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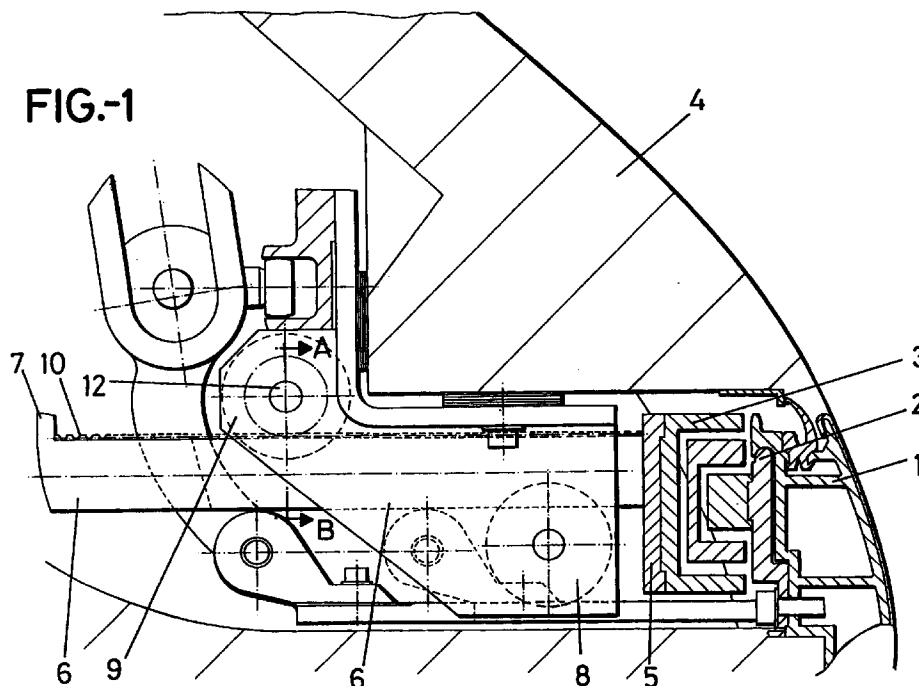
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(54) SUSPENSION MECHANISM FOR NESTABLE SLIDING DOORS

(57) The specific object of the suspension mechanism is to ensure, during the fitting and unfitting operations of the door (1), a movement of the door which is perfectly perpendicular to the general closing plane, in order to improve the conditions of said closing operation. This is obtained by fixing the telescopic guide (3) for the sliding of the door (1) to a support (5) from which extend integrally a pair of axis (6) projecting horizontally

towards the inside of the carriage (4) or like element and which are conventionally guided by a pair of sheaves (8) and (9) or by any other appropriate means. The longitudinal motion of said axis is synchronized so as to avoid the nodding of the doors or out-of-adjustment of one door with respect to the other when it concerns two complementary doors.

FIG.-1



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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a suspension mechanism for fitting, sliding doors, as for example those used in railroad carriages and the like, doors, which in locked position, remain fitted inside the carriage carbody, establishing external surface smoothness with the same, in order to improve the aerodynamic penetration conditions, and which must be initially disengaged in order to open them from said carbody, for the subsequent conduction of the longitudinal sliding, which is necessary for their aperture.

[0002] The object of the invention is to improve the fitting conditions of the door inside the carbody, for an improved closure.

BACKGROUND OF THE INVENTION

[0003] Specifically within the field of railroad carriages, as well as in other practical examples in which similar functions are required, folding doors pose a wide and varied range of problems which make them, at the present moment to be found totally in disuse, having been replaced by sliding or runner doors.

[0004] Different solutions are in existence for moving these sliding doors, and which range from a simple, external runner, along which these doors are displaced, parallel to the wall of the carriage or elements involved, up to doors which, besides being sliding doors, are also of the fitting type, as has been previously indicated.

[0005] Specifically, one of the solutions, which has been used as being the most appropriate for this type of doors, consists in using a horizontal and upper, telescopic guide, from which the door is suspended, said guide, besides being capable of telescopically extending and shortening, is capable of displacement of the totality of its assembly, when it is unfolded, towards the front, with the purpose of establishing the fitting and unfitting operations of the same, from the corresponding housing of the carriage carbody.

[0006] However, this front displacement is only from the theoretical point of view, since in practice, it is achieved by means of a pair of tie rods, which, at one of their ends are joined articulated, to the telescopic guide, whilst, on the other, it is joined to fixed points of the carriage carbody. This signifies, that during the tilting movement of the tie rods, the doors describe an arched trajectory, that is to say, that the movement of the same as regards the carriage, is not perfectly perpendicular to the general plane of said carriage in which the door plays, but that it is in real fact oblique, and with arched trajectory. Consequently, the housing of the carriage carbody must be conceived, designed and dimensioned to permit this slanting movement of the doors, which signifies a structural complexity of the closure which is appreciably greater than if said doors conducted the fit-

ting and disengaging operation with a perfectly perpendicular trajectory to the general plane of its mouth in the carriage carbody.

