieur de l'espace (19) formé à l'intérieur dudit deuxième bras (14).
 11. Charnière selon la revendication 3 ou 4, **caractérisée en ce que** ladite première butée (48) est constituée par la base de l'entaille (51) formée à l'extrémité dudit premier bras (13) afin de permettre la sortie de la partie avant dudit deuxième bras (14), et **en ce que** ladite deuxième butée (49) est constituée par une patte (52) qui est monolithique vis-à-vis dudit deuxième bras (14) et qui se trouve à l'intérieur dudit espace (19).
 12. Charnière selon la revendication 2, **caractérisée en ce que** ledit élément de verrouillage (147) est constitué par un levier (154) qui est articulé sur ledit deuxième bras (14) et qui est partiellement contenu à l'intérieur de la fente (50) pour l'ouverture vers le haut de l'espace (19) formé à l'intérieur dudit deuxième bras (14), l'extrémité (155) dudit levier (154) qui se trouve à l'opposé de l'extrémité pour le pivote-

ment par rapport au deuxième bras (14) butant, durant l'étape de verrouillage, contre ladite première butée (148).

13. Charnière selon la revendication 12, **caractérisée en ce que** ladite extrémité (155) dudit levier (154) qui se trouve à l'opposé de l'extrémité pour le pivotement par rapport audit deuxième bras (14) est plus large que la largeur de ladite fente (50).

10

14. Charnière selon la revendication 6 ou 7, **caractérisée en ce que** ladite deuxième butée (149) est constituée par le pivot pour le pivotement dudit levier (154) par rapport audit deuxième bras (14), tandis que ladite première butée (148) est constituée par la base de l'entaille (51) formée à l'extrémité du premier bras (13) afin de permettre la sortie de la partie avant du deuxième bras (14).

