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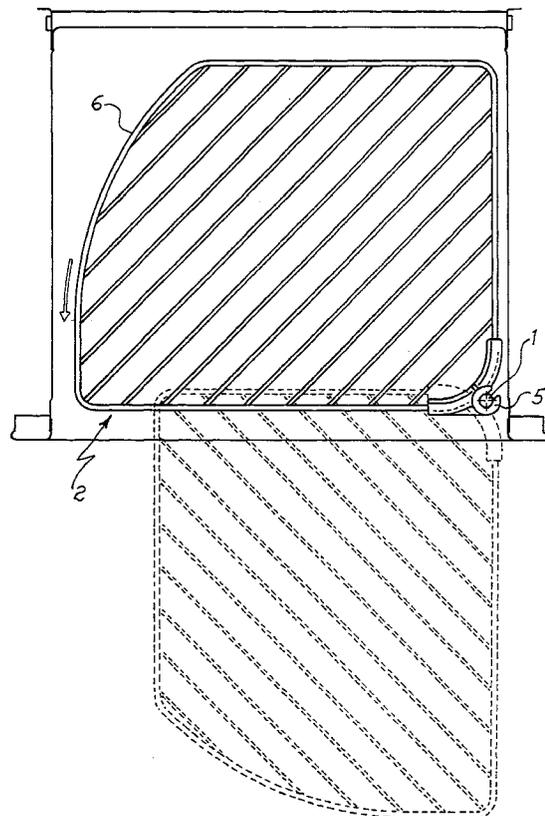
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(54) **Cooking oven with rotatable and removable shelves**

(57) A cooking oven of a domestic or professional type, comprising a cooking space having a plurality of removable shelves (2) inserted therein, further comprises at least a vertical journal (1) secured to a wall of the cooking space, each shelf (2) being provided with a connection (5) capable of allowing the coupling to said journal (1) and the rotation around it independently of the other shelves (2). Thus an absolute safety is obtained in pulling out the shelves, which always remain perfectly horizontal and can not be inadvertently removed, and it is easy to have access to any point of the shelf without having to put your hands into the oven.

Fig. 2



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Description

The present invention relates to cooking ovens for food, both for domestic and professional use, and in particular to an oven provided with shelves rotatable around a vertical journal and removable therefrom.

Conventional ovens are known to comprise a plurality of removable shelves which slide horizontally along guides arranged on the side walls. For the sake of simplicity and economy, such guides may be made by shaping suitable rises on the sheet forming the side wall. As an alternative, the guides may consist of a pair of horizontal bars joined by end vertical bars so as to form a separate frame mounted inside the oven cavity. The shelves generally consist of pans or are grid-shaped, i.e. with a perimetral frame having welded thereon transversal bars, and they are completely removable from the oven, i.e. an end-stroke blocking device is not provided.

The use of this type of conventional oven has various drawbacks due to the aforementioned structure of the shelves and to their type of coupling with the guides.

First of all, there is a safety problem due to the fact that an inadvertent complete removal of the shelf is possible, which shelf can fall to the ground and/or on the user, together with the cooking container placed on the shelf. It is also possible that, even without reaching a complete removal, when the shelf is pulled out for the most of its depth, it tilts downwards due to the weight of the cooking container and to the clearance between the shelf and the guides. In this case the container can slide down the shelf and fall to the ground and/or on the user. Therefore it is clear that you have to be very careful when pulling out the shelf from its guides.

A second kind of problem, related to the previous one, is the difficulty of a complete exploitation of the shelf surface. In fact, if the shelf is pulled out for not more than a half of its depth in order to avoid fall risks, the access to the rear area of the shelf involves the introduction of the hands inside the heated oven and/or the use of very long kitchen utensils.

The object of the present invention is thus to provide a cooking oven overcoming the aforementioned pull-backs.

This object is achieved by means of a cooking oven having the characteristics specified in claim 1.

A first main advantage of the oven according to the present invention is the absolute safety in pulling out the shelves, which always remain perfectly horizontal and can not be inadvertently removed.

A second advantage is the easy access to any point of the shelf, without having to put one's hands into the oven, thanks to the possibility of completely pulling out the shelves.

A third advantage is the flexibility of use of said oven, allowing to use only rotatable shelves, or only the conventional slideable shelves, or a combination of rotatable and slideable shelves.

A further advantage of the rotatable shelves is the absolute freedom in the shape of the shelves and of the cross-section of the peripheral frame. In fact, since it is sufficient that the shelf is provided at one corner with the connection to the journal, the rest of the structure may be freely adapted to specific production requirements.

These and other advantages and features of the cooking oven according to the present invention will be evident to those skilled in the art from the following detailed description of some embodiments thereof, with reference to the attached drawings, wherein:

Figure 1 is a schematic front view of a first embodiment of an oven comprising four rotatable shelves; Figure 2 is a schematic plan view of the aforementioned oven, wherein the rotation of the shelves is represented;

Figure 3 is an enlarged detail of the connection of a shelf of Figure 2, further showing a vertical section of the connection;

Figure 4 is a schematic front view representing the coupling of the connection of Figure 3 to the journal;

Figure 5 is a schematic front view of a second embodiment of an oven comprising four rotatable shelves;

Figure 6 is an enlarged detail of the connection of a shelf of Figure 5, also showing a vertical cross-section of the connection;

Figure 7 is a schematic front view showing the coupling of the connection of Fig. 6 to the journal;

Figure 8 is a schematic front view of a characterizing member of a third embodiment, similar to the preceding one; and

Figure 9 is a schematic partial plan view of the member of Figure 8, mounted inside the oven.

Referring to Figures 1 and 2, there is seen that a cooking oven according to the present invention comprises a vertical journal 1 arranged in the front right corner of the oven (i.e. near the door) and secured between the bottom and the ceiling of the cooking space. This journal 1 has coupled thereon a plurality of horizontal shelves 2, in particular four in the illustrated example, the uppermost shelf comprising a dripping-pan 3 integral with the frame instead of the conventional bars, the lowermost shelf being instead provided with lower books 4 so as to have inserted therein a removable dripping-pan 3', and the other two shelves being conventional grids.

