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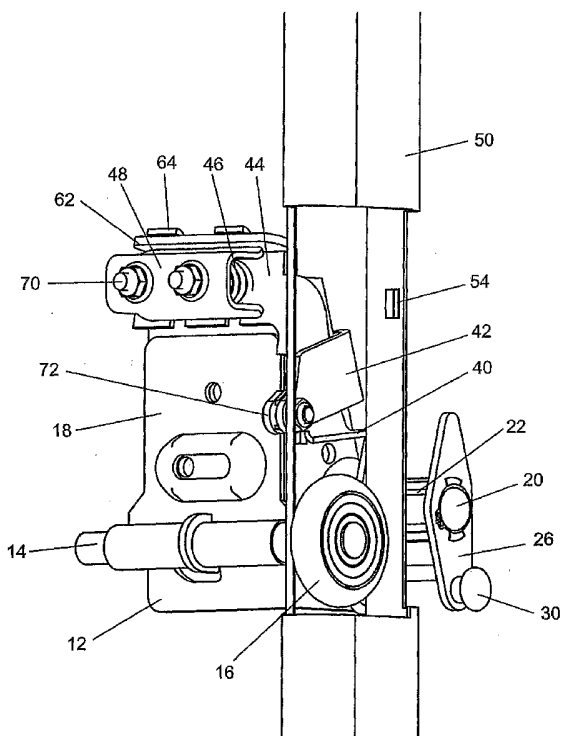
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(54) Title: DEVICE FOR SECURING A GARAGE DOOR



(57) Abstract: The present invention relates to a bottom bracket for fall arrest of a garage door, where the bottom bracket is arranged to a door leaf of the garage door and set up to be connected to a suspension wire (52) from the spring suspension of the garage door, comprising an L-shaped corner plate (12), fastened adjoining a side edge of said door leaf, with a bolt (14) and a pulley wheel (16) fastened to the one side edge of the corner plate (12), set up to roll in an adjoining side rail (50) of the garage door, and where the corner plate (12) on its other side edge comprises a rotatable fall arrest unit (22;222;322) with a locking edge (34;234) that, under the influence of a spring force, is set up to engage with the side rail (50) to stop or brake the garage door if the suspension wire (52) breaks or becomes loose. The fall arrest unit (22;222;322) is rotatable arranged to a suspension bolt (20;220;320) fastened on the side edge of the corner plate against the side rail, as the locking edge (34;234) is placed diagonally and directed downwards at a distance adjoining and against wall fastening side of the side rail (50), where said suspension wire (52) is eccentrically connected to the fall arrest unit (22;222;322) in relation to its mounting point, and contributes to maintaining the locking edge (34;234) at a given distance from the wall fastening side of the side rail (50) when the suspension wire (52) is taut, and the bottom bracket comprises spring means (46;146;246,346) arranged to rotate the fall arrest unit (22;222;322) so that the locking edge (34;234) engages with an outwardly extending protrusion (54) on the wall fastening side of the side rail (50), if the suspension wire (52) breaks or becomes loose.

WO 2006/068498 A1

Device for securing a garage door.

The present invention relates to a bottom bracket for fall arresting a garage door, where the bottom bracket is fixed to a leaf of the garage door and
5 arranged to be connected to a suspension wire from the spring suspension of the garage door, comprising an L-shaped corner plate, fastened adjacent to a side edge of said door leaf, with a bolt and a pulley wheel, fastened to the one side edge of the corner plate, arranged to roll in an adjoining side rail of the garage door, and where the corner plate comprises, on its other side edge, a
10 rotatable fall arrest unit with a locking edge, which, under the influence of a spring force, is set up to engage with the side rail to stop or to brake the garage door if the suspension wire breaks or becomes loose. The invention also relates to a side rail for use with a bottom bracket as described.

15 In particular, the invention relates to a bottom bracket on a garage door that is arranged to safeguard the door from falling down if there is a break in one single component in the suspension or the balancing system for the door. The mechanism shall satisfy the new safety requirements that are to come into force. These safety requirements are specified in NS-EN 12604, and are a
20 standard that shall be valid as a requirement from 2005.

From prior art, DK B 162787, amongst others, shall be mentioned. This document concerns a catching mechanism for a garage door that is connected to a drive device, and where the catching mechanism comprises a housing with
25 a spring loaded locking arm with a locking edge that is swung out if the suspension wire breaks. The locking edge is swung out and engages with catching openings in a catching rail fitted internally of the catching mechanism and the side rails, i.e. the catching rail is fitted to the garage wall.

30 Furthermore, EP 1199432 A1 relates to a braking mechanism for a garage door, where the braking mechanism is fitted to a side in the door opening and where the braking mechanism works with a locking element fastened to the garage door inside the pulley wheel that runs in the side rail. The locking element is swung out if the suspension wire breaks and engages with the
35 braking mechanism fastened to the wall.

As an example of prior art, SE B 463628 shall also be mentioned, where a safety appliance for a garage door with moving doorplates is mentioned.

The object of the invention is to provide a device for fall arresting that is simple to produce, easy to fit and which further fall arrests garage doors with respect to present and new standards.

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According to one aspect of the present invention, a bottom bracket is provided as described in the independent claim 1, in that the fall arrest unit is rotatable fitted to a suspension bolt fastened to the side edge of the corner plate against the side rail, as the locking edge is placed across and directed downwards at a distance, adjoining and against the wall fastening side of the side rail, that said suspension wire is eccentrically connected to the fall arrest unit in relation to its mounting point, and contributes to maintain the locking edge at a given distance from the wall fastening side of the side rail when the suspension wire is taut and that the bottom bracket comprises spring means arranged to rotate the fall arrest unit so that the locking edge engages with an outwardly extending protrusion on the wall fastening side of the side rail if the suspension wire breaks or becomes loose.

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Alternative preferred embodiments are characterised by the dependent claims 2-11. The suspension bolt can be shaped as a bolt or a spike and the fall arrest unit can comprise one or more openings or recesses arranged for a rotatable fastening of the fall arrest unit to the suspension bolt. The fall arrest unit preferably comprises at least one holding arm arranged to be supplied a force from said spring means.

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The fall arrest unit can be formed as at least one partial sleeve part and incorporates holding arms lying on the outside on each side, where at least the one holding arm constitutes a wire safeguarding arm and comprises fastening means for connection to the suspension wire and also that the locking edge is arranged diagonally and directed downwards centrally in the fall arrest unit.

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Alternatively the fall arrest unit can be formed in a partial U-shape, where an inner part comprises, on its lower part, the locking edge, where the locking edge is arranged diagonally and directed downward centrally in the fall arrest unit, and that the side edges are made up of the holding arm and the fastening means for fastening of the suspension wire.

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The corner plate can comprise a holding edge which at least one of the holding arms is arranged to lie against, when the fall arrest unit is in a passive position due to the pull in the wire of the suspension wire, and that said spring means comprises a spring which is arranged to rotate the fall arrest unit so that the locking edge engages with the protrusion on the side rail if the suspension wire
5 breaks or becomes loose. The spring can be fastened to or adjoining the holding edge and to an upper part of the holding arm arranged to spring load the holding arm.

10 In an alternative embodiment, the locking plate can comprise an outwardly extending edge which at least covers the spring partially, and the holding arm can comprise a lip or similar that locks the fall arrest unit in a passive position before and during fitting, where the lip lies against an arm on the corner plate and is arranged to be broken off after the fitting.

