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# (54) IMPROVEMENTS TO TELESCOPIC GUIDES USED FOR FIXING NESTABLE DOORS OF RAILWAY WAGONS

(57) Consisting of providing inner segment (1) of the guide, which is meant to attach to the car structure, with a E-bar such that in its middle arm (2) are established rolling tracks (3) which relate said inner segment to intermediate segment (4), which adopts a U-shaped configuration and receives within it middles arm (2) of the interior segment (1) through respective top and bottom sets of balls (12), while on the intermediate segment (4) is mounted external segment (8), also U-shaped, such that its side arms (9) are considerably near the top and bottom arms of inner segment (1), establishing with it a type of cage which encloses and protects all the rolling mechanisms.

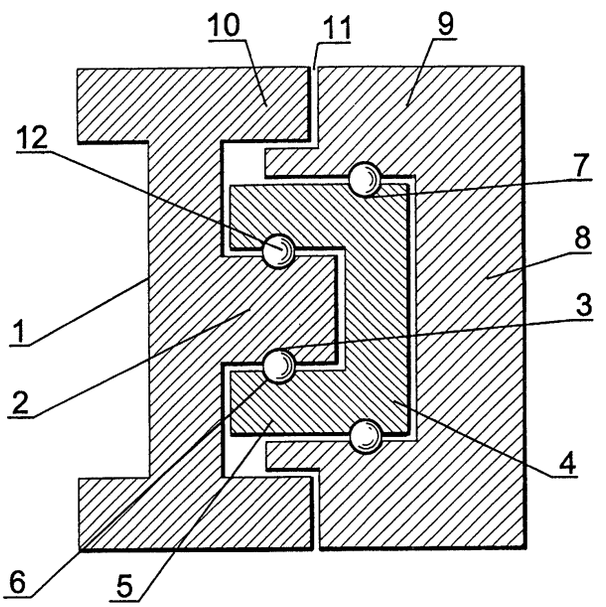


FIG. 1

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## Description

### OBJECT OF THE INVENTION

**[0001]** The present invention relates to a number of improvements made in telescoping guides normally used for locking doors, such as those used in railroad cars, which improvements provide an enclosure for the guides and thereby protect the rolling mechanisms from environmental factors, and provide a better support of the balls on the rolling tracks, as well as a stable positioning of said spheres as regards their separation.

### BACKGROUND OF THE INVENTION

**[0002]** The applicant is the assignee of Spanish invention patent application number 9501451, in which a suspension mechanism is described for locking sliding doors, in which participates a telescoping guide based on several segments which slide on each other so that the door is joined to the end segment of the guide while its initial segment is joined by rods jointed to the car structure, so that by these rods the door may be locked and released, while by the telescoping guide the door may slide in order to open and close.

**[0003]** A similar structure is seen in the addition certificate to said patent with application number 9600313, in which the telescoping guide is double so that an intermediate segment is attached to the rigid car structure also through rods which enable to lock and release the guides, while the two end sectors of these guides, with the corresponding segments, allow a simultaneous mobility of two opposing doors.

**[0004]** In any of the two aforementioned records the segments of the telescoping guide have opposing grooves in which are provided the corresponding set of spheres to aid in their sliding.

**[0005]** However, such guides have a disadvantage which mainly resides in the following aspects:

- The various segments of the guide, or of each guide, are open on one their sides, so that the sliding means, both the tracks and the balls are in an exposed situation implying a likely reception of dust and dirt on said sliding means, with the ensuing problems implied for the functionality of the doors.
- Balls which take part in the sliding means are free inside the corresponding guides, so that they may accumulate at any of their points without an even distribution which would obviously improve their functionality.
- The rolling tracks of the guides have a curved configuration with a radius of curvature which is considerably greater than that of the balls, so that these contact the track on a single point, which in addition to implying a maximum load concentration on said balls allows a certain sideways jolting of the door, which must be limited by additional guides placed underneath the door.

### DESCRIPTION OF THE INVENTION

**[0006]** The improvements disclosed in the invention solve the aforementioned problems in the various aspects considered in a fully satisfactory manner.

