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(54) **Device for preventing the tilt of lift doors**

(57) A device for preventing the tilt of lift doors, namely for lift systems (20) equipped with two central or fast-(18) and side or slow-moving doors (16), comprising, for each of these doors (16, 18), means that are fastened to one of these doors and matching a rolling or sliding surface that is integral with the complementary door.

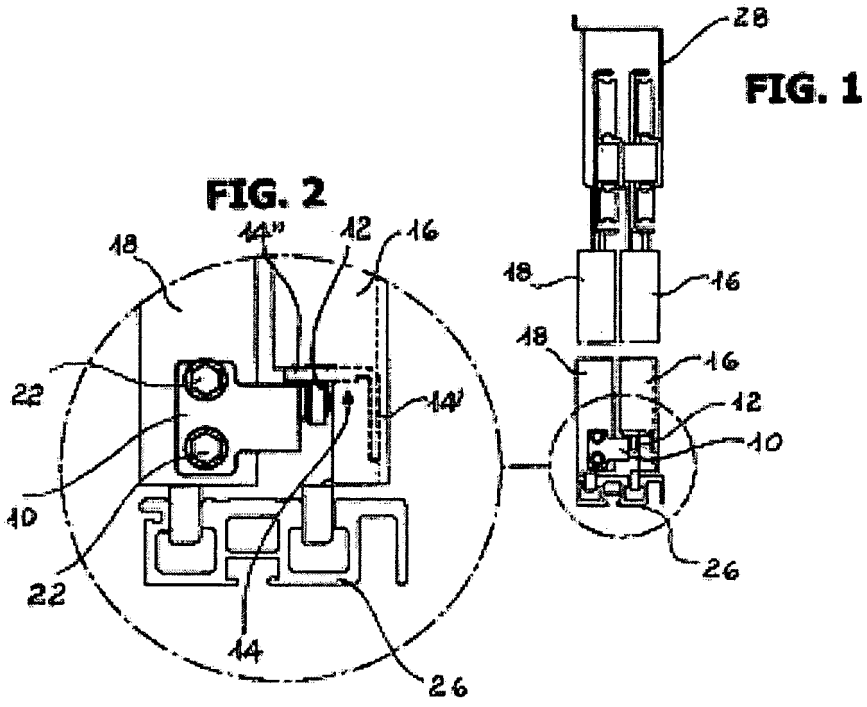

FIG. 1

FIG. 2

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Description

[0001] This invention refers to a device for preventing the tilt of lift doors.

[0002] More particularly, this invention refers to a device meant to prevent the tilt of sliding lift doors in case of forced opening of the shutters.

[0003] It is known that some types of lifts envisage the use of double doors, sliding at different speeds and overlapping along parallel slides at their wide opening stage. This embodiment, which is specially indicated and valued for lifts whose access compartment features a considerable width, generally includes two pairs of opposed doors, wherein those that are set to meet along a central closing line are handled at a basically double speed, by means of speed-reducing devices that are already per se known, compared to side doors.

[0004] As all lift systems, even those that are equipped with pairs of opposed doors sliding along two rails through respective upper carriages are exposed to the risk of getting damaged by vandalism or accidents possibly occurring. In these terms, a frequent occurrence is the attempt to forcedly open the doors, starting from the gap provided between the two central doors; this brings about a problem of great relevance.

[0005] More particularly, the problem stands in that the application of a force in the opening direction of the two central doors or fast-moving doors typically entails a localized increase in width of the gap, as the mentioned forced opening almost compulsorily occurs starting from one sole point. Hence, the two central or fast-moving doors tend to slightly open or spread apart, sometimes too much, so as to produce a condition of danger caused by the excessive size of the gap thus created, which makes wearisome and expensive repair actions needed.

[0006] JP 126 1192 described a sliding door for a two-door lift wherein a rubber muffling member is provided to prevent the door from tilting.

[0007] The object of this invention is to remedy the foregoing problem. More particularly, the object of this invention is to provide a device for preventing the tilt of lift doors which is suited to prevent dangerous gaps leading to the lift running compartment from opening, these gaps typically being the fruit of vandalism or accidents.

[0008] A further object of the invention is to provide a device as described above that is suitable to be easily applied to lift doors, without demanding material actions or changes to be brought to the doors.

[0009] A further object of this invention is to make available to users a device for preventing the tilt of lift doors which is such as to ensure a high degree of resistance and reliability over time, and also such as to be easily and cheaply manufactured.

