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(54) SUSPENSION MECHANISM FOR NESTABLE SLIDING DOORS

(57) The improvements consist of the establishment, in the cavity of each one of the supports (8) intended for the attachment of the mechanism to the related wagon or element, of a special axis (7) provided with an upper threaded end (12), which plays inside a likewise threaded orifice (13), of the upper branch of the support, in such a way, that this axis (7) acts as a worm shaft, on activation on its lower head (15), dragging with it the corresponding small connecting-rod (4), and in

consequence the door, since this small connecting-rod is keyed to the axis (7) by means of a lower bushing (10) on which the axis abuts through a stepped recessing, and by means of an upper nut (11) attached to the actual threaded section (12) of the axis (7). A locking screw (17) immobilises the adjustment means, at the end of the adjustment phase during the assembly operation of the door or doors.

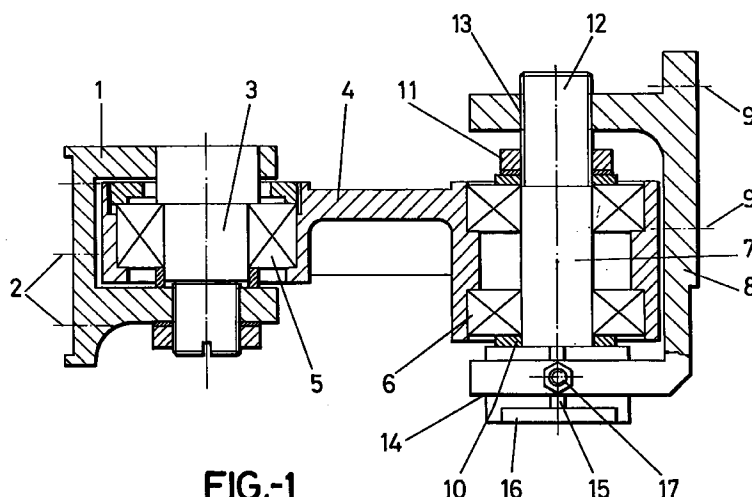


FIG.-1

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Description

OBJECT OF THE INVENTION

The present invention refers to various improvements introduced in the suspension mechanism of fitting, sliding, doors which constitute the object of the Patent of Invention 9501451, these improvements being directed towards permitting an easy adjustment of the mechanism, with which it is possible to conduct a perfect adjustment in the height of the door or doors, associated to this mechanism.

The mechanism is applicable to doors used in railroad wagons or the like, maintaining the functional effectiveness of the same, and practically maintaining the same simplicity.

BACKGROUND OF THE INVENTION

Specifically, in the field related to railroad wagons, as well as in other practical examples in which similar functions are required, folding doors create different types of problems which have determined that at present, they are to be found completely in disuse, sliding doors being much more practical.

Different solutions exist for moving these sliding doors, which range from a simple external runner over which these doors are displaced, parallel to the wall of the related wagon or element, up to doors which in addition to being sliding doors, are also fitting doors, passing through doors which slide inside the cavity of a double wall established on the actual wagon.

Without doubt, the fitting and sliding doors are the most suitable in the field of railroads, since, as is obvious, a sliding door does not allow the establishment of a perfectly adjusted locking, which is capable of being obtained when the door, after its sliding movement which places it in a closed position, describes a slight frontal movement, fitting into the gap to be closed, where it can exert pressure on the corresponding joint.

Currently, the fitting, sliding doors remain generally suspended from a horizontal and upper guide, established on the external side of the related wagon or element, which permits the movement of the door towards the location confronting the gap to be closed, position in which the indicated guides finish off in short guides, perpendicular to the former ones, which allows the final frontal movement of the door for its complete closure.