15 A pressure arm can, for example, be connected via a hinge to an upper area of a part of the corner plate on the inside of the door blade, and the pressure arm stretches preferably about the corner of the corner plate to an area which adjoins one of the holding arms of the fall arrest unit, and the lower part of the
20 pressure arm can comprise a holding edge to which at least one of the holding arms is arranged to lie against when the fall arrest unit is in a passive position because of the pull in the wire of the suspension wire. Said spring means can comprise a number of springs that are arranged to the corner plate and that are set up to force the holding edge of the pressure arm to rotate the fall arrest unit
25 so that the locking edge engages with the protrusion on the side rail if the suspension wire breaks or becomes loose.

A number of spring pegs can be permanently fastened to the corner plate, where each spring peg runs through an associated opening or groove in the
30 pressure arm, and a spring plate can be arranged to the free end of the spring pegs, set up to protect/cover and to pre-stress said springs that lie between the pressure arm and the spring plate.

35 According to a second aspect, the invention also relates to a side rail of a garage door, for use with a bottom bracket as described above, where the side rail comprises a number of external, outwardly extending protrusions arranged mutually spaced apart in the longitudinal direction of the side rail, arranged to provide a friction free/mechanical connection between a locking edge of the

bottom bracket and the side rail, where the outwardly extending protrusions are arranged on the wall-fastening side of the side rail. The outwardly extending protrusions can be arranged with a mutual distance of between 5 and 30 cm apart.

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According to the mentioned solutions of known technology, there are several essential differences between the present invention and the comparable citation DK B 162787. Among other things, the corner plate, according to the invention, comprises a fastening means that stretches towards, alternatively at least partially beyond, the wall-fastening side of the side rail. This feature does not appear in DK B 162787, as the suspension bolt DK B 162787 only extends towards the side rail, and also the fact that the placing of the side rail is of no significance for the functioning of the solution in DK B 162787. This prevents a complete protection of the wire.

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An essential feature of the present invention is that the locking edge of the bottom bracket engages with the protrusion on the wall-fastening side of the side rail, at the same time as the bottom bracket maintains its position with respect to the side rail, due to the bottom bracket also comprising the pulley wheel that rolls in the side rail. This leads to the function and the effect of the bottom bracket being independent of the slope of the side rail. In many garage doors, the side rail slopes about 0.5° into the garage. This leads to the garage door moving horizontally while it is opened, and it will then not slip or scrape the sealing strips. Such a slope can correspond to 26 mm for a 3 m tall garage door. Thus, the distance between the centre of the locking arms in DK B 162787 and the frame rail will be so great that the fall arrest poorly functions. The arm in DK B 162787 will get a more increasing wandering the further up it is released. With the present solution the slope of the side rail is not important, as the distance between the locking edge and the side rail is constant along the whole length of the side rail.

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Furthermore, the present solution is independent of the thickness of the garage door. This can vary from 30 mm to 50 mm, and in said documents, in particular DK B 162787, this can result in the stopping arm being too short. In the case of DK B 162787, the length of the locking arm or the placing of the fall arrest unit must be adjusted.

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A further moment of the present solution is that when the fall arrest is released, the side rail is squeezed between the pulley wheel and the locking edge. The force is directed vertically (or at an angle of 0.5°) downwards, and offers no unfortunate load on screws and the frame rail. The described solutions require
5 a strong connection between side rail and frame rail. If there is not sufficient friction in the screw connections between frame rail and side rail, or if the rails are not sufficiently rigid sideways, the distance between the locking arm and frame rail becomes so large that the fall of the garage door is not stopped.

10 The suspension point for the wire in the present invention lies almost all the way down at the floor. Thus, the fall arrest does not steal lifting height for the garage door. Free driving height and internal ceiling height are often limiting factors for a garage door. Furthermore, the suspension point for the wire in the present solution is placed eccentrically with regard to the axis of rotation for the
15 fall arrest unit and it is this which ensures that the locking edge is pulled out from the side rail when the wire is taut.

The advantage with the present solution is that it is much simpler than that described in the mentioned documents, and is consequently both cheaper and
20 more dependable than the complicated solutions shown.

The invention shall now be described in more detail with reference to the enclosed drawings, in which:

Figure 1 shows a first embodiment of a bottom bracket according to the present
25 invention, fitted with regard to a side rail of a garage door, and in a passive/non-locking position.

Figure 2 shows a corresponding embodiment as in figure 1, but with the bottom bracket in an active/locking position.

Figure 3 shows a perspective drawing of the bottom bracket only as shown in
30 figure 2 in an active/locking position.

Figure 4 shows a second embodiment of a bottom bracket in a passive position.

Figure 5 shows the second embodiment of the bottom bracket in an active position.

35 Figure 6 shows a corner plate according to the invention, with components for use in the embodiment shown in the figures 1-5.

Figure 7 shows a fall arrest unit according to the invention for use in the embodiments shown in the figures 1-6.

Figure 8 shows a third embodiment of a bottom bracket fitted in relation to a side rail of a garage door according to the present invention.

Figure 9 shows the bottom bracket only according to figure 8, without a pulley wheel, in a passive position.

5 Figure 10 shows only the bottom bracket according to the figures 8 and 9 in an active position.

Figure 11 shows a fourth embodiment of only a bottom bracket in a passive position.

Figure 12 shows the embodiment shown in figure 11 in an active position.

10 The figures 13 and 14 show a fall arrest unit as shown in the figures 8-10 and 11-12, respectively, and

The figures 15a and 15b show the bottom bracket with a fall arrest unit as shown in the figures 8-13 in a passive and an active position, respectively, viewed from the side rail side.

15 Figure 16 shows a variant of the embodiment shown in the figures 11 and 12.

As mentioned, the invention relates to a bottom bracket for fall arrest of a garage door, where the bottom bracket is arranged to a leaf of the garage door and set up to be connected to a suspension wire 52 from the spring suspension

20 of the garage door. The bottom bracket is preferably fastened to the bottom door leaf of the garage door, but can if required be arranged to other door leaves. The bottom bracket comprises a corner plate 12, fastened adjoining a side edge of said door leaf, and a bolt 14 with a pulley wheel 16 fastened to the corner plate 12, arranged to roll in an adjoining side rail 50 of the garage door.

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The corner plate, the bolt and the pulley wheel correspond in the main in the different embodiments and are therefore referred to with the same reference numbers in all the drawings. The corner plate 12 is, in the main, shaped in an L-form arranged to surround the side edge of the door leaf and a suspension

30 bolt 20,220 is fitted to the part of the corner plate that lies against the side edge. The other part of the corner plate 12 comprises a fastening connection for the bolt 14 with the pulley wheel 16.

A first embodiment of the present invention is shown in the figures 1 to 3 and

35 comprises a corner plate 12 with a suspension bolt 20 that extends at least partially beyond the wall fastening side of the side rail 50, where the suspension bolt 20 is connected to a rotatable fall arrest unit 22 arranged to be connected to said suspension wire 52. Furthermore, the bottom bracket

comprises spring means to rotate the fall arrest unit 22 around the suspension bolt 20 so that a locking edge 34 engages with a protrusion 54 on an adjoining side rail 50. It is sufficient that the spring force is very small. The fall arrest unit 22 is preferably arranged around or adjoining a suspension bolt 20 and is
5 rotated if the suspension wire 52 breaks or becomes loose.