15

20

25

30

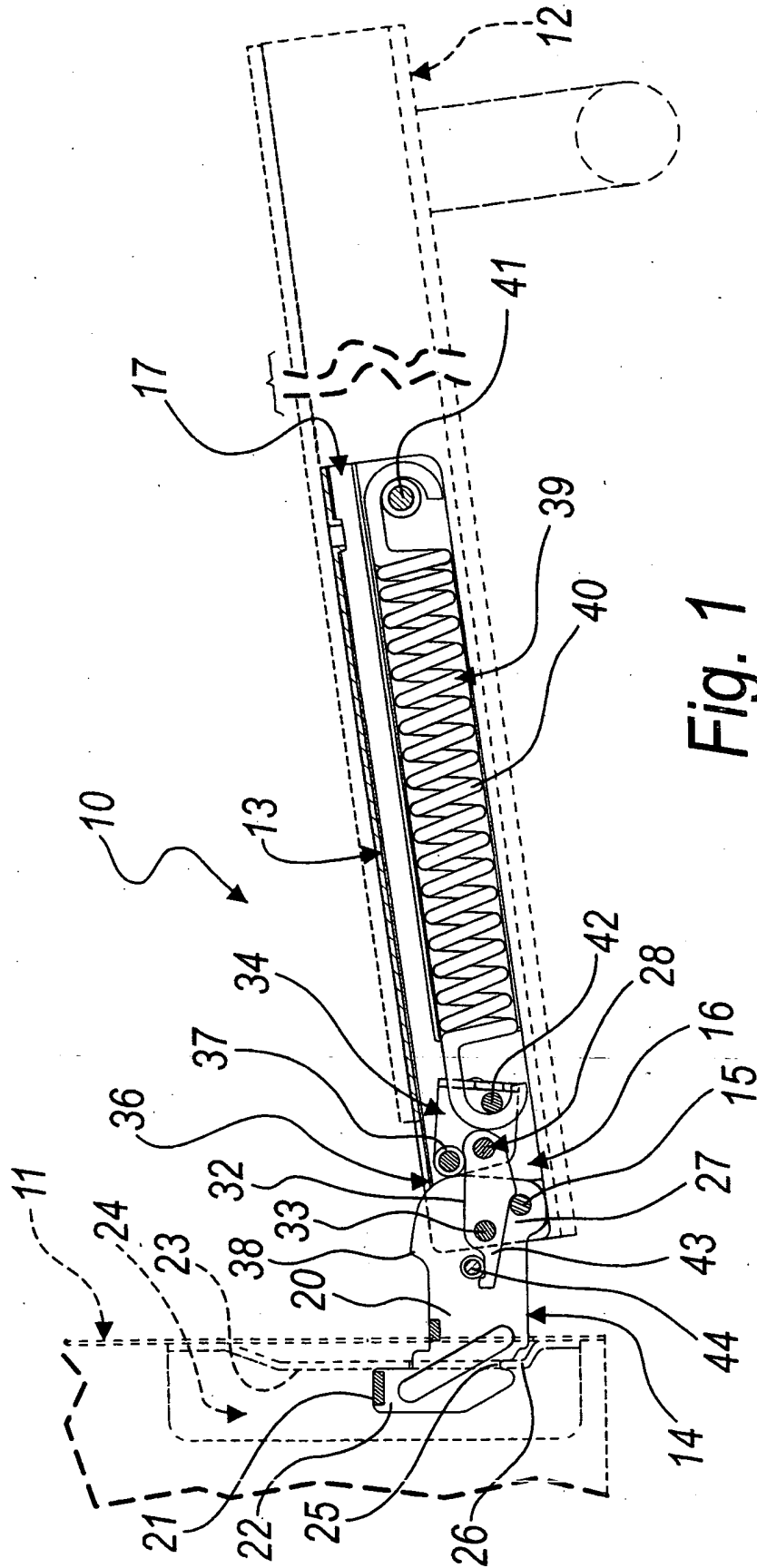
35

40

45

50

