



Description:

Runner for a sliding door

The invention concerns a runner for a sliding door, in particular for a sliding lift door, and consisting of a ball bearing, the inner ring of which is connected with a suspension bracket carrying the sliding door and of flanges, which are connected with the outer ring of the ball bearing and at the peripheral ends of which a tyre of synthetic material is arranged, wherein the tyre runs along on a roller track of a carrier, which is arranged at a door panel, during the opening and closing of the sliding door.

A runner for a sliding door, in particular for a sliding lift door, has become known from the specification EP-A1-0 343 351. The runner is held by a guide rail and carries a door wing by means of a door hanger. During the opening and closing of the sliding lift door, the runner runs along on a guide rail. The runner consists of two flanges, a ball bearing and a tyre. The flanges encompass half of the outer annular cage of the ball bearing and peripherally form a ring, which is U-shaped in cross-section and in which the tyre with a running surface is arranged.

A disadvantage of the known runner lies in that the tyre with running surface is temperature-dependent in respect of mechanical stability. When the door is not used for a longer time at higher ambient temperatures, the tyre is deformed under the door load, which leads to unpleasant running noises. Beyond that, such tyres because of insufficient fire retardation do not fulfill the fire protection regulations of lift plants.

Here, the invention is to create a remedy. The invention, as it is characterised in the claims, solves the problem of avoiding the disadvantages of the known equipment and proposing a runner which does justice to the demands on quiet running and fire resistance of a sliding door.

On the one hand, fire-retarding synthetic materials for the running surface of a runner do not have the mechanical properties,



which are necessary for sliding lift doors, in respect of stability and service life. On the other hand, synthetic materials, which are mechanically suitable, burn easily and therefore do not withstand the fire test. The invention fulfills the demand for a mechanically suitable runner and the demand for a fire-retarding runner at the same time.

The advantages achieved by the invention are to be seen substantially in that the runner according to the invention displays only small quantities of synthetic materials without the mechanical properties in respect of stability, service life and quietness of running being restricted thereby. The small quantities of synthetic materials used in the runner permit the use of mechanically suitable synthetic materials which are not particularly fire-resistant. It is furthermore advantageous that the build-up of the runner according to the invention is applicable to all runner diameters, which in turn - thanks to mass production - acts favourably on the manufacturing costs.

The invention is explained more closely in the following by reference to drawings illustrating merely one manner of embodiment. There show:

- Fig. 1 a schematic illustration of a sliding lift door with a runner according to the invention,
- Fig. 2 a front elevation of the runner according to the invention,
- Fig. 3 a side elevation of the runner according to the invention and
- Fig. 4 a section through the runner according to the invention along the line A-A of the Fig. 3.

In the Figs. 1 to 4, a door panel is denoted by 1, at which a carrier 2 with a roller track 3 is fastened by means of a first screw 4. The roller track 3 carries a runner 5 with a tyre 5.1, which stands in connection with a suspension bracket 7 by means of a second screw 6. A sliding lift door 8 is arranged at the suspension bracket 7. During the opening and closing of the sliding lift door 8, the runner 5 rolls on the roller track 3.

The runner 5 consists of a concentrically arranged ball bearing 9 with an inner ring 10 and an outer ring 11 and a bore 12, which is penetrated by the second screw 6, wherein the outer ring 11 is



covered laterally by a first annular flange 13 and a second annular flange 14. Both the flanges 13 and 14 are held together at the peripheral end by rivets 15 so that the outer ring 11 is clamped firmly between the flanges 13 and 14. In place of the rivets 15, screws can also be used. The peripheral space between the outer ring 11 and the flanges 13 and 14 is in the case of the runners known from the state of the art filled out by a tyre of synthetic material. In the case of the runner 5 according to the invention, an inner armouring cage 16 and an outer armouring cage 17 are laid into the tyre 5.1 in the peripheral space and this is filled out by synthetic material.

