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Remarks:
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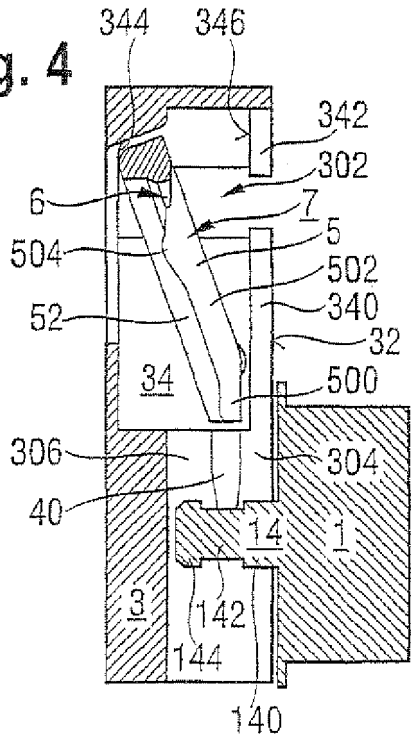
(54) **Retention mechanism in a dispenser for retaining an exchangeable roll of material, retention system, dispenser and method for inserting a roll of material into such retention mechanism and end plug**

(57) The invention pertains to a retention mechanism (2, 2', 2") in a dispenser for retaining an exchangeable roll of material, the retention mechanism comprising a housing (3, 3', 3'') with an insertion slot (30) for insertion of a bearing pin (14) of the exchangeable roll, said insertion slot having an entrance section (300) and an exit section (302, 302''). The retention mechanism further comprising a guiding bracket (5, 5') arranged in the housing, said guiding bracket having a guiding slot (7) for guiding the bearing pin and a locking section (6) for locking the bearing pin in an end position, and the guiding bracket being configured such that only a bearing pin with appropriate dimensions can be locked.

Fig. 4



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Description

1 Technical Field

[0001] The invention relates to the technical field of dispensers for exchangeable rolls such as paper rolls and the suitable geometry for inserting such rolls into such dispenser. In particular, the invention relates to a retention mechanism in a dispenser for retaining an exchangeable roll of material, a retention system, a. dispenser and a method for inserting a roll of material into such retention mechanism and an end plug.

2 Prior Art

[0002] Numerous prior dispensers are known for dispensing paper towels, kitchen paper, toilet paper, foil, plastics wrapping sheet and other materials wound onto a roll. Usually, such dispensers are provided with a supporting guiding bracket having support members in the form of arms upon each of which an end of an exchangeable roll is rotatably mounted. The support arm usually carries a hub member rotatably supported thereon over which one end of the roll core is inserted in replacing the roll. To the other end of the roll, an end plug is secured which is inserted in a catcher mechanism in the other support arm of the dispenser. By means of providing an end plug only on one side of the roll, the correct placement of the supply roll relative to the dispensing mechanism and, consequently, the proper feeding of the sheet material is ensured.

[0003] In the prior art, different suggestions have been made in order to ensure the proper feeding of dispensers or to prevent the insertion of unauthorized rolls such as paper rolls of inferior quality into a dispenser.

[0004] US 2,334,689 deals with the problem of providing dispensers with means to prevent any but a particular type of towel roll being inserted. As a solution to this problem, the paper roll and the paper thereon are provided with a groove at one longitudinal end. Only paper rolls with such a groove can be inserted into the dispenser. If a paper roll without such groove but of shorter longitudinal dimensions is used, it cannot rest on a support structure provided in the dispenser.

[0005] EP 0 657 134 B1 provides a solution to the problem of preventing the wrong insertion of paper rolls into a dispenser. The paper rolls are provided with plugs on both sides, the plug on the one side having a larger diameter and a slit which divides the pin into two crescent-shaped segments. This geometry is adapted to match a specific receiving geometry of the dispenser which is provided with corresponding depressions for receiving the crescent-shaped segments of the bearing pin.

[0006] Based on the object of preventing unauthorized use of paper rolls, US 2,905,405 describes a coupling mechanism having openings of a special shape within a flange plate of the dispenser. The end plugs of the exchangeable replacement rolls have matching projections to be inserted through these openings. The projections of the end plugs inserted through the openings press on leaf springs that bias them into a position in which they do not impede the proper operation of the dispenser. Only replacement paper rolls having matching projections can be used in order to operate each individual leaf spring.

[0007] Another similar technical solution is known from US 6,749,149 B1. The dispenser described therein has support arms for supporting a paper towel roll having a selected geometry with protrusions shaped to fit into matching openings in the end faces of the paper towel roll.

[0008] The above-described solutions serve the purpose of ensuring the proper insertion of a roll of material provided with the matching geometry to some receiving structure. However, such paper rolls having a specific geometry with projections to be inserted in corresponding depressions in the receiving geometry are difficult to handle. The user cannot simply insert a replacement roll but has to check its proper orientation relative to the receiving structure. This entails the danger of wrong operation or that the user applies undue pressure to push a replacement roll into the dispenser.

3 Summary of the Invention

[0009] It is an object of the present invention to provide a retention mechanism in a paper towel dispenser for retaining an exchangeable roll of material such that the insertion of a replacement roll is easy but the inadvertent use of a wrong or wrongly positioned roll is effectively prevented. It is a further object to provide a retention system and a dispenser with these features as well as a method for inserting an exchangeable roll of material into a retention mechanism.

[0010] This object is solved by a retention mechanism in a paper towel dispenser for retaining an exchangeable roll of material with the features of claim 1. A retention system solving the object is defined by the features of claim 30. A method for inserting an exchangeable roll of material into a retention mechanism is described by the features of claim 33. Preferred embodiments are described in the dependent claims. An end plug for a retention system is provided with the features according to claim 36.

[0011] The basic idea of the invention is to provide a retention mechanism in a dispenser which is arranged such that an exchange of the exchangeable rolls of material is easy but the retention mechanism provides a "key-lock-system" which prohibits the insertion of a bearing pin of an end plug carrying the exchangeable roll of material that has inappropriate or unsuited dimensions. This key-lock-system which serves to reject a bearing pin with inappropriate dimensions is provided, according to claim 1, by the provision of a housing with an insertion slot having an entrance section and an exit section. Additionally, a guiding bracket is provided which is arranged in the housing, the guiding bracket having a guiding slot

for guiding the bearing pin and a locking section for locking the bearing pin in an end position. The guiding bracket is configured such that a bearing pin with inappropiate dimensions is rejected.

[0012] This particular arrangement of the housing with an insertion slot having two open ends, namely an entrance section and an exit section, in combination with the guiding bracket, provides a mechanism which effectively enables the rejection of inappropiate dimensioned bearing pins. The rejection of bearing pins of inappropiate dimensions has the effect that only rolls of material that carry an end plug with the correct dimensions will be accepted by the retention mechanism. The manufacturer of the rolls of material can, thus, provide the specific rolls of material with end plugs having bearing pins with specific dimensions that fit into the respective retention mechanism. This ensures that only the correct rolls of material can be inserted into the retention mechanism and locked in their respective end position. Thus, the burden of re-checking whether the correct roll is inserted into the retention mechanism in the correct orientation is taken from the user since only correct rolls in the correct orientation can be inserted and retained in the retention mechanism. The danger of damaging or clogging the dispenser is, thus, prevented.

[0013] In particular, if the bearing pin is too thin in certain portions, such that it cannot be locked by the locking section, such an inappropiately dimensioned bearing pin will slide through the insertion slot from the entrance section straight to the exit section and be rejected from the retention mechanism. In other words, if the bearing pin is too thin, it is impossible to lock the bearing pin in its end position.

[0014] On the other hand, if the bearing pin is too thick in certain portions, it cannot readily be inserted into the insertion slot and thus cannot be locked in its end position. In both cases, namely when certain portions of the bearing pin are too thin or too thick, the bearing pin will be rejected in the sense that it cannot be locked in the intended end position. It can then either not be slid through the insertion slot or the guiding slot at all or cannot be locked in the locking section but slides straight through the insertion slot and exits the retention mechanism.

[0015] In order to more precisely achieve this rejection of inappropriately dimensioned bearing pins, guide rails for a meshing engagement with a groove of the bearing pin can be arranged along at least a portion of the guiding slot. Furthermore, a guide rail for meshing engagement with a groove of the bearing pin can be arranged along at least a portion of the insertion slot of the housing. This particular guide rail can be arranged such that it guides a bearing pin such that it enters the guiding slot of the guiding bracket. The provision of the guide rails along the insertion slot and/or the guiding slot ensures that only a bearing pin with a groove can be inserted into the insertion slot and/or the guiding slot.

[0016] A bearing pin that does not have a groove or a section with dimensions corresponding to the guide rails, will be rejected. In the case that the bearing pin has a diameter at the portion of the bearing pin where the groove is intended to be located that is larger than the required diameter of the groove, such a bearing pin cannot enter the insertion slot and/or the guiding slot of the guiding bracket since the distance between the guide rails will be too narrow. Should a bearing pin be inserted into the insertion slot and/or into the guiding slot having an overall diameter of that of the intended groove, such a bearing pin can slide through the insertion slot and the guiding slot but will not be locked in an end position in the locking section. On the contrary, such a bearing pin will completely slide through the guiding slot and exit the insertion slot at the exit section. Thus, bearing pins with inappropriate dimensions are rejected.

[0017] It is advantageous to provide the locking section with at least one projection projecting in a direction perpendicular and/or parallel to the axial direction of a bearing pin. This projection enables the user to feel a slight resistance in the movement when urging a correct roll into its end position. A projection projecting in a direction parallel to the axial direction of the bearing pin abuts against a side face of the groove of the bearing pin. A projection projecting in a direction perpendicular to the axial direction of the bearing pin abuts against the circumferential surface of the groove of the bearing pin.

[0018] In the case that an inappropiately dimensioned bearing pin is used, in particular one that does not have a groove at all, a locking condition can either not be achieved or the inappropiately dimensioned bearing pin cannot pass the projection. The inappropiately dimensioned bearing pin is, thus, rejected and cannot be locked in the correct end position.

[0019] As a further feature of the retention mechanism, the insertion slot may form two supporting surfaces for supporting the bearing pin when it is being slid through the insertion slot, the two supporting surfaces being arranged such that they face each other. Such supporting surfaces can be the basis for guide rails that extend along the insertion slot in a direction perpendicular to the supporting surfaces. An arrangement of said guide rails can be such that two guide rails situated on an upper and on a lower supporting surface, respectively, are arranged such that they face each other and have a minimum distance in between each other in the direction perpendicular to the support surfaces, the minimum distance being such that it corresponds to the diameter of a groove in a "correct" bearing pin. Furthermore, the support surfaces can be arranged such that they have a minimum distance in a direction perpendicular to a support surface, the minimum distance being such that it corresponds to the diameter of a bearing pin. These features ensure that only appropiately dimensioned bearing pins, namely bearing pins having a groove of dimensions corresponding to the guide rails, can be inserted into the insertion slot and/or guiding slot.

[0020] In a further preferred embodiment, the guiding bracket is integrated with the housing. In other words,

the guiding slot as well as the locking section of the guiding bracket are integral with the housing. This embodiment leads to an inexpensive and reliable construction of the retention mechanism. In this embodiment, the insertion slot forms an upper and a lower surface, the support surfaces facing each other, whereas the locking section comprises a depression in the lower support surface for receiving a portion of the bearing pin. The depression is such that a bearing pin can enter this depression in order to be locked in its end position.

[0021] The retention mechanism of this embodiment also may have an upper end a lower guide rail extending along a portion of the insertion slot, the lower guide rail having a descending portion in the locking section. Preferably, the depression in the lower supporting surface and the descending portion of the guide rail can then be arranged in a relationship such that the bearing pin is received in the depression without touching an upper surface of the guide rail. In other words, the construction is such that a portion of the bearing pin, which is not the groove portion, is in full contact with the depression. The bearing pin is, however, not in contact with the housing by way of its groove portion. This configuration ensures that the bearing pin sits firmly in the end position and is held in this position at least by gravity. It is possible, however, to combine the "gravity fit" with a form-fit of a protrusion in a guide rail or in the support surface in order to ensure that the bearing pin of the "correct" end plug is held firmly in its intended end position.

[0022] The terms "locking", "fixing" or "sitting firmly" of the bearing pin relate to a fixation of the bearing pin as to any displacement out of the fixed position. Even when the bearing pin is described herein to be "locked", "fixed" or "sitting firmly", it still may be rotated about its axis. The locking section locks the retention pin only with regard to its movement along the insertion slot and/or the guiding slot but does not restrict any rotational movement about its axis.

[0023] According to another preferred embodiment of the invention, the support surface is intersected by the guide rails and divided into two sections, the depression of the locking section being situated in only one section. In this embodiment, the section that comprises the depression can be arranged such that it extends further into the insertion slot in the proximity of the depression than the other section. In other words, a bearing pin slid into this section in the proximity of the depression is lifted by the section that extends further into the insertion slot relative to the other section and is, thus, lifted off the other section of the supporting surface.