[0010] These and other objects are achieved by a device for preventing the tilt of lift doors, namely for lift systems equipped with two opposed pairs of doors, namely central or fasr-moving doors and side or slow-moving ones, which comprises, for each pair of fast- and slow-moving doors, some means that are fastened to one of these doors and which meet a rolling or sliding surface that is integral with the complementary door (according to claim 1).

[0011] The structural and functional characteristics of the device for preventing the tilt of lift doors of this invention will be better highlighted in the following description, where reference will be made to the attached drawings illustrating a preferential embodiment which is not meant to be restrictive in character and wherein:

figure 1 is a schematic view of a side section of a lift door with double doors equipped with the device described in this invention;
figure 2 is an enlarged schematic view of a detail of the previous figure;
figure 3 is a schematic view of a front section of a lift door as seen from the inside of the lift compartment with doors in the closing position;
figure 4 is a schematic view of the upper section of the same lift door;
figure 5 is an enlarged schematic view of a detail of the previous figure;
figure 6 is a schematic view of the front section of the same door when a force is being applied in the opening direction to the central or fast-moving doors..

[0012] With reference to the foregoing figures, the device for preventing the tilt of lift doors includes a platelike support 10 for a roller or bearing 12, possibly for a runner, which is meant to meet a plate 14, to be preferably L-shaped in section and fastened in a known manner to each of the side or slow-moving doors, with reference number 16, of a lift system door, referenced as a whole with 20 in figures 3 and 6. The fast-moving doors of the same lift door are referenced with 18 and the device of this invention is advantageously paired with each pair of doors 16 and 18, as described in detail hereinafter. Doors 16 and 18 are made of folded metal plates forming boxes that are per se known of a generally quadrangular section, as shown in detail in figure 4.

[0013] The platelike support 10, typically made from metal, is fastened through screws 22 or equivalent items to each of the fast-moving doors 18, preferably by or next or close to the lower portion of one of the side walls of the door.

[0014] The front side of this support extends overhanging from door 18 towards door 16 and determines a refolding 24, basically of 90°, oriented towards the same slow-moving door 16. Such refolding houses the roller or bearing 12 that is fastened in a known manner to the mentioned refolding and can idle freely.

[0015] The roller or bearing 12 can be made from whatever suitable material and/or coated with rubber or a plastic material on its rolling surface.

[0016] The roller or bearing 12 is arranged in such a way as to systematically match the plate 14, which is

preferably composed of a metal section bar with an "L"-shaped section". One of the branches of this section bar, which is hatched with 14' in figure 2, is fastened by welding or any equivalent means, inside each of the slow doors 16, close to one of the front walls and next to the lower portion of the same door adjoining the threshold of the lift cage, whose schematic reference is 26 in figure 2. Opposed to this threshold 26, in the upper portion of the lift system 20, door sliding carriages 28 paired with handling means 30, per se known, are located to open and close the doors. The adjoining branch 14" of the plate 14, at right angles to the branch 14', makes up the sliding surface of the bearing 12 and develops widthwise along each of the slow-moving doors 16.

[0017] From the foregoing description, the functioning of the device of this invention is easily deduced, as detailed below with initial reference to figure 6. This figure schematizes the condition when the lift door, starting from the central or fast-moving doors 18, is opened forcedly by applying a force illustrated by the opposed arrows F1 and F2. The application of this force tends to open wide the mentioned doors 18, as schematized in the same figure 6 wherein the wide opening is highlighted for the sake of a more immediate understanding.

[0018] As soon as the doors 18 tend to open wide, the roller or bearing 12 presses on the surface made of the branch 14" of the plate 14; since the bearing 12 is fastened to the support 10 which is, in turn, tied to each of the fast-moving doors 18, the wide opening of the latter stops, or is actually almost prevented.

[0019] Although the invention has been described above with special reference to one embodiment which is exclusively provided as an illustration and is not intended to be exhaustive or to limit the invention to the precise form disclosed, several variations and changes of the embodiment therein will be obvious to one of ordinary skill in the art, in the light of the above disclosure. Hence, this invention is only intended to include all variations and changes making up the scope defined by the claims appended hereto.

Claims

1. A device for preventing the tilt of lift doors, namely for lift systems (20) equipped with two opposed central or fast-moving doors (18) and side or slow-moving doors (16), **characterized in that** it includes, for each pair of doors (16, 18), means that are fastened to one of these doors and matching a rolling or sliding surface that is integral with the complementary door.

2. A device according to claim 1, **characterized in that** these means fastened to one of the doors and matching a rolling or sliding surface that is integral with the complementary door comprise at least one idling roller or bearing (12), or equivalent rolling/sliding members fastened to a platelike support (10) close to an angular folding (24) turned towards each of the side or slow-moving doors (16), this support (10) being fastened by means of screws (22) or equivalent retaining means to each of the central or fast-moving doors (18).