The synthetic material used displays suitable mechanical properties in consideration of the load to be carried, but is however in itself little fire-retardant. Because of the small quantities used and because of the connection with the armouring cages 16 and 17, the runner 5 is in the case of fire not flame-supporting, but merely charring. The inner armouring cage 16 lies within the rivets 15 and so far removed from the outer ring of the ball bearing 9 that space remains open for a minimum first layer 18 of synthetic material between the outer ring 11 and the inner armouring cage 16. The outer armouring cage 17 encompasses the grooves 15 and is covered over by a minimum second layer 19 of synthetic material, wherein the second layer 19 displays a profile corresponding with the roller track 3. A third, not illustrated layer of synthetic material is arranged between both the armouring cages 16 and 17. The layers 18 and 19 serve as noise damping and the armouring cages 16 and 17 thereagainst serve the mechanical stability. For the manufacture of the runner 5, all components are put into a casting mould with the aid of a pattern plate in known manner and so kept in their position during the injection-moulding operation, during which the synthetic material is injected into the remaining hollow spaces. The armouring cages 16 and 17 consist of stiffening rings 20, which are kept apart by spacer members 21. In place of the stiffening rings 20, corrugated washers can also be used, which keep themselves apart mutually by their wavy shape.

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REPLACED

Patent Claims:

1. Runner (5) for a sliding door (8), in particular for a sliding lift door, which displays a ball bearing (9), the inner ring (10) of which is connected with a suspension bracket (7) carrying the sliding door (8), and flanges (13, 14), which are connected with the outer ring (11) of the ball bearing (9) and at the peripheral ends of which a tyre (5.1) of synthetic material is arranged, wherein the tyre (5.1) runs along on a roller track (3) of a carrier (2), which is arranged at a door panel (1), during the opening and closing of the sliding door (8), characterised thereby, that the tyre (5.1) displays at least one armouring cage (16, 17).
2. Runner according to claim 1, characterised thereby, that a first layer (18) of synthetic material is arranged between the armouring cage (16, 17) and the outer ring (11) and that the armouring cage (16, 17) is covered by a second layer (19) of synthetic material, which layer at the surface displays a profile corresponding with the roller track (3).
3. Runner according to the claims 1 and 2, characterised thereby, that an inner armouring cage (16) and an outer armouring cage (17) are provided, between which a third layer of synthetic material is arranged.
4. Runner according to the claims 1 to 3, characterised thereby, that the armouring cage (16, 17) displays stiffening rings (20), which are kept apart by spacer members (21).
5. Runner according to the claims 1 to 3, characterised thereby, that the armouring cage (16, 17) displays corrugated washers which keep themselves apart mutually by their wavy shape.