Each shelf 2 is coupled to journal 1 through an identical connection 5, described in detail further on, and in a plan view (Figure 2) has a shape matching with the necessary clearance the rectangular plan of the oven except for corner 6 opposite to connection 5. In fact, said corner 6 must be rounded so that no point of shelf 2 lies at a distance from the rotation axis greater than the distance between said axis and the side wall opposite thereto, the left one in this case. Thus shelf 2 may be

rotated through 90° in a pulled-out position, as shown in dotted lines in Figure 2.

A further advantage of this type of shelf is its very silent extraction, unlike the conventional metal grids which frictionally slide over metal guides.

Connection 5 will be hereinafter described in detail with reference to Figure 3. This figure clearly shows that connection 5 consists of a cylindrical body 7 with a C-shaped cross-section having an inner diameter equal to the outer diameter of journal 1 (obviously with the adequate tolerances). The cross-sectional view along line A-A shows that said body 7 has, in the lower portion, a radial projection 8 along the inner perimeter which reduces the inner diameter thereof for a determined length. Body 7 further has, at its upper end, a pair of opposite lugs 9, which cause the same diameter reduction of projection 8 but extend only along the mouth of the C-shaped section, i.e. outwardly with respect to the inner diameter along which projection 8 extends.

Figure 4 shows how each shelf 2 may be rotated or removed independently of the other shelves. At the height where each shelf 2 has to be coupled, journal 1 has an upper sinking groove 10 and a lower sinking groove 11 having a diameter equal to the inner diameter of projection 8. The distance between the lower abutment of groove 10 and the upper abutment of groove 11 is greater than the distance between projection 8 and lugs 9, and the height of grooves 10 and 11 is greater than the height of projection 8 and lugs 9, respectively. Thus connection 5 can be inserted on journal 1 at the level of such grooves 10 and 11 (view on the left).

The height of lower groove 11 is such that, when projection 8 abuts on the lower abutment of such a groove, the upper end of connection 5 is flush with the lower abutment of upper groove 10 (view on the right). In such a position, kept by shelf 2 due to the gravity, connection 5 is free to rotate around journal 1 but can not be removed therefrom thanks to lugs 9 lying at the level of the outer diameter of journal 1 and no longer at the level of groove 10. The shelf uncoupling is obviously performed by a movement opposite to the coupling.

Journal 1 may obviously be arranged either on the left or the right and it is preferably removably coupled in the cooking space by any known device, e.g. through a bayonet connection. The removability of journal 1, besides making the oven cleaning easier, allows to use the conventional slideable shelves instead of the rotatable ones, by inserting them in the usual side guides which for simplicity's sake are not represented in Figures 1 and 2.

It should be noted that journal 1 may be provided shorter than the height of the cooking space and coupled only to the bottom or the ceiling. It is thus possible to combine one or more slideable shelves with one or more rotatable shelves. It is also possible to combine two removable journals 1 having an overall length not greater than the height of the cooking space, e.g. a first journal on the bottom light and a second journal on the

ceiling left. Thus some shelves will be pulled out leftwards and the others rightwards, and furthermore it is possible to choose whether to keep the rotatable shelves above and the slideable ones below or vice versa, depending upon the removed journal.

Referring to Figures 5-7, a second embodiment of the present Oven is illustrated, which differs from the previous one in that each shelf 2 is coupled to a respective journal 1' secured to a side wall, instead of having a journal 1 coupled to the bottom and/or to the ceiling of the cooking space and carrying a plurality of shelves 2. Connections 5' as well are slightly different from the connections 5 illustrated above, as it is clear from the plan and cross-sectional views of Figure 6.

In particular, the cross-sectional view along line B-B shows that the lower portion of cylindrical body 7 is left substantially unchanged, with the radial projection 8, whereas lugs 9 of connection 5 are joined together so as to form an upper ring 9' having an inner diameter equal to the diameter of projection 8. Other different details are the orientation of the mouth of body 7, rotated 90° clockwise with respect to Figure 3, and the shape of the coupling flange of connection 5' on shelf 2. It should be noted that such modifications are intended only to illustrate possible different embodiments, since connections 5 of the first embodiment could be used also in this case with single short journals 1'.

Also the coupling of connection 5' to journal 1', illustrated in Figure 7, is quite similar to the coupling of connection 5 of Figure 4. Each journal 1' has a sinking upper section 10' and a lower groove 11, both having a diameter equal to the inner diameter of projection 8 (with the adequate tolerances). The distance between the top of section 10' (i.e. of journal 1') and the upper abutment of groove 11 is greater than the distance between projection 8 and ring 9', and the height of groove 11 is greater than the height of projection 8. Thus it is possible to insert connection 5' on journal 1', as illustrated in the upper view of Figure 7.

The height of lower groove 11 is such that, when projection 8 abuts on the lower abutment of said groove, the lower end of ring 9' abuts on the abutment of the sinking section 10' (lower view). In such a position, kept by shelf 2 due to the gravity, connection 5' is free to rotate around journal 1' but can not be removed therefrom thanks to ring 9' inserted on section 10'. The shelf uncoupling is obviously performed by a movement opposite to the coupling.

The upper view of Figure 7 further shows (in dotted lines) a bolt 12 horizontally protruding from the wall of the cooking space and having screwed thereon journal 1'. Thus each journal 1' may be selectively removed from the oven in order to use in the same position a conventional slideable shelf to be inserted in corresponding guides 13 arranged behind journals 1' (Figure 5).

Obviously, in this case as well it is possible to arrange some journals 1' on the right side wall and others on the left wall, so as to have some shelves rotating

clockwise and others counter-clockwise. It is also possible to combine one or more single journals 1' with a "multiple" journal 1 carrying a plurality of shelves 2.