As can be seen in figure 7, the fall arrest unit 22 comprises at least a partial sleeve part 24 arranged to rotationally surround the suspension bolt 20, where the sleeve part comprises at least a holding arm, preferably one on either side
10 of the outside-lying holding arm 26,28, where at least the one holding arm constitutes a wire safeguard arm, and comprises fastening means 30,32 for connection to the suspension wire 52. This fall arrest unit 22 is similar in both the first and the second embodiments.

15 In the first embodiment, the corner plate 12 comprises, in its upper part, an outwardly extending edge 62 with a number of through-going openings and a pressure arm 44 comprising a corresponding number of arms 64 arranged to engage with said openings. The pressure arm 44 is thereby hinge-connected to an upper area of the part of the corner plate 12 on the inside of the door leaf
20 and the pressure arm 44 extends around the corner of the corner plate to an area adjoining the inner of the holding arms 28 of the fall arrest unit 22. Furthermore, the lower part of the pressure arm 44 comprises a holding edge 40 to which at least one of the holding arms 28 is arranged to lie against when the fall arrest unit 22 is in a passive position because of the wire pull in the
25 suspension wire 52. The holding arm 28 can comprise a groove or protrusion to lie against the holding edge 40.

Said spring means comprises, in this embodiment, a number of springs 46, for example two pieces as shown in the figures. The springs are arranged to the
30 corner plate 12 and are set up to force the holding edge 40 of the pressure arm 44 to rotate the fall arrest unit 22 so that the locking edge 34 engages with one of the protrusions 54 on the side rail 50 if the suspension wire 52 breaks or becomes loose. To fasten the springs, a number of spring pegs 70 are permanently fixed to the corner plate 12, where each spring peg runs through an
35 associated opening or groove in the pressure arm 44, and where a spring plate 48 is arranged to the free end of the spring pegs, set up to contain and possibly pre-stress said springs 46 that lie between the pressure arm 44 and the spring plate 48. If the wire 52 breaks or becomes loose, the springs will thereby force

the pressure arm 44, as shown in figure 2, in a direction toward the right in the figure and correspondingly force the upper part of the inner holding arm 28 to the right. When the bottom bracket is in a passive position, the pull in the wire will force the holding arm 28 toward the left in the figure and thereby force the pressure arm the same way.

The corner plate 12 can further comprise a support plate 42 which is set up to at least partially surround the pressure arm 44 and where the support plate 42 comprises a fastening means 72 which can be arranged to take up the force from the holding arm 28 (this force will normally be about 1/3 of the pull in the wire, for example, up to 25 kg, and is not led further up along the pressure arm), and also to take up and retain the pressure arm 44 during fitting of the bottom bracket to the door leaf. The support plate will, in this way, considerably ease the fitting of the bottom bracket.

A second embodiment of the present invention is shown in the figures 4 and 5, while an associated corner plate with a fall arrest unit 22 is shown in figure 6. This embodiment comprises corresponding to that described above in connection with the first embodiment, a corner plate 12 with a suspension bolt 20 that extends at least partially beyond the wall fastening side of the side rail 50, where the suspension bolt 20 is connected to a rotatable fall arrest unit 22 arranged for connection to said suspension wire 52. Furthermore, the bottom bracket comprises spring means 146 to force a locking edge 34 of the fall arrest unit 22, arranged on or adjoining the suspension bolt 20 to engage with a protrusion 54 on the wall fastening side of the side rail 50 if the suspension wire 52 breaks or becomes loose.

The fall arrest unit 22 comprises corresponding to that described above, one at least partial sleeve part 24 arranged to rotatable surround the suspension bolt 20, where the sleeve part preferably comprises, lying outside on each side, a holding arm 26,28 where at least the one holding arm constitutes a wire safe-guard arm 26 and comprises fastening means 30,32 for connection to the suspension wire 52.

In this embodiment, the corner plate 12 comprises a holding edge 140, to which at least one of the holding arms 28, i.e. preferably the inner holding arm 28, is arranged to lie against when the fall arrest unit 22 is in a passive position because of the wire pull in the suspension wire 52. The holding arm 28 can

comprise a groove or protrusion to lie against the holding edge 140. Said spring means comprises a spring 146 which is arranged, at least partially, around the suspension bolt 20 and which is set up to rotate the fall arrest unit 22 so that the locking edge 34 engages with the protrusion 54 on the side rail 50 if the suspension wire 52 breaks or becomes loose. The spring can be fastened to the holding edge 140, run round the suspension bolt 20 and up to an upper part of the holding arm 28, to which it can be brought into a groove in the upper part. In this embodiment the fall arrest unit rotates in a corresponding way to that described in connection with the first embodiment. However, it shall be noted that the spring can be arranged in ways other than that shown as long as the same spring force is supplied to the fall arrest unit. Furthermore, it shall be noted that the wire safeguard arm and the holding arm can be the same arm, i.e. that the outer holding arm 26 can be excluded if the wire is fastened to the inner holding arm 28.

A third preferred embodiment is shown in the figures 8-10 and comprises, as mentioned before, a corner plate 12 with associated components. A pressure arm 244 is hinge-connected to an upper area of the part of the corner plate 12 that is inside the door leaf, where the pressure arm 244 extends around the corner of the corner plate to an area adjoining an upper part of the holding arm 228 of the fall arrest unit 222. Furthermore, the lower part of the pressure arm 244 comprises a holding edge 240 against which the upper part of the holding arm 228 is arranged to lie when the fall arrest unit 222 is in a passive position because of the wire pull of the suspension wire 52. The holding arm 228 can comprise a groove, recess or protruding part to lie against the holding arm 240. Correspondingly, the holding arm 228 can comprise a groove or protrusion to lie against the holding edge 240.

Said spring means comprises, in this embodiment, a number of springs 246, where the spring(s) and a spring plate 270 are arranged as described above. If the wire 52 breaks or becomes loose, the spring will thereby force the pressure arm 244, as shown in figure 8, in a direction towards the right in the figure, and correspondingly force the upper part of the inner holding arm 228 towards the right. When the bottom bracket is in a passive position, the wire pull will force the holding arm 228 towards the left in the figure and thereby force the pressure arm the same way.

A fall arrest unit 222 is preferably used in this embodiment, as shown in figure 13. The fall arrest unit 222 can here also be said to have a partial sleeve form, but more precisely, it is formed in a partial U-shape, where the inner part 280 comprises, on its lower part, the locking edge 234 and the side edges are made up of the holding arm 228 and the fastening means 230 for fastening of the suspension wire 52. The fastening means 230 can be a bolt or the like. The holding arm 228 comprises an opening or a recess 274 for fastening to the suspension bolt 220, and the fall arrest unit 222 is thereby rotational about this fastening point. Furthermore, the holding arm 228 can comprise a groove or the like, arranged to lie against the pressure arm 244. The fall arrest unit 222 can also comprise an edge 276 or the like, against which the suspension wire can lie. With or without the edge, said suspension wire 52 is connected eccentrically to the suspension point of the fall arrest unit, and contributes to maintaining the locking edge 234 at a given distance from the wall fastening side of the side rail 50 when the suspension wire 52 is taut. This is also the case for the embodiments described earlier, and also below.