55



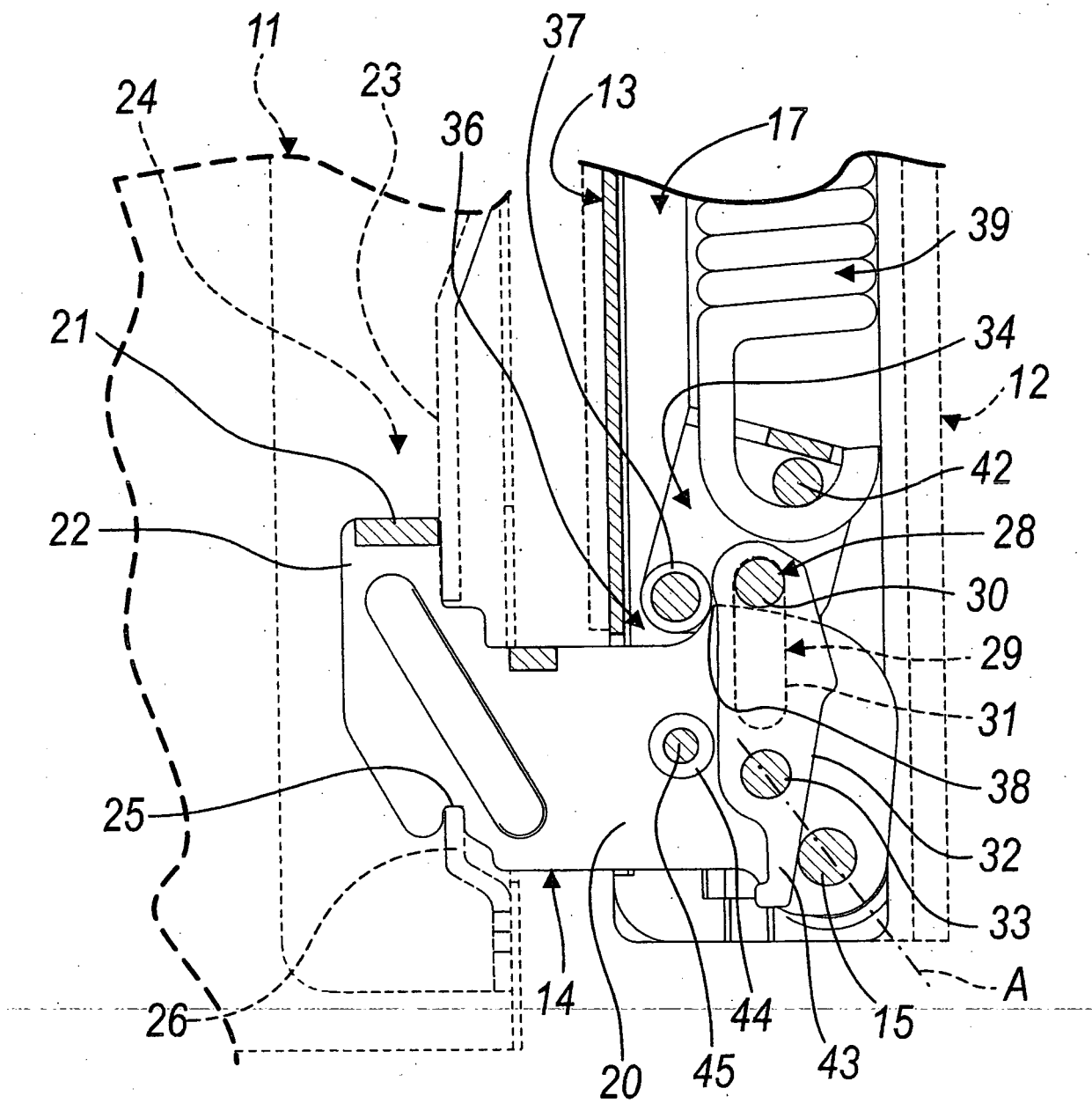


Fig. 2