Figures 8 and 9 illustrate a third embodiment which differs from the previous one for the arrangement and the securing method of journals 1' in the cooking space.

As shown in the front view of Figure 8, journals 1' (only one being shown in the figure) are secured on a vertical elongated plate 14 having a hole 15 at mid-height. Said plate 14 has further coupled thereon the front ends of guides 13, each being formed by a pair of parallel horizontal bars which have their rear ends joined by a vertical bar 16. Each journal 1' is secured on plate 14 so as to lie within the height "d" between the upper abutment of a guide 13 and the lower abutment of the overlying guide 13. Thus the slideable shelves can be inserted into guides 13 without having to remove journals 1', which in this case are three and not four as in the previous embodiment.

In order to fasten the member represented in Figure 8 inside the cooking space, as shown in Figure 9, hole 1.5 and bottom and top bars 13a of guides 13 are used. The rear ends of said bars 13a extend beyond the vertical bar 16 and are introduced into suitable holes provided into the rear wall 17 of the cooking space. The fastening of the member in such a position is performed by a bolt 12' (in dotted lines), which is introduced into hole 15 and blocks plate 14 through a ring nut.

This mounting solution has the advantage of allowing the application of the rotatable shelves as post-sale accessories on ovens already in use. In fact, it is sufficient to replace the conventional guide-carrier plate by this guide-carrier plate 14 provided also with journals 1'.

Furthermore, the aforementioned arrangement of journals 1' allows to keep in the oven at the same time all the rotatable and slideable shelves, since they do not interfere with one another. Such an arrangement is obviously possible in the second embodiment as well, each journal 1' being screwed on a respective bolt 12 arranged at a suitable height for preventing interferences with guides 13.

Thus, it is clear that the embodiments of the oven according to the herein described and illustrated invention are just examples liable to various modifications. In particular, shelves 2 may be freely changed in their structure, number and shape, the latter anyhow complying with the aforementioned rotation constraint. Likewise, connections 5, 5' and the relating journals 1, 1' (as well as their mounting means 12, 12') may be otherwise produced as long as they allow the independent rotation and removal of each shelf. Furthermore, shelves 2 may be provided with connections 5, 5' made so as to allow the use of shelves 2 both as slideable shelves on guides 13 and as rotatable shelves on journals 1, 1'.

Claims

1. A cooking oven of a domestic or professional type, comprising a cooking space and a plurality of removable shelves (2) inserted therein, characterized in that it comprises one or more vertical journals (1, 1') secured to one or more walls of the cooking space, one or more shelves (2) being provided with a connection (5, 5') capable of allowing the coupling to said journals (1, 1') and the rotation around them independently of the other shelves (2).
2. An oven according to claim 1, characterized in that said one or more vertical journals (1') are secured to a side wall of the cooking space through a plate (14) provided with at least a hole (15) for the blocking by a mounting means (12') arranged on said wall, said plate (14) further carrying a plurality of guides (13) for slideable shelves, at least one of said guides being engaged in a seat provided in the rear wall (17) of the cooking space.
3. An oven according to claim 1, characterized in that said one or more vertical journals (1') are secured, preferably in a removable way, on either side wall of the cooking space, each through a corresponding mounting member (12) arranged on the side wall.
4. An oven according to one of the claims 1 to 3, characterized in that said one or more vertical journals (1') are sized and secured in the cooking space in an intermediate position between the guides (13) for slideable shelves so as to allow the insertion of slideable shelves on said guides (13).
5. An oven according to one of the claims 1 to 4, characterized in that the connection (5') of the shelves (2) consists of a cylindrical body (7) with a C-shaped cross-section having an inner diameter equal to the outer diameter of the journal (1'), said cylindrical body (7) having in its lower portion a radial projection (8) along the inner perimeter and at its upper portion a ring (9') having the same inner diameter as said projection (8), the journal (1') having an upper sinking section (10') and a lower groove (11), both having a diameter equal to the inner diameter of the projection (8) and a height and mutual distance sufficient to allow the insertion of said ring (9') and of the projection (8) respectively above said sinking section (10') and at the level of said groove (11), the height of the lower groove (11) being such that, when the projection (8) abuts on the lower abutment of said groove (11), the lower edge of the ring (9') lies below the top of the sinking section (10').
6. An oven according to claim 1, characterized in that it comprises one or more journals (1) coupled to the ceiling and/or to the bottom of the cooking space,

preferably in a removable way, and capable of carrying one or more rotatable shelves (2).

- 7. An oven according to claim 6, characterized in that the connection (5) of the shelves (2) consists of a cylindrical body (7) with a C-shaped cross-section having an inner diameter equal to the outer diameter of the journal (1'), said cylindrical body (7) having in its lower portion a radial projection (8) along the inner perimeter and at its upper portion a pair of opposite lugs (9) causing the same diameter reduction as said projection (8) but extending only outwardly with respect to the inner diameter along which the projection (8) extends, the journal (1) having at least a pair of sinking grooves formed by an upper groove (10) and a lower groove (11), both having a diameter equal to the inner diameter of the projection (8), as well as a height and mutual distance sufficient to allow the insertion of the lugs (9) and of the projection (8) respectively at the level of said upper (10) and lower (11) grooves, the height of the lower groove (11) being such that when the projection (8) abuts on the lower abutment of said groove (11), the lower edge of the lugs (9) lies below the lower abutment of the upper groove (10).