A fourth preferred embodiment is shown in the figures 11 and 12. A fall arrest unit 322 as shown in figure 14 is preferably used in this simple embodiment, and also a somewhat different spring system than that previously described. Correspondingly, it can be said that the fall arrest unit 322 has a partial sleeve form, but more precisely it is formed in a partial U-shape, where the inner part 280 comprises the locking edge 234 on its lower part and the side edges are made up of the holding arm 328 and the fastening means 230 for securing the suspension wire 52. The fastening means 230 can be a bolt or the like. The holding arm 328 comprises an opening or a recess 374 for fastening of the suspension bolt 320, and the fall arrest unit 322 is thereby rotatable around this fastening point. Furthermore, the holding arm 328 can comprise an opening or the like arranged to receive the spring 346. An arm of the spring is fastened to the side edge of the corner plate, or to a holding edge 340, and a second arm of said spring is fastened to an upper part of the holding arm 328. The fall arrest unit 322 can correspondingly comprise an edge 276 or the like against which the suspension wire can lie. The suspension wire 52 is correspondingly connected eccentrically to the suspension point of the fall arrest unit.

For this fourth embodiment the locking plate 18 can be equipped with an outwardly extending edge 381 which at least partially covers the spring 346. To simplify the fitting, the holding arm 328 can be equipped with a lip 382 or the

like (spindle, holding edge, etc.) that locks the fall arrest unit in a passive position (as shown in figure 16). This lip lies against an arm on the corner plate, or another element that provides the same function, and the whole of the lip is preferably broken off after fitting.

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It shall be noted that the fall arrest unit shown in the figures 13 and 14 can be considered to be used with the embodiments shown in, for example, the figures 1 and 4. Correspondingly, it can also be considered that the fall arrest unit shown in figure 7 can be used in the third and fourth embodiment.

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As mentioned, the invention also relates to a side rail 50, preferably for use with the bottom bracket according to the embodiments described, where the side rail 50 comprises, on one of the sides, a number of external, outwardly extending protrusions 54 arranged mutually spaced apart in the longitudinal direction of the side rail 50. The protrusions are preferably placed on the wall fastening side of the side rail. The aim of the protrusions is to provide a friction-free/mechanical connection between the locking edge of the fall arrest unit and the side rail 50. However, one side rail according to the invention can also be used in connection with other bottom brackets that have a corresponding function to that of the present bottom bracket, and the protrusions can be located on other sides than the wall fastening side of the side rail.

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The outwardly extending protrusions 54 are preferably arranged mutually spaced about 5 to 30 cm apart, where the protrusions are large enough for the locking edge to get a grip. Shorter distance between the protrusions leads to lower fall height and thereby a smaller strain on the side rail.

Claims

1. Bottom bracket for fall arrest of a garage door, where the bottom bracket is arranged to a door leaf of a garage door and set up to be connected to a suspension wire (52) from the spring suspension of the garage door, comprising an L-shaped corner plate (12) fastened adjoining a side edge of said door leaf, with a bolt (14) and a pulley wheel (16), fastened to the one side edge of the corner plate (12), set up to roll in an adjoining side rail (50) of the garage door, and where the corner plate(12) on its other side edge comprises a rotatable fall arrest unit (22;222;322) with a locking edge (34;234) which, under the influence of a spring force, is arranged to engage with the side rail (50) to stop or to brake the garage door if the suspension wire (52) breaks or becomes loose, characterised in:

that the fall arrest unit (22;222;322) is arranged rotatable to a suspension bolt (20;220;320) fastened on the side edge of the corner plate against the side rail, as the locking edge (34;234) is placed diagonally and directed downwards at a distance adjoining and against the wall fastening side of the side rail (50),

that said suspension wire (52) is connected eccentrically to the fall arrest unit (22;222;322) in relation to its suspension point, and contributes to maintain the locking edge (34;234) at a given distance from the wall fastening side of the side rail (50) when the suspension wire (52) is taut, and

that the bottom bracket comprises spring means (46;146;246;346) arranged to rotate the fall arrest unit (22;222;322) so that the locking edge (34;234) engages with an outwardly extending protrusion (54) on the wall fastening side of the side rail (50) if the suspension wire (52) breaks or becomes loose.

2. Bottom bracket according to claim 1, characterised in that the suspension bolt (20;220;320) is shaped as a bolt or spike, and that the fall arrest unit (22;222;322) comprises one or more openings or recesses (74;274;374) arranged for rotational fastening of the fall arrest unit to the suspension bolt (20;220;320).

3. Bottom bracket according to claims 1 or 2, characterised in that the fall arrest unit (22;222;322) comprises at least one holding arm (28;228;328) arranged to be subjected to a force from said spring means (46;146;246;346).

4. Bottom bracket according to claim 3,
c h a r a c t e r i s e d i n that the fall arrest unit (22) is formed as at least a
partial sleeve part, and incorporates an holding arm (26,28) lying outside on
5 each side, of which at least the one holding arm constitutes a wire safeguard
arm (26) and comprises fastening means (30,32) for connection to the
suspension wire (52) and also that the locking edge (34) is arranged diagonally
and directed downwards centrally in the fall arrest unit (22).
- 10 5. Bottom bracket according to claim 3,
c h a r a c t e r i s e d i n that the fall arrest unit (222) is formed in a partial U-
shape, where an inner part (280) comprises, on its lower part, the locking edge
(234), where the locking edge (234) is arranged diagonally and directed
downwards centrally in the fall arrest unit (222), and that the side edges are
15 made up of the holding arm (228) and the fastening means (230) for fastening
of the suspension wire (52)
6. Bottom bracket according to claims 4 or 5,
c h a r a c t e r i s e d i n that the corner plate (12) comprises a holding edge
20 (140;340) against which at least one of the holding arms (28;328) is arranged
to lie when the fall arrest unit (22;322) is in a passive position because of the
wire pull in the suspension wire (52), and that said spring means comprises a
spring (146;346) that is arranged to rotate the fall arrest unit (22;322) so that
the locking edge (34;234) engages with the protrusion (54) on the side rails (50)
25 if the suspension wire (52) breaks or becomes loose.
7. Bottom bracket according to claim 6,
c h a r a c t e r i s e d i n that the spring (146;346) is fastened to or adjoining
the holding edge (140;340) and to an upper part of the holding arm (28;328),
30 arranged to spring-load the holding arm (28;328).
8. Bottom bracket according to claims 6 or 7,
c h a r a c t e r i s e d i n that the locking plate (18) comprises an outwardly
extending edge (381) which covers the spring (346) at least partially, and that
35 the holding arm (328) comprises a lip (382) that locks the fall arrest unit (322) in
a passive position before and during fitting, where the lip lies against an arm on
the holding plate and is arranged to be broken off after fitting.