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Fig. 1

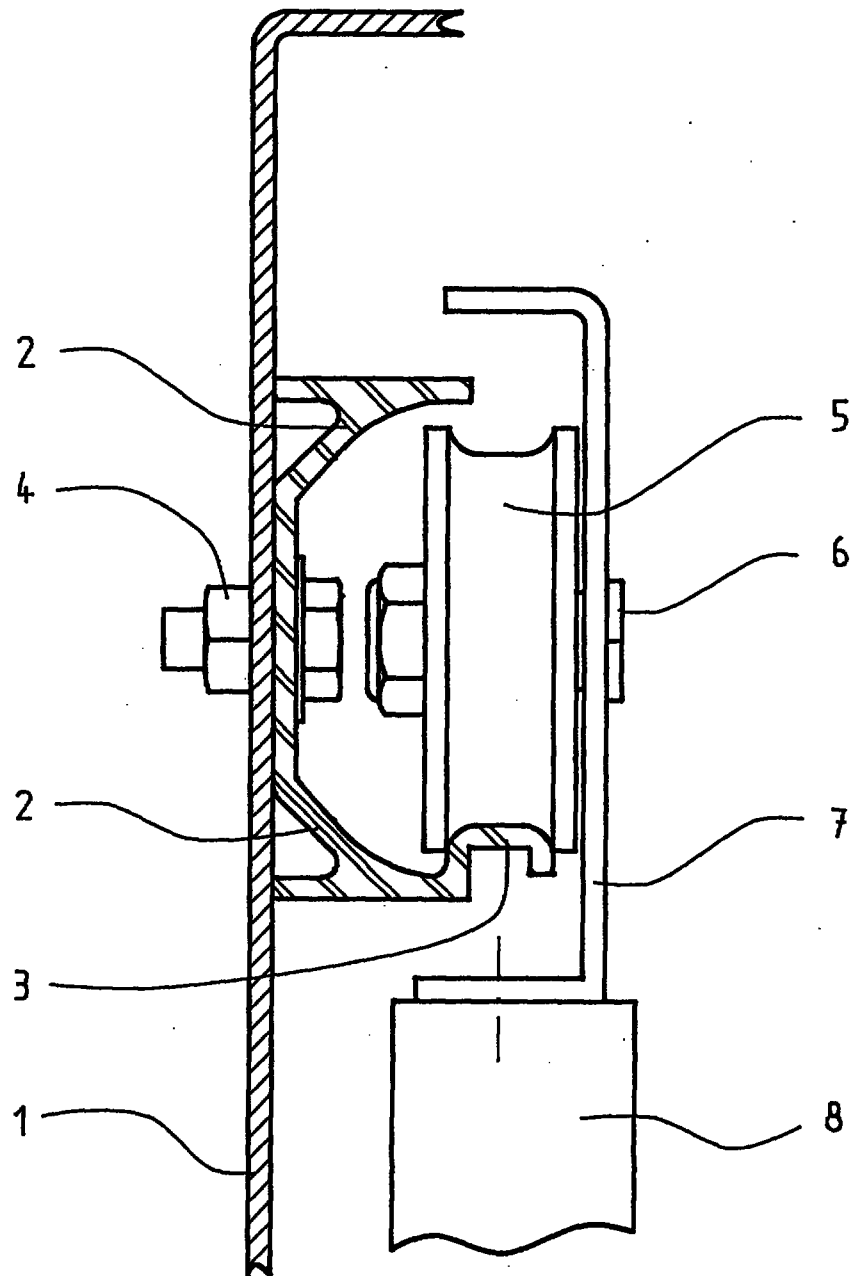




Fig. 2

Fig. 3

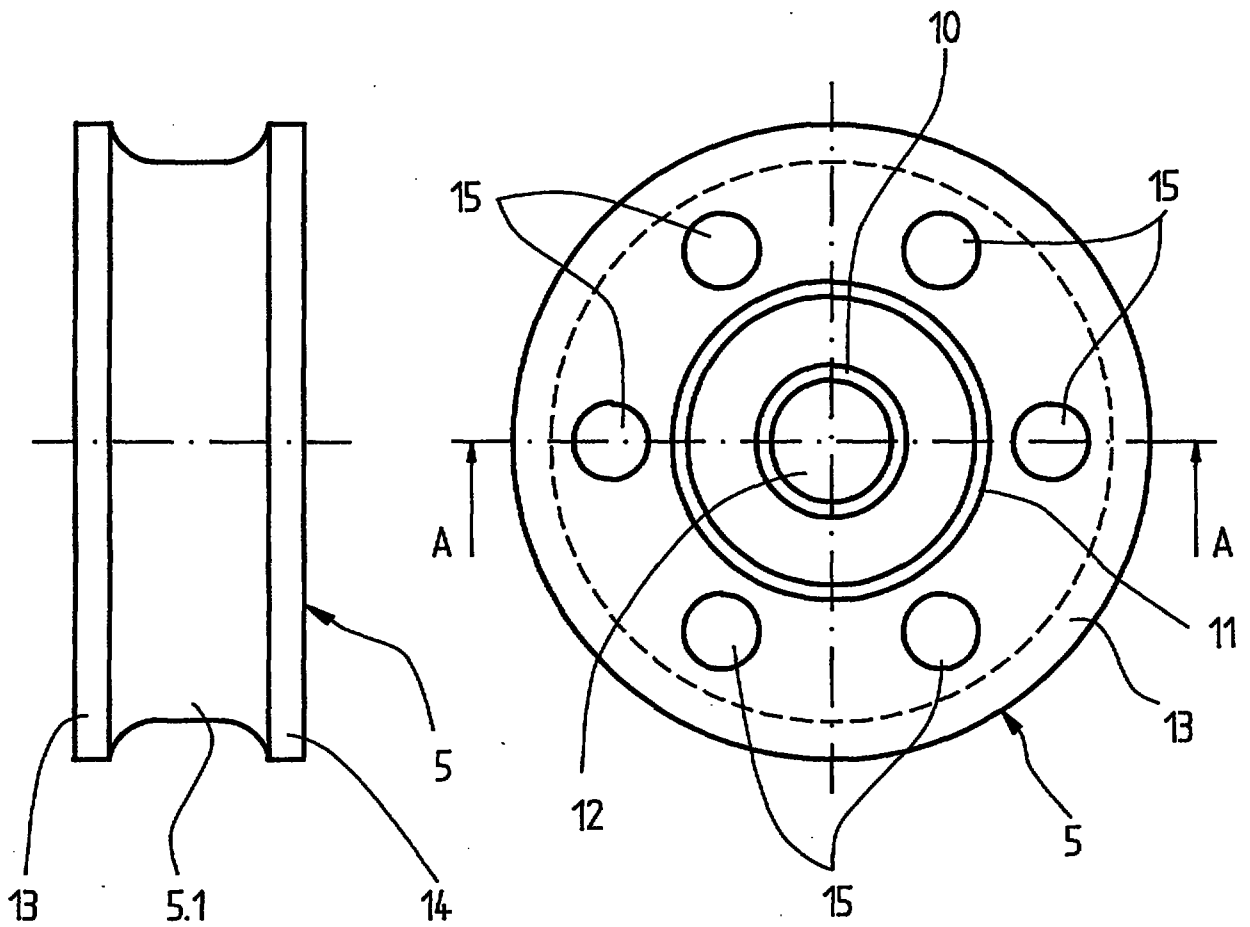
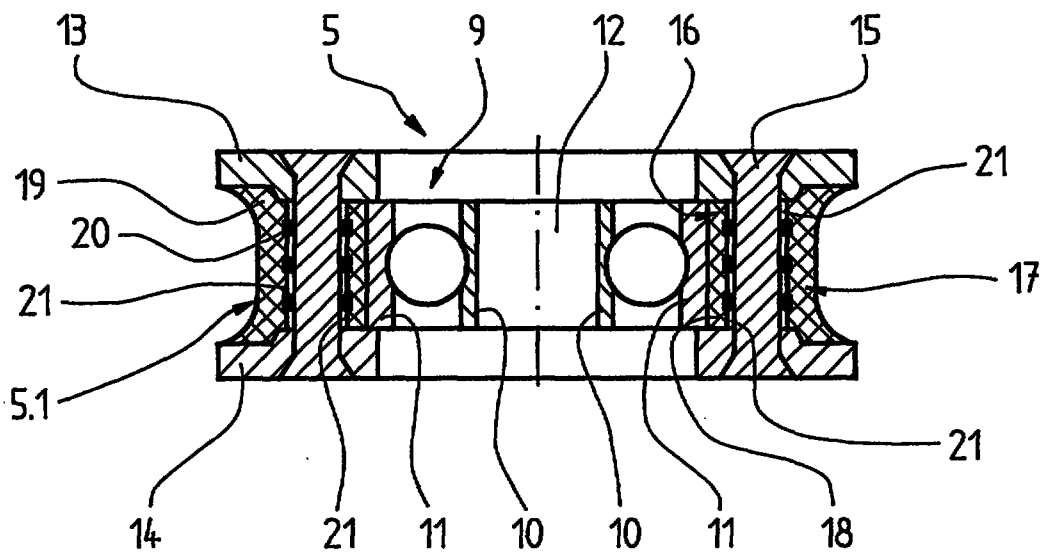


Fig. 4



RUNNER FOR A SLIDING DOOR

Abstract

This runner (5) displays an armoured tyre (5.1) with running surface. The runner (5) consists of a concentrically arranged ball bearing (9) with an inner ring (10) and an outer ring (11) and a bore (12) wherein the outer ring (11) is covered laterally by a first annular flange (13) and a second annular flange (14). Both the flanges (13, 14) are held together at the peripheral end by rivets (15) so that the outer ring (11) is clamped firmly between the flanges (13, 14). The peripheral space between the outer ring (11) and the flanges (13, 14) is in the case of the runners, which are known from the state of the art, filled out by a tyre with a running surface of synthetic material. In the runner (5) according to the invention, an inner armouring cage (16) and an outer armouring cage (17) are laid into the peripheral space and this is filled out with synthetic material.

(Fig. 4)

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22 MAR 1996

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A runner for a sliding door, in particular for a sliding lift door, has become known from the specification EP-A1-0 343 351. The runner is held by a guide rail and carries a door wing by means of a door hanger. During the opening and closing of the sliding lift door, the runner runs along on a guide rail. The runner consists of two flanges, a ball bearing and a tyre. The flanges encompass half of the outer annular cage of the ball bearing and peripherally form a ring, which is U-shaped in cross-section and in which the tyre with a running surface is arranged.