[0024] In order to properly guide the bearing pin along this complex trajectory, the sections of the upper supporting surface of the insertion slot are arranged substantially in the same manner and formed with substantially the same shape as that of the sections of the lower supporting surfaces. In other words, the first and second sections of upper and lower surfaces, respectively, are substantially parallel. Therefore, the distance between the respective sections of the upper and lower supporting surfaces remains substantially constant.

[0025] The distance between the upper and lower guide rails is such that it does not fall under a predetermined value which corresponds to the dimensions of a groove of a "correct" bearing pin. This ensures that a bearing pin with inappropiate dimensions can still be slid through the insertion slot along the guide rails but exit the insertion slot at the exit section.

[0026] In a still further preferred embodiment of the invention, the guiding bracket is pivotable with respect to the housing between an insertion position and a sliding position, the exit section of the insertion slot being left open in the insertion position.

[0027] On account of this arrangement, a bearing pin with inappropriate dimensions, for example a bearing pin which is too thin, will slide through the insertion slot and the guiding slot of the guiding bracket and exit the retention mechanism at the exit section since the insertion slot is left open and the pivotable guiding bracket is not moved into a position in which it blocks the exit section.

[0028] Preferably, the pivotable guiding bracket is pretensioned towards the insertion position. This ensures that the insertion slot is normally left open.

[0029] In a further preferred embodiment, the pivotable guiding bracket is arranged such that the depth, which is defined to be measured in the direction of the axis of a bearing pin inserted into the insertion slot, of a section of the insertion slot is smaller than the distance between the outer wall of the housing and a section of the guiding slot of the guiding bracket, when the pivotable guiding bracket is in its insertion position. This arrangement ensures that when a bearing pin of a length that corresponds to the depth of the first section of the insertion slot is inserted into the insertion slot, it will automatically fall off the guiding slot when it is slid along the insertion slot and the guiding slot as soon as the length of such bearing pin is less than the distance between the outer wall of the housing and the guiding slot.

[0030] The retention mechanism may further comprise guide rails in the guiding bracket that are dimensioned such that they come into meshing contact with a groove of a bearing pin such that the pivotable guiding bracket is pivoted from its insertion position into its sliding position against the pre-tensioning of the guiding bracket when the bearing pin is slid along the guiding slot. In the sliding position, the guide rails of the guiding bracket are substantially parallel to the outer wall of the housing.

[0031] In order to ease the insertion of a groove of a bearing pin into the guide rails, the guide rails of the guiding bracket may have a sliding section that extends essentially parallel to the plane of the bracket and an insertion section that is angled with respect to the sliding section. The angle between the sliding section and the insertion section of the guide rails preferably corresponds to the pivoting angle of the pivotable guiding bracket. Thus, the insertion of a bearing pin with a groove is simplified when the guiding bracket is in its insertion position.

[0032] A secure fit of the bearing pin is reached when the locking section comprises a conical surface to receive a portion of the bearing pin.

[0033] In a further preferred embodiment, the pivotable guiding bracket comprises a blocking section for readily blocking the insertion into the guiding slot of a bearing pin of inappropiate dimensions. This prevents the insertion of a bearing pin of inappropiate dimensions, in particular a bearing pin which is too thin, into the guiding slot. The blocking section is pivoted into the blocking position by the pre-tensioning of the pivotable guiding bracket.

[0034] This blocking section may have a bearing pocket for receiving a bearing pin of too small a diameter, in particular, of a bearing pin that has an overall diameter that corresponds to the diameter of the groove of a "correct" bearing pin. The blocking section, furthermore, may comprise inclined surfaces that extend substantially in the direction of the insertion slot, the inclined surfaces being arranged such that they cooperate with an appropiately dimensioned bearing pin. When pushed away by an appropiately dimensioned bearing pin, the inclined surfaces cause the guiding bracket to pivot into a sliding position such that a bearing pin can be inserted into the guiding slot.

[0035] In order to simplify the construction, a recess is provided in the housing which is adapted to receive the pivotable guiding bracket. The recess may furthermore define supporting structures for the pivotable guiding brackets in its locking position.

[0036] The invention, furthermore, pertains to a retention system comprising the retention mechanism described above and an end plug for a roll of material to be retained in the retention mechanism, the end plug having a receiving portion with dimensions to fit into a hollow core of the roll of material and a bearing pin, said bearing pin having a first diameter and a circumferential groove of a second diameter, the second diameter being smaller than the first diameter, the dimensions of the end plug being such that the bearing pin is insertable into the insertion slot and the guiding bracket and is lockable in its end position with respect to the receiving mechanism in the locking section of the guiding bracket.

[0037] This system combines the specific features of the retention mechanism with a correspondingly shaped end plug with a specific bearing pin such that a reliable and secure exchange of a roll of material can be performed easily.

[0038] The invention, furthermore, pertains to the use of the combination as described above for fitting the plug into a hollow core of a roll material and retaining the roll of material in a dispenser unit.

[0039] The invention also pertains to a dispenser unit for exchangeable paper rolls, in particular paper towel rolls or tissue paper rolls, and comprising a housing and laterally extending receiving means for mounting a retention mechanism according to the description above.

[0040] A method for inserting an exchangeable roll of material comprising at least one end plug having a bearing pin is described, said bearing pin having a first diameter and a circumferential groove of a second diameter, the second diameter being smaller than the first diameter the method for inserting the roll into a retention mechanism being as described above. The method comprises the placing of the bearing pin of the end plug into the entrance section of the insertion slot of the retention mechanism, sliding the bearing pin into a position where the groove comes into meshing engagement with the guiding slot, and sliding the bearing pin further along the guiding slot and locking it in its end position in the locking section. The groove of the bearing pin can, furthermore, be brought into meshing engagement with a guide rail of the guiding bracket. A portion of the bearing pin may, furthermore, push away a blocking section of the guiding bracket.

[0041] In a preferred embodiment, an end plug for a roll of material to be inserted into a retention mechanism as described above is provided. The end plug comprises a receiving portion with dimensions to fit into a hollow core of the roll of material and a bearing pin having at least two portions with different outer diameters, a first portion with a larger diameter and a second portion with a smaller diameter than the first diameter portion.

[0042] Preferably, the first and second portions are contiguous with each other. In a variant, the first portion has an outer diameter of at least 5mm and the second portion has an outer diameter of 3,5mm or less. It is preferred that the end plug further comprises a flange-shaped member around the receiving portion to limit the depth of insertion of the receiving portion into the hollow core of the roll of material. In a preferred embodiment, the end plug is integrally extruded from plastics material, especially PP or PE. The described end plug can be used with an retention mechanism as described above and is a measure to distinguish appropriate rolls from inappropriate rolls.

3 Brief Description of the Drawings

[0043] In the following, various exemplary embodiments of the invention will be described in detail with reference to schematic drawings in which

Figure 1 is a top view of an end plug;

Figure 2 is a perspective view of a first embodiment of a retention mechanism and a partial sectional view taken along the line I-I of Figure 1 of the end plug;

Figure 3 is a side view of the first embodiment of the retention mechanism of Figure 2 with the end plug inserted therein;

Figure 4 is a cross-section taken along the line II-II of Figure 3 of the first embodiment of the retention mechanism and the end plug;

Figure 5 is a front and a side view of the first embodiment of the retention mechanism;

Figure 6 is a top view of the first embodiment of the

retention mechanism with an end plug inserted therein;
Figure 7 is a cross-sectional view of the first embodiment taken along the line III-III of Figure 6;
Figure 8 is a cross-sectional view of the first embodiment of the retention mechanism taken along line II-II of Figure 3 with an end plug inserted therein, where the end plug is advanced significantly forward within the insertion slot;
Figure 9 shows a perspective view of the first embodiment of a pivotable guiding bracket;
Figure 10 shows a cross-sectional top view of the first embodiment of the retention mechanism;
Figure 11 shows a cross-section of the first embodiment of the retention mechanism with the end plug inserted therein and the end plug almost in the end position;
Figure 12 shows a cross-section of the first embodiment of the retention mechanism with the end plug inserted therein and the end plug in its locked, end position;
Figure 13 shows a top view of the first embodiment of the retention mechanism with an end plug inserted therein and the end plug in its end position;
Figure 14 is a cross-section of the first embodiment taken along the line IV-IV of Figure 13;
Figure 15 is a perspective view of the first embodiment of the retention mechanism and an end plug in its end position with the upper part of the housing cut away;
Figure 16 shows a perspective view of a second embodiment of the retention mechanism and a perspective cross-sectional view of an end plug taken along the line I-I of Figure 1;
Figure 17 shows a side view of the retention mechanism of the second embodiment and the end plug in a position where the end plug is inserted into the insertion slot;
Figure 18 is a cross-sectional view of the second embodiment taken along the line V-V of Figure 17;
Figure 19 is a front view of the housing of the second embodiment;
Figure 20 is a cross-sectional view taken along line VI-VI of Figure 19;
Figure 21 is a cross-sectional view of the pivotable guiding bracket of the second embodiment;
Figure 22 is a perspective view of the pivotable guiding bracket of the second embodiment, as shown in Figure 21;
Figure 23 is a top view of a retention mechanism of the second embodiment with an end plug inserted therein;
Figure 24 is a cross-sectional view taken along line VII-VII of Figure 23;
Figure 25 is a cross-section of the second embodiment in a position of the end plug as shown in Figure 23;
Figure 26 is a cross-section of the second embodiment with the end plug being slid a considerable distance into its end position;
Figure 27 is a cross-section top view of the end plug in its end position;
Figure 28 is a top view of the retention mechanism and the end plug in its end position;
Figure 29 is a cross-section taken along line VIII-VIII of Figure 28;
Figure 30 is a perspective view of the retention mechanism and the end plug in its end position with a part of the housing being cut away;
Figure 31 shows a perspective view of a third embodiment of a retention mechanism and an end plug;
Figure 32 shows a side view of a retention mechanism in the third embodiment with an end plug inserted therein;
Figure 33 shows a cross-section of the retention mechanism of Figure 32 taken along the line IX-IX;
Figure 34 shows a side view of the third embodiment of the retention mechanism;
Figure 35 shows a cross-section of the retention mechanism of the third embodiment taken along the line X-X of Figure 34;
Figure 36 shows a cross-section of the retention mechanism of the third embodiment with an end plug inserted therein in its end position;
Figure 37 shows a cross-section taken along line XI-XI of Figure 36;
Figure 38 is a perspective view of the retention mechanism of the third embodiment with parts of the housing broken away; and
Figure 39 is a perspective view of the retention mechanism of the third embodiment with an end plug inserted therein in its end position in a half-cut view.

4. Detailed Description of the Drawings

[0044] Figure 1 shows an end plug 1 which is used in combination with the retention mechanism of the first and second embodiments which are shown in Figures 2 to 15 and 16 to 30, respectively.

[0045] The end plug 1 comprises a receiving section in the form of a cylindrical part 10 which is to be inserted into the roll core (not shown) of an exchangeable roll of material, in particular a roll core of an exchangeable paper towel roll, toilet paper roll or the like. The cylindrical part 10 of the end plug 1 has a diameter which corresponds to the inner diameter of the roll core of the exchangeable roll or has a diameter which is slightly larger than that of the roll core in order to achieve a press-fit of the cylindrical part 10 of the end plug 1 within said roll core. Adjacent to the cylindrical part 10 of the end plug 1, a discoidal element 12 is situated which has a larger diameter than that of the cylindrical part 10. Whenever the cylindrical part 10 of the end plug 1 is completely inserted inside the roll core of the exchangeable roll of material, the inner face 120 of the discoidal element will abut the roll core of the exchangeable roll of material.

[0046] The end plug 1 also includes a bearing pin 14 which extends from the outer face 122 of the discoidal element 12 in the axial direction of the end plug 1. The bearing pin 14 has a first portion 140 of a first diameter D_1, a second portion 142 of a second diameter D_2, also referred to as a groove in the following, and a third portion 144 which has, again, the first diameter D_1. The first portion 140 has an axial extension (length in the axial direction of the bearing pin 14) of L_1, the second portion 142 has an axial extension of L_2 and the third portion 144 has an extension of L_3. The bearing pin 14 has an overall first diameter of D_1 and has in portion 142 a second diameter D_2 and length L_2, whereas the second diameter D_2 of the groove 142 is smaller than the first diameter D_1 of the bearing pin. The overall length of the bearing pin 14 is $L=L_1+L_2+L_3$. Thus, the bearing pin 14 has a groove 142.

[0047] Figure 2 shows the retention mechanism 2 in a perspective view and the end plug 1, which is also shown in Figure 1, in a perspective, half-cross-sectional view, whereas the cross-section of the end plug 1 is taken along the line I-I of Figure 1. The end plug 1 of this embodiment is filled with material. An end plug 1' as shown in Figure 31, which has a hollow receiving section 10, can also be used.

[0048] The retention mechanism 2 includes a housing 3 which has an insertion slot 30 comprising an entrance section 300 on one of its ends and an exit section 302 on the other end. The entrance section 300 and the exit section 302 as well as the insertion slot 30 have a width I_1 which corresponds at least to the diameter D_2 of the bearing pin 14 of the end plug 1.

[0049] The insertion slot 30 is dimensioned such that an end plug 1 having a bearing pin 14 of the smaller diameter D_2 corresponding to the diameter of the groove 142 can be completely slid through the insertion slot from the entrance 300 to the exit 302 without any hindrance.