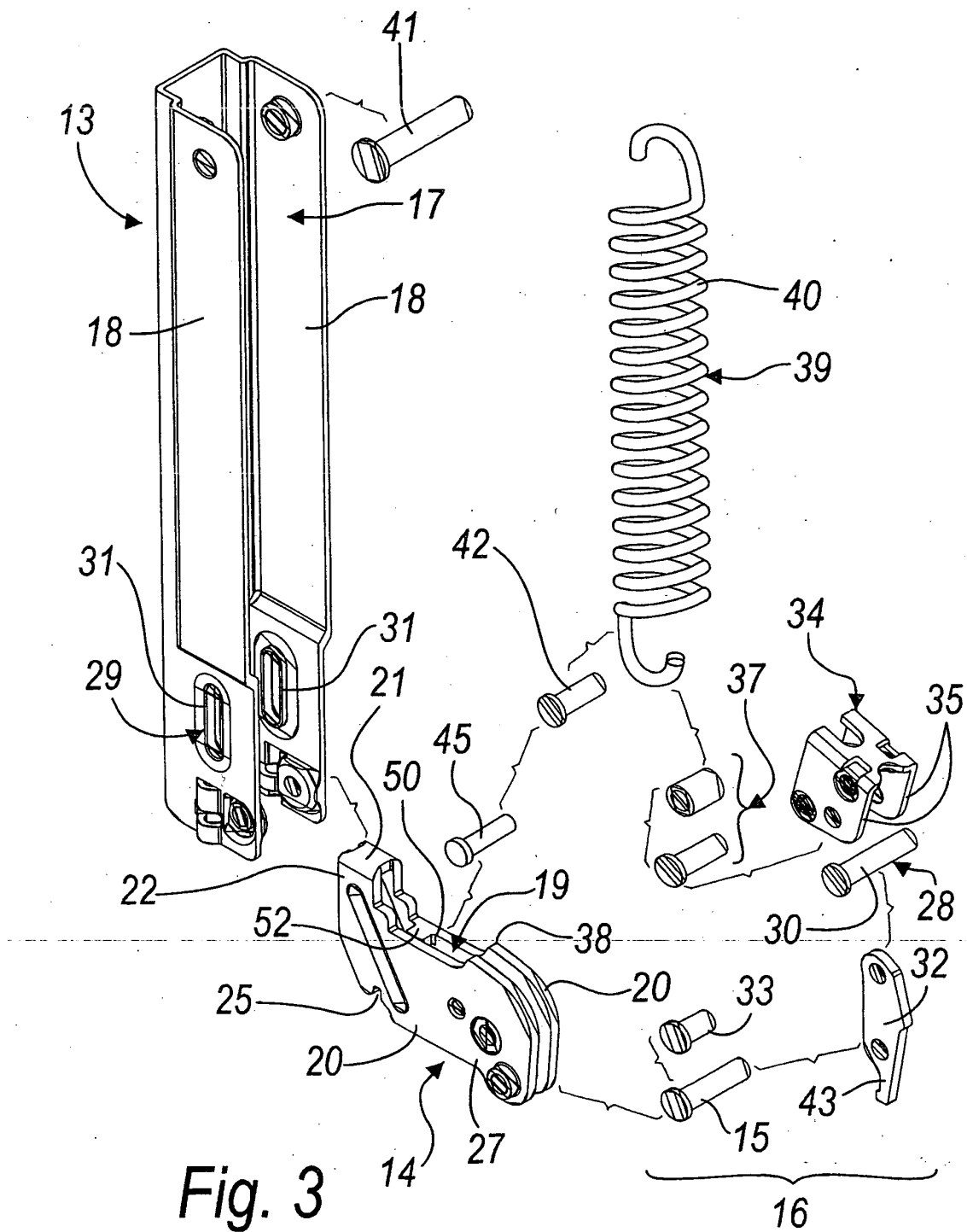
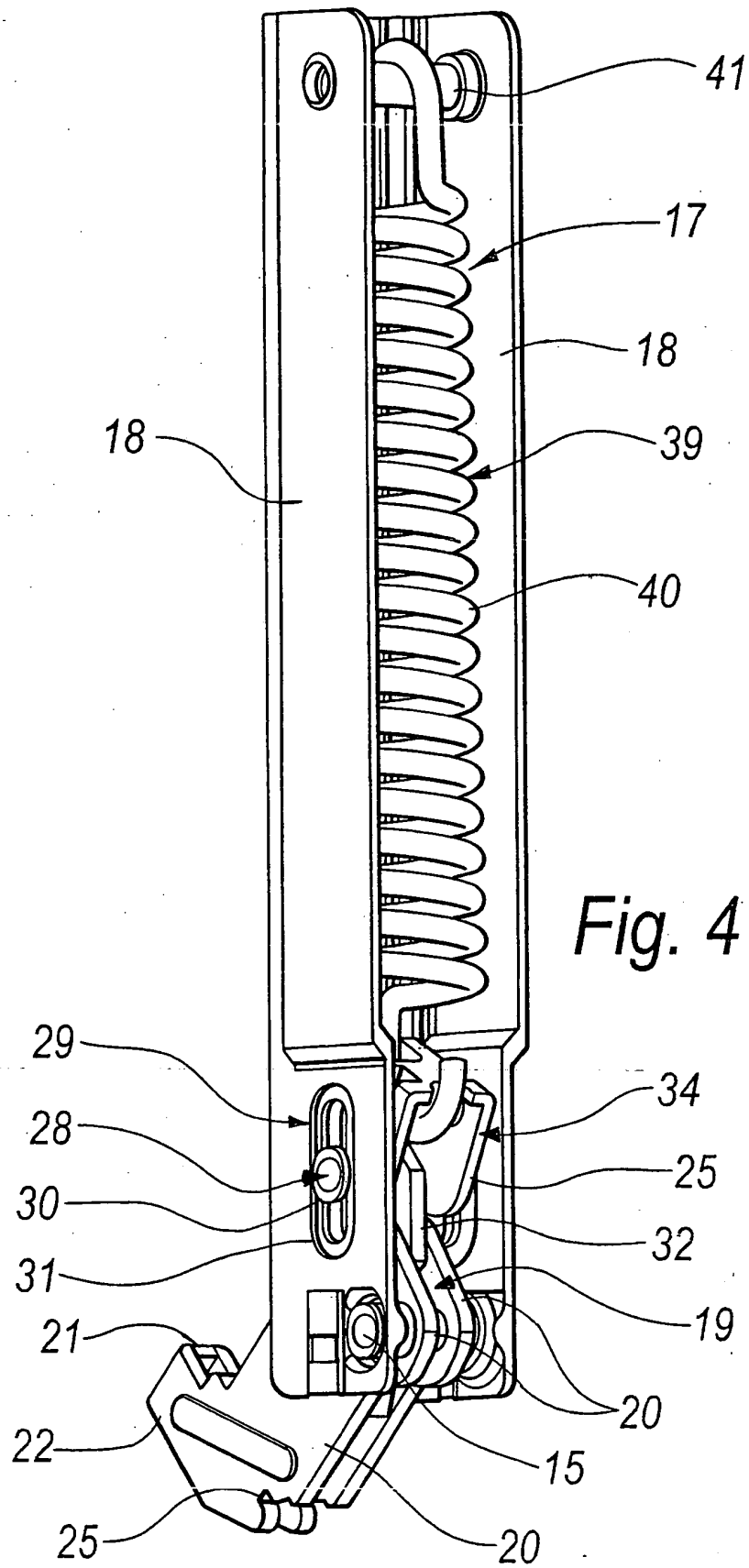