This poses a problem with a double aspect, on one hand, the longitudinal guides are visible during closed positions, with negative repercussion on the aesthetic looks of the related wagon or element, simultaneously constituting elements which break its aerodynamic smoothness, with the possible production of noise, especially, when the train moves at high speed, whilst on the other hand, the short guides, perpendicular to the former ones, demand very accurate adjustments, which consequently have a negative repercussion both

at the moment of construction of the door and during its subsequent maintenance, also creating problems during the handling, when, as is generally the case, the activation of these doors is automatic.

The previously indicated problem is solved by means of the mechanism of the Patent of Invention 9501451, in which a telescopic guide participates, based on various sections which slide one with the other, on one of which, at the terminal section, the referenced door is attached, on which, at the initial section, and with the collaboration of end supports, a pair of small articulated connecting-rods are attached, which in turn are joined, articulated to other supports made solid with the fixed structure of the related wagon or element, in such a manner, that through these connecting-rods, and with the collaboration of appropriate activation means, the assembly, constituted by the telescopic guide and the door, is capable of fitting and detaching from its gap, and in a detached position, the door may move sideways between the limit open and closed positions, by means of the extending and retracting of the telescopic guide.

In a first Acceptance Certificate attached to this Patent of Invention, improvements are described, which permit two doors to hang from one same mechanism, working in combination, fittable into one same gap, common to both, from which they are also simultaneously detachable in order to slide in opposite directions.

Both in one or another case, and in order to correct possible assembly errors or misadjustments, the suspension arms shall act as height adjustment elements for the door or doors, in order to conveniently adjust them as regards the gap of the wagon.

DESCRIPTION OF THE INVENTION

The improvements proposed by the invention constitute a simple and totally effective solution for performing this adjustment in height.

To achieve this, and in a more specific manner, these improvements consist in the assembly of each one of the small connecting-rods of the mechanisms on the corresponding inside cornice forked support of the upper zone of the gap of the related wagon or element, through a special axis, to which this small connecting-rod is advantageously keyed, this axis being made up of a screw which is advantageously threaded to one of the transversal branches of the forked support, in such a manner, that when it activates on the screw head, in one or another direction, it acts in turn as a worm shaft which moves axially in vertical direction, dragging along, the corresponding small connecting-rod and, in consequence, causing the rise or fall of the door or doors, for its positional adjustment.

According to another of the characteristics of the invention, it has been provided, that this special axis be assisted by a locking screw, which, after the advantageous adjustment of the locking at the end of its assem-

bly operation, finally immobilises the system.

DESCRIPTION OF THE DRAWINGS

In order to complement this description, and with the object of helping to achieve a better understanding of the characteristics of the invention, this present Specification is attached with a single sheet of drawings forming integral part of it, in which, with illustrative and non limitative character, and in its single figure, a side elevational view, in partial section, of the mechanism's connecting-rods has been represented with their corresponding supports and accessories, in compliance with the improvements which are the object of the present Acceptance Certificate.

PREFERRED EMBODIMENT OF THE INVENTION

In the indicated figure, the forked support has been referenced with (1), on which the telescopic guide which is not referenced, is to be attached, for example according to the attachment points represented in an exploded view with broken lines (2), establishing between the side branches of this forked support (1), an axis (3), around which the small connecting-rod (4) rotates or tilts, with a ball bearing (5) in interposition, at the same time as this small connecting-rod (4), on its other end, and through the other ball bearing (6), rotates around an axis (7) assembled in turn on a forked support (8), intended in turn to be attached, by screwing or by any other means, according to the exploded view lines (9), to an inside cornice operationally established on the upper zone of the gap of the referenced wagon or element.

Thereby, parting from this basic and conventional structure, the improvements of the invention center on the fact that the end of the connecting-rod (4) corresponding to the support (8) for attachment to the related wagon or element, is keyed to this axis (7), in such a way, that it may tilt freely as regards this axis, though it remains absolutely unmoveable in axial direction, this keyed position being conducted by means of a lower bushing (10) and an upper nut (11), this nut being attached to the axis (7) whereby this axis is a special axis, with a threaded section (12), through which it receives the indicated nut (11) for keying of the connecting-rod (4) and through which the actual special axis (7) forms a solid part of the upper branch of the forked support (8), specifically inside a threaded orifice (13) which is operationally performed on the latter.