[0050] In the embodiment shown in Figure 2, however, at least an outer section 304 and an inner section 306 of a supporting surface 308 of the insertion slot 30 has a width which corresponds to the larger diameter D_1 of the portions 140, 144 of the end plug 1. This can be also seen in Figure 3 which is a side view of the retention mechanism 2 with the end plug 1 already inserted into the insertion slot 30.

[0051] The measure "width" in this respect is defined to be the distance between two facing surfaces in the direction perpendicular to the axis of a bearing pin inserted into the insertion slot 30 and perpendicular to the supporting surface 308 of the insertion slot 30.

[0052] In Figure 3, a guiding section 4 extends along a portion of the insertion slot 30. The guiding section 4 includes a guide rail 40 which is integrated with the housing 3 inside of the insertion slot 30 in the current embodiment. The guide rail 40 has dimensions such that it fits into the groove 142 of the bearing pin 14 of the end plug 1.

[0053] This is shown in Figure 3, where the end plug 1 is inserted with its bearing pin 14 into the insertion slot 40. The groove 142 of the bearing pin 14 and the first and third portions 140, 144 of the bearing pin 14 mesh with the guide rail 40 of the guiding section 4. The dimensions of the insertion slot 30 are, thus, such that the width I_1 of the outer section 304 and the inner section 306 of the support surface 308 correspond to the larger diameter D_1 of the bearing pin 14. The width between the guide rail 40 and the opposite guide rail 42, I_2, correspond to the smaller diameter D_2 of the groove 142 of the bearing pin 14. Thus, the end plug 1 becomes fixed in its length direction (axial direction of the bearing pin 14) as soon as the guide rails 40, 42 enter into the groove 142 of the bearing pin 14. The end plug 1 is, however, movable along the extension of the insertion slot 30 (perpendicular to the axial direction of the bearing pin 14).

[0054] The length L of the bearing pin 14 corresponds to the depth 1 of the insertion slot in the entrance section 300.

[0055] The situation shown in Figure 3 is shown in Figure 4 in a sectional view taken along the line II-II of Figure 3. Here, it is shown that the end plug 1 comes into contact with the guide rail 40 in the area of the groove 142 of the bearing pin 14. The specific function of the parts shown in the top part of Figure 4 will also be described in connection with the following Figures.

[0056] The guiding section 4 comprises a pivotable guiding bracket 5 which is situated inside the housing 3. The pivotable guiding bracket 5 is pivotable between an insertion position as shown in Figure 4 and a sliding position as it is shown and described in Figure 11. The pivotable guiding bracket constitutes a guiding slot 7 for the insertion of a bearing pin.

[0057] A recess 34 is provided inside the housing 3 which is dimensioned such that it allows the pivotable guiding bracket 5 to pivot freely inside the housing. The recess 34 has a width which is greater than the width I_1 of the insertion slot 30 in order to accommodate the pivotable guiding bracket. Furthermore, an exterior wall comprising portions 340 and 342 has surfaces at the same level as that of the outer section 304 of the insertion slot are present. The exterior wall portions are formed to provide a rest for sections of the pivotable guiding bracket 5.

[0058] The pivotable guiding bracket has a guide rail 50 which corresponds to the guide rails 40, 42 on the supporting surfaces 308 of the insertion slot 30. It has, furthermore, a section 52 which basically corresponds to the inner section 306 of the insertion slot 30 of the housing 3. In other words, the pivotable guiding bracket 5 constitutes an extension of the arrangement of the guide rail 40 and the inner section 306 of the insertion slot.

[0059] The guide rail 50 of the pivotable guiding bracket 5 comprises an insertion section 500 and a sliding section 502. The insertion section 500 is angled with respect to the sliding section 502 of the guide rail 50 such that the insertion of a groove of a bearing pin is easy when the guiding bracket is in the insertion position. The sliding section of the guide rail 50 extends along the direction defined by the plane lying inside the pivotable

guiding bracket. The angled portion 500 and the sliding section 502 enclose an angle such that the guide rail 40 extends linearly in the direction of the angled portion 500 when the pivotable guiding bracket 5 is in the insertion position. The sliding portion 502 extends parallel to the front face 32 of the housing 3 when the pivotable guiding bracket 5 is in the sliding position.

[0060] The sliding section 502 of the guide rail 50 of the pivotable guiding bracket 5 comprises a projection 504 which has an extension perpendicular to the plane lying in the pivotable guiding bracket 5 which exceeds slightly the length L_2 of the groove 142 of the bearing pin 14. The projection 504 is such that when the groove 142 of the bearing pin 14 is slid over the sliding section 502 of the guide rail 50 of the pivotable guiding bracket 5, a slight resistance has to be overcome in order to slide the bearing pin 1 further into its end position.

[0061] In other words, the end plug 1 is slid along the insertion slot 30, meshing with the guide rails 40, 42, and then enters the angled portion 500 of the guide rail 50 of the pivotable guiding bracket 5 and pivots said pivotable guiding bracket 5 in a direction towards the exterior walls 340, 342. Then it is slid further along the sliding section 502 of the guide rails 50, is forced over the projection 504 and brought into an end position. In the end position 6, the bearing pin sits inside a conical recess 60.

[0062] Figure 5 shows the retention mechanism 2 in a perspective view taken from a different position than that shown in Figure 2. In Figure 5, the guide rail 40 which is situated on the lower supporting surface 310 of the insertion slot 30 and the guide rail 42 on the upper supporting surface 312 of the insertion slot 30 are shown.

[0063] Figure 6 shows a top view of the retention mechanism 2 with an end plug 1 inserted therein in a state in which the end plug 1 is already slid a short distance into the insertion slot 30 in the direction towards the end position.

[0064] Figure 7 shows a cross section through the housing 3 of the retention mechanism and the end plug 1 which is taken along line III-III of Figure 6. It is shown that the groove 142 of the bearing pin 14 of the end plug 1 meshes with the guide rails 40, 42 of the guiding bracket 4 of the housing 3 of the retention mechanism. The outer face 122 of the discoidal element 12 of the end plug 1 faces the outer surface 32 of the housing 3.

[0065] These steps can be seen in Figure 8 where the bearing pin 14, and in particular the groove 142, meshes with the angled portion 502 of the guide rail 50 of the pivotable guiding bracket 5 of the guiding bracket. In this position, the pivotable member 5 still abuts with its end section against the backside 344 of the recess 34.

[0066] In Figure 9, the pivotable guiding bracket 5 is shown in greater detail. It comprises pins 56 to be inserted into respective bores in the housing 3 in order to mount the pivotable guiding bracket 5 in a pivotable manner. The guide rail 50 and the section 52, which corresponds to the inner section 306 of the insertion slot, are shown. The guide rail 50 comprises an angled portion 500, a sliding section 502 as well as a projection 504.

[0067] Figure 10 shows the end plug 1 in the same position as in Figure 8 but in a different cross-section of the retention mechanism. It is shown that the angled portion 500, which meshes with the groove 142 of the bearing pin 14, extends approximately to a position near the axis through the pins 56.

[0068] Figure 11 shows the retention mechanism 2 with the end pin 1 inserted therein in a situation where the end plug 1 is already slid through the insertion slot in the direction of its end position and the groove 142 of the bearing pin 14 being just in the process of overcoming the projection 504 of the guide rail 50. The pivotable guiding bracket 5 abuts with its end section, which is situated opposite to the area in which the pins 56 are situated, on an inner face 346 of the exterior walls 340 and 342.

[0069] The pivotable guiding bracket 5 is pre-tensioned by a spring (not shown) or other elastic member in the insertion direction.

[0070] Figure 12 is a cross section and the end plug 1 is moved into its final end position inside the retention mechanism 2. The groove 142 of the bearing pin 14 of the end plug 1 sits now firmly between the projection 504 of the guide rail 50 and a conically shaped inner wall 60 of the locking section 6. Thus, the end plug 1 is correctly placed in its end position and is fixed in the locking section 6 such that it cannot move up or down the insertion slot under normal operating conditions of the retention mechanism and roll in a dispenser. The end plug 1 is, therefore, in a defined position with respect to the housing 3.

[0071] Figures 13 to 15 show this end position in different views and cross-sections. Figure 13 is a top view of the end pin 1 and the housing 3 of the retention mechanism 2. Figure 14 is a cross-section taken along the lines IV-IV of Figure 13. Figure 15 is a perspective view with half of the housing 3 of the retention mechanism 2 cut away. In Figure 14, the conical end faces 60 of the locking section 6 and their interaction with the bearing pin 14 are clearly visible.

[0072] In Figure 15, the fixation of the bearing pin 14 between the projections 405 of the guide rails 50 and the conical faces 60 of the locking section 6 is shown.

[0073] An end plug 1 which is held in its end position in the retention mechanism 2 can be released by reversal of the insertion procedure. Thus, bearing pin 14 is to be released from the locking section 6 by overcoming the projection 504 and sliding the end plug 1 back.

[0074] In Figures 16 to 30, a second exemplary embodiment of a retention mechanism 2' is shown. As will become apparent from the drawings, the main difference between the first embodiment shown in Figures 2 to 15 and the second embodiment is the structure of the pivotable guiding bracket 5'.

[0075] In Figure 16, the retention mechanism 2' comprises a housing 3' having an insertion slot 30 for inserting a bearing pin 14 of an end plug 1. The structure of the insertion slot 30 is basically the same as that described with respect to the first embodiment. In particular, a guid-

ing section 4 including a guide rail 40 is present. Furthermore, the housing 3' includes a recess 34' and exterior walls 340, 342 that resemble the structure of the housing 3' of the first embodiment. As will become apparent, however, from Figures 17 and 18, the recess 34' of the second embodiment extends considerably wider in the direction of the entrance 300 of the insertion slot 30 and towards the backside 36 of the housing 3' than that of the first embodiment.

[0076] In Figure 17 a front view of the housing 3' of the second embodiment with an end plug 1 inserted into the insertion slot 30 is shown. As in the first embodiment, the groove 142 of the bearing pin 14 of the end plug 1 is brought into meshing engagement with the guide rails 40 and 42.

[0077] As can be seen in Figure 18, the pivotable guiding bracket 5' has a structure comparable to that of the first embodiment. It does not, however, comprise the angled portion of the first embodiment. The guide rail 50 of the pivotable guiding bracket 5' of this embodiment has a rather linear shape with the exception of the projection 504 before the locking section 6. The guiding slot 7 extends between the guide rail 50 and its counterpart (not shown).

[0078] The pivotable guiding bracket 5' comprises, furthermore, a blocking section 58 which is comprised of two inclined surfaces 582 and a bearing face 584. The bearing face 584 is situated in a plane perpendicular to the insertion direction of a bearing pin into the insertion slot 30, when the pivotable guiding bracket 5' is in the insertion position. The insertion position is shown in Figure 18 and this is the position in which the end part of the pivotable guiding bracket 5', which is near the locking section 6, abuts a rear side 344 of the recess 34'.

[0079] The blocking section 58 constitutes a bearing pocket 580 confined by the inclined surfaces 582 and the bearing face 584. It is configured such that it can receive a bearing pin with a diameter D_2 of the groove 142 of the bearing pin or any diameter smaller than that. Such a bearing pin would be received on the bearing face 584 which consequently prohibits that the bearing pin is slid any further.

[0080] In Figure 17, the inclined faces 582 of the blocking section 58 are shown as they are pushed away by the third portion 144 of the bearing pin 14 of the end plug 1, which has a diameter D_1 which is larger than the diameter D_2 of the groove 142.

[0081] On account of these configurations of the dimensions, the blocking section 58 is pushed away when the bearing pin 14 is inserted into the insertion slot 30 such that the third portion 144 glides along the inclined faces 582 and, at the same time, the pivotable guiding bracket 5' is pivoted such that the locking section 6 abuts against an inner face 346 of the exterior walls 340, 342 and aligns the guiding slot with the outer wall surface 32 of the housing 3'.

[0082] Figure 19 is a front view of the housing 3' of the retention mechanism 2' of the second embodiment. The insertion slot 30, the guide rails 40, 42, the entrance 300 and the exit 302 of the insertion slot 30 as well as the missing back wall 34' which is part of the recess, are shown.

[0083] Figure 20 is a cross-sectional view taken along the line VI-VI of Figure 19. The housing 3', the upper guide rail 42, the lower guide rail 40, the recess 34' and the outer section 304 of the insertion slot 30 are shown.

[0084] Figure 21 shows the pivotable guiding bracket 5' in a cross-section and Figure 22 shows the pivotable guiding bracket 5' in a perspective view. The inclined faces 582 of the blocking section 58 are shown. The inclined faces 582 are, optionally, chamfered to match likewise optionally chamfered portions of the bearing pin 14. The bearing face 584, which is arranged in its initial position perpendicular to the direction of the insertion of a bearing pin into the insertion slot 30, is also shown. The inclined faces 582 and the bearing face 584 constitute the bearing pocket 580. The bearing pocket 580 has a width B_1 that is equal to, or smaller than the diameter D_2 of the groove 142 of the bearing pin 14.

[0085] The pivotable guiding bracket 5' is pre-tensioned by a spring (not shown) or other elastic member in the insertion direction.