Fig. 3



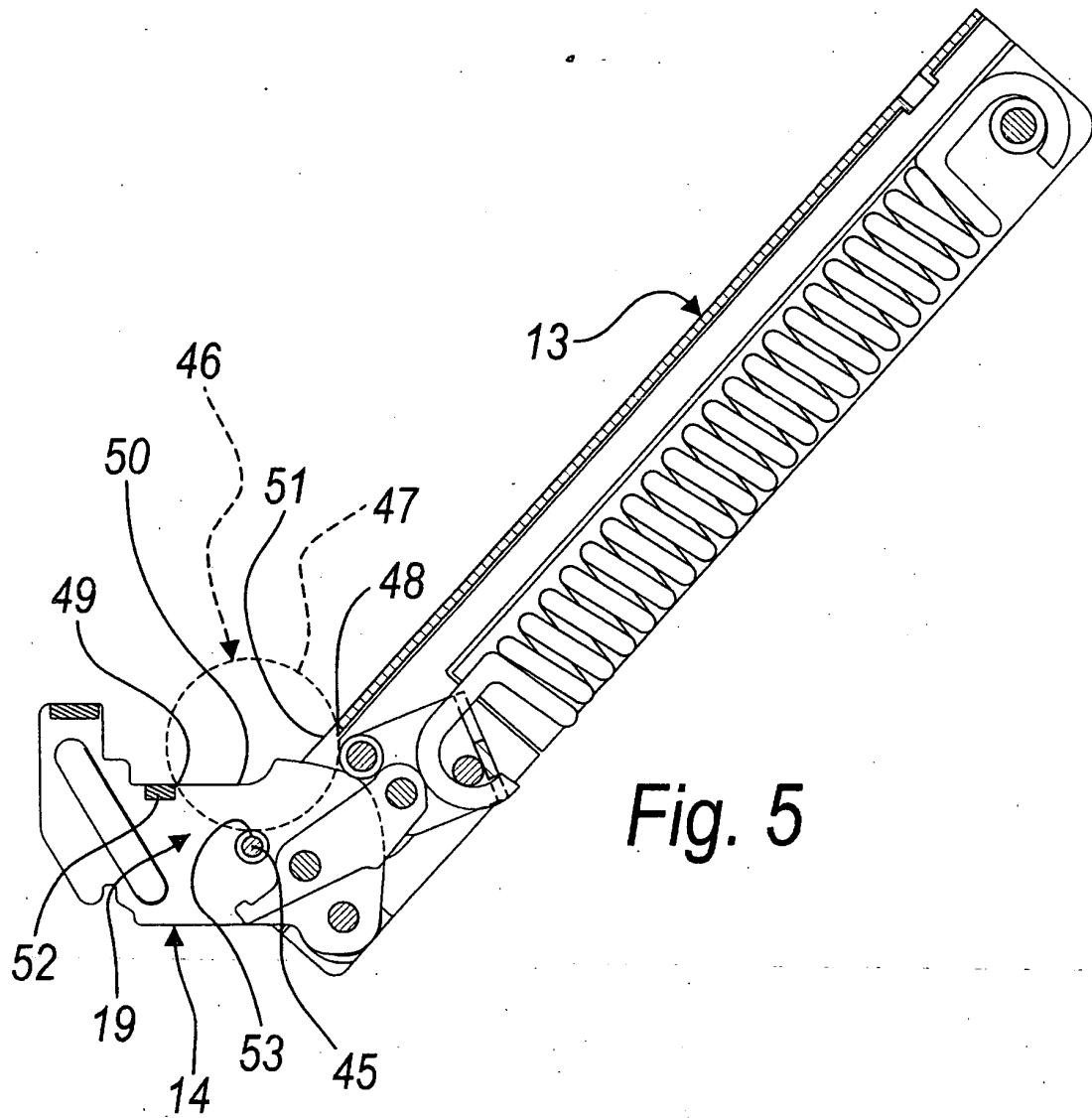
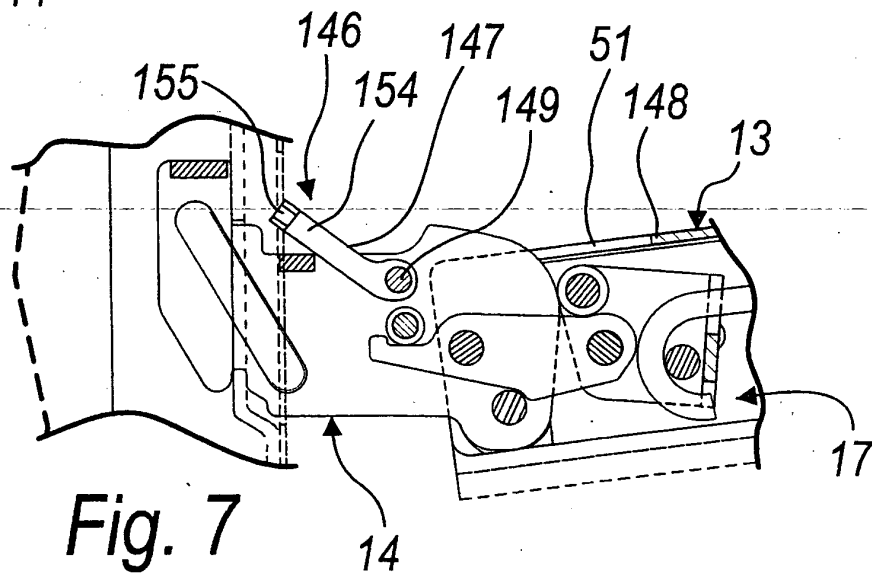
