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⑳ Applicant: METALTECH V.O.F.

Middenweg 143D
NL-1394 AH Nederhorst den Berg(NL)

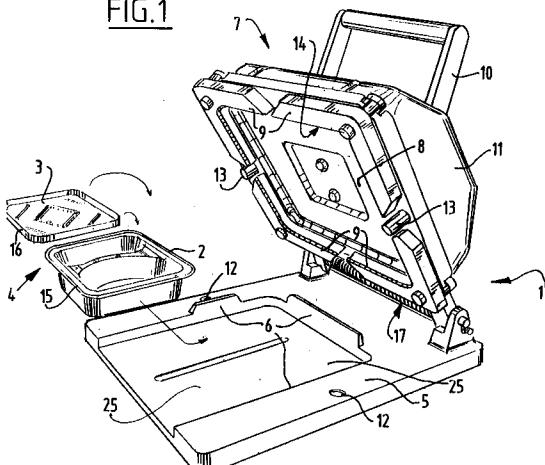
㉑ Inventor: De Rijk, Robert
Stichts End 29
NL-1244 PK Ankeveen(NL)

㉒ Representative: Hoijtink, Reinoud
OCTROOIBUREAU ARNOLD & SIEDSMA
Sweelinckplein 1
NL-2517 GK Den Haag(NL)

㉓ Method and apparatus for closing a packing.

㉔ The invention relates to a method for closing a packing (4) consisting of two parts (2,3) by folding an edge (16) of the one packing part (3) in a continuous movement round a flange (15) of the other packing part (2) and pressing together the flange (15) and the edge (16). The invention further relates to an apparatus (1) for performing this method having a folding edge (14) divided into segments (9), wherein the segments (9) are movable in radial direction parallel to a pressure surface (8) of the closing apparatus (1) to a first closing position in which the flange (15) and the edge (16) are folded together and are movable therefrom transversely of the pressure surface (8) to a second closing position in which the flange (15) and the edge (16) are pressed together.

FIG.1



The present invention relates to a method for closing a packing consisting of two parts, by placing the parts one on the other, and subsequently folding a downward hanging edge of the one part round a protruding flange of the other part, by applying to the part of the edge lying under the flange first compressive forces directed towards each other, the lines of action of which are directed substantially parallel to the main plane of the flange. Such a method is known and is frequently employed for example for closing heat-retaining packagings for meals.

The invention has for its object to provide a method as described above, wherewith a packing can be closed more rapidly and simply than previously. According to the invention this is achieved in that at least two pairs of compressive forces are applied whereof the lines of action are in different directions.

A very good closing of the packing is achieved by applying to the folded edge part and the flange second compressive forces directed toward each other, the lines of action of which are directed substantially transversely of the main plane of the flange.

When the second compressive forces are applied while maintaining the first compressive forces the packing is closed quickly and efficiently.

The invention further relates to an apparatus for closing a packing consisting of two parts, including means for holding the packing in a closing position and means for folding a downward hanging edge of the one packing part round a protruding flange of the other part of the packing, which folding means take the form of a ring, the peripheral form of which corresponds with that of the packing.

Such apparatus are known and are commercially available for instance under the name "Moulinette". In the known apparatus the folding ring is moved by means of an eccentric drive such that it successively comes into engagement with adjacent sides of the packing. The downward hanging edge is thus folded running round the protruding flange. However, this apparatus has the drawback that the packing parts can slide relative to each other during closing, whereby a faulty closure occurs. Closing a packing using the known apparatus moreover takes a relatively long time, while in addition it is not simple to ascertain when the folding ring has been in engagement with all sides of the packing.

The invention therefore has the further object of providing a closing apparatus of the above described type wherein these drawbacks do not occur. This is achieved according to the invention in that the ring consists of a number of segments and the segments are movable in radial direction substantially parallel to a compressive surface between

a release position, in which the dimensions in peripheral direction of the ring are greater than those of the packing flange, and a first closing position in which the dimensions in peripheral direction of the ring are smaller than those of the flange.

In order to realize an optimal closing action of the apparatus the segments can be movable from the first closing position substantially transversely of the compressive surface embodied as profiled pressure plate to a second closing position in which the flange and the folded edge are pressed together between the ring segments and the pressure plate.

A bead which closes off the packing very well is obtained when each ring segment has a nose portion which co-acts in the second closing position with a rib arranged running round the pressure plate for pressing together the flange and the edge to form a bead.

When each ring segment is slidably mounted on the pressure plate, a spacer member is arranged between each segment and the pressure plate and the pressure plate has a number of spacer member-receiving spaces which are arranged such that in the first closing position each spacer member is in register with a receiving space and is received therein during a movement to the second closing position, the compressive forces can be applied to the packing while maintaining the folding forces.

In order to simplify introduction or removal of the packing into or out of the closing apparatus, the apparatus can comprise a base carrying the holding means and a closing part arranged on the base and carrying the pressure plate, wherein the closing part can pivot between an opened position for introducing or removing the packing and a closed position.