**[0007]** For this purpose and more specifically, according to one of the characteristics of the invention the inner guide adopts a configuration in an shape resembling an "E", so that its rolling tracks are placed in its middle arm, to which is added an enveloping intermediate guide with a U shape, while the outer guide also has a U shape, with its concave surface facing the inner guide and so that the ends of its lateral arms adopt a position of maximum approximation to the extreme guides of the inner guide, providing an enclosure of said inner guide which protects the rolling means provide inside said enclosure.

**[0008]** According to a further characteristic of the invention each set of balls which relates the two guides is aided by a type of cage which maintains the balls suitably separated from each other, preventing unwanted groupings which would have a negative effect on the guide's operation.

**[0009]** Finally and according to a further characteristic of the invention, the rolling tracks provided in said guides are given an angular configuration, so that contact of each ball with them occurs in two clearly separated points, which in addition to providing an improved load transmission between said balls, conveniently stabilises the guides against the door's tendency to jolt sideways.

### DESCRIPTION OF THE DRAWINGS

**[0010]** These and further advantages of the invention will be better understood in view of the accompanying drawings of a preferred embodiment, where for purposes of illustration only the following is shown:

Figure 1.- Shows a schematic cross sectional view of a group of three telescoping guides designed to support a locking door of the type used in railroad cars, according to the improvements object of the present invention.

Figure 2.- Shows an enlarged detail of the previous figure of a ball which relates the various guides, according to another improvement of the invention.

Figure 3.- Shows a side elevation view of one of the cages meant to distribute the balls in each guide of figure 1.

Figure 4.- Shows a plan view of the cage of the previous figure.

Figure 5.- Shows, finally, a side view of the same cage.

## PREFERRED EMBODIMENT OF THE INVENTION

**[0011]** In view of these figures and particularly of figure 1, it may be seen that in accordance with one of the improvements of the invention inner guide (1) has an approximately E-shaped configuration, so that in its middle arm (2) are established, above and below, respective rolling tracks (3) for intermediate guide (4), which in turn has a U-shaped configuration with its concave surface facing inner guide (1), so that the side arms (5) frame middle guide (2) of said inner guide and internally include the corresponding rolling tracks (6), with said side arms of intermediate guide (4) externally provided with tracks (7) for outer guide (8), which is also U-shaped but considerably larger, with its concave surface facing the inner guide (1), so that its side arms (9) are at the same level as end arms (10) of said inner guide (1) in a position of maximum approximation to these, thereby defining only narrow grooves (11) to prevent direct contact between the two guides.

**[0012]** According to this construction and as derived from observing figure 1, inner guide (1) and outer guide (8) define a nearly closed compartment which houses intermediate guide (4) and all the rolling means, thereby achieving two functions, on one hand eliminating hazards for workers in later maintenance operations by preventing fingers from entering the guide, and in addition providing a well-sealed unit which prevents entry of foreign elements which may damage or hinder its operation.

**[0013]** In addition to the structure described, and as seen in figure 2, any of said rolling tracks (3), (6) and (7) adopt a dihedral shape, preferably approximating 90°, so that balls (12) which relate them rest on each of the tracks at two points (13) which are considerably distant form each other, providing two beneficial effects: on one hand the load supported by each ball is distributed among two of its points, and furthermore, the guides related by said balls are prevented from pitching, thereby preventing the door from jolting sideways as well.

**[0014]** Finally, and according to a further characteristic of the invention, balls (12) are placed between guides (2), (4) and (8) with the aid of cages (14) as shown in figures 3 to 5, or any other similar construction, so that these cages (14) adopt a U-shaped grooved configuration, and are attached by orifices (15) of their intermediate arm to one of the guides, and incorporating on their side arms inner protrusions (16) distributed evenly throughout cage (14) and suitably separated so that they retain balls (12) longitudinally without affecting their normal rolling.

## Claims

1. Improvements made in telescoping guides meant to support locking doors used in railroad cars, of those comprising three segments, one of which is attached to the car and another to the door, and all of which are related by sets of balls provided in the corresponding rolling tracks, **characterised in that** the inner segment (1) meant to be attached to the car structure has an E-shaped configuration, with its mid arm (2) provided with the rolling tracks (3) for intermediate segment (4), which adopts a U-shaped configuration with its lateral arms (5) suitably distanced so that they frame and house within the intermediate arm of inner segment (1), with said lateral arms provided with internal rolling tracks (6) for connection to the inner segment (1) and with external rolling tracks (7) for connection to the third segment (8), which is meant to receive the door, and which is also U-shaped and is mounted on the intermediate segment (4), so that the ends of its lateral arms (9) in their maximum approximation position are placed opposite lateral arms (10) of inner segment (1), establishing for the latter a type of case which is markedly closed and houses within it all the rolling means, so that the set on one hand eliminates manipulation hazards by preventing access of fingers to its interior and in addition, depending on the tightness obtained prevents the entry of foreign elements which may affect its operation.