A disadvantage of the known runner lies in that the tyre with running surface is temperature-dependent in respect of mechanical stability. When the door is not used for a longer time at higher ambient temperatures, the tyre is deformed under the door load, which leads to unpleasant running noises. Beyond that, such tyres because of insufficient fire retardation do not fulfill the fire protection regulations of lift plants.

Here, the invention is to create a remedy. The invention, as it is characterised in the claims, solves the problem of avoiding the disadvantages of the known equipment and proposing a runner which does justice to the demands on quiet running and fire resistance of a sliding door.

On the one hand, fire-retarding synthetic materials for the running surface of a runner do not have the mechanical properties,

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which are necessary for sliding lift doors, in respect of stability and service life. On the other hand, synthetic materials, which are mechanically suitable, burn easily and therefore do not withstand the fire test. The invention fulfills the demand for a mechanically suitable runner and the demand for a fire-retarding runner at the same time.

The advantages achieved by the invention are to be seen substantially in that the runner according to the invention displays only small quantities of synthetic materials without the mechanical properties in respect of stability, service life and quietness of running being restricted thereby. The small quantities of synthetic materials used in the runner permit the use of mechanically suitable synthetic materials which are not particularly fire-resistant. It is furthermore advantageous that the build-up of the runner according to the invention is applicable to all runner diameters, which in turn - thanks to mass production - acts favourably on the manufacturing costs.

The invention is explained more closely in the following by reference to drawings illustrating merely one manner of embodiment. There show:

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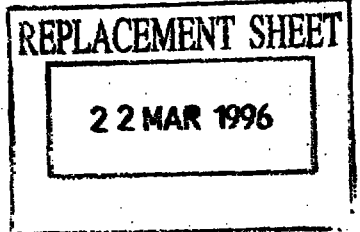
In the Figs. 1 to 4, a door panel is denoted by 1, at which a carrier 2 with a roller track 3 is fastened by means of a first screw 4. The roller track 3 carries a runner 5 with a tyre 5.1, which stands in connection with a suspension bracket 7 by means of a second screw 6. A sliding lift door 8 is arranged at the suspension bracket 7. During the opening and closing of the sliding lift door 8, the runner 5 rolls on the roller track 3.

The runner 5 consists of a concentrically arranged ball bearing 9 with an inner ring 10 and an outer ring 11 and a bore 12, which is penetrated by the second screw 6, wherein the outer ring 11 is

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covered laterally by a first annular flange 13 and ~~a second annular flange 14~~. Both the flanges 13 and 14 are held together at the peripheral end by rivets 15 so that the outer ring 11 is clamped firmly between the flanges 13 and 14. In place of the rivets 15, screws can also be used. The peripheral space between the outer ring 11 and the flanges 13 and 14 is in the case of the runners known from the state of the art filled out by a tyre of synthetic material. In the case of the runner 5 according to the invention, an inner armouring cage 16 and an outer armouring cage 17 are laid into the tyre 5.1 in the peripheral space and this is filled out by synthetic material.

The synthetic material used displays suitable mechanical properties in consideration of the load to be carried, but is however in itself little fire-retardant. Because of the small quantities used and because of the connection with the armouring cages 16 and 17, the runner 5 is in the case of fire not flame-supporting, but merely charring. The inner armouring cage 16 lies within the rivets 15 and so far removed from the outer ring of the ball bearing 9 that space remains open for a minimum first layer 18 of synthetic material between the outer ring 11 and the inner armouring cage 16. The outer armouring cage 17 encompasses the grooves 15 and is covered over by a minimum second layer 19 of synthetic material, wherein the second layer 19 displays a profile corresponding with the roller track 3. A third, not illustrated layer of synthetic material is arranged between both the armouring cages 16 and 17. The layers 18 and 19 serve as noise damping and the armouring cages 16 and 17 thereagainst serve the mechanical stability. For the manufacture of the runner 5, all components are put into a casting mould with the aid of a pattern plate in known manner and so kept in their position during the injection-moulding operation, during which the synthetic material is injected into the remaining hollow spaces. The armouring cages 16 and 17 consist of stiffening rings 20, which are kept apart by spacer members 21. In place of the stiffening rings 20, corrugated washers can also be used, which keep themselves apart mutually by their wavy shape.