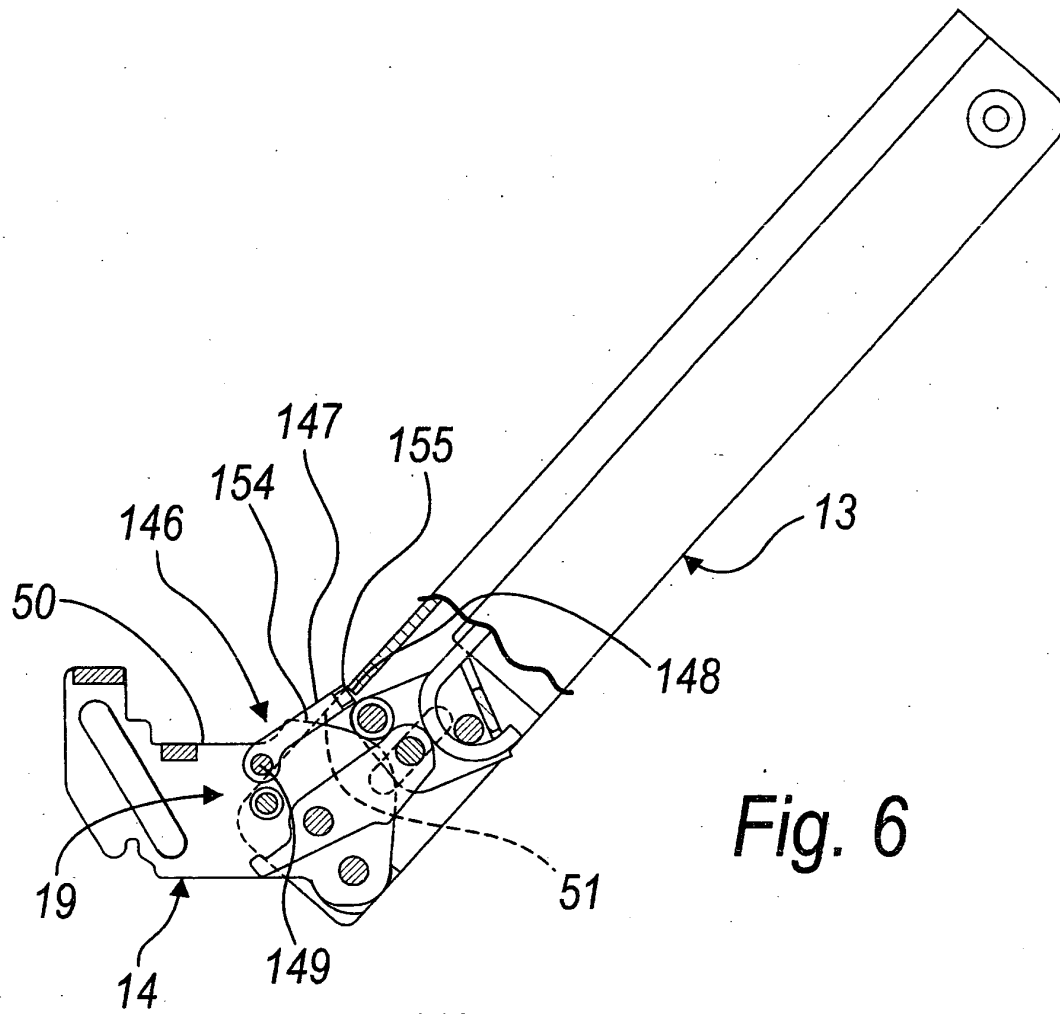


Fig. 5



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0589853 A [0014]