The closing apparatus preferably has a recess arranged in the base for receiving the packing and stops protruding out of the pressure plate, wherein the depth of the recess and the height of the stops are geared to one another such that in the closed position of the closing part the distance between a bottom surface of the recess and the pressure plate corresponds with the height of the packing. In order to be able to close packagings of different heights the apparatus preferably has at least one filler piece arranged in the recess.

A closing apparatus according to the invention that is simple to operate has control means connected to the segments, which control means can include a lever pivotally arranged on the pressure plate, a bridge piece pivotally connected to the lever and movable substantially transversely of the main plane of the pressure plate and pivot arms connecting the bridge piece to the ring segments.

When the ring is divided into segments such

that each ring segment engages onto a corner of the packing, an efficiently closing apparatus is obtained still only having a small number of moving parts.

The invention will now be elucidated on the basis of an embodiment, wherein reference is made to the drawing, in which:

- fig. 1 shows a perspective view of a closing apparatus according to the invention and a packing to be closed therewith,
- fig. 2 shows a perspective view of the closing apparatus with dismantled parts, prior to the actual closing movement,
- fig. 3 shows a view corresponding with fig. 2 of the apparatus during the closing movement, wherein a number of components have been omitted for the sake of clarity,
- fig. 4 is a partially sectional view along the line IV-IV in fig. 2,
- fig. 5 shows a view corresponding with fig. 4 of the apparatus in the position shown in fig. 3,
- fig. 6A to D show partially sectional detail views according to the arrow VI in fig. 4 and 5 during different phases of the closing operation, and
- fig. 7 is a perspective view of a ring segment of the closing apparatus.

An apparatus 1 for closing a packing 4 consisting of two parts 2, 3 (fig. 1) comprises a base 5 having arranged thereon means 6 closely enclosing the packing for holding the packing 4 in a closing position. A closing part 7 of the apparatus 1 is hingeably arranged on the base 5 and comprises a pressure surface 8 in the form of a profiled pressure plate, ring segments 9 mounted slidably therein, a lever 10 connected to the ring segments 9 over a control mechanism (not shown here), a protective cover 11 for the control mechanism, and stop bosses 13 co-acting with stop recesses 12 of the base 5.

In order to close the packing 4 the upper part 3 is placed in the manner indicated by the arrows onto the bottom part 2, whereby a downward hanging edge 16 of the upper part 3 falls round a protruding flange 15 of the bottom part 2. The packing 4 is then placed in a recess 25 in the base 5 between the holding means 6. The closing part 7 is then pivoted downward using the lever 10 counter to the action of a hold-open spring 17 (fig. 6A) until the bosses 13 rest in the stop recesses 12. The apparatus 1 is dimensioned such that in this position the upper part of the packing 4 just makes contact with the pressure plate 8 (fig. 6B). (For packagings 4 with a different height filler pieces (not shown here) can be placed in the recess 25 in the base 5). The inner periphery of the ring 14 formed by the segments 9 is larger in this position than the outer periphery of the flange 15.

The lever 10 is then moved further downward

whereby the ring segments 9 are moved towards each other from their release position into a first closing position in which the inner periphery of the ring 14 is smaller than the outer periphery of the flange 15. The downward hanging edge 16 of the upper packing part 3 is hereby folded round the protruding flange 15 of the bottom packing part 2 (fig. 6C). By moving the lever 10 still further downward the ring segments 9 are moved substantially transversely of the main plane of the pressure plate 8 theretoward to a second closing position in which the flange 15 and the edge 16 folded therearound are pressed together between nose portions 26 of the segments 9 and a rib 27 running round the pressure plate 8, whereby a bead is formed and a good closure of the packing 4 is ensured (fig. 6D). The lever 10 is then moved upward whereby the segments 9 are moved back to their releasing position and the closing part 7 is pivoted upward so that the closed packing 4 can be taken out of the apparatus 1.

The movements of the ring segments 9 are controlled by a control mechanism 18 (fig. 2) connecting the lever 10 and the segments 9 and consisting of a bridge piece 19 and pivot arms 20 connecting the bridge piece 19 to the ring segments 9. The bridge piece 19 is pressed onto the pressure plate 8 using bias springs 21 supporting against the cover 11, so that the ring segments 9 can be held by the pivot arms 20 in their release position located furthest to the outside.

When the lever 10 is pivoted downwards relative to the pressure plate 8 (fig. 3), the bridge piece 19 is moved upward from the pressure plate 8 by means of lifting arms 22 pivotally connected to the lever 10, whereby the ring segments 9 are moved towards each other by the pivot arms 20. As a result of the orientation of the pivot arms 20 a force directed obliquely upward is exerted on the ring segments 9. Between each ring segment 9 and the pressure plate 8 a spacer member 23 is therefore arranged (fig. 4), which ensures that between the release position and the first closing position the segment 9 moves substantially parallel to the pressure plate 8 (fig. 6C). When the ring segment 9 has reached the first closing position, the spacer member 23 is situated in register with a receiving space 24 recessed into the pressure plate 8, so that the segment 9 is moved toward the pressure plate 8 to the second closing position under influence of the upward directed force exerted by the pivot arm 20 (fig. 5, 6D).