9. Bottom bracket according to claims 3, 4 or 5,
c h a r a c t e r i s e d i n that a pressure arm (44;244) is hinged to an upper
area of the part of the corner plate (12) on the inside of the door blade, and that
the pressure arm (44;244) stretches around the corner of the corner plate to an
5 area adjoining one of the holding arms (28;228) of the fall arrest unit (22;222),
and that the lower part of the pressure arm (44;244) comprises a holding edge
(40;240) against which at least one of the holding arms (22;222) is arranged to
lie when the fall arrest unit (22,222) is in a passive position because of the wire
pull of the suspension wire (52).
- 10
10. Bottom bracket according to claim 9,
c h a r a c t e r i s e d i n that said spring means comprises a number of
springs (46;246) that are arranged to the corner plate (12) and that are set up
to force the holding edge (40;240) of the pressure arm (44,244) to rotate the fall
15 arrest unit (22;222) so that the locking edge (34;234) engages with the
protrusion (54) on the side rail (50) if the suspension wire (52) breaks or
becomes loose.
11. Bottom bracket according to claim 10,
20 c h a r a c t e r i s e d i n that a number of spring pegs (70;270) are
permanently fastened to the corner plate (12), where each spring peg runs
through an associated opening or groove in the pressure arm (44;244), and
that a spring plate (48;248) is arranged to the free end of the spring pegs, set
up to protect/cover and to pre-stress said springs (46;246) that lie between the
25 pressure arm (44;244) and the spring plate (48;248).
12. Side rail for a garage door, for use together with a bottom bracket as
described in one or more of the claims 1-11, where the side rail (50) comprises
a number of outwardly extending protrusions (54) arranged mutually spaced
30 apart in the longitudinal direction of the side rail (50), set up to provide a friction
free/mechanical connection between a locking edge (34) of the bottom bracket
and the side rail (50), c h a r a c t e r i s e d i n that the outwardly extending
protrusions (54) are arranged on the wall fastening side of the side rail.
- 35 13. Side rail according to claim 12,
c h a r a c t e r i s e d i n that the outwardly extending protrusions (54) are
arranged mutually spaced apart with a distance of between 5 and 30 cm.