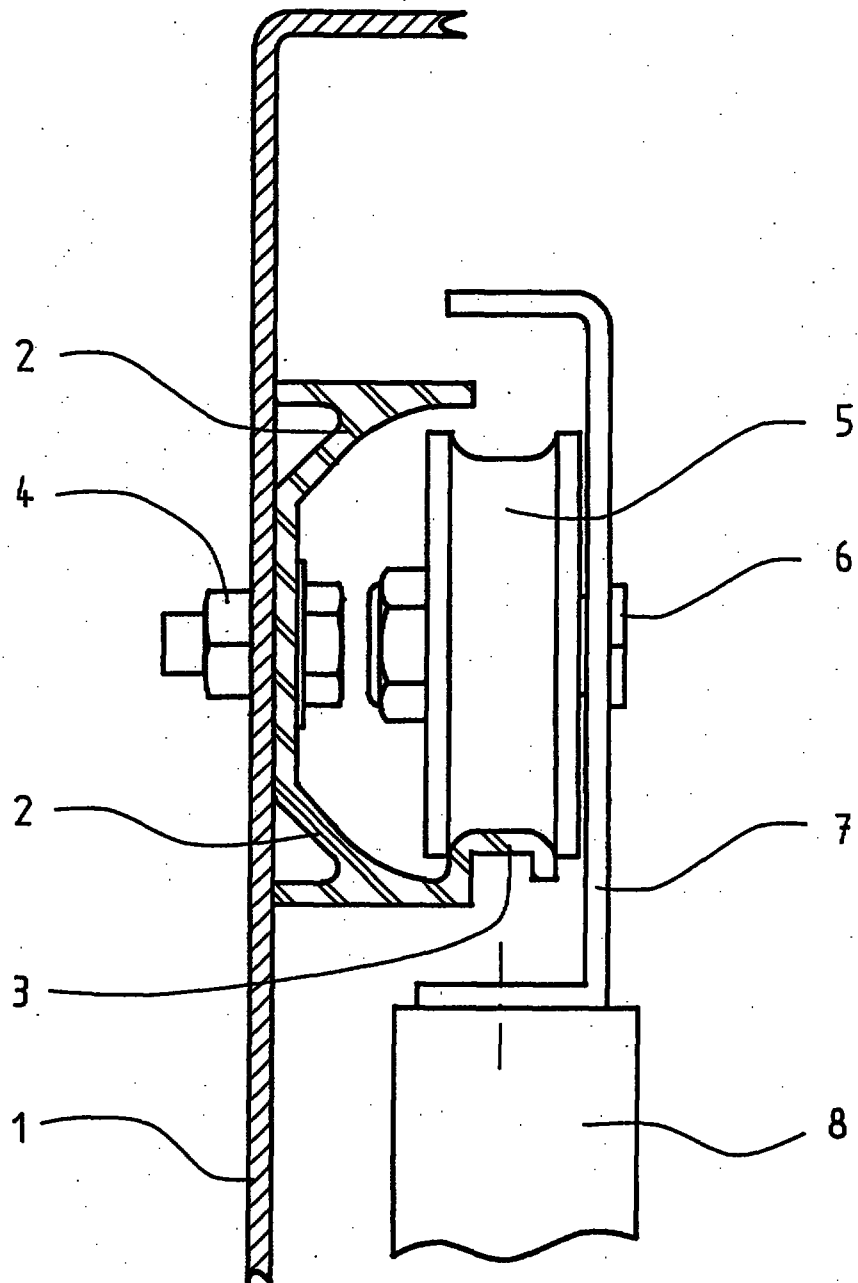


Patent Claims:

1. Runner (5) for a sliding door (8), in particular for a sliding lift door, which displays a ball bearing (9), the inner ring (10) of which is connected with a suspension bracket (7) carrying the sliding door (8), and flanges (13, 14), which are connected with the outer ring (11) of the ball bearing (9) and at the peripheral ends of which a tyre (5.1) of synthetic material is arranged, wherein the tyre (5.1) runs along on a roller track (3) of a carrier (2), which is arranged at a door panel (1), during the opening and closing of the sliding door (8), characterised thereby, that the tyre (5.1) displays at least one armouring cage (16, 17).
2. Runner according to claim 1, characterised thereby, that a first layer (18) of synthetic material is arranged between the armouring cage (16, 17) and the outer ring (11) and that the armouring cage (16, 17) is covered by a second layer (19) of synthetic material, which layer at the surface displays a profile corresponding with the roller track (3).
3. Runner according to the claims 1 and 2, characterised thereby, that an inner armouring cage (16) and an outer armouring cage (17) are provided, between which a third layer of synthetic material is arranged.
4. Runner according to the claims 1 to 3, characterised thereby, that the armouring cage (16, 17) displays stiffening rings (20), which are kept apart by spacer members (21).
5. Runner according to the claims 1 to 3, characterised thereby, that the armouring cage (16, 17) displays corrugated washers which keep themselves apart mutually by their wavy shape.