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Fig. 1

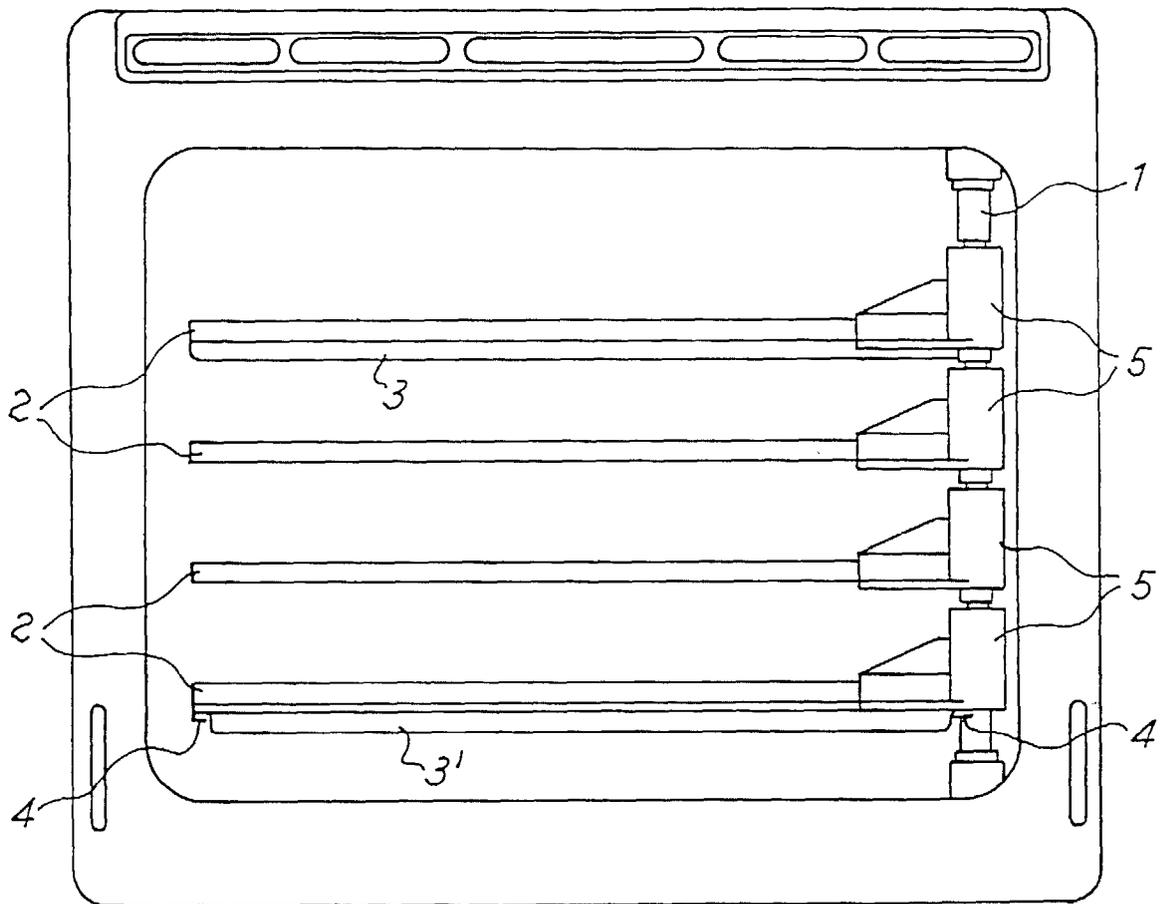