The lower bushing (10) plays freely inside an orifice (14) of the lower branch of the support (8), and is crossed by a sector (15) of the axis (7) with a reduced diameter prior to its activating head (16), in such a way, that when it acts on this head (16), the special axis (7) rotates jointly with the bushing (10), the nut (11) and the internal and corresponding section of the bearings (6), acting as a worm shaft on the nut (13), which is moved vertically, dragging with it, the small connecting-rod (4),

which may thus vary its working height as regards the support (8), in consequence permitting the adjustment of the position of the door or doors height, associated to this connecting-rod (4) and its twin.

Obviously, this adjustment operation is generally conducted only once, at the moment of assembly of the door or doors, and in order to prevent that in time, lack of adjustments are produced in the mechanism, it has been provided that on one of the side branches of the support (8), preferably on the lower branch, a locking screw (17) is established which immobilises the axis (7), keeping the mechanism absolutely stable.

Claims

1. Improvements introduced in the Patent of Invention 9501451, by means of the "suspension mechanism for fitting, sliding, doors", such as those used in railroad wagons, essentially characterized in that they consist of the use, as a means of articulated connection of each connecting-rod (4) to the corresponding support (8) attachable to the rigid structure of the indicated wagon or element, of a special axis (7), to which the small connecting-rod (4) remains advantageously keyed, the activating head (16) of which, is assembled free to rotate around the lower branch of the support (8), and its upper and free end being provided with a threaded sector (12) which plays inside a threaded orifice (13) of the upper branch of this support (8), this special axis (7) acting in the manner of a worm shaft, its rotational movement causing its own axial movement with the consequent dragging of the small connecting-rod (4), and of the door it is associated with.
2. Improvements introduced in the Patent of Invention 9501451, by means of the "suspension mechanism for fitting, sliding, doors", according to claim 1, characterized in that the small connecting-rod (4) remains keyed to the special axis (7) with the collaboration of a lower bushing (10), which plays with free rotation inside an orifice (14) operationally performed on the lower branch of the support (8), bushing (10) on which the axis (7) abuts through a stepped recessing, and an upper nut (11) which is attached to the actual threaded section (12) of the axis (7), remaining axially unmoveable between the bushing (10) and the nut (11), the set of bearings (6) which relate the connecting-rod (4) with the axis (7).
3. Improvements introduced in the Patent of Invention 9501451, by means of the "suspension mechanism for fitting, sliding, doors", according to the previous claims, characterized in that on one of the side branches of the forked support (8) a locking screw (17) is established, which, after the adjustment of

the position in the height of the small connecting-rod (4), finally immobilises the axis-screw (7).