DESCRIPTION OF THE INVENTION

[0007] The suspension mechanism which the invention proposes, solves in a completely satisfactory manner, the previously indicated problem, permitting, in compliance with the main objective of said invention, that the sliding door conducts its fitting and disengaging operations with a perfectly perpendicular movement as regards the general fitting plane of the same.

[0008] To achieve this, more specifically and parting from a conventional structurization, according to which, the pair of doors which generally establish as a whole, the closure of a specific gap, are assembled on respective telescopic guides, each one of these guides forming integral part of a support to which in turn, a pair of axis form integral part, which emerge perpendicular to the end zones of said support and which are capable of sliding in relation to the carbody of the carriage or element involved, in the direction of its own axes, that is to say, in a perfectly perpendicular direction to the locking plane.

[0009] More specifically, it has been provided, that each one of these axes shall be guided by a pair of sheaves, said axes being also equipped with a run limiting stop, which, obviously, limits the displacement of the door in disengaging direction of the same.

[0010] According to another of the characteristics of the invention, and with the object of achieving a perfect synchronism, both for the two axes which participate in one same door, and in its case, for the two axes of one of the doors as regards the two of the complementary door, it has been provided that each one of these axes include a rack in correspondence with the abutment generatrix of one of the sheaves, whilst the corresponding sheave includes a complementary toothing, the respective sheaves of the different axes remaining related to each other by means of a common axis which forces them to a synchronized movement, which is the equivalent to an also synchronized movement of the corresponding axes through the respective racks.

[0011] However, this solution may be replaced by a torsion bar, suitably forming integral part of the rear and free end of the axes, said bar forcing them, in a like manner, to a parallel and synchronized movement.

DESCRIPTION OF THE DRAWINGS

[0012] In order to complement the description which is being carried out, and with the object of helping to a better understanding of the characteristics of the invention, the present Specification is enclosed, forming integral part of the same, with a set of drawings in which, with illustrative and non limitative character, the following has been represented:

Figure 1 shows a partial, cross sectional detail of a carriage, at the level of the suspension zone of one of its doors, in which the structure of the suspension mechanism which constitutes the object of the present invention, can be observed.

Figure 2 shows a cross sectional detail of the assembly, represented in the previous figure, according to the cut line A-B of said figure.

PREFERRED EMBODIMENT OF THE INVENTION

[0013] In view of said figures, and especially from figure 1, it can be observed how the sliding door (1), by means of an appropriate anchorage (2), remains suspended from a telescopic guide (3) capable of remaining tied-down in the cavity of the carbody (4) of the carriage in closed situation, for the door represented in figure 1, or of a transversal movement towards the outside, so as to be placed outside said carbody (4), permitting, by means of its extension, the longitudinal movement of the door (1) which is necessary for the opening of the same.

[0014] Thus, as from this basic and conventional structurization, the mechanism of the invention centres its characteristics in the fact, that the telescopic guide module (3) placed in counterposition to that for the attachment of the door (1), forms integral part of a support (5), elongated in correspondence with the actual guide (3), to which, in turn, various axes (6) form integral part in the proximity of its end which, attached perpendicular to the support (5), extend horizontally towards the inside of the carriage (4), finished off at its free end by various stops (7), which shall be herewith described.

[0015] These axes (6), intended for supporting the telescopic guide (3), and through the same, the sliding door (1), is related to the carriage (4) or element involved, each one of them, through a pair of sheaves (8) and (9), and each, peripherically grooved in correspondence with the axis curvature (6), one placed below, which is referenced with (8), in the proximities of the support (5), whilst the other, the one referenced with (9), is placed above, and in a considerably more removed location, with the object of absorbing the stresses tending towards the tilting of the axis (6), generated by the actual weight of the door (1).

[0016] The upper-interior sheave (9) in addition to acting as guiding means for the axis (6), acts as limiting stop for the axial run of said axis (6), when the stop (7) incides on the same, which forms integral part with the free end of said axis (6), said stop however, may incide, in order to limit said movement, on any other fixed element of the carriage structure (4).