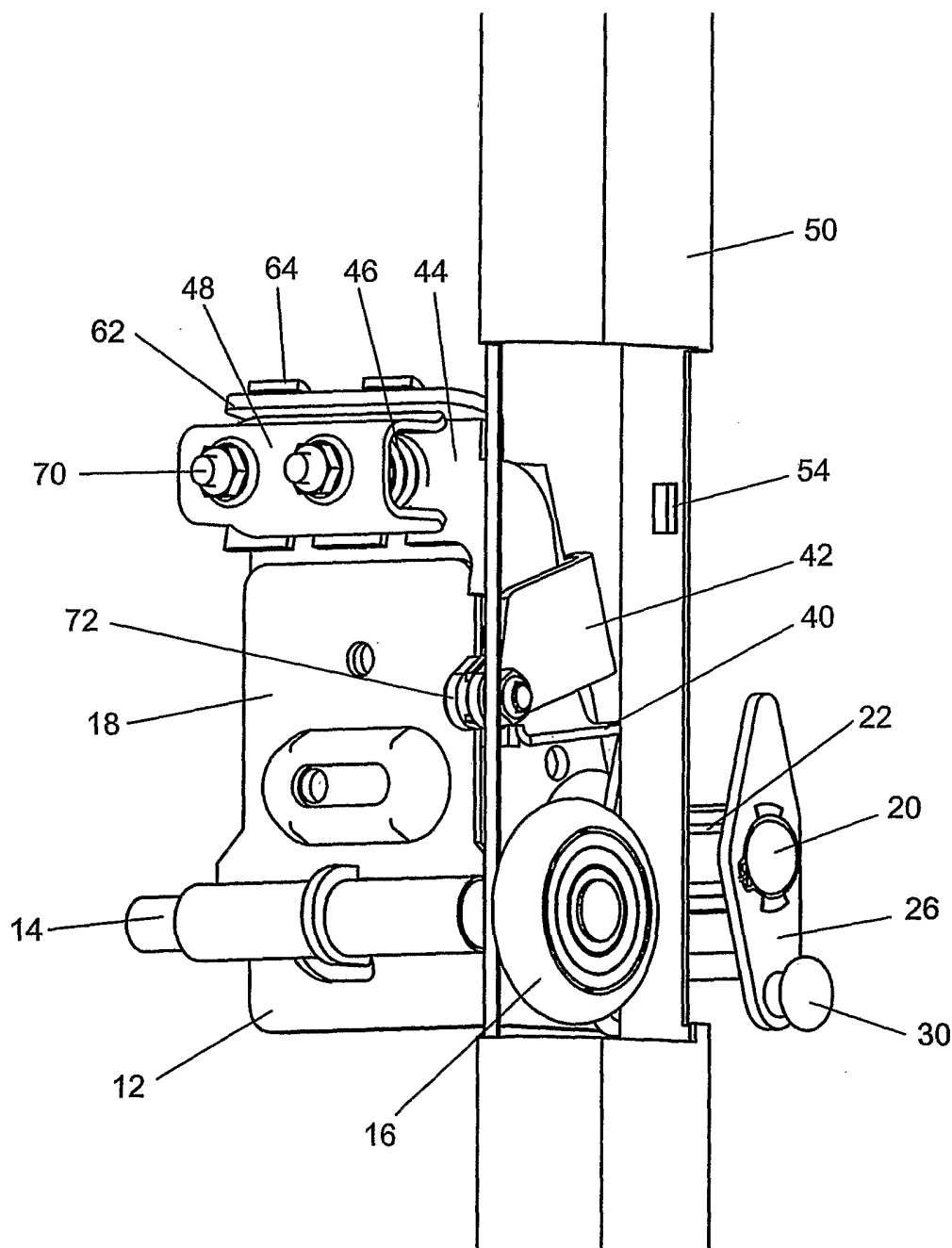


FIG. 1

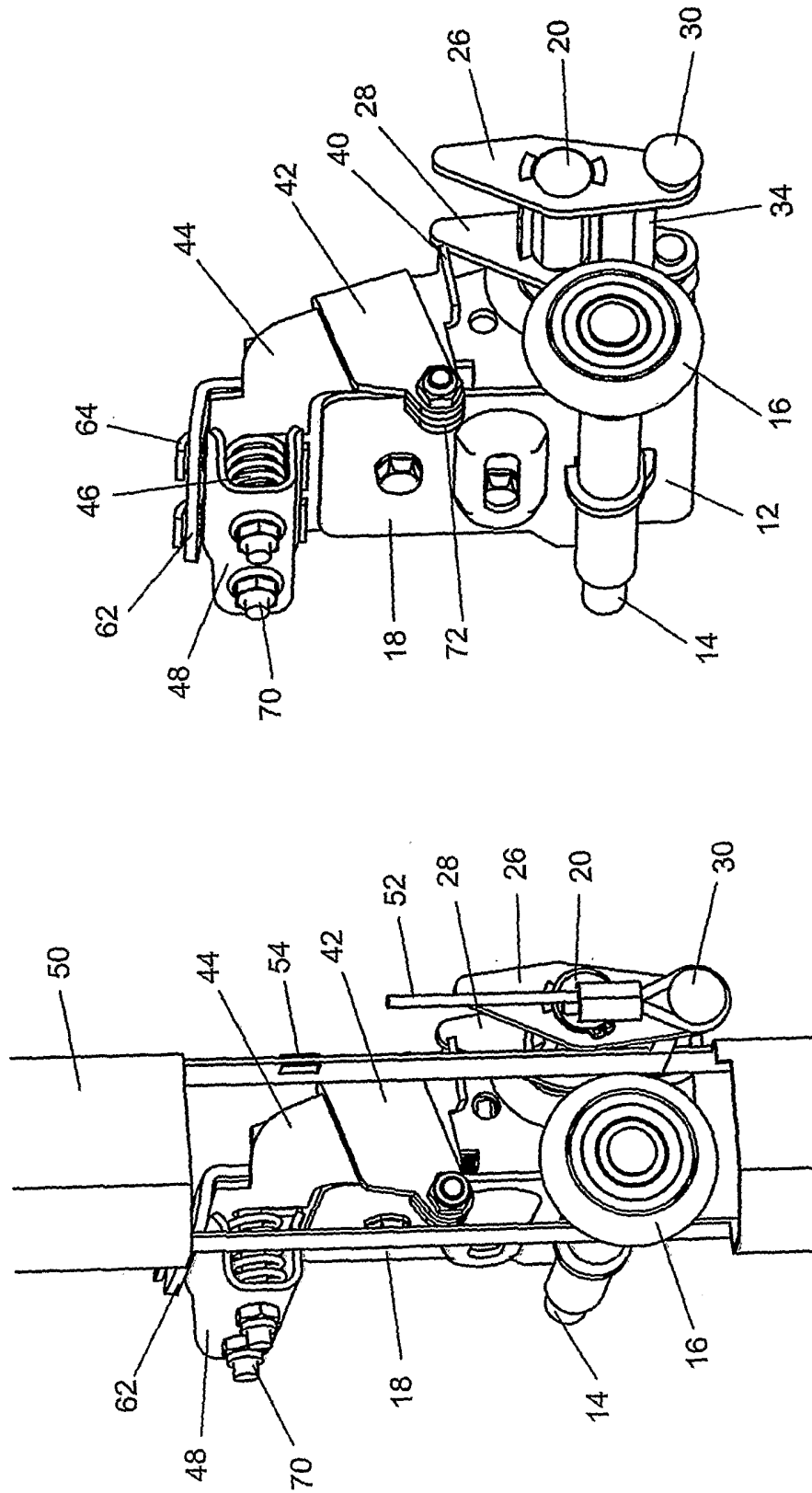


FIG. 3

FIG. 2

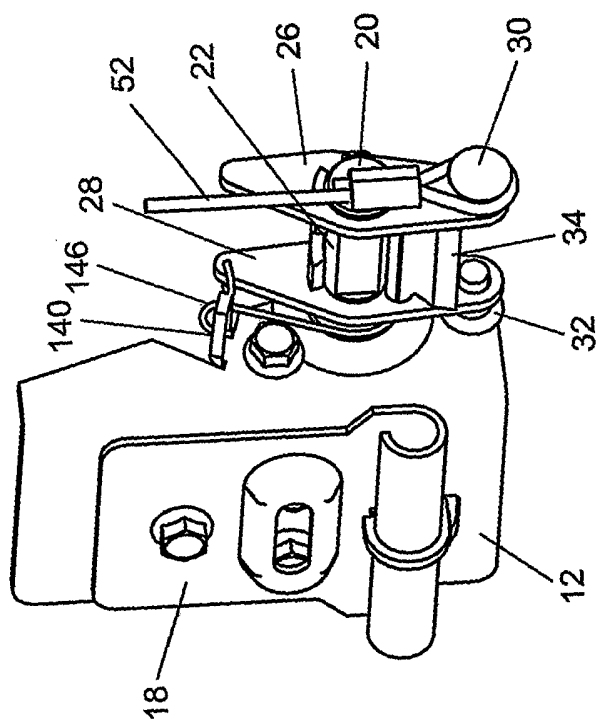


FIG. 5

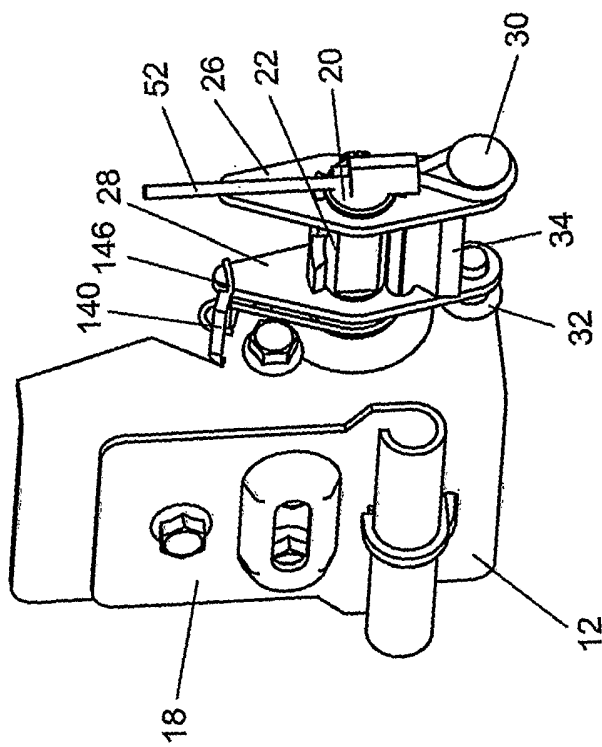


FIG. 4

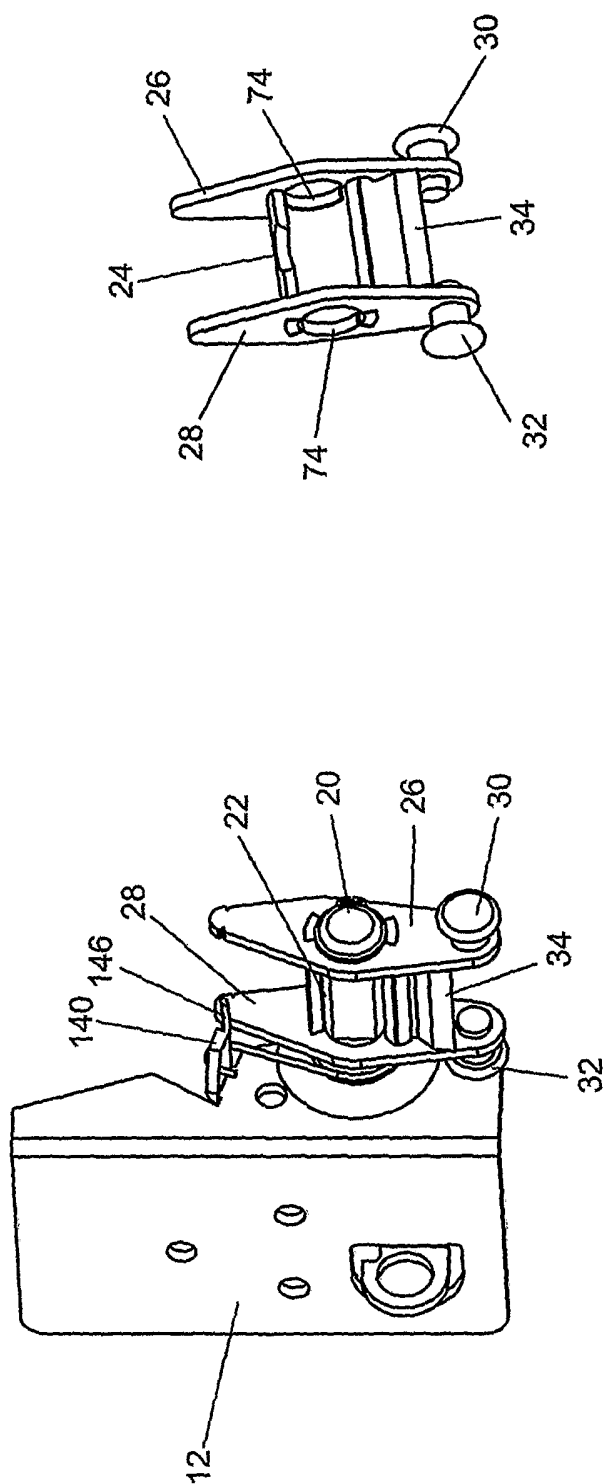


FIG. 7

FIG. 6

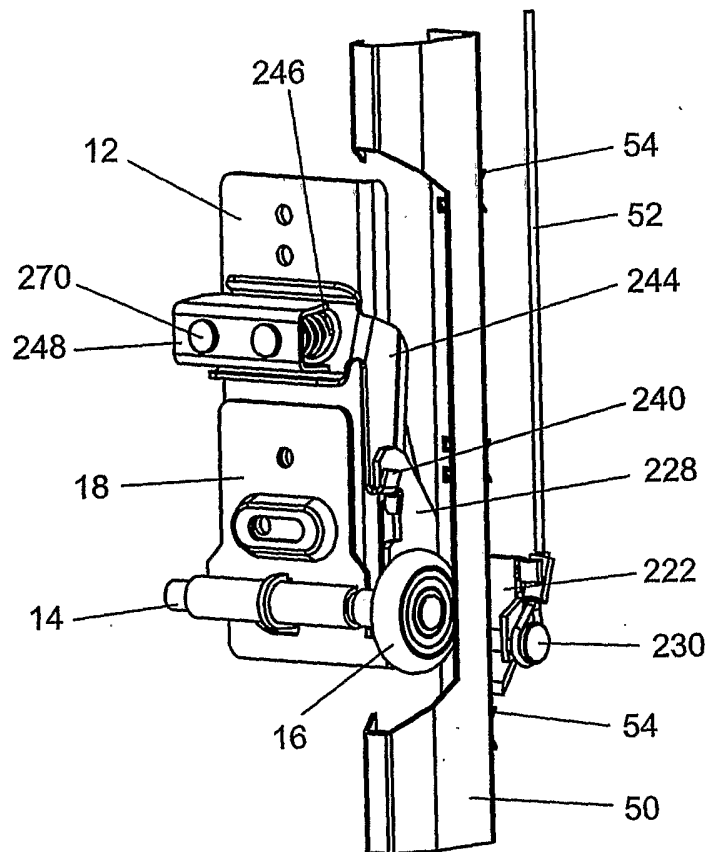


FIG. 8

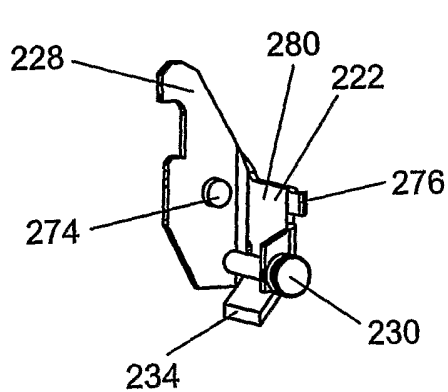


FIG. 13

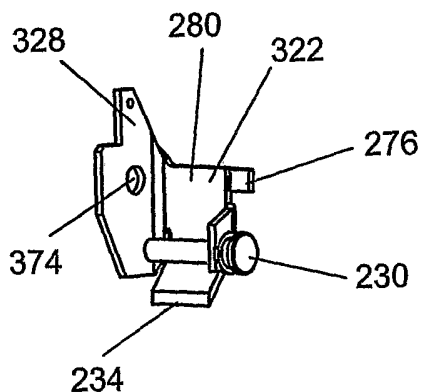


FIG. 14

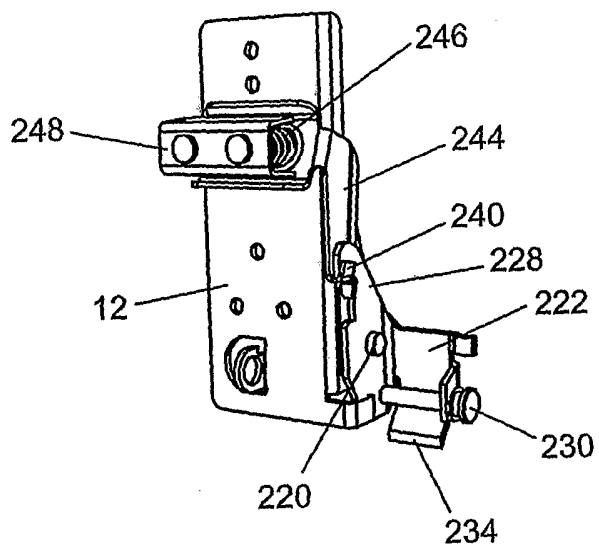


FIG. 9

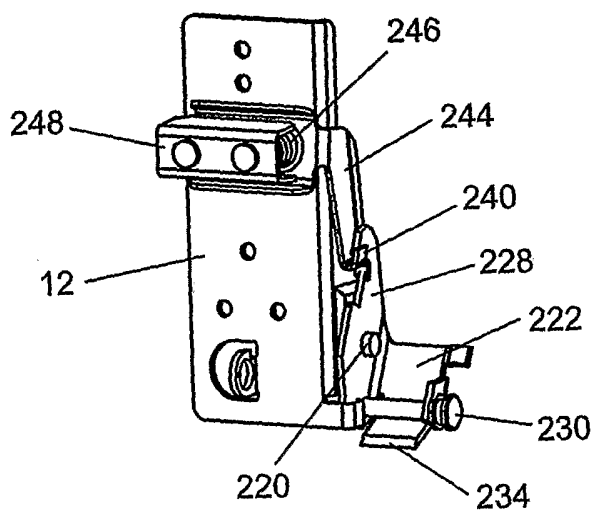


FIG. 10

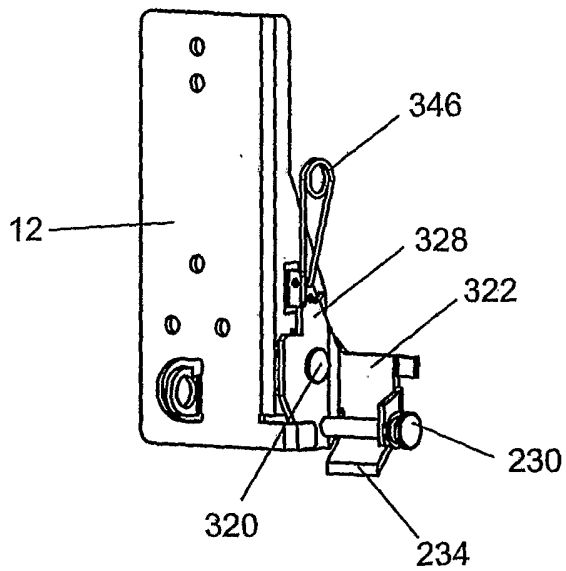


FIG. 11

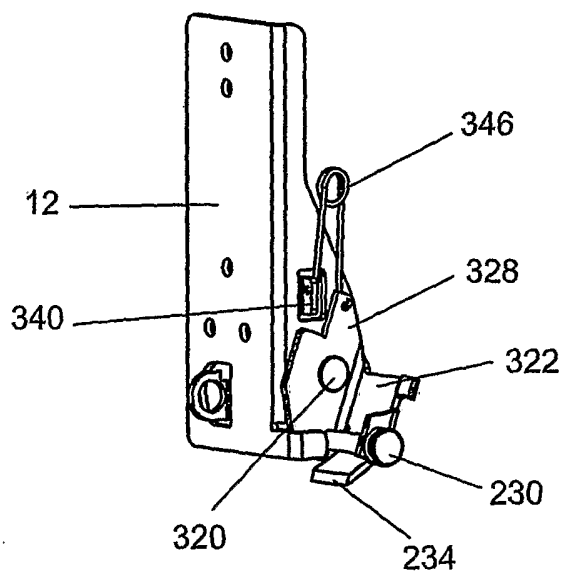


FIG. 12

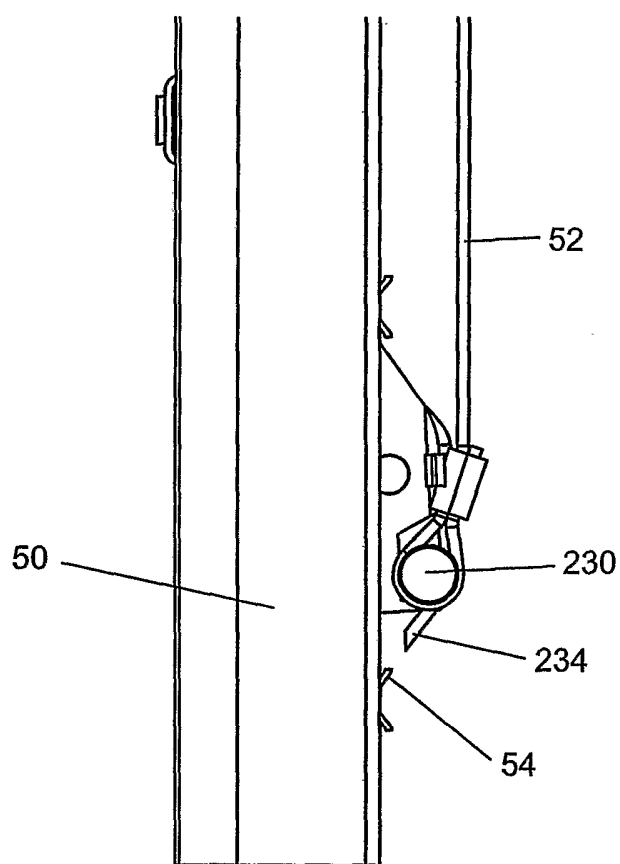


FIG. 15a

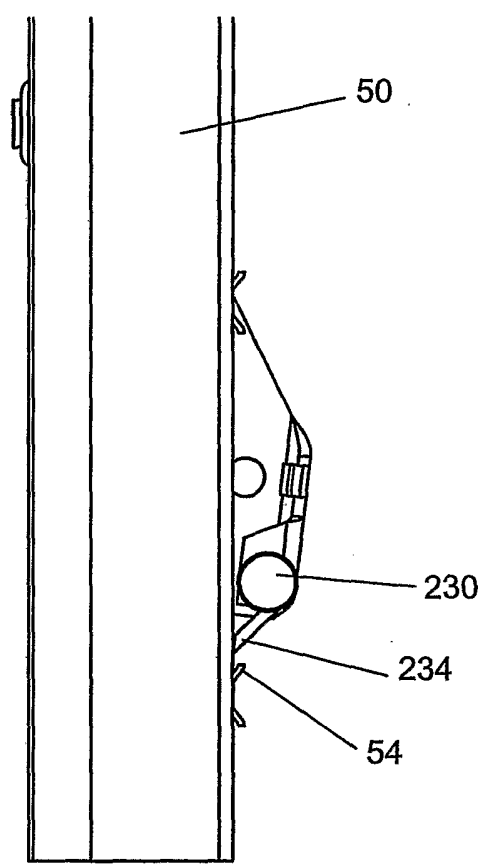