[0086] The pivotable guiding bracket 5' comprises a guide rail 50 in the section that corresponds to the pivotable guiding bracket of the first embodiment, the guide rail basically being linear except for the projection 504 before the locking section 6.

[0087] Figure 23 is a top view of the retention mechanism 2' with an end plug 1 inserted therein. Figure 24 is a cross-section taken along the line VII-VII of Figure 23. From Figure 24, it can be taken that the groove 142 of the end plug 1 meshes with the guide rails 40, 42 of the housing 3'. It is, furthermore, shown in which manner the third portion 144 pushes away the locking section 58 of the pivotable guiding bracket 5' with its outer face being in contact with the inclined surfaces 582 of the blocking section 58.

[0088] Figure 25 is a cross-section of the same embodiment in which the end plug 1 is pushed further inside the insertion slot 30 in the direction of the locking section 6. The pivotable guiding bracket 5' has already been pivoted such that the locking section 6 comes closer to the exterior walls 342 and the guide rail 50 is almost parallel to the outer face 32 of the housing 3'. Thus, the groove 142 of the bearing pin 14 engages the guide rail 50 of the guiding bracket. It is appreciated that this is only possible since the third portion 144 of the bearing pin 14 has pushed away the blocking section 58 such that the pivotable guiding bracket 5' is pivoted into this position.

[0089] Figure 26 shows a situation in which the end plug 1 is slid almost completely into the end position in the locking section 6. The pivotable guiding bracket 5' is pivoted such that the guide rail 50 extends parallel to the outer face 32 of the body 3'. The groove 142 is, thus, in meshing connection with the guide rail 50 and has already partly overcome the projection 504.

[0090] Figure 27 shows the end plug 1 in its end position in the locking section 6. The projection 504 of the guide rail 50 of the pivotable guiding bracket 5' is overcome and the bearing pin 14 sits in a conical surface 60 of the locking section 6 and a declining section 62 of the projection 504.

[0091] Figure 28 is a top view of the end plug 1 in this final position in the retention mechanism 2'. Figure 29 is a cross-sectional view taken along the line VIII-VIII of Figure 28. Figure 30 shows the same end position of the end plug 1 in the retention mechanism 2' with half of the housing 3' cut away.

[0092] It will be appreciated that the locking section 58 serves to avoid the insertion of end plugs with the wrong dimensions or shapes. In particular, an end plug having a bearing pin with a diameter that is equal to or less than B_1 will only be insertable in the insertion slot 30 until it abuts the bearing face 584. Such an end plug with a bearing pin that has a too thin diameter will, thus, be received in the bearing pocket 580 and cannot properly be inserted into the retention mechanism 2'. A bearing pin which is too thick, on the other hand, will not be able to pass through the insertion slot 30 since the guide rails 40, 42 prevent such insertion. This prevents the insertion of an incompatible end plug.

[0093] An end plug 1 which is held in its end position in the retention mechanism 2' can be released by reversal of the insertion procedure. Thus, bearing pin 14 is to be released from the locking section 6 by overcoming the projection 504 and sliding the end plug 1 back along the insertion slot 30.

[0094] In the following, a third exemplary embodiment of the retention mechanism is described with reference to Figures 31 to 39.

[0095] In Figure 31, a perspective view of the retention mechanism 2" according to the third embodiment is shown. Furthermore, an end plug 1' is shown, which differs slightly from the end plug 1 shown in the preceding embodiments. The end plug 1' is hollow in the portion of the cylindrical part 10. In other words, the cylindrical part 10 is comprised of a ringshaped hollow cylinder. However, an end plug of the first or second embodiments described above can also be used.

[0096] The retention mechanism 2" of the third embodiment comprises a housing 3" which has an insertion slot 30 having an entrance section 300 and an exit section 302". The insertion slot 30 of the retention mechanism 2" of the third embodiment is basically linear. Entrance section 300 and exit section 302" are thus in line with each other. Inside the insertion slot 30, a guiding section which includes the guiding bracket 5 is arranged. The guiding bracket 5 is, in this third embodiment, integrated with the housing 3". The guiding bracket 5 comprises guide rails 40 which extend along the direction of the insertion slot 30 and is dimensioned such that it enables a meshing engagement of the groove 142 of the end plug 1' when the end plug 1' is inserted into the insertion slot 30.

[0097] The insertion slot 30 has a supporting surface 308 which is divided by the guide rails 40 into an outer section 304 of the support surface 308 and an inner section 306 of the support surface 308. The outer section 304 and the inner section 306 of the support surface 308 are dimensioned such that they can support the first portion 140 and/or third portion 144 of the bearing pin 14 of the end plug 1', respectively.

[0098] As can be seen in Figure 34, the third portion 144 of the end plug 1' is supported in the third embodiment by the inner section 306 of the supporting surface. The bearing pin 14 is, thus, only supported in its third portion 144 (outermost portion) on the supporting surface 306. The guide rails 40, 42 are, however, in meshing engagement with the groove 142 of the bearing pin such that the end plug 1' is secured in its axial direction.

[0099] The situation shown in Figure. 33 is a cross-section taken along the line IX-IX of Figure 32. In Figure 33, the bearing pin 14 of the end plug 1' comes into meshing engagement with the guide rail 40 and slides on top of the outer section 306 of the support surface 308 with its third portion 144. In the cross-section of Figure 33, the locking section 6 is shown, which will become even more clear in connection with Figure 38. The inner section 306 of the support surface 308 has a depression 600 in the vicinity of the locking section 6, the depression being is surrounded by inclined surfaces 602 and 604. At the same time, the guide rail 40 has a descending surface 640 which reaches its lowest point 642 adjacent to the centre of the depression 600. The outer section 304 of the support surface 308 remains on the same level throughout this locking section.

[0100] The design of the guide rails 40 and 42 is shown in Figure 34. The guide rails 40, 42 are situated on the lower support surface 308 and upper support surface 310. The respective support surfaces 308, 310 face each other and form the insertion slot 30. The guide rails 40, 42 have, in this third embodiment, a characteristic shape. The lower guide rail 40 ascends slowly up to a highest platform 644 which then enters into a decent 640 ending at the lowest point 642 of the lower guide rail 40. The descending surface 640 is "phase-shifted" with regard to the inclined surface 602, as shown in Figure 33. The phase shift is determined by the difference of diameters of the groove 142 and the third portion 144 of the end plug 1'. The upper guide rail 42 extends more or less parallel to the upper supporting surface 310 and descends at a descent 650 parallel to the descending face 640 of the lower rail 40. The lowest portion 642 of the lower rail 40 is parallel to the lowest section 652 of the upper rail 42. Between the guide rails 40, 42, the guide slot 7 is situated.

[0101] The minimum spacing or distance l_2 between the lower rail 40 and the upper rail 42 corresponds to the diameter D_2 of the groove 142 of the end plug 1'. This minimum distance l_2 between the lower rail 40 and the upper guide rail 42 is kept perpendicular to the respective surfaces of the lower rail 40 and upper guide rail 42 at

all times. In other words, only a pin with a maximum diameter of l_2 can be slid through the gap provided between the lower guide rail 40 and the upper guide rail 42.

[0102] The geometry of the guide rails 40, 42 in relation with the outer section 304 of the supporting surface and the inner section 306 of the supporting section is shown, once more, in Figure 35, which is a cross-section taken along the line X-X of Figure 34.

[0103] Figure 36 shows the end plug 1' in its end position in the locking section 6. The bearing pin 14 of the end plug 1' sits with its third portion 144 in the depression 600 of the locking section 6. The groove 142 of the bearing pin 14 is partly released from the friction of the guide rail 40 in the direction perpendicular to the axis of the bearing pin 14. This can be seen in Figure 37, which is a cross-sectional view along the line XI-XI of Figure 36.

[0104] In Figure 37, it is shown that the third portion 144 as well as the first portion 140 of the bearing pin 14 are supported on the inner section 306 and the outer section 304 of the supporting surface, respectively. A gap is present between the groove 142 and the lower portion 642 of the lower guide rail 40. The end plug 1' is, therefore, only supported in the direction perpendicular to the guide pin 14 by the support surfaces 304 and 306. This results in particularly low friction of the bearing pin 14 when gliding along the insertion slot 30. In the axial direction of the bearing pin 14, the end plug 1' is secured by the lowest portion 642 of the lower guide rail 40 as well as by the lowest portion 652 of the upper guide rail 42.

[0105] In Figure 37, it is shown that the upper supporting surface 310, as shown in Figure 34, follows the shape of the upper guide rail 42 along its inner section 316. Thus, the inner section 316 of the upper support surface 310 also has a descent in the area of the descent 650 of the upper guide rail 42. The outer section 314 of the upper support surface 310 remains, however, on the same level throughout the insertion slot 30.

[0106] The geometry of the locking section 6 is also shown in Figure 38, which is a perspective view of the retention mechanism 2" of the third embodiment. Here, parts of the housing 3" are broken away. The lower support surface 308 and the upper support surface 310 are shown. Furthermore, the descent 318 of the inner section 316 of the upper surface 310 is shown. This descent 318 extends parallel to the descent of the upper guide rail 42.

[0107] An end plug 1 which is held in its end position in the retention mechanism 2" can be released by reversal of the insertion procedure. Thus, bearing pin 14 is to be released from the locking section 6 by overcoming the projection 504 and sliding the end plug 1 back.

[0108] Figure 39 shows a cross-section of the end plug 1' sitting in its end position in the locking section 6 with the third portion 144 of the bearing pin 14 sitting in the depression 600 pressed against the inclined surface 604 of the depression 600, on the one side, and, on the other side, the descending surface 642 of the lower guide rail 40 presses against the groove 142 of the bearing pin. The bearing pin and, thus, the end plug 1' are fixed in this position due to gravity and its shape. The end plug 1' is fixed in both directions and cannot move along the insertion slot 30 as long as gravity and a shape lock engagement keep it in the depression 600.

[0109] In case an end plug with inappropriate dimensions is inserted into the insertion slot 30, it will be rejected. Should the bearing pin have a diameter along its whole length which resembles the diameter of the groove, the bearing pin would slide through the insertion slot 30 completely. It would simply enter the retention mechanism at the entrance section 300 and exit at the exit section 302".

[0110] Should a bearing pin with the outer dimensions of the end plug 1' be entered into the insertion slot 30, the guide rails 40, 42 would prohibit that the end plug is slid through the insertion slot 30. In both cases, the end plug cannot be fixed at the required end position. In this manner, it is ensured that only end plugs with bearing pins having appropriate dimensions can be inserted into the retention mechanism. This helps to ensure that only material rolls with proper properties are inserted into the dispensing apparatus. It is, thus, prohibited that the dispensing apparatus is used with materials of the wrong specifications which may lead to clogging or the destruction of the apparatus.

[0111] The following numbered paragraphs set out particular combinations of features which are considered relevant to particular embodiments of the present disclosure.

1. Retention mechanism (2, 2', 2") in a dispenser for retaining an exchangeable roll of material, the retention mechanism comprising:

- a housing (3, 3', 3") with an insertion slot (30) for insertion of a bearing pin (14) of the exchangeable roll, said insertion slot having an entrance section (300) and an exit section (302, 302''),
- a guiding bracket (5, 5') arranged in the housing, said guiding bracket having a guiding slot (7) for guiding the bearing pin and a locking section (6) for locking the bearing pin in an end position,
- the guiding bracket being configured such that only a bearing pin with appropriate dimensions can be locked.

2. Retention mechanism according to paragraph 1, characterised in that the guiding bracket is configured such that a bearing pin with inappropriate dimensions either cannot be slid through the guiding slot or cannot be locked in the locking section.

3. Retention mechanism according to paragraphs 1 or 2, characterised in that guide rails (50, 52) for meshing engagement with a groove (142) of the bearing pin are arranged along at least a portion of the guiding slot.

4. Retention mechanism according to any one of the preceding paragraphs, characterised in that a guide rail for meshing engagement with a groove of the bearing pin extends along at least a portion of the insertion slot of the housing.

5. Retention mechanism according to paragraph 4, characterised in that the guide rail is arranged such that it guides a bearing pin to enter the guiding bracket.

6. Retention mechanism according to any one of the preceding paragraphs, characterised in that the locking section comprises at least one projection (504) projecting in a direction perpendicular or parallel to the axial direction of a bearing pin.

7. Retention mechanism according to any one of the preceding paragraphs, characterised in that the insertion slot forms two supporting surfaces (308, 310) for supporting a bearing pin when being slid through the insertion slot, the two supporting surfaces being arranged such that they face each other.

8. Retention mechanism according to paragraph 7, characterised in that guide rails extend along the insertion slot in an direction perpendicular to the supporting surfaces.

9. Retention mechanism according to paragraph 8, characterised in that the guide rails have a minimum spacing (l_2) in the direction perpendicular to a support surface that corresponds to a diameter (D_2) of a groove in a bearing pin.

10. Retention mechanism according to paragraph 8 or 9, characterised in that the support surfaces have a minimum spacing (l_1) in a direction perpendicular to a support surface that corresponds to an outer diameter of a bearing pin.

11. Retention mechanism according to any one of the preceding paragraphs, characterised in that the guiding bracket is integrated with the housing.