Fig. 2

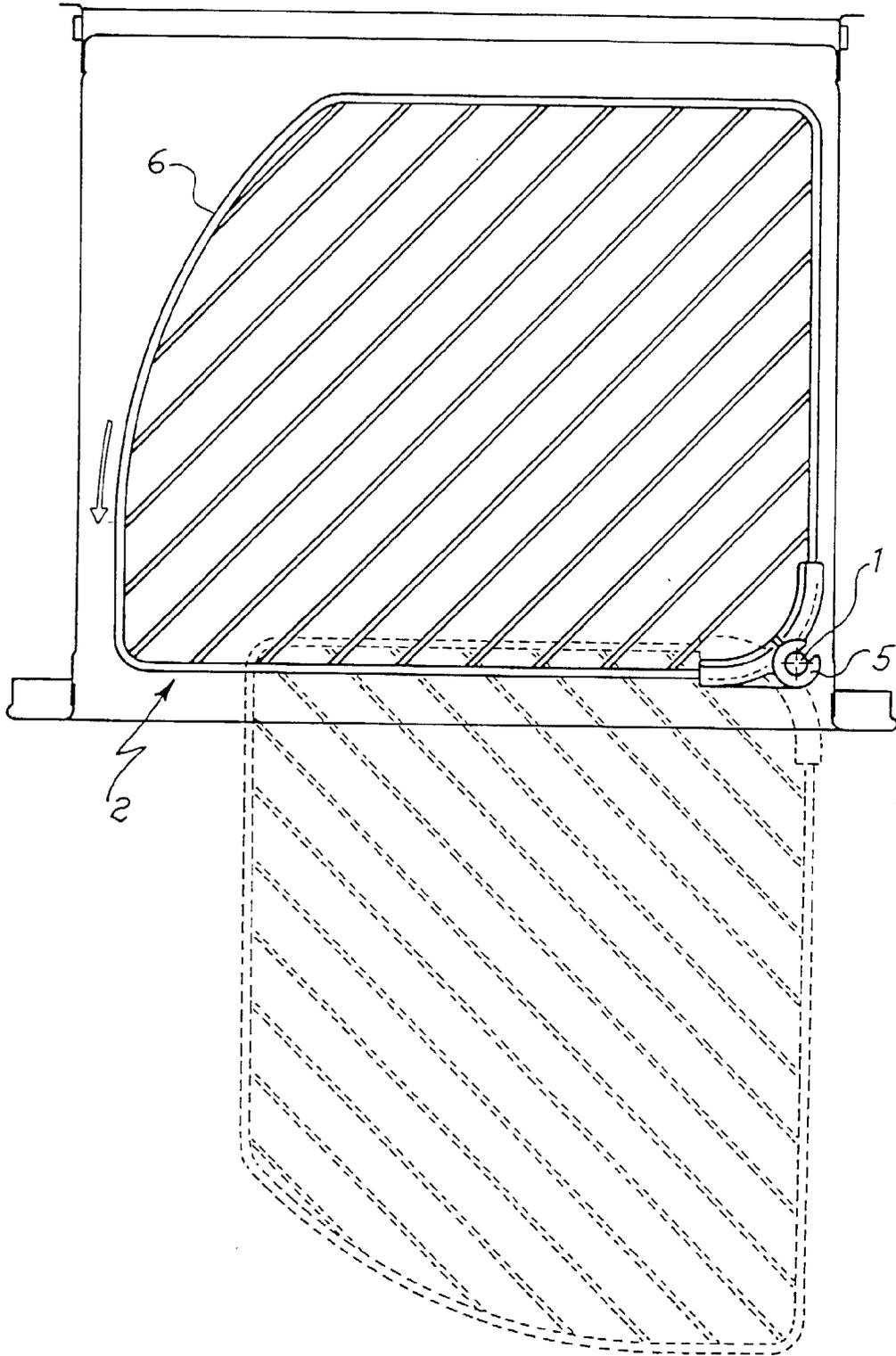


Fig. 3