In order to cause the movement of the segment 9 along the pressure plate 8 to progress easily, the spacer member 23 takes a cylindrical form (fig. 7), and is received in a semi-cylindrical recess in the ring segment 9.

Because the ring 14 in the embodiment shown

is divided into segments 9 such that a segment 9 engages onto each corner of the packing 4, a uniform force can be exerted on the edge 16 in all directions using a minimum number of separate segments 9. It is however conceivable to divide a folding ring 14 of the form shown into a larger or smaller number of segments 9. This results however in a greater mechanical complexity or a less good distribution of force.

In the embodiment shown a closing apparatus 1 is described for use with a rectangular packing 4. The invention can however also be applied with packagings of a shape other than that shown here, wherein the shape of the closing ring 14, of the recess 25 and of the holding means 6, the number of segments 9 and the control mechanism 18 can then be adapted correspondingly.

Claims

- Method for closing a packing (4) consisting of two parts (2,3) by placing the parts (2,3) one on the other, and subsequently folding a downward hanging edge (16) of the one part (3) round a protruding flange (15) of the other part (2), by applying to the part of the edge (16) lying under the flange (15) first compressive forces directed towards each other, the lines of action of which are directed substantially parallel to the main plane of the flange (15), **characterized in that** at least two pairs of compressive forces are applied whereof the lines of action are in different directions.
- Method as claimed in claim 1, **characterized by** applying to the folded edge part (16) and the flange (15) second compressive forces which are directed toward each other and the lines of action of which are directed substantially transversely of the main plane of the flange (15).
- Method as claimed in claim 2, **characterized in that** the second compressive forces are applied while maintaining the first compressive forces.
- Apparatus (1) for closing a packing (4) consisting of two parts (2,3), including means (6) for holding the packing (4) in a closing position and means for folding a downward hanging edge (16) of the one packing part (3) round a protruding flange (15) of the other part (2) of the packing (4), which folding means take the form of a ring (14), the peripheral form of which corresponds with that of the packing (4), **characterized in that** the ring (14) consists of a number of segments (9) and the segments

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(9) are movable in radial direction substantially parallel to a pressure surface (8) between a release position in which the dimensions in peripheral direction of the ring (14) are greater than those of the packing flange (15) and a first closing position in which the dimensions in peripheral direction of the ring (14) are smaller than those of the flange (15).

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- Apparatus (1) as claimed in claim 4, **characterized in that** the segments (9) are movable from the first closing position substantially transversely of the pressure surface (8) embodied as profiled pressure plate to a second closing position in which the flange (15) and the folded edge (16) are pressed together between the ring segments (9) and the pressure plate (8).

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- Apparatus (1) as claimed in claim 5, **characterized in that** each ring segment (9) has a nose part (26) which co-acts in the second closing position with a rib (27) arranged running round the pressure plate (8) in order to press together the flange (15) and the edge (16) to form a bead.

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- Apparatus (1) as claimed in claim 6, **characterized in that** each ring segment (9) is slidably mounted in the pressure plate (8), a spacer member (23) is arranged between each segment (9) and the pressure plate (8) and the pressure plate (8) has a number of spacer member-receiving spaces (24) which are arranged such that in the first closing position each spacer member (23) is in register with a receiving space (24) and is received therein during a movement to the second closing position.

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- Apparatus (1) as claimed in claim 7, **characterized by** a base (5) carrying the holding means (6) and a closing part (7) carrying the pressure plate (8) and arranged on the base (5), which closing part (7) is pivotable between an opened position for introducing or removing the packing (4) and a closed position.

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- Apparatus (1) as claimed in claim 8, **characterized by** a recess (25) arranged in the base (5) for receiving the packing (4) and stops (13) protruding out of the pressure plate (8), wherein the depth of the recess (25) and the height of the stops (13) are geared to each other such that in the closed position of the closing part (7) the distance between a bottom surface of the recess (25) and the pressure plate (8) corresponds with the height of the

packing (4).

10. Apparatus (1) as claimed in claim 9, **characterized by** at least one filler piece arranged in the recess (25).

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11. Apparatus (1) as claimed in any of the claims 4-10, **characterized by** control means (18) connected to the segments (9).

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12. Apparatus (1) as claimed in claim 11, **characterized in that** the control means (18) include a lever (10) pivotally arranged on the pressure plate (8), a bridge piece (19) pivotally connected to the lever (10) and movable substantially transversely of the main plane of the pressure plate (8) and pivot arms (20) connecting the bridge piece (19) to the ring segments (9).