12. Retention mechanism according to paragraph 11, characterised in that the insertion slot forms an upper and a lower support surface, the support surfaces facing each other, whereas the locking section comprises a depression (600) in the lower support surface for receiving a portion of a bearing pin.

13. Retention mechanism according to paragraph 11 or 12, characterised in that an upper and a lower guide rail (50, 52) extend along a portion of the insertion slot, the lower guide rail having a descending portion (640) in the locking section.

14. Retention mechanism according to paragraph 12 and 13, characterised in that the depression in the lower supporting surface and the descending portion of the guide rail are arranged in a relationship such that a bearing pin can be received in the depression without touching the upper surface of the guide rail.

15. Retention mechanism according to paragraph 13 or 14, characterised in that the support surface is intersected by the guide rails into two sections (304, 306) and the depression is situated one section (306) only.

16. Retention mechanism according to paragraph 15, characterised in that the section comprising the depression extends further into the insertion slot with respect to the other section in the proximity of the depression.

17. Retention mechanism according to any one of paragraphs 12 to 16, characterised in that the sections of the upper supporting surface are shaped basically in the same manner as that of the sections of the lower supporting surfaces.

18. Retention mechanism according to any one of paragraphs 13 to 17, characterised in that the upper and lower guide rails are arranged such that they basically follow each other and the distance (l_2) between the guide rails does not run under a predetermined value.

19. Retention mechanism according to any one of paragraphs 1 to 10, characterised in that the guiding bracket is pivotable with respect to the housing between an insertion position and a locking position, whereas in the insertion position the exit section of the insertion slot is left open.

20. Retention mechanism according to paragraph 19, characterised in that the pivotable guiding bracket is pre-tensioned into the insertion position.

21. Retention mechanism according to paragraphs 19 or 20, characterised in that the guiding bracket is arranged such that the depth (1) of a first section of the insertion slot is less than the distance between the outer wall (32) of the housing and a section (6) of the guiding slot of the guiding bracket in its insertion position.

22. Retention mechanism according to any one of paragraphs 19 to 21, characterised in that the guide rails of the guiding bracket have a sliding section (502) that extends basically parallel to the plane of the bracket and an insertion section (500) of the guide rails that is angled with respect to the sliding

section.

23. Retention mechanism according to paragraph 22, characterised in that the angle between the sliding section and the insertion section of the guide rails corresponds to the pivoting angle between the insertion position and the locking position of the pivotable guiding bracket.

24. Retention mechanism according to any one of paragraphs 19 to 23, characterised in that the locking section comprises a conical surface (60) to receive a portion (144) of a bearing pin.

25. Retention mechanism according to any one of paragraphs 19 to 24, characterised in that the pivotable guiding bracket comprises a blocking section (58) for blocking the insertion of a bearing pin of inappropriate dimensions into the guiding slot.

26. Retention mechanism according to paragraph 25, characterised in that the blocking section has a bearing pocket (580) for receiving a bearing pin of a low diameter.

27. Retention mechanism according to paragraph 25 or 26, characterised in that the blocking section comprises inclined surfaces (582) for cooperating with an appropriately dimensioned bearing pin, the inclined surfaces acting, when pushed away by an appropriately dimensioned bearing pin, to pivot the guiding bracket in a sliding position such that a bearing pin can be inserted into the guiding slot.

28. Retention mechanism according to any one of paragraphs 19 to 27, characterised in that the housing comprises a recess (34, 34') adapted to receive the pivotable guiding bracket.

29. Retention mechanism according to paragraph 28, characterised in that the recess defines a supporting structure (340, 342) for the pivotable guiding bracket in its locking position.

30. Retention system comprising the retention mechanism according to any one of the paragraphs 1 to 29 and an end plug (1, 1') for a roll of material to be retained in the retention mechanism, the end plug having a receiving portion (10) with dimensions to fit into a hollow core of the roll of material and a bearing pin (14), the bearing pin having a first diameter (D_1) and a circumferential groove (142) of a second diameter (D_2), the second diameter being smaller than the first diameter, the dimensions of the end plug being such that the bearing pin is insertable into the insertion slot (30) and the guiding slot (7) and is lockable in its end position with respect to the receiving mechanism in the locking section (6) of the guiding bracket.

31. Use of the combination of the retention mechanism and the end plug according to paragraph 30 for fitting the plug into a hollow core of a roll of material, in particular a paper towel roll or a tissue paper roll, and retaining the roll of material in a dispenser unit.

32. Dispenser unit for exchangeable paper rolls, in particular paper towel rolls or tissue paper rolls, comprising:

- housing; and
- laterally extending receiving means for mounting an retention mechanism according to any one of paragraphs 1 to 29.

33. Method for inserting an exchangeable roll of material comprising at least one end plug (1, 1') having a bearing pin (14), the bearing pin having a first diameter (D_1) and a circumferential groove (142) of a second diameter (D_2), the second diameter being smaller than the first diameter, into a retention mechanism according to any one of the paragraphs 1 to 29, comprising the steps:

- Placing the bearing pin of the end plug into the entrance section (300) of the insertion slot (30) of the retention mechanism;
- Sliding the bearing pin into a position where the groove comes into meshing engagement with the guiding slot (7); and
- Sliding the bearing pin further along the guiding slot and locking it in its end position in the locking section (6).

34. Method according to paragraph 33, characterised in that the groove of the bearing pin is brought into meshing engagement with a guide rail (50, 52) of the guiding bracket.

35. Method according to paragraph 33 or 34, characterised in that a portion of the bearing pin pushes away a blocking section (58) of the guiding bracket.

36. End plug (1, 1') for a roll of material to be inserted into a retention mechanism according to any one of paragraphs 1 to 29, comprising:

- a receiving portion (10) with dimensions to fit into a hollow core of the roll of material; and
- a bearing pin (14) having at least two portions of different outer diameters, a first portion (140) with a larger diameter (D_1) and a second portion (142) with a smaller diameter (D_2) than the first diameter portion.

37. End plug according to claim 36, wherein the first and second portions (140, 142) are contiguous with each other.

38. End plug according to paragraph 36 or 37, wherein the first portion (140) has an outer diameter of at least 5mm and the second portion (142) has an outer diameter of 3,5mm or less.

39. End plug according to any of the paragraphs 36 to 38, further comprising a flange-shaped member (12) around the receiving portion (10) to limit the depth of insertion of the receiving portion into the hollow core of the roll of material.

40. End plug according to any of the paragraphs 36 to 39, characterized in that the end plug (1) is integrally extruded from plastics material, especially PP or PE.

41. Retention system comprising the retention mechanism according to any one of the paragraphs 1 to 29 and the end plug according to any one of paragraphs 36 to 40.

Claims

1. Retention mechanism (2, 2', 2") in a dispenser for retaining an exchangeable roll of material, the retention mechanism comprising:

- a housing (3, 3', 3") with an insertion slot (30) for insertion of a bearing pin (14) of the exchangeable roll, said insertion slot having an entrance section (300) and an exit section (302, 302"),
- a guiding bracket (5, 5') arranged in the housing, said guiding bracket having a guiding slot (7) for guiding the bearing pin and a locking section (6) for locking the bearing pin in an end position,
- the guiding bracket being configured such that only a bearing pin with appropriate dimensions can be locked.

2. Retention mechanism according to claim 1, **characterised in that** the guiding bracket is configured such that a bearing pin with inappropriate dimensions either cannot be slid through the guiding slot or cannot be locked in the locking section.

3. Retention mechanism according to claims 1 or 2, **characterised in that** guide rails (50, 52) for meshing engagement with a groove (142) of the bearing pin are arranged along at least a portion of the guiding slot.

4. Retention mechanism according to any one of the preceding claims, **characterised in that** a guide rail for meshing engagement with a groove of the bearing pin extends along at least a portion of the insertion slot of the housing.

5. Retention mechanism according to claim 4, **characterised in that** the guide rail is arranged such that it guides a bearing pin to enter the guiding bracket.

6. Retention mechanism according to any one of the preceding claims, **characterised in that** the locking section comprises at least one projection (504) projecting in a direction perpendicular or parallel to the axial direction of a bearing pin.

7. Retention mechanism according to any one of the preceding claims, **characterised in that** the insertion slot forms two supporting surfaces (308, 310) for supporting a bearing pin when being slid through the insertion slot, the two supporting surfaces being arranged such that they face each other.

8. Retention mechanism according to any one of claims 1 to 7, **characterised in that** the guiding bracket is pivotable with respect to the housing between an insertion position and a locking position, whereas in the insertion position the exit section of the insertion slot is left open.

9. Retention mechanism according to claim 8, **characterised in that** the pivotable guiding bracket is pretensioned into the insertion position.

10. Retention mechanism according to claims 8 or 9, **characterised in that** the guiding bracket is arranged such that the depth (1) of a first section of the insertion slot is less than the distance between the outer wall (32) of the housing and a section (6) of the guiding slot of the guiding bracket in its insertion position.

11. Retention mechanism according to any one of claims 8 to 10, **characterised in that** the guide rails of the guiding bracket have a sliding section (502) that extends basically parallel to the plane of the bracket and an insertion section (500) of the guide rails that is angled with respect to the sliding section.

12. Retention mechanism according to claim 11, **characterised in that** the angle between the sliding section and the insertion section of the guide rails corresponds to the pivoting angle between the insertion position and the locking position of the pivotable guiding bracket.

13. Retention mechanism according to any one of claims 8 to 12, **characterised in that** the locking section

comprises a conical surface (60) to receive a portion (144) of a bearing pin.

14. Retention mechanism according to any one of claims 8 to 13, **characterised in that** the pivotable guiding bracket comprises a blocking section (58) for blocking the insertion of a bearing pin of inappropriate dimensions into the guiding slot.

15. Retention mechanism according to claim 14, **characterised in that** the blocking section has a bearing pocket (580) for receiving a bearing pin of a low diameter.

16. Retention mechanism according to claim 14 or 15, **characterised in that** the blocking section comprises inclined surfaces (582) for cooperating with an appropriately dimensioned bearing pin, the inclined surfaces acting, when pushed away by an appropriately dimensioned bearing pin, to pivot the guiding bracket in a sliding position such that a bearing pin can be inserted into the guiding slot.

17. Retention mechanism according to any one of claims 8 to 16, **characterised in that** the housing comprises a recess (34, 34') adapted to receive the pivotable guiding bracket.

18. Retention mechanism according to claim 17, **characterised in that** the recess defines a supporting structure (340, 342) for the pivotable guiding bracket in its locking position.

19. Retention system comprising the retention mechanism according to any one of the claims 1 to 18 and an end plug (1, 1') for a roll of material to be retained in the retention mechanism, the end plug having a receiving portion (10) with dimensions to fit into a hollow core of the roll of material and a bearing pin (14), the bearing pin having a first diameter (D_1) and a circumferential groove (142) of a second diameter (D_2), the second diameter being smaller than the first diameter, the dimensions of the end plug being such that the bearing pin is insertable into the insertion slot (30) and the guiding slot (7) and is lockable in its end position with respect to the receiving mechanism in the locking section (6) of the guiding bracket.

20. Use of the combination of the retention mechanism and the end plug according to claim 19 for fitting the plug into a hollow core of a roll of material, in particular a paper towel roll or a tissue paper roll, and retaining the roll of material in a dispenser unit.

21. Dispenser unit for exchangeable paper rolls, in particular paper towel rolls or tissue paper rolls, comprising:

- housing; and
- laterally extending receiving means for mounting an retention mechanism according to any one of claims 1 to 18.

22. Method for inserting an exchangeable roll of material comprising at least one end plug (1, 1') having a bearing pin (14), the bearing pin having a first diameter (D_1) and a circumferential groove (142) of a second diameter (D_2), the second diameter being smaller than the first diameter, into a retention mechanism according to any one of the claims 1 to 18, comprising the steps:

- Placing the bearing pin of the end plug into the entrance section (300) of the insertion slot (30) of the retention mechanism;
- Sliding the bearing pin into a position where the groove comes into meshing engagement with the guiding slot (7) ; and
- Sliding the bearing pin further along the guiding slot and locking it in its end position in the locking section (6).