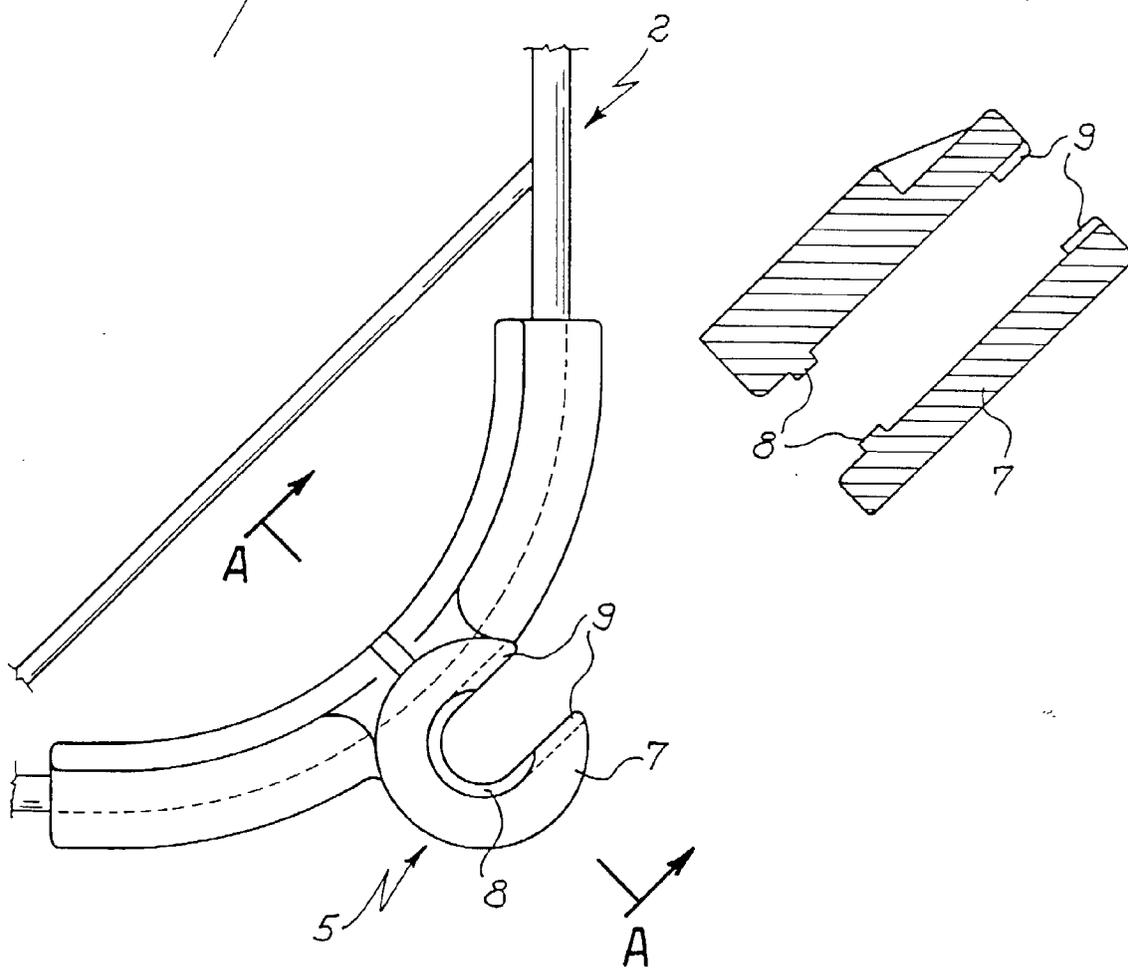


Fig. 4

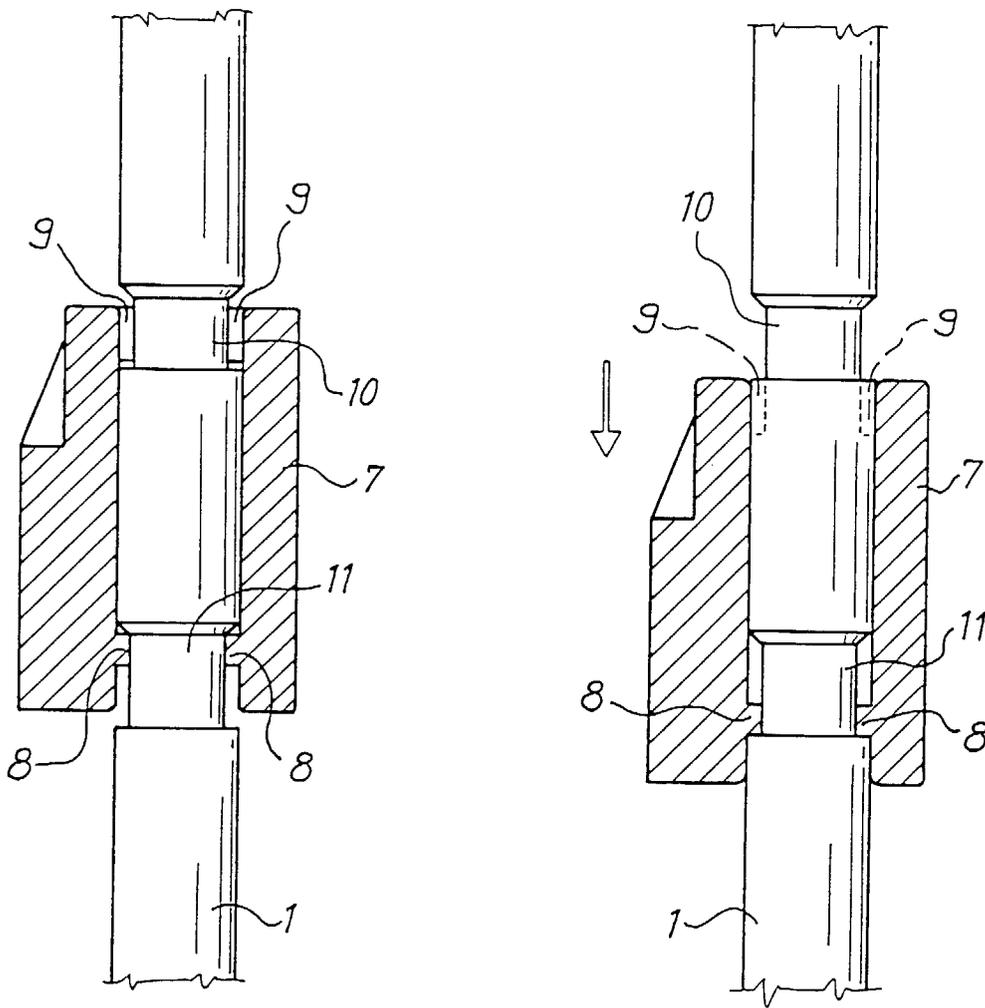