[0017] In this manner, and parting from the closed position represented in figure 1, the door (1) is capable of outwards displacement, in a perfectly perpendicular movement as regards the general closing plane, due to

the displacement of its pair of axes (6), on the corresponding pair of sheaves (8) and (9), up to a limit situation defined by the stop (7) in which the telescopic guide (3) is placed totally outside the carbody (4) of the carriage, remaining in a condition which permits the transversal displacement of the door (1), for the corresponding opening operation, an opposing operation being obviously established for the closing operation.

[0018] The door (1), or in its case, the pair of complementary doors (1), shall be activated by any suitable pushing means, such as for example, a pneumatic circuit which acts, for example, on the support (5), pushing or pulling the same. Thus, in this sense, and with the purpose of avoiding possible pitching of a door or disarrangement in the mobility of a door as regards its complementary door, it has been provided that the different axis (6) move in a perfectly synchronized manner. In this sense, each axis (6) may be equipped with a rack (10), for example on the upper support generatrix of the sheave (9), said sheave (9) being provided with a complementary toothing (11), and the sheaves (9) corresponding to the different axes (6) of the door or doors (1), forming integral part to each other through a common axis (12), which forces them to a synchronized movement, in such a manner that it is impossible that any of said axes (6) may become misadjusted in their advancing or retreating longitudinal movement as regards the rest of the group.

[0019] However, as has been previously indicated, this synchronization in the movement of the different axes (6), may be also conducted by means of a torsion bar, conveniently forming integral part with the rear and free end of the same.

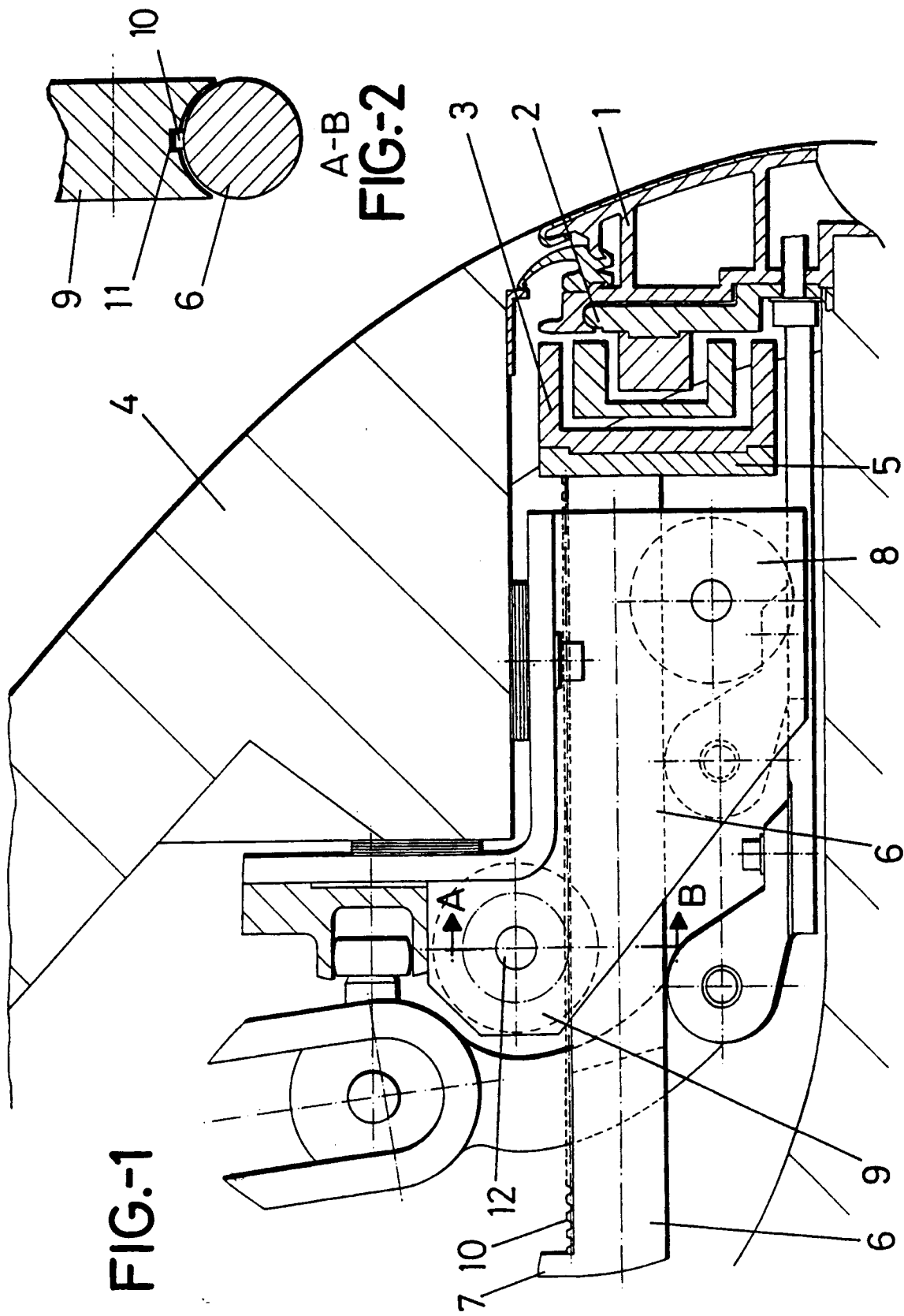
[0020] In any case, according to the main objective of the invention, it has been achieved that versus the slanting movement of the conventional fitted doors, for its uncoupling from the carbody of the carriage or element involved by means of the mechanism of the invention the disengaging operation, as well as the subsequent disengaging during the locking, it is conducted by means of a trajectory of the door, which is perfectly perpendicular to the locking plane and, in consequence, in optimum conditions for said locking.