Fig. 1

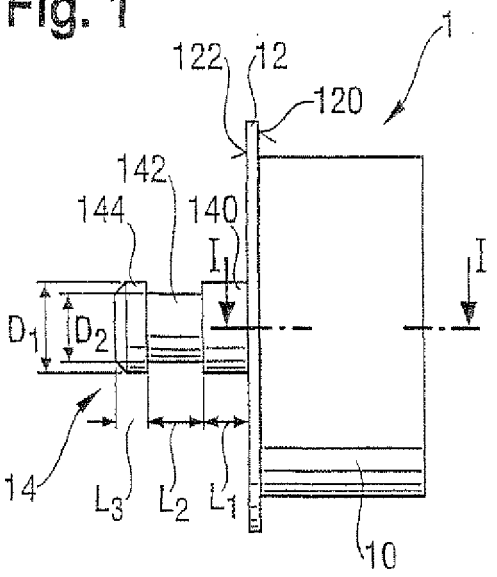


Fig. 2

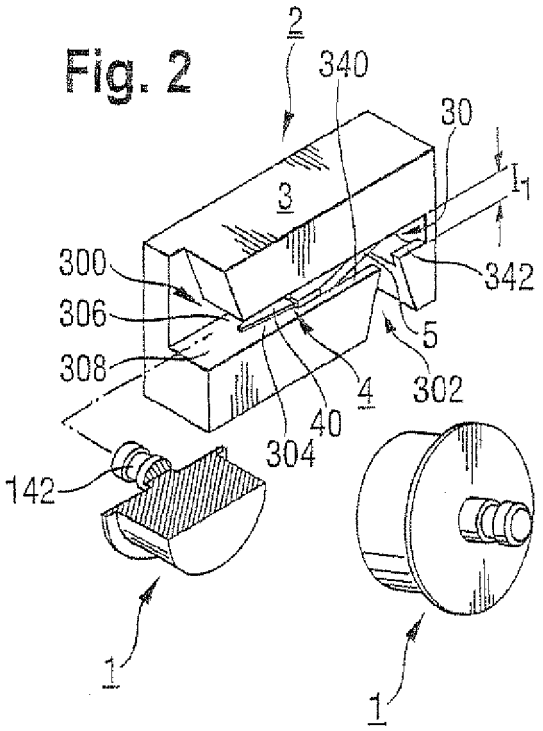


Fig. 3

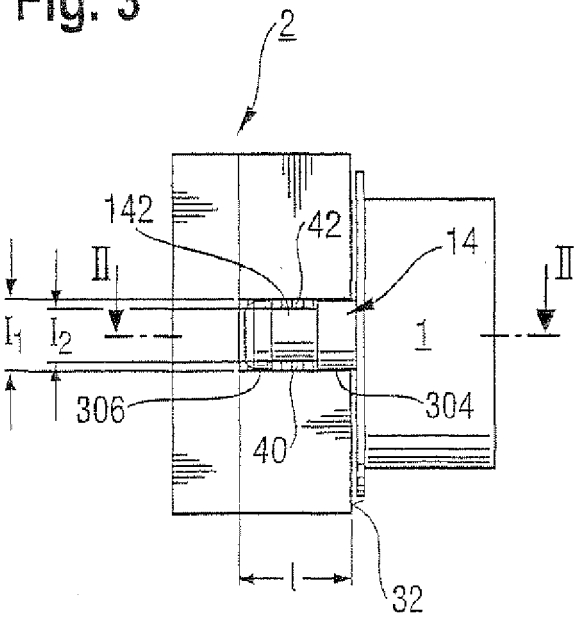


Fig. 4

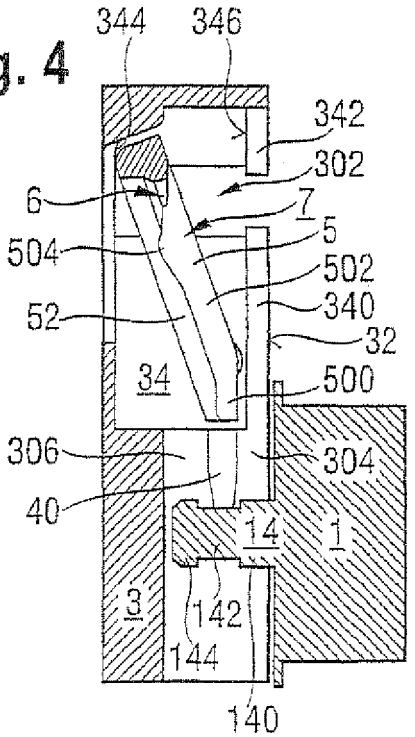


Fig. 5

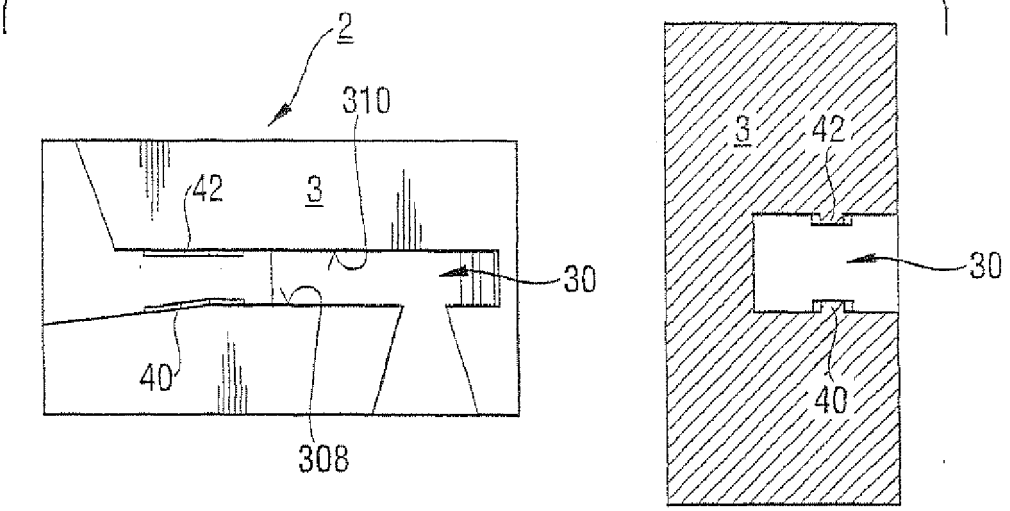
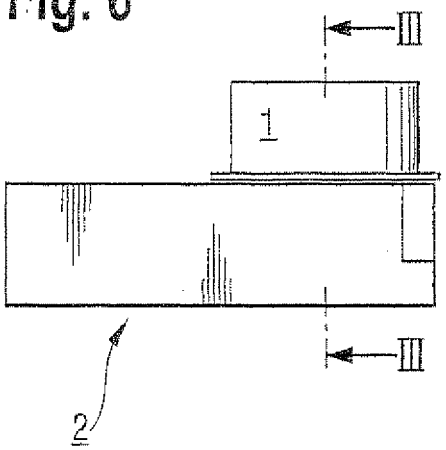