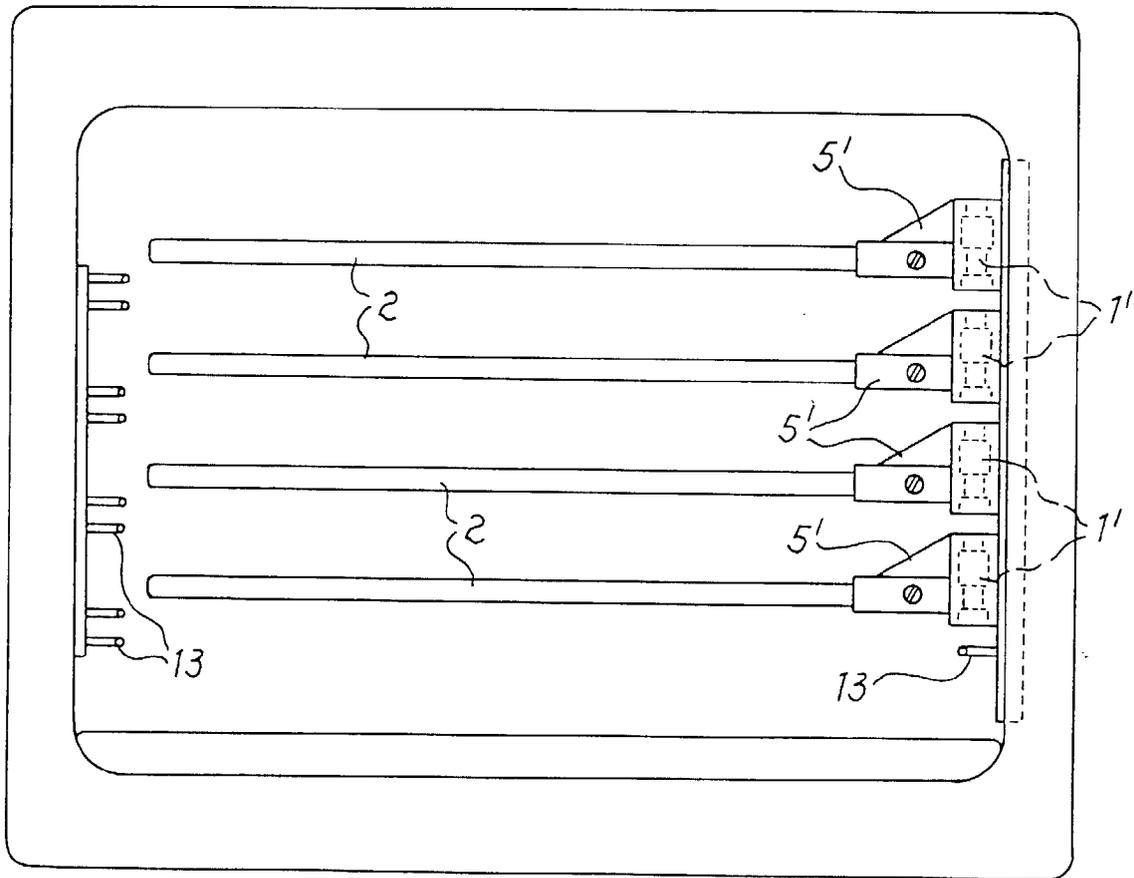
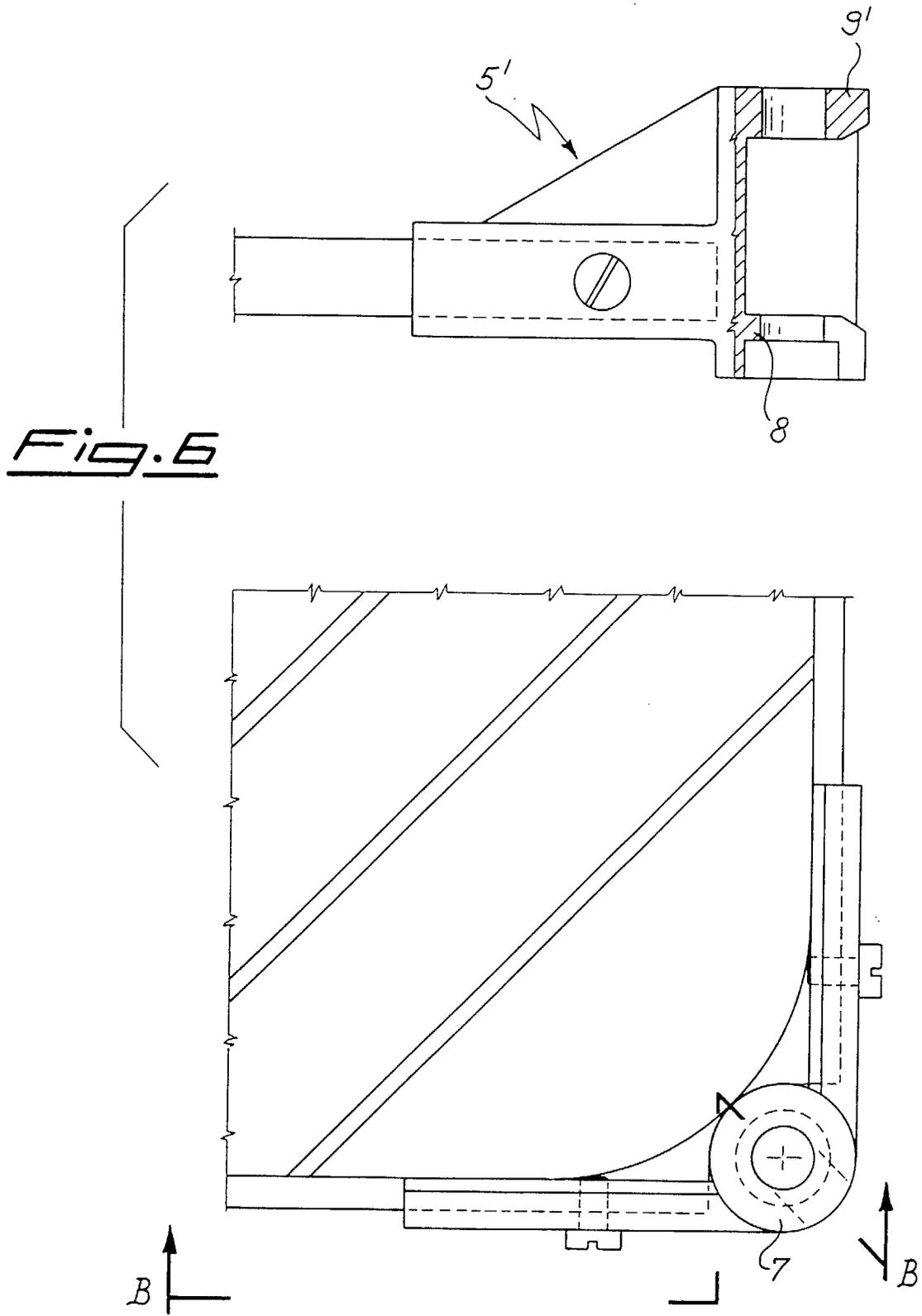