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13. Apparatus (1) as claimed in any of the claims 4-12, **characterized in that** the ring (14) is divided into segments (9) such that each ring segment (9) engages onto a corner of the packing (4).

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FIG.1

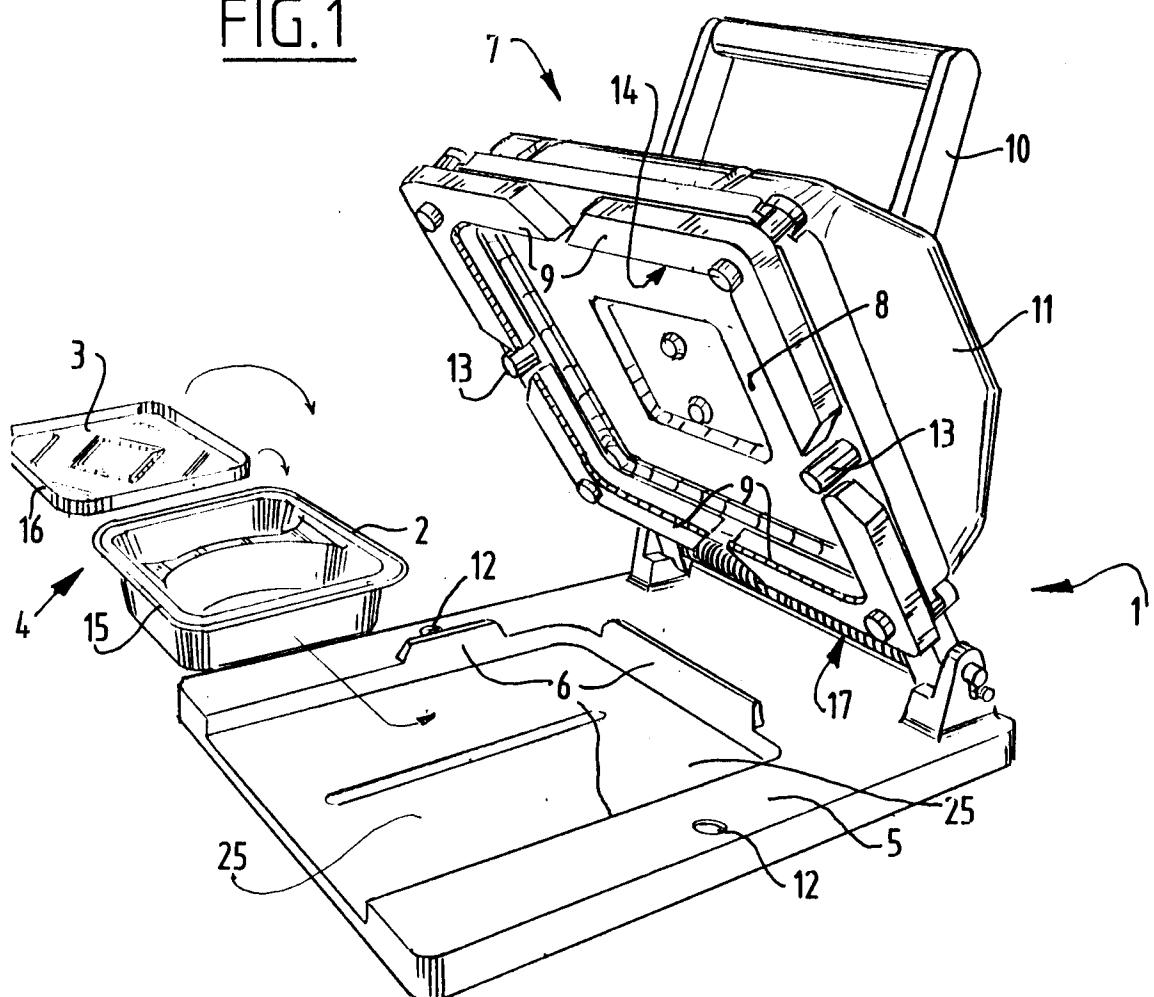
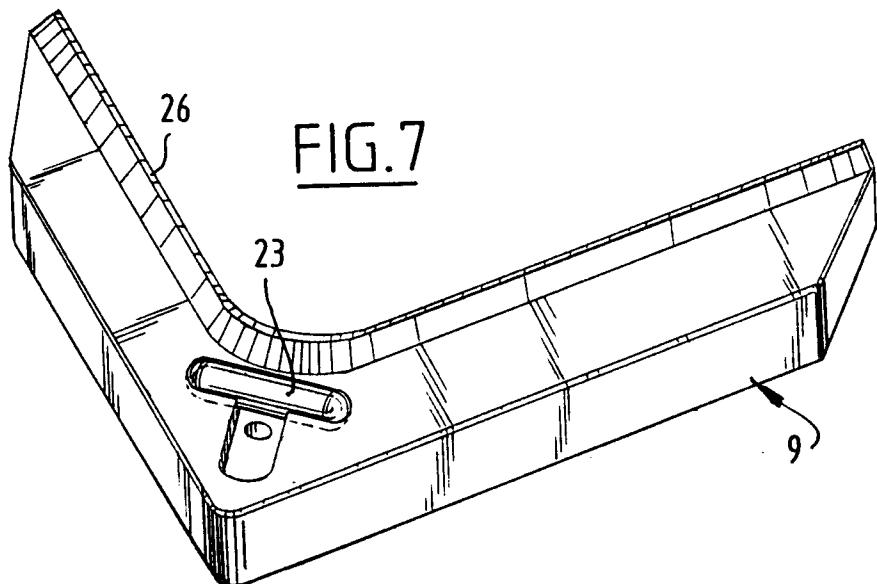


