

The present invention relates to the field of railroad equipment and more precisely to an improved device for locking the wheels of vehicles on a railroad car used for their transport.

Systems and devices for locking the wheels of vehicles transported on platforms of railroad cars of various types are well known. Some of said systems and devices were described in European Patent application No. 90830051.0 in the name of the same Applicant.

In particular, the above mentioned patent application relates to one of these devices, particularly suited for locking the wheels of vehicles on railroad cars having a double lane capacity platform in sheet metal, in particular fretted sheet, with grooves that are transversal with respect to the longitudinal axis of the car. A first embodiment of said device comprises a rod which can be fixed in one of said grooves and a substantially tubular sliding guide on said rod, on which a support plate for the stopping means of the wheel of the vehicle to be locked is provided for. Said stopping means is inclined with respect to the track of the wheel, so that, to lock the latter on the platform of the railroad car, it is sufficient to introduce the rod into the groove closest to the track of the wheel and move the plate along the rod by means of the guide which slides in the groove until the stopping means meets the wheel. At this point, to fix the position of the stopping means with respect to the wheel it is sufficient to introduce a protruding pin of the guide into one of the several longitudinal holes formed in the rod. The device according to this first embodiment is very simple to construct and to utilize, in that it requires only one adjustment in a direction transversal to the wheel. However, since the contact with the latter does not occur on all of the track but only off the edge of the wheel between the track and the side, the device is suitable only for light vehicles, such as automobiles, and it is not proper for heavier vehicles, such as trucks, for which the forces derived from braking or curving of the train are significantly greater.

For this reason the second embodiment set forth in the above-mentioned patent application has been studied, in which the stopping means is both parallel and perpendicular to the track of the wheel. In this case, the device has two adjustments, one in a transversal direction similar to the previous one, and one in a longitudinal direction obtained by means of a mobile plate carrying the stopping means and a fixed plate integral with a tubular guide and in which the mobile plate slides. The position of the fixed plate with respect to the mobile one is adjustable by means of a pair of hooks which are introduced into a pair of holes created in the fixed plate and in holes placed along two rows formed in the mobile plate. The device is then fixed in the groove closest to the track of the wheel, then its position is adjusted first in a transversal direction as previously described, and then in a

longitudinal direction, until the stopping means meets the wheel. The two adjustments are independent and must be carried out separately, requiring increased positioning time of the device for each wheel and a greater difficulty in manoeuvrability. Furthermore, in case of locking of the wheels of very heavy vehicles, the stopping means of the device according to the above cited patent has been proven inadequate, in that the mobile plate, pressed by loads which burden the stopping means itself, sometimes becomes deformed permanently and the device is damaged.

The object of the present invention is to provide an improved device for locking the wheels of vehicles on a railroad car used for their transport which is easy to construct, of simple, easy and safe manoeuvrability from the stand point of the workmen, and which is sturdy and load resistant without deformations in its structure.

The improved device according to the present invention is suited for locking the wheels of vehicles on a railroad car used for their transport and having a platform with parallel transversal grooves, and comprises stopping means for one of the wheels of the vehicles, a rod, with a plurality of longitudinal holes, which can be fitted in one of the grooves and a guide which slides on said rod and is integral with a base with which a support element for the stopping means of the wheel engages slidingly. The novel feature of the device according to the invention is that the support element for the stopping means comprises an elongated structure with box-type ends to one of which the stopping means is fixed and a plate, which guides the sliding of the base, extending between said ends and provided, in the middle part comprised between said ends, with a plurality of holes. Mobile locking means engageable contemporaneously with the support element, the base and the rod are provided for in order to lock with a single manoeuvre the relative movements. Besides a stopping equipment for said mobile locking means is provided for.

Said locking with a single manoeuvre is possible by means of the operation of a substantially L-shaped handle which is pulled by the operator to release an arm having a forked pin at one end, the two points of which engage in holes formed in the base, in the plate of the support element and in the rod fixed in the groove of the platform. After rotating the handle, said double pin disengages from the holes allowing, still by means of the handle, the relative displacement between the various components of the device and the positioning against the wheel to be effected.

With respect to European Patent application No. 90830051.0, mentioned above, the device according to the invention has the advantage of easy adjustment of the position with respect to the wheel and of increased sturdiness under heavy loads. The advantage of easy manoeuvrability is very important, mainly taking into account the number of operations of this

type which the railroad workmen assigned to the locking and releasing of wheels of vehicles on railroad car platforms carry out for a train load.