2. Improvements made in telescoping guides meant to support locking doors used in railroad cars, as claimed in claim 1, **characterised in that** rolling tracks (3), (6) and (7) corresponding to the various guide segments adopt a dihedral arrangement, so that balls (12) rest on said rolling tracks at two points (13) which are considerably distanced from each other.

3. Improvements made in telescoping guides meant to support locking doors used in railroad cars, as claimed in above claims, **characterised in that** each set of balls (12) which relates segments (1 - 4 - 8) of the guide is aided by a U-shaped cage (14) provided in its middle arm with orifices (15) or any other means of attachment to the corresponding guide segment, and is provided on its side arms with inner protrusions (16), evenly distributed and which act as spacers which maintain balls (12) suitable distributed along the corresponding entire segment.

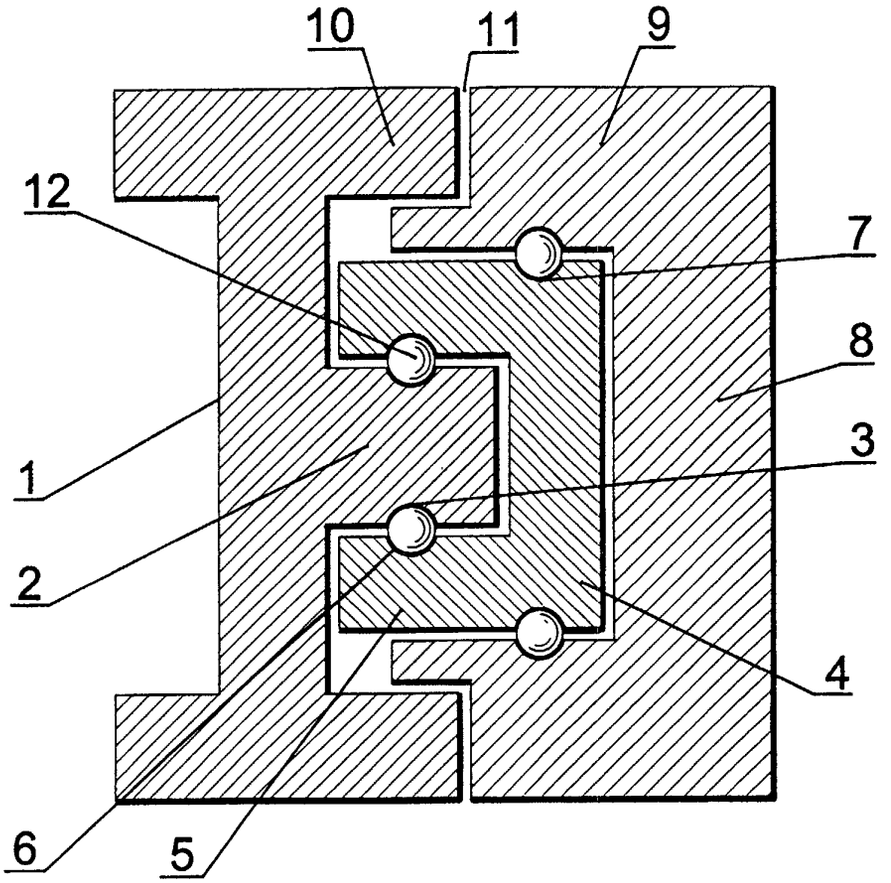


FIG. 1

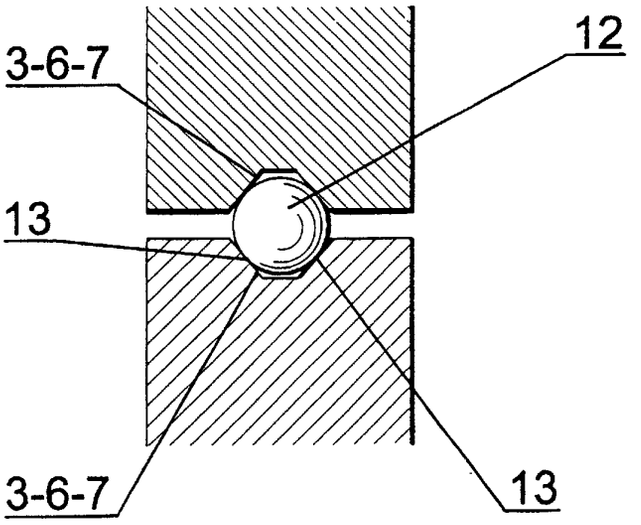


FIG. 2

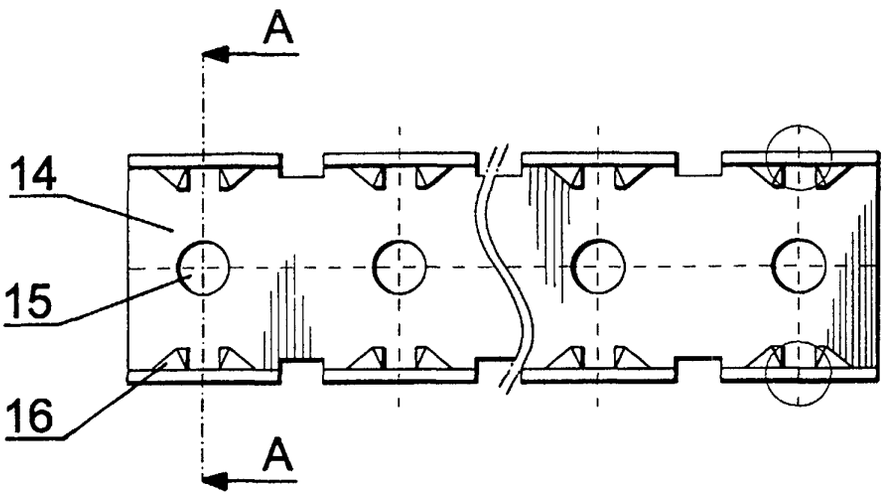


FIG. 3

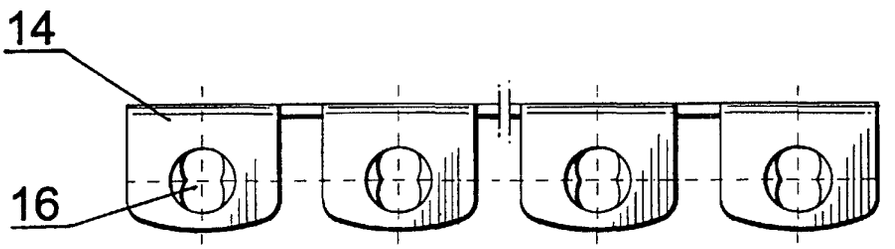


FIG. 4