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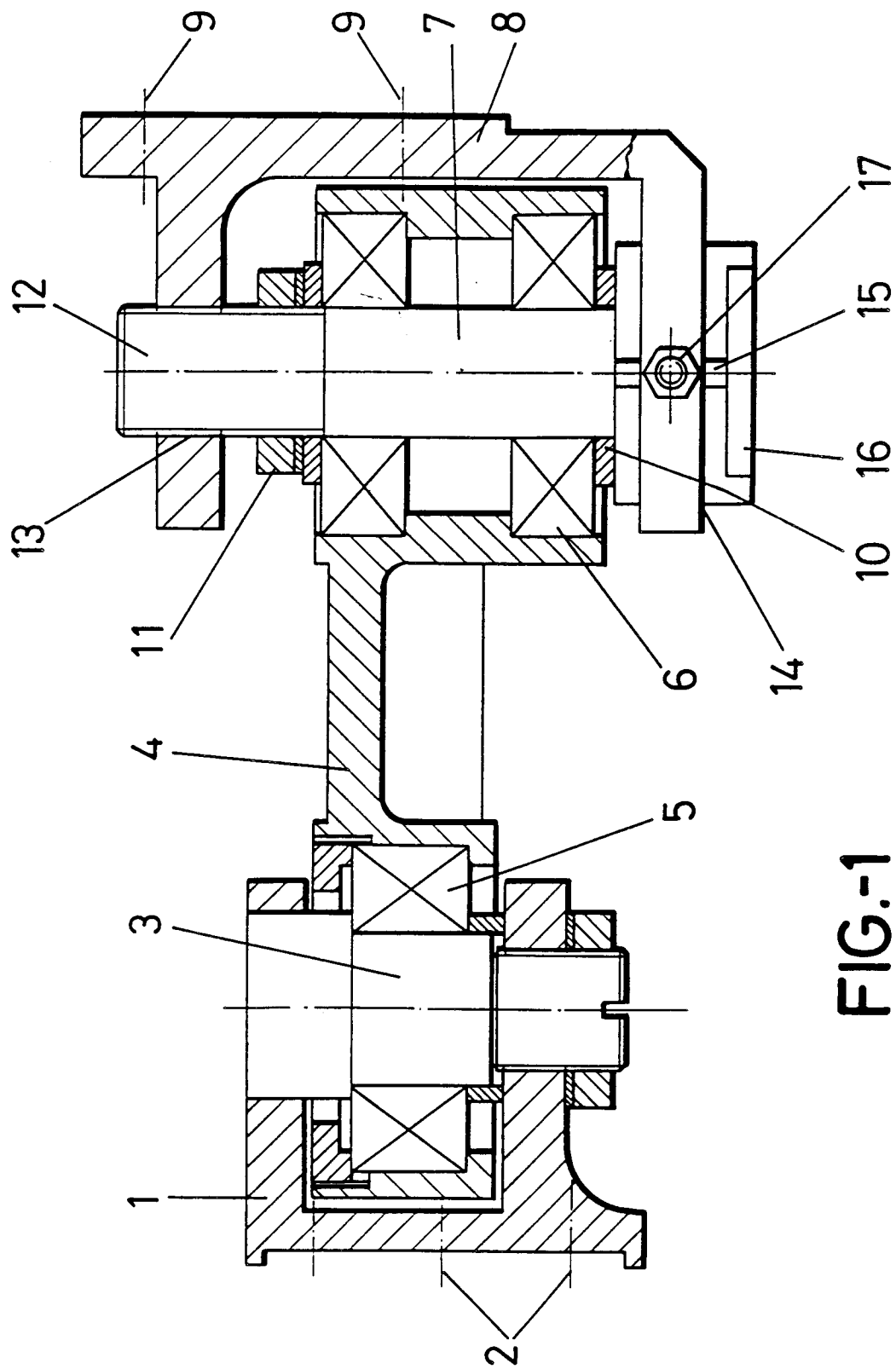


FIG.-1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 96/00239

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁶ : E05D15/10 E05D7/00		
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 :		
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)		
WPI, EPODOC, PAJ, CIBEPAT		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3728819 A (GOLDBACH ET AL) 24 April 1973 (24.04.73) see column 6, line 33-column 8, line 50; figures	1
A	GB 1464992 A (FAIVELEY) 16 February 1977 (16.02.77) see page 4, line 29-line 53; figure 4	1
A	GB 796887 A (SAGL ET AL) 18 June 1958 (18.06.58) see page 1, line 66-page 2, line 31; figures	1-3
A	GB 637608 A (REVO) 24 May 1950 (24.05.50) see page 2, line 53-page 3, line 3; figures	1
☐ Further documents are listed in the continuation of Box C. ☒ 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 12 March 1997 (12.03.97)		Date of mailing of the international search report 14 March 1997 (14.03.97)
Name and mailing address of the ISA/ S. P. T. O.		Authorized officer
Facsimile No.		Telephone No.