FIG. 15b

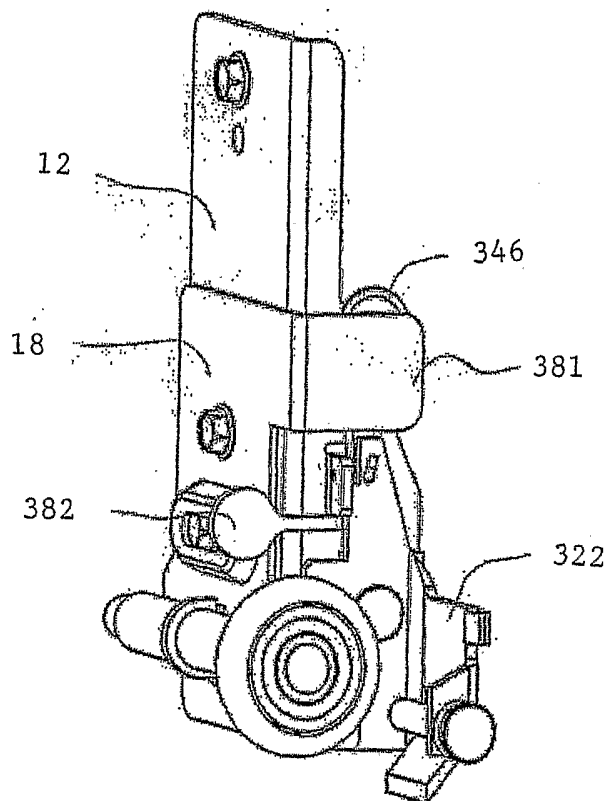


FIG. 16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2005/000472

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6189266 B1 (A.A. MIHALCHEON), 20 February 2001 (20.02.2001) --	1-3
X	US 4385471 A (F.F. GABRY ET AL), 31 May 1983 (31.05.1983) --	1-3
Y	WO 9524541 A1 (LUCAS, B.), 14 Sept 1995 (14.09.1995) --	12-13
Y	EP 0149692 A1 (RIEXINGER, G.), 31 July 1985 (31.07.1985) --	12-13

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

18 April 2006

Date of mailing of the international search report

21-04-2006

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2005/000472

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	EP 0721043 A1 (MARANTEC ANTRIEBS- UND STEUERUNGSTECHNIK GMBH & CO., PRODUKTIONS KG), 10 July 1996 (10.07.1996) --	1-13
A	EP 1199432 A1 (CARDO DOOR CONTINENTAL B.V.), 24 April 2002 (24.04.2002) --	1-13
A	US 6279268 B1 (M. BEAUDOIN ET AL), 28 August 2001 (28.08.2001) --	1-13
A	DE 20110546 U1 (MÜLLER, G.), 27 Sept 2001 (27.09.2001) -- -----	1-13

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International application No.
PCT/NO2005/000472

International patent classification (IPC)

E05D 13/00 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

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04/03/2006

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DE	20110546	U1	27/09/2001	NONE		