FIG.7



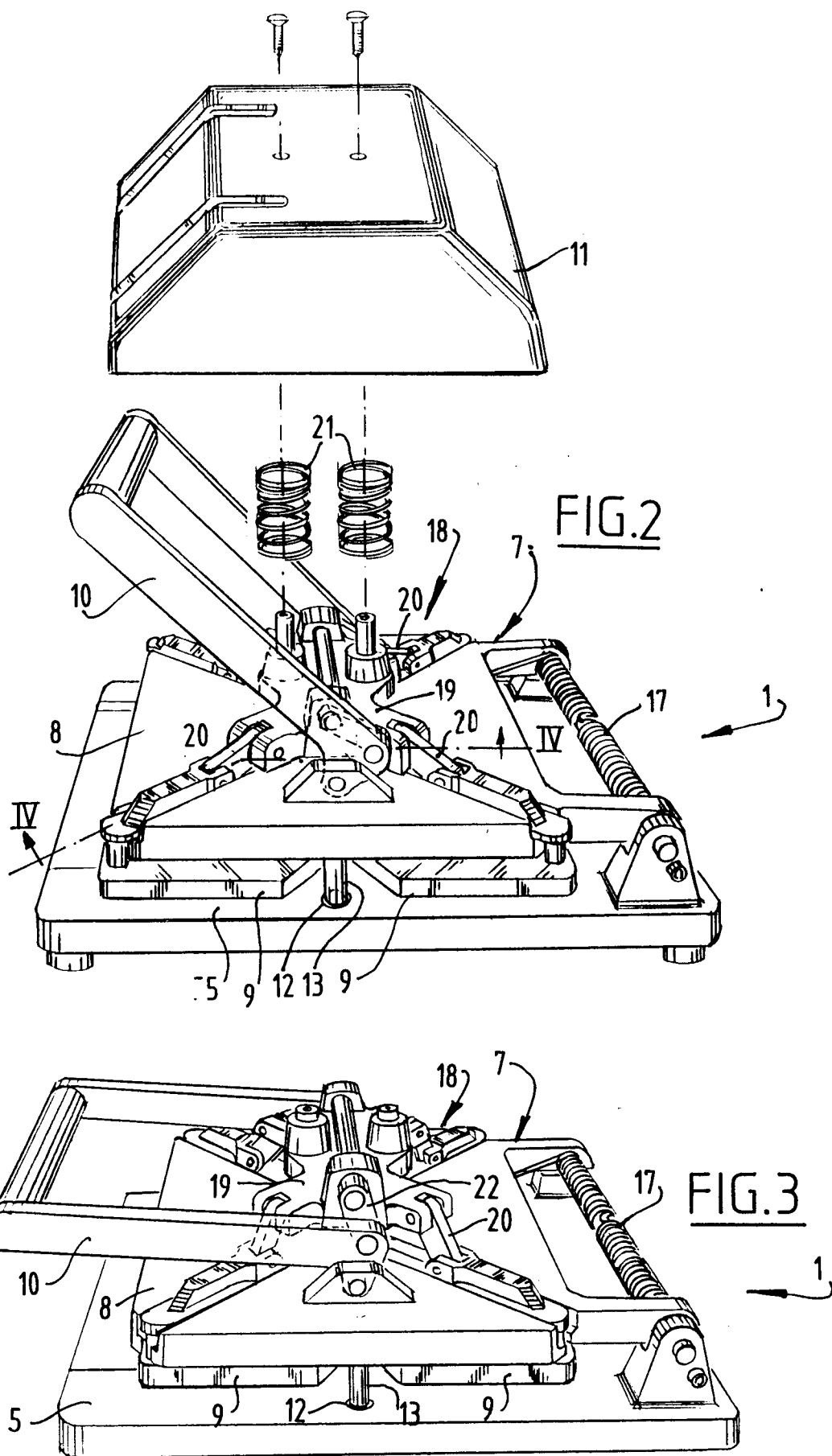