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Fig. 1



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Fig. 2

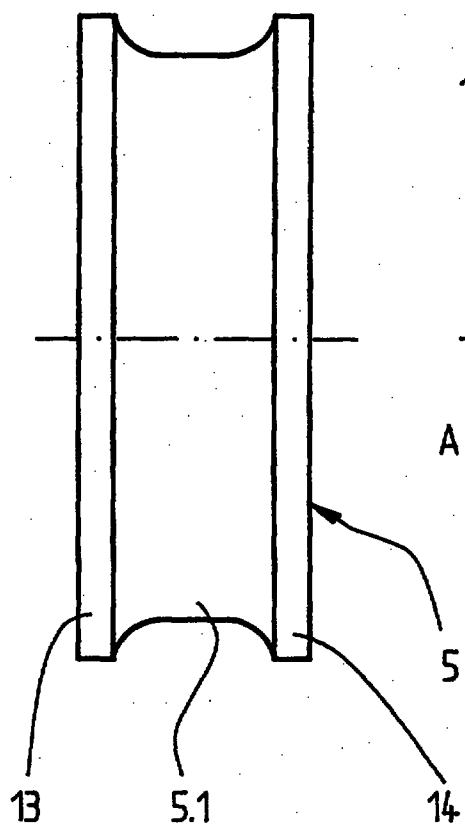


Fig. 3

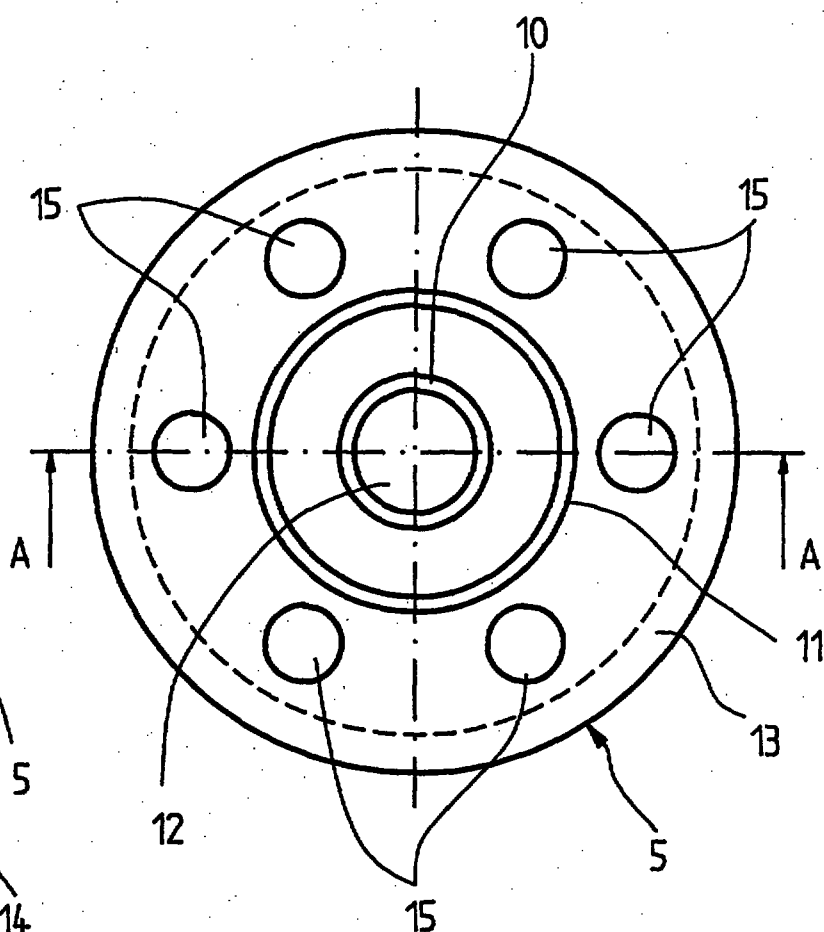


Fig. 4