Fig. 6



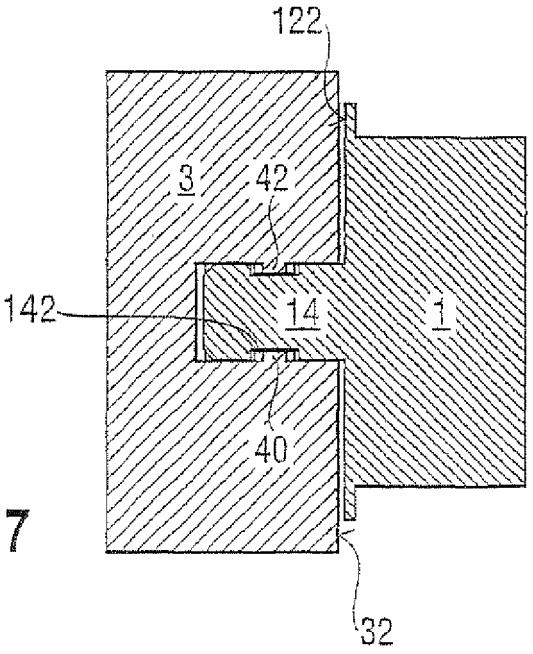


Fig. 7

Fig. 8

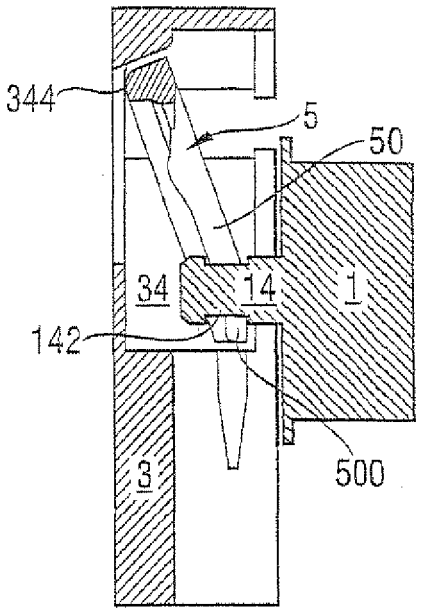


Fig. 9

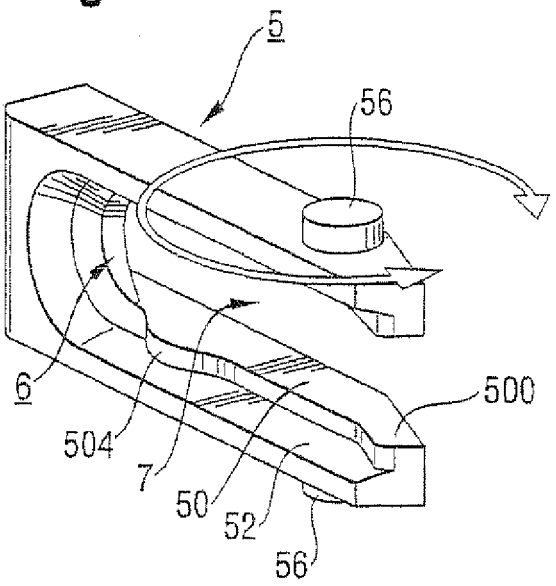


Fig. 10

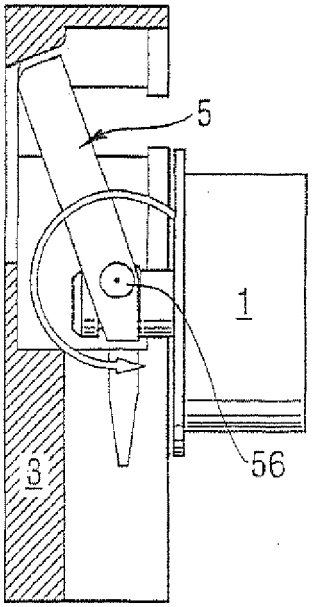


Fig.11

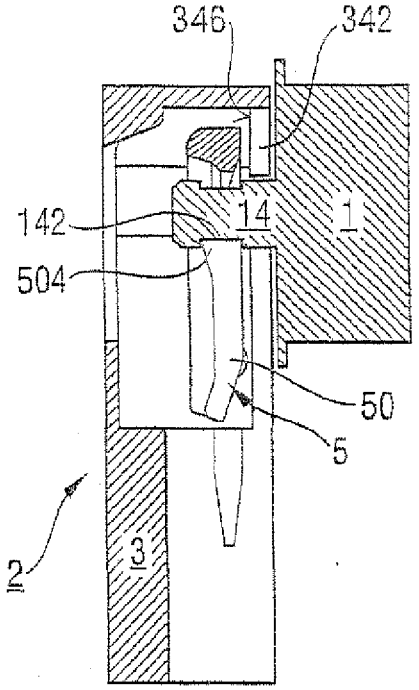


Fig.12

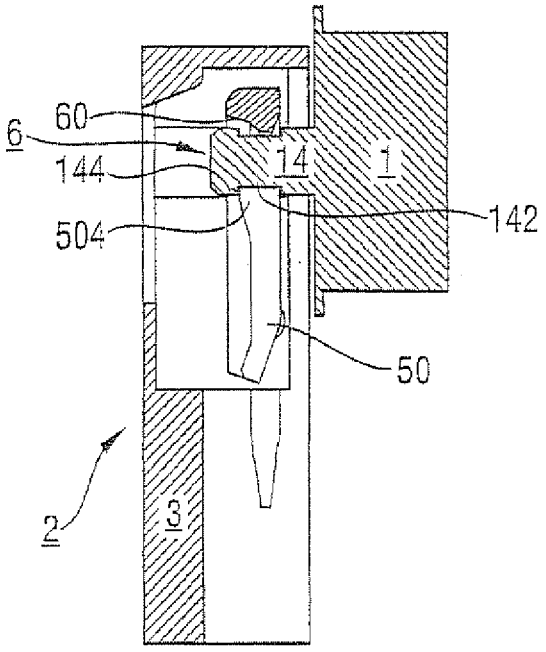


Fig. 13

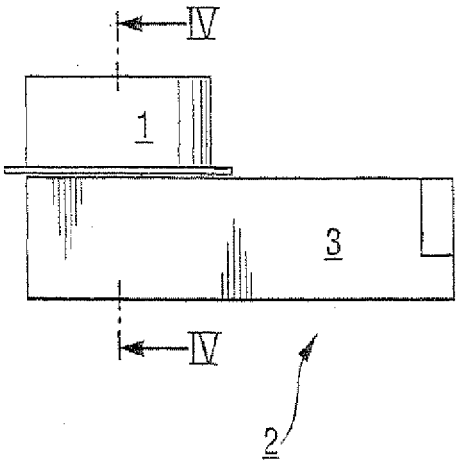


Fig. 14

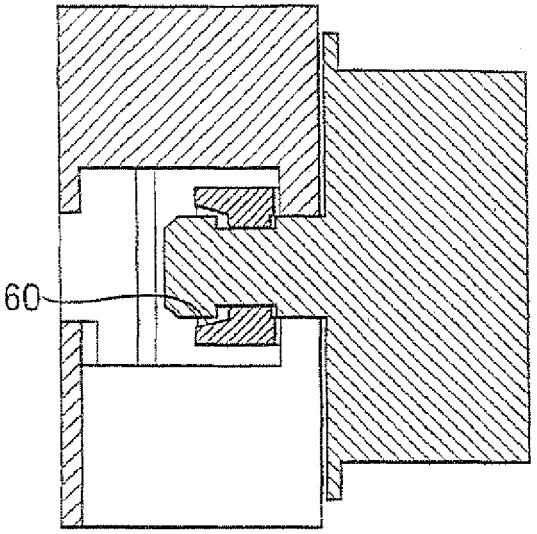


Fig. 15

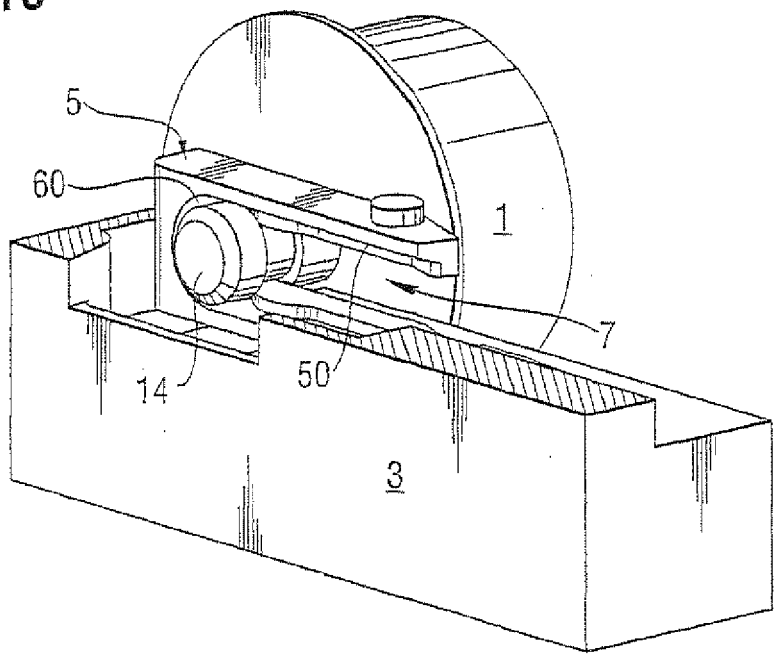


Fig. 16

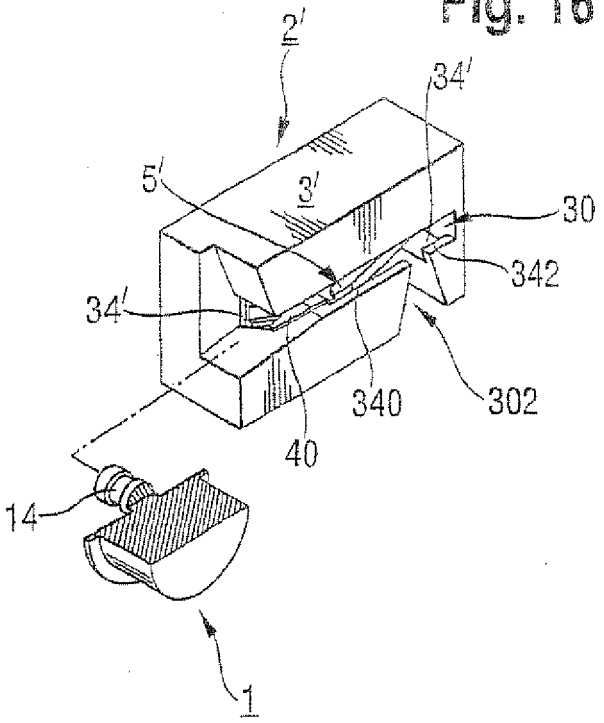


Fig. 17

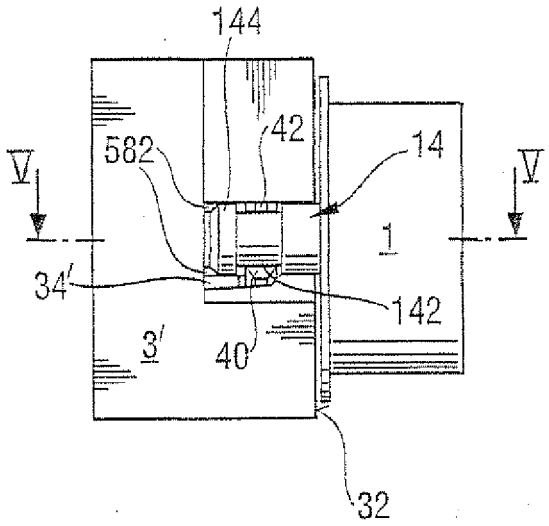


Fig. 18

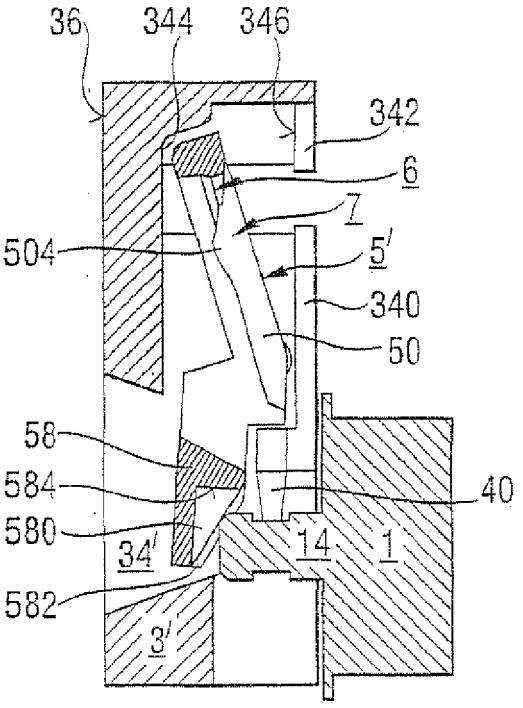


Fig. 19

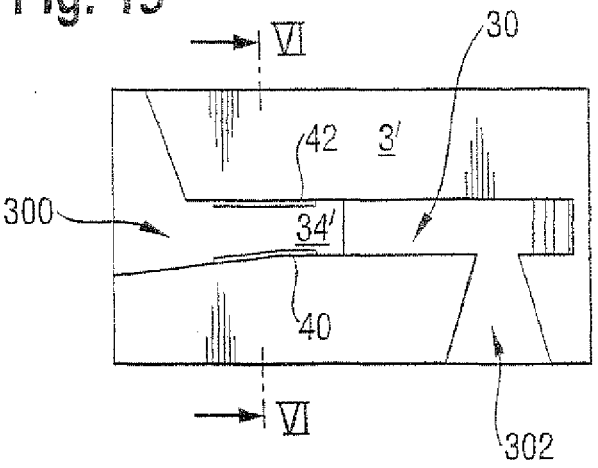
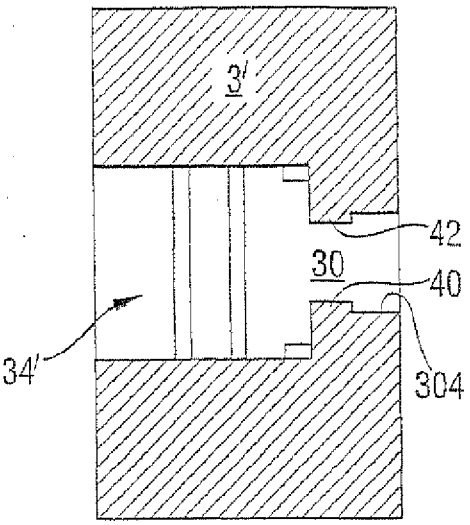


Fig. 20



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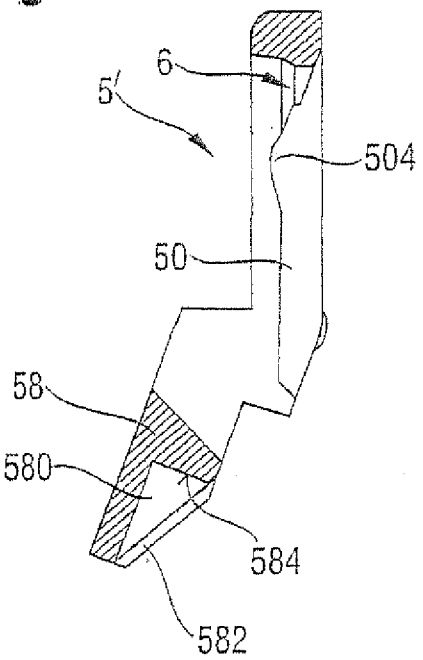

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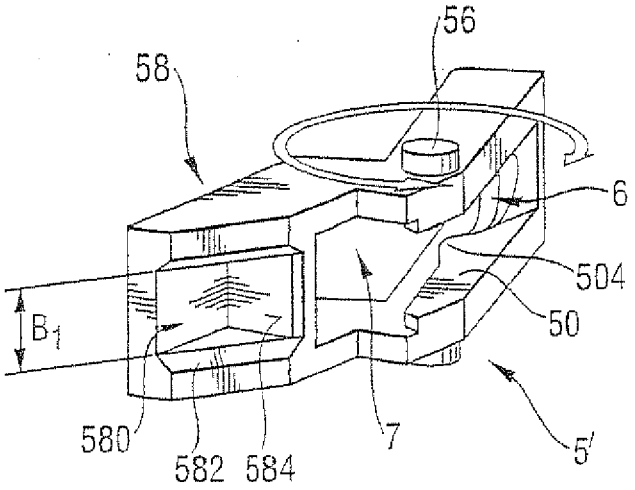

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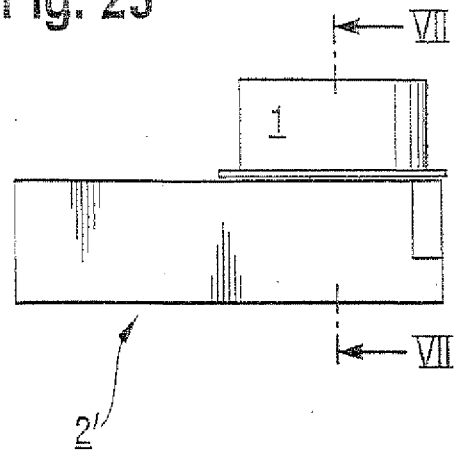

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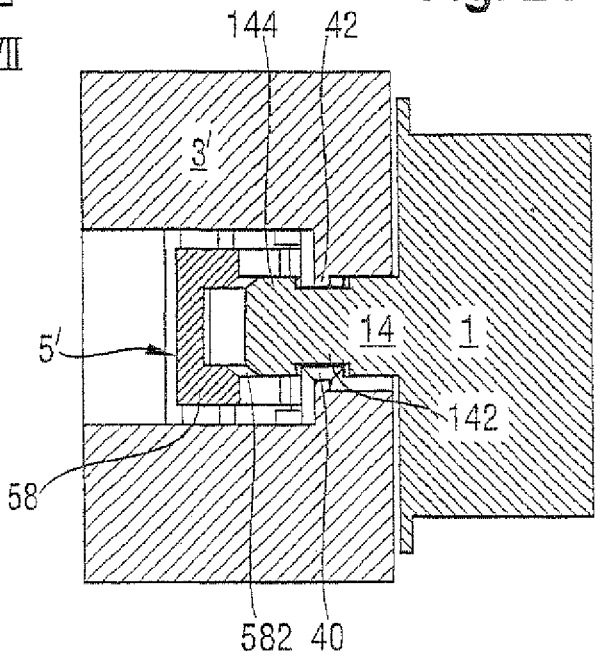


Fig. 25

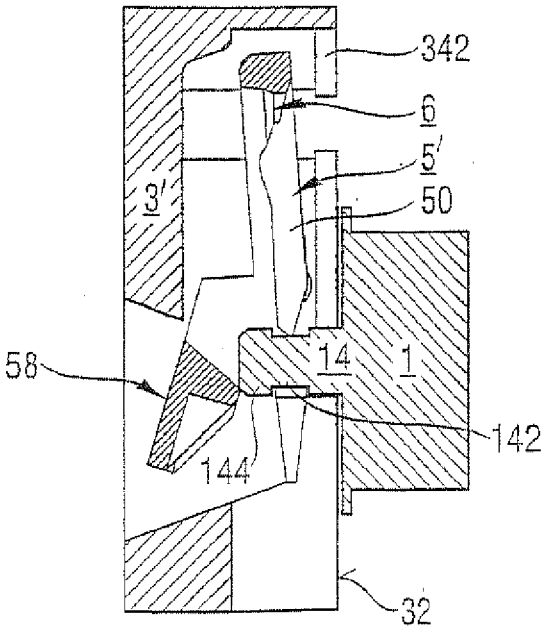


Fig. 26

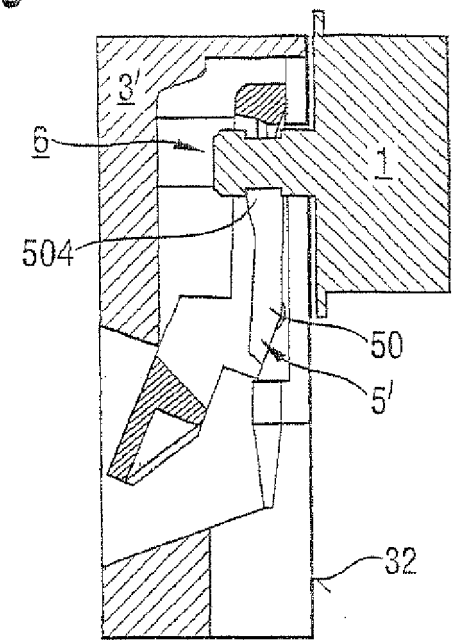
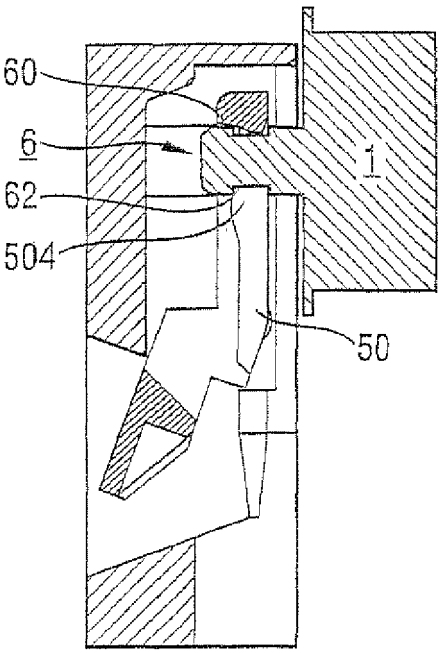