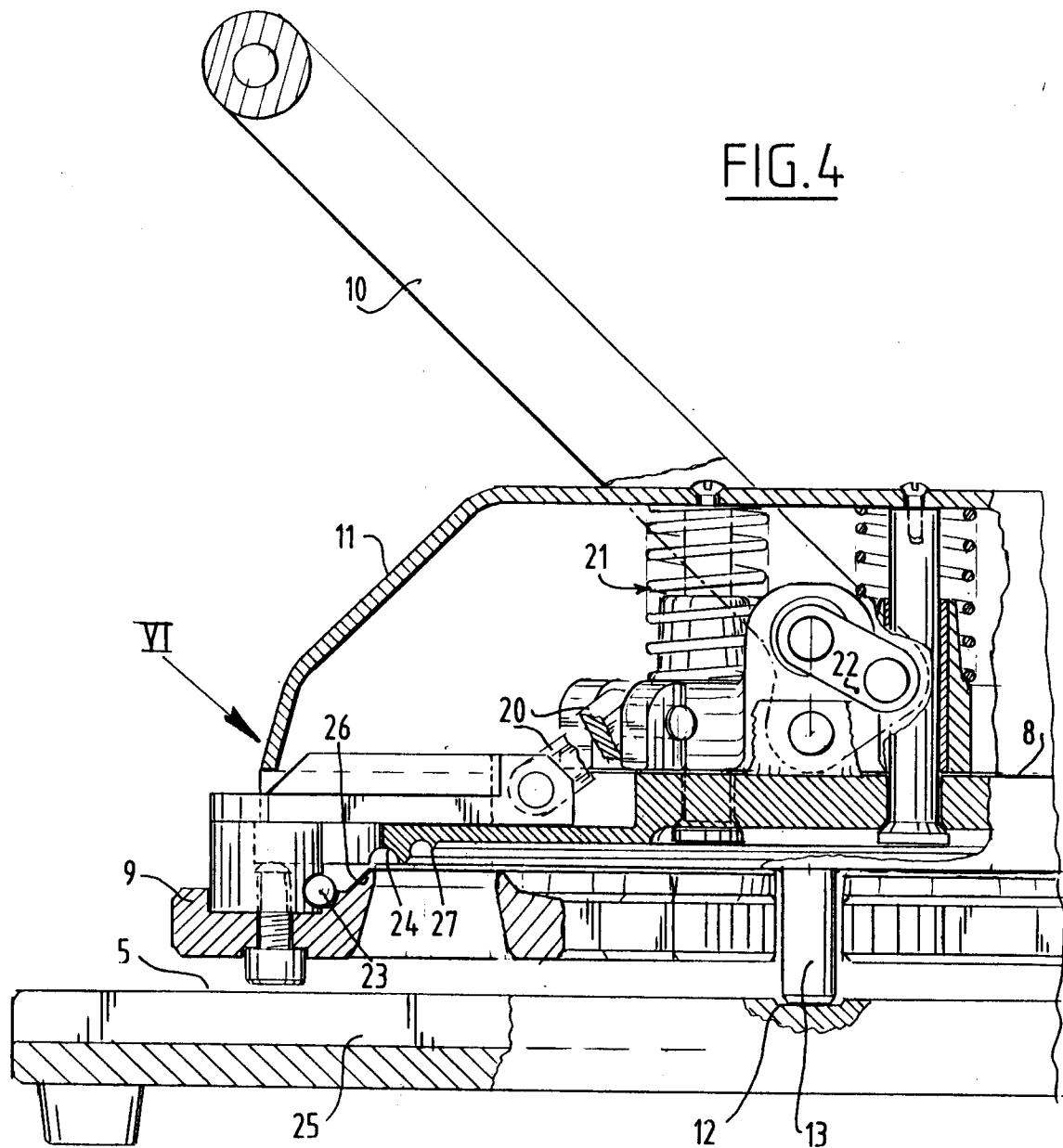