Claims

1. Suspension mechanism for fitting sliding doors, specifically for doors (1), the sliding of which over runners, is conducted on the outside of the carbody (4) of the carriage or element involved, with the collaboration of a telescopic guide (3) which, together with the actual door (1), is capable of remaining fitted inside said carbody (4), or of resulting laterally projecting as regards the same, to permit the opening operation by the sliding of the door, essentially characterized in that it consists of a support (5), elongated in correspondence with the telescopic

guide (3) and advantageously attached to the module of the latter, opposite the one for attachment of the door (1), at least one pair of axis (6) forming integral part with this support (5), and which project perpendicularly to the support (1) towards the interior of the carriage or element involved, where they are advantageously guided, in such a manner that the sliding door describes, during the fitting and disengaging operation of the same, a perfectly perpendicular movement to the general locking plane of the same.

2. Suspension mechanism for fitting, sliding doors, according to claims 1, characterized in that the guiding means for each one of these axes (6), forming integral part of the support (5) of the guide (3) for the door (1), consist of a pair of sheaves (8), and (9), opposite to each other and transversally misadjusted, peripherically grooved in correspondence with the curvature of the actual axis (6), having been provided that one of them, specifically the innermost one, also constitutes the run limiting stop for the door, when a stop (7) which is advantageously established on the axis (6), axially displaceable, incides on the same
3. Suspension mechanism for fitting, sliding doors, according to the previous claims, characterized in that in order to achieve a perfect synchronism of the longitudinal movement of the axes (6), which prevents pitchings of the door (1) and/or that it advantageously synchronises the movement of the two complementary doors, each axis (6) presents, in correspondence with its support generatrix of one of its sheaves, a rack to which a tooth of said sheave is complementary, the toothed sheaves of the different axis forming additionally integral part of a common axis which determines a synchronized rotational movement of all of them.
4. Suspension mechanism for fitting, sliding doors, according to claims 1 and 2, characterized in that in order to obtain a perfect synchronism in the longitudinal movement of the axes (6), which prevents pitching of the door (1) and/or advantageously synchronises the movement of the two complementary doors, the different (6) are stiffened to each other, by their internal and free end, by means of a torsion bar which assures their joint movement.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 97/00061

A. CLASSIFICATION OF SUBJECT MATTER IPC ⁶ E05D15/10 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 ⁶ E05D Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPODOC, WPI, CIBEPAT, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB-2191528-A (THE BRITISH MUSEUM) 16 December 1987	1
A	(16.12.87) page 1, line 102-page2, line28; figures	2
Y	FR-2438149-A (ATTILIO ET AL.) 30 April 1980 (30.04.80) page 3, line 10-line 15; figures	1
A	CH-603376-A (SOCIMI) 15 August 1978 (15.08.78) Column 5, line 10-line 21; Column 5, line 33-line 36; column 5, line 58-line 63; column6, line 34-line 15; figures	1,2
A	EP-0589180-A (BODE) 30 March 1994 (30.03.94) column3, line 10- Column 44, line 36; figures	1,3
A	FR-1461213-A (SCHMITT) 15 February 1967 (15.02.67) Page 2, right column, line 45- line59; figures	1
A	DE-2219176-A (KIEKERT) 31 October 1973 (31.10.73) Page 5, paragraph 1; figures	1
A	DE-3619775-A (HANEWINKEL) 17 December 1987 (17.12.87) Column 8, line 68- column 9, line 10; figures	3
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 30 June 1997 (30.06.97)		Date of mailing of the international search report 30 June 1997 (30.06.97)
Name and mailing address of the ISA/ S.P.T.O. Facsimile No.		Authorized officer Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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NONE