Fig. 5





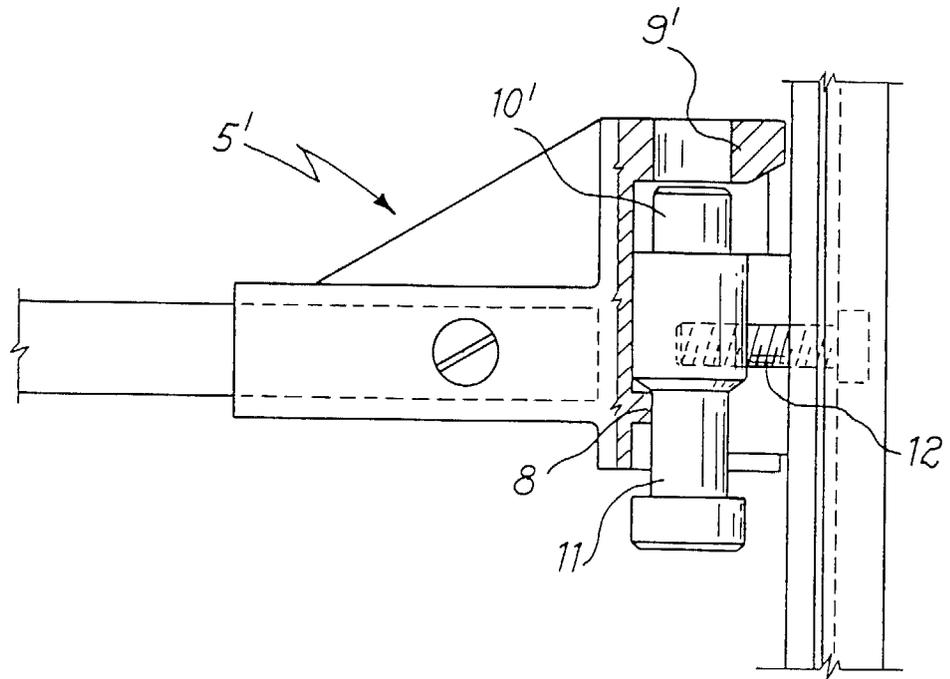


Fig. 7

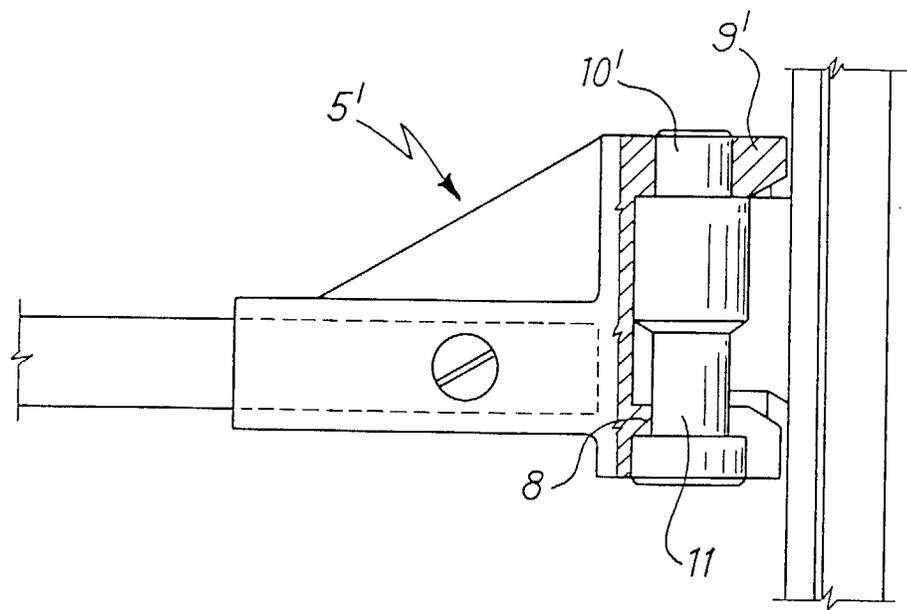


Fig. 8

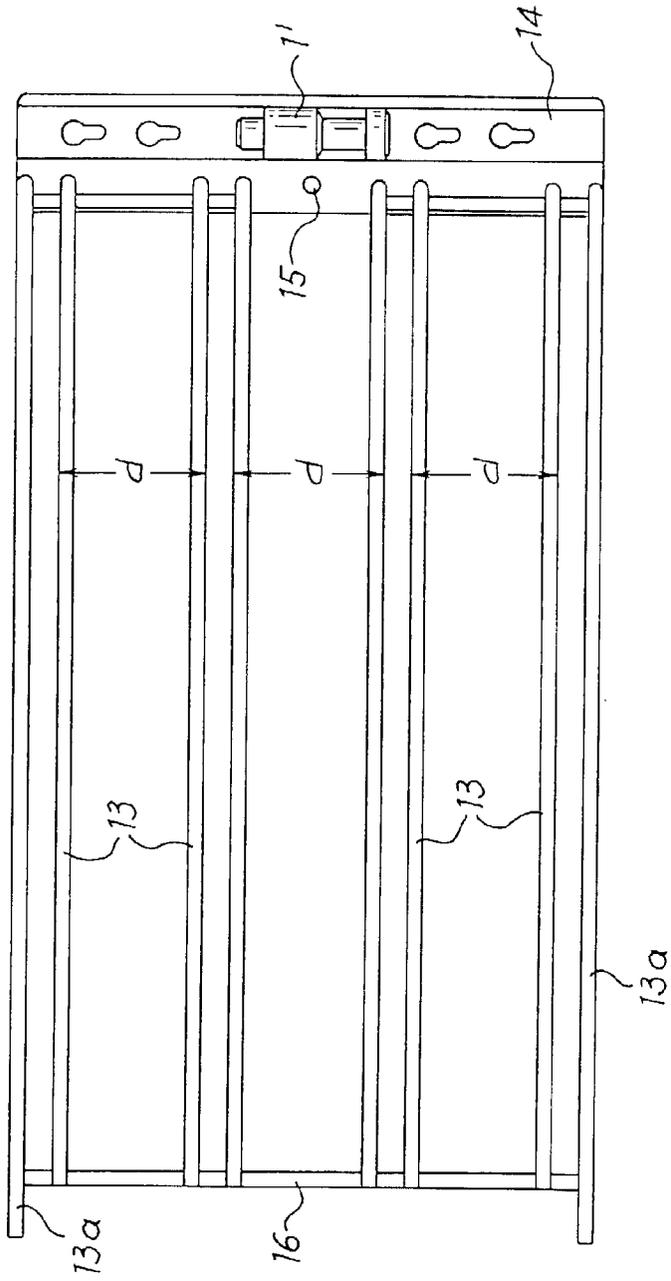
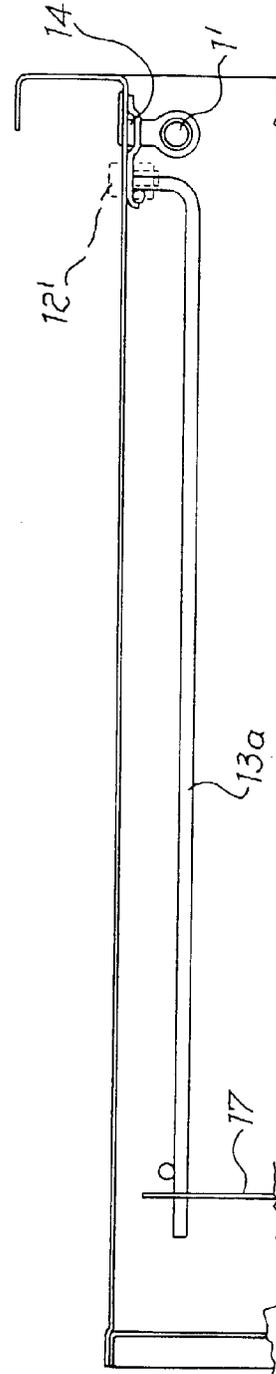


Fig. 9





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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 98830123.0
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	DE 4236740 A1 (BAUKNECHT HAUSGERÄTE GMBH) 05 May 1994 (05.05.94), fig. 1,2. -----	1	F 24 C 15/16
			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			F 24 C
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 08-06-1998	Examiner HOLZWEBER
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