FIG.4



EIG. 5

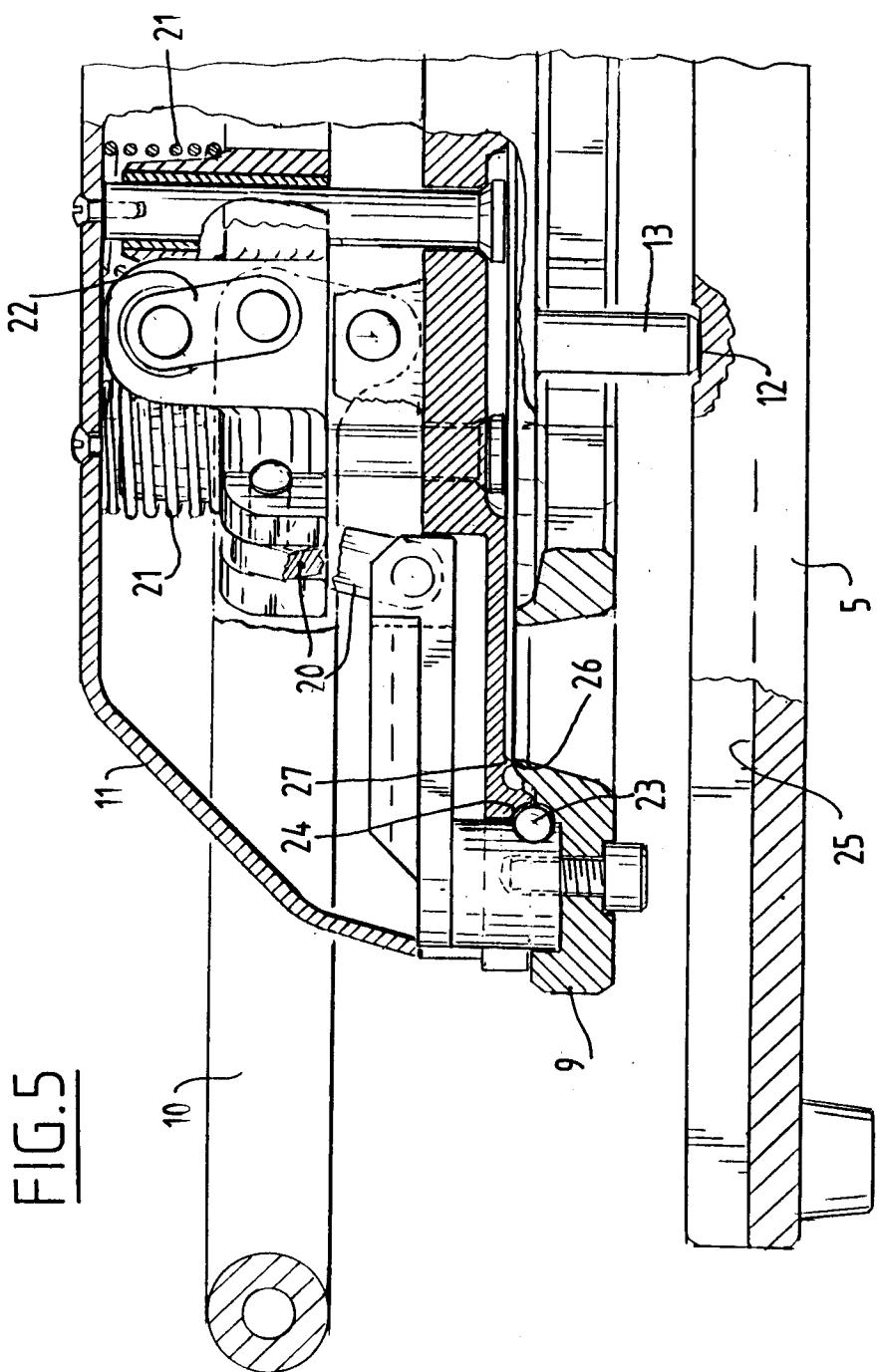


FIG.6A

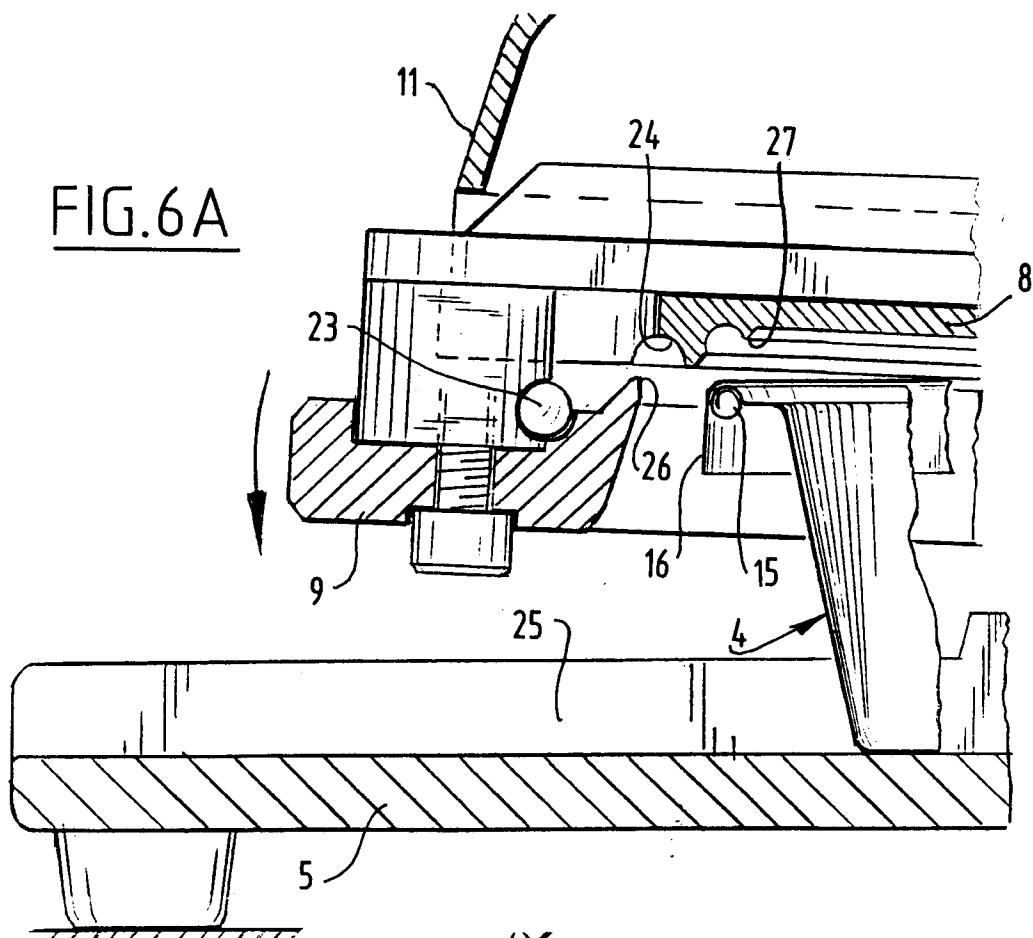
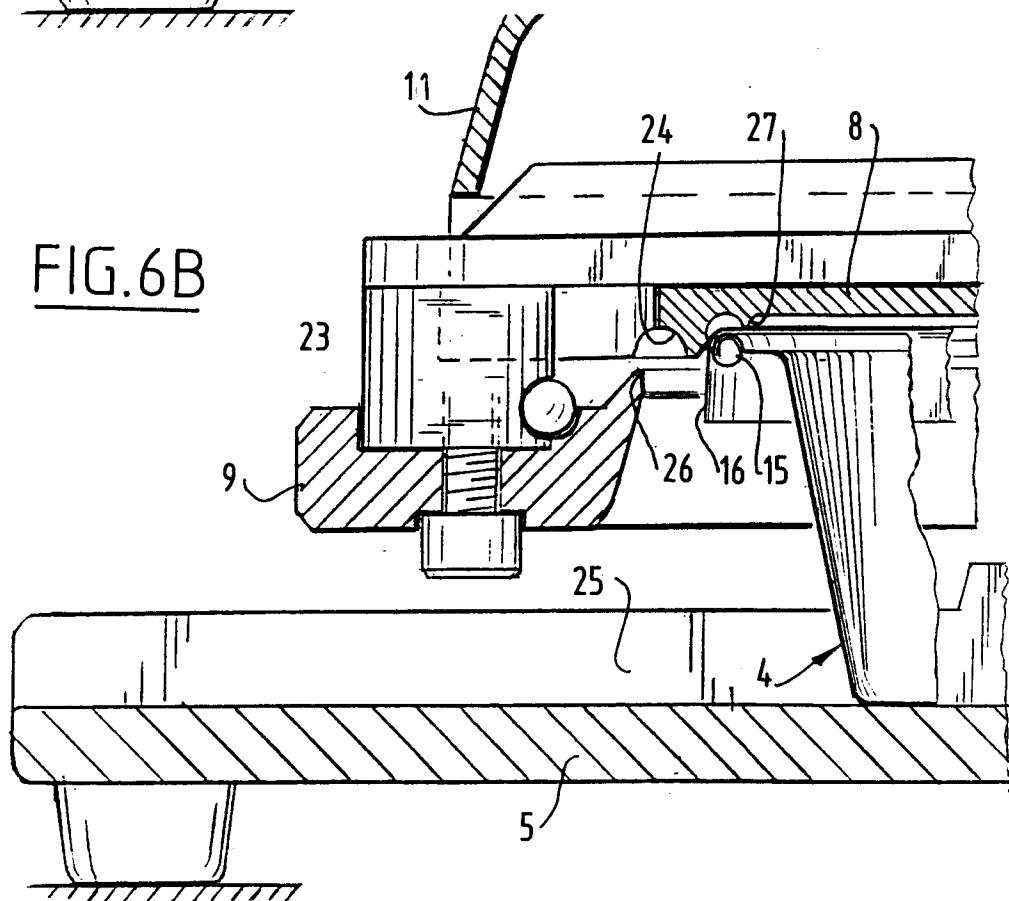


FIG.6B





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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2436

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 071 130 (SEIDEL)	1-5, 11, 13	B65B7/28
A	* page 6, line 21 - page 9, line 27; figures 1-7 *	6	
A	NL-A-7 606 488 (DOUGLAS) * figure 3 *	8	
A	EP-A-0 209 890 (WAGNER)	-----	
TECHNICAL FIELDS SEARCHED (Int. Cl.5)			
B65B B21D			

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 DECEMBER 1992	CLAEYS H.C.M.
CATEGORY OF CITED DOCUMENTS		
<p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>		