Fig. 27



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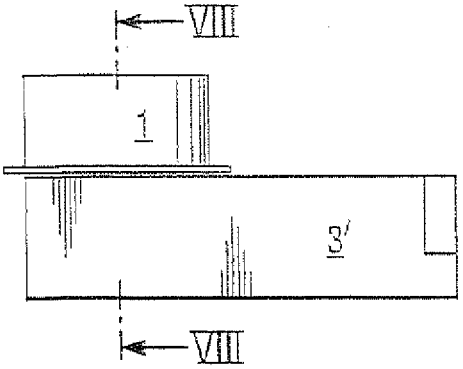


Fig. 29

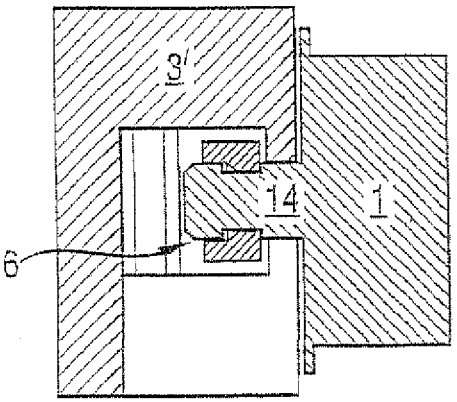


Fig. 30

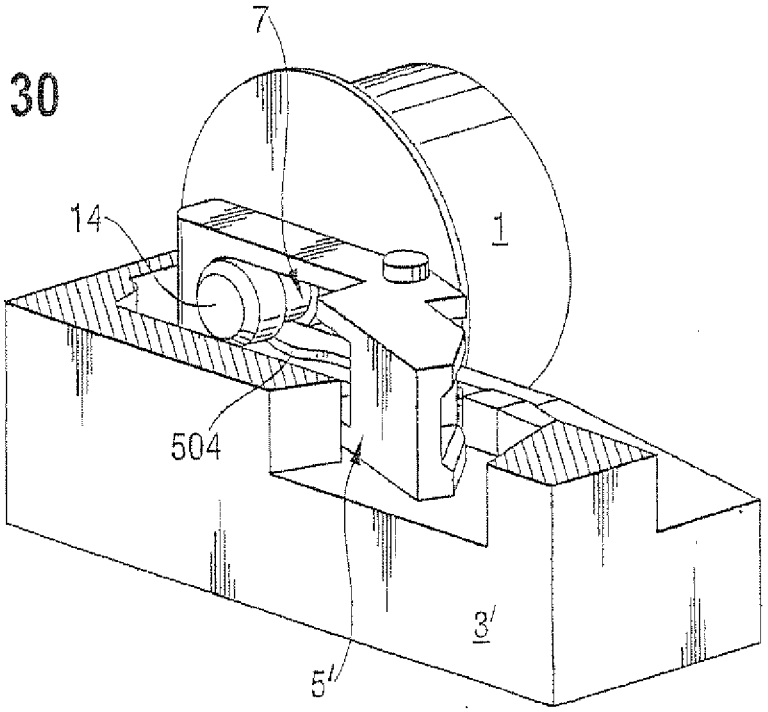


Fig. 31

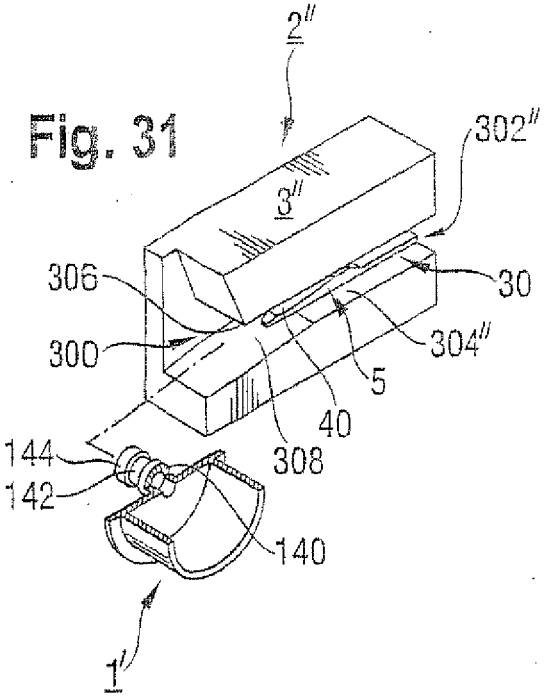
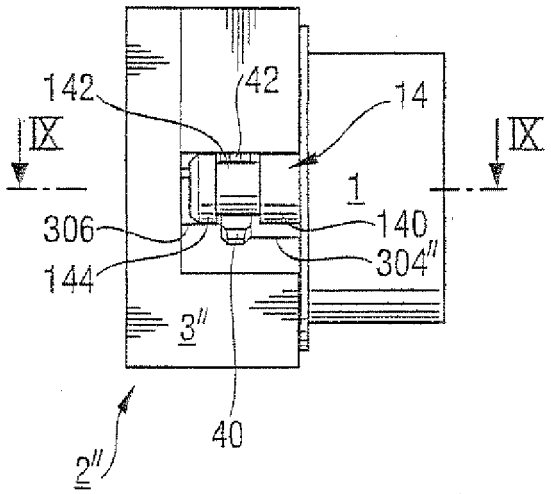


Fig. 32



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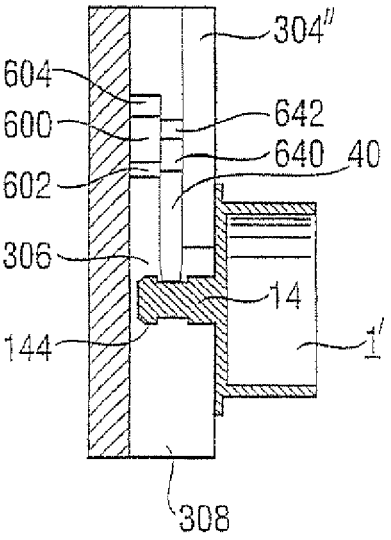


Fig. 34

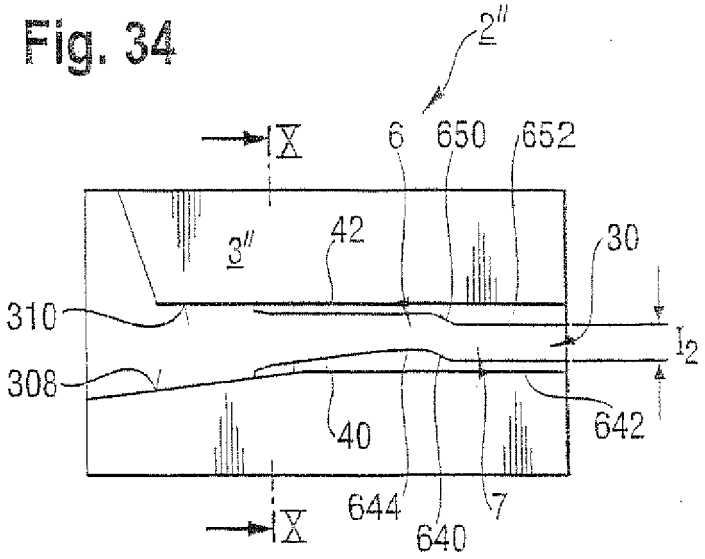


Fig. 35

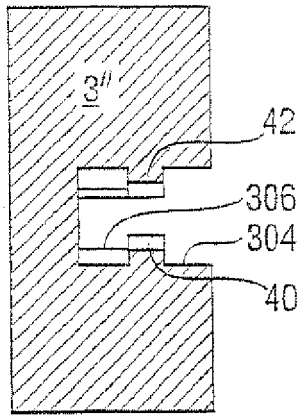


Fig. 36

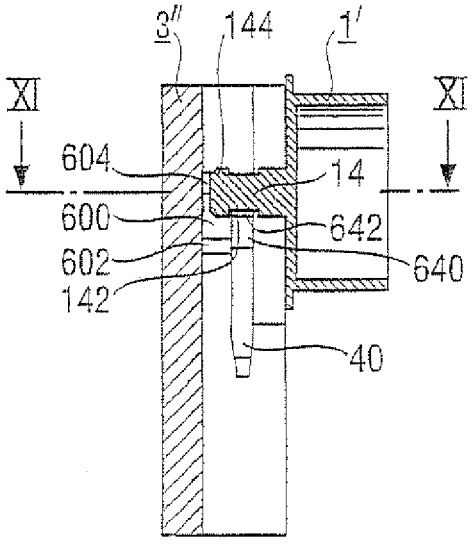
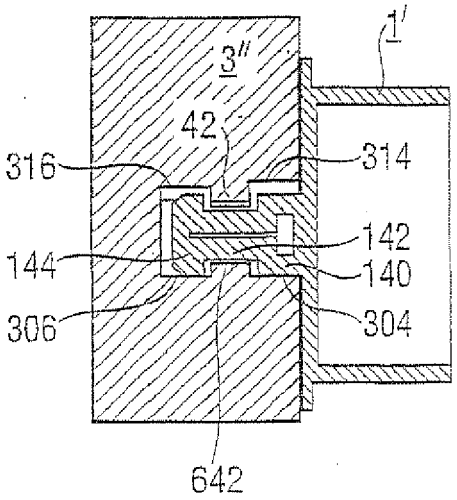


Fig. 37



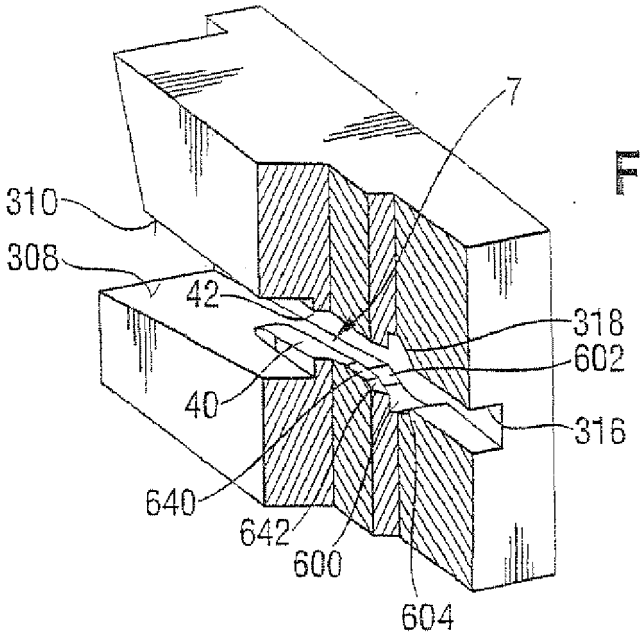

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Fig. 38

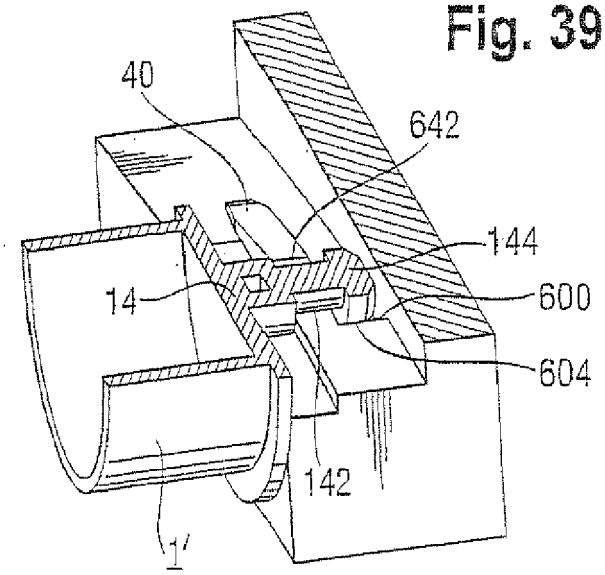
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Fig. 39

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EUROPEAN SEARCH REPORT

Application Number
EP 10 17 9326

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 February 2011	Kising, Axel

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1

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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