3. A device according to the foregoing claims, **characterized in that** the platelike support (10) is fastened on or close to the lower portion of one of the side walls of the door (18).

4. A device according to one or more of the foregoing claims, **characterized in that** the roller or bearing (12) is coated with rubber or any plastic material on its rolling surface.

5. A device according to the foregoing claims, **characterized in that** the plate (14) comprises a section bar with an "L"-shaped section wherein one branch (14') is fastened, by welding or equivalent means, to the inside of each door (16) and the adjoining branch (14") of this section bar is fastened to the base of these doors (16), made from folded metal plates forming boxes that are generally rectangular in section.

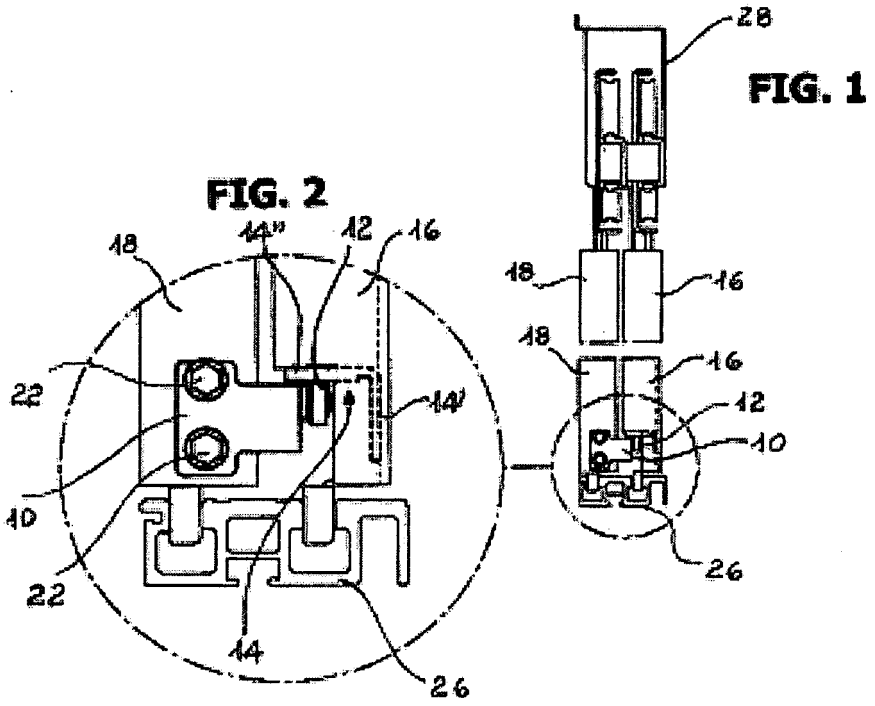


FIG. 1

FIG. 2

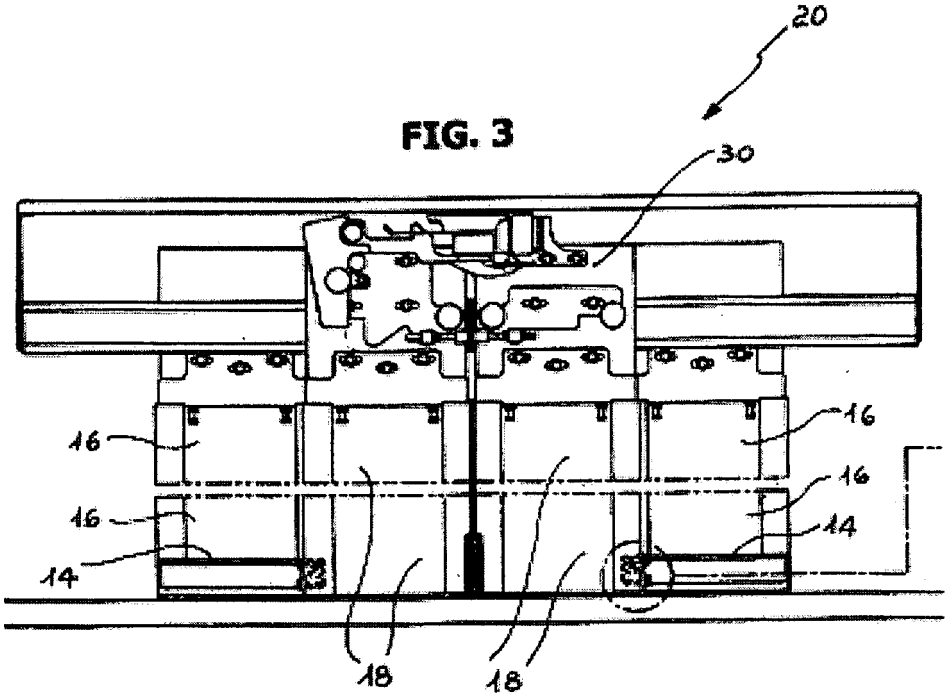


FIG. 3

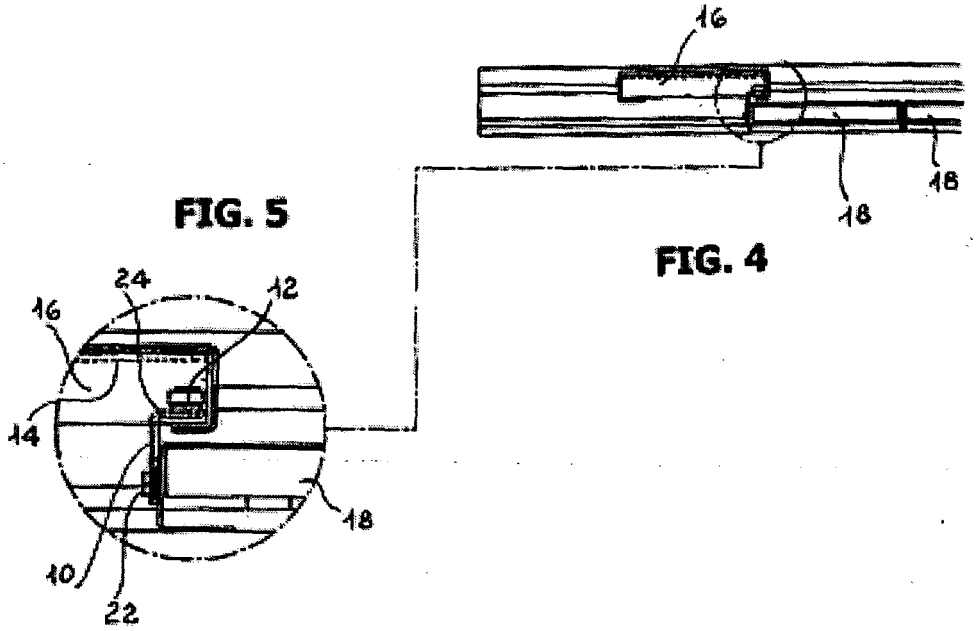
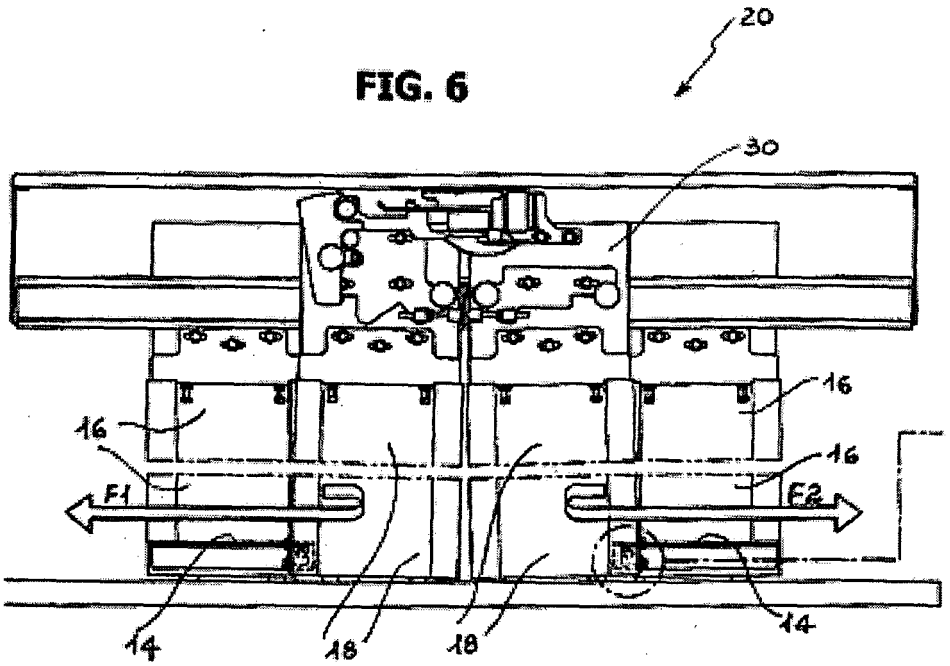


FIG. 5

FIG. 4

FIG. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 06 02 5598

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			TECHNICAL FIELDS SEARCHED (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	4 May 2007	ECKENSCHWILLER, A

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