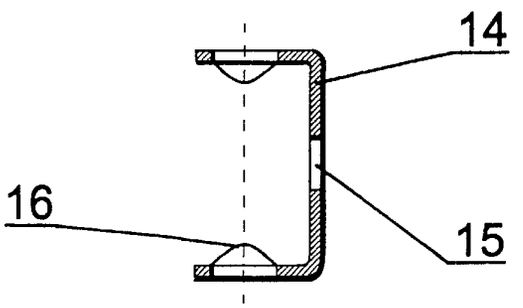


FIG. 5

A-A

## INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 00/00215

A. CLASSIFICATION OF SUBJECT MATTER :

IPC7 :B60J5/06; E05F15/10; B61D19/00; B61D19/02

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)

IPC7 :B60J; E05F; B61D

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

CAJETINES DE PATENTES Y MODELOS DE UTILIDAD ESPAÑOLES; E05F15/10T1; B60J5/06B

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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|---|---|---|
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| A | **US 4091570 A (FAVREL) 30 May 1978 (30.05.1978), abstract, figures.** | **1** |
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☐ 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 | Date of mailing of the international search report |
|---|---|
| **28 September 2000 (28.09.2000)** | **02 October 2000 (02.10.2000)** |
| Name and mailing address of the ISA/ | Authorized officer |
| Facsimile No. **S.P.T.O** | Telephone No. |

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/ ES00/00215

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