Further characteristics and advantages of the improved device for locking the wheels of vehicles on a railroad car used for their transport, will be made apparent in the description which follows of one of its embodiments, given as an example, but not limitative, whith reference to the attached drawings in which:

- figure 1 is a perspective view of an improved wheel locker according to the present invention, mounted on a lane of a platform in fretted sheet;
- figure 2 shows a partially sectioned elevational side view of the device in figure 1 with a partial schematic view of one wheel R;
- figure 3 is a transversel sectional view of the device of figure 1, effected according to arrows III-III of figure 2;
- figure 4 is a top plan view of the device of figure 1 with essential parts that are not visible indicated by dashed line.

With reference to the above mentioned figures, 1 generally indicates a transversal portion of a lane of a platform of a railroad car of a known type, for the transport of various types of vehicles. The lane has longitudinal external 2 and internal 3 edges and is made in fretted sheet, comprising a plurality of transversal grooves 4 delimited by corresponding projections 5 on each of which there is formed a row of holes 6 drawn towards outside with a sharp edge in order to increase the adherence of the tires to the platform itself.

The above mentioned figures also illustrate the improved device for the locking of the wheel R of a vehicle, indicated generically by 7, comprising stopping means 8 and 9 for said wheel fixed to an elongated support element 10 with box-type ends 10a and 10b to which there are fixed the ends 11a and 11b of a substantially rectangular plate 11 with a central part raised in a longitudinal direction and provided with holes 12, in the central middle portion, which are positioned in two rows illustrated with dashed lines in figure 4. The lower central portion of the element 10 has a wide opening 13 in which an internally hollow base 14 is slidingly engaged with the middle portion of the plate 11 which is suspended between its two ends 11a and 11b. Mobile locking means with the element 10 and the platform 1 as well as a stopping equipment of the mobile locking means are fixed to the base 14.

More precisely, two flat supports 15, having an elongated circular hole 15a in which a tubular sleeve 16 is slidingly and rotationally engaged, are fastened in a protruding way to the base 14 on the side facing the end 11b of the plate 11. A flat arm 17 is fastened with one end to the tubular sleeve 16 and has at the other end a forked pin 18. In the middle part of the arm 17 a laterally bent projection 17a extending orthogonally to the latter is provided for. To the lower face of the

base 14 a tubular guide 19 in which a channel section rod 20 is slidingly engaged is fastened. The channel section rod 20 has a plurality of equally spaced holes 21 made on its botton wall and is provided with a projecting plate 22 positioned orthogonally to the rod 20 itself and comprising a pin 23 engageable with one of the holes 6 of the platform 1. The forked pin 18 in figure 1 is shown with its ends introduced in two holes 24 formed on the upper face and, correspondingly, on the lower face of the base 14, as well as in a pair of holes 12 formed on the plate 11 and in a pair of holes 21 of the rod 20.

In the above mentioned figures a tubular manoeuvring handle is also illustrated which is bent substantially in a L-shape, one end 25a of which is suited to be grasped by a user, while the other end 25b is slidingly engaged in the tubular sleeve 16 and has at its end a shoulder 27 against which one end of a spring 28 operates while the other end of the spring urges against the sleeve 17. The handle 25 also has a pivot 29, bent at right angle which can engage with an open seat 30 formed in one of the flat supports 15 and with a saddle seat 26 formed in the projection 17a which extends from the arm 17. Finally, an auxiliary gripping handle 31 fastened on a side face of the support element 20 is provided for.

The locking device 7 can not be separated from the rod 20 by means of a hook 20a, fixed to one end of the rod, and the projecting plate 22, fixed to its other end, preventing complete extraction of the rod from the guide 19 which is integral with the device 7 and in which the rod 20 itself slides.

In the use of the locking device 7 of a wheel R on a platform 1, the pin 23 is introduced into one of the holes 6 of the platform 1 and contemporaneously the rod 20 and the tubular guide 19, in which the rod 20 slides, are placed in the groove 4 of the platform itself. The chosen groove 4, and therefore the row of holes 6, is that which is closest to the track of the wheel R which must be locked. The positioning of the stopping means 8 and 9 against the track and a side face of the wheel R is carried out by pulling the spring loaded handle 25 until the shoulder 27 compresses the spring 28 against one of the enlarged edges of the sleeve 16 and, therefore, until the right-angled pivot 29 disengages the seat 30 and allows for the rotation of the handle 25. The latter trails with it, by means of the pivot 29 which is still engaged in the saddle seat 26, the projection 17a and therefore the arm 17 and the fork 18 in rotary motion around the axis of the sleeve 16. Consequently the holes 12 of the plate 11 and the holes 21 of the rod 20 are released from the forked pin 18 allowing for the longitudinal translation of the base 41 with respect to the rod 20 in a direction transversal to the platform and allowing for the translation of the support element 10 by means of the plate 11 which is slidingly engaged in the cavity of the base element 14.

Once the stopping means 8 and 9 has been posi-

tioned against the wheel resting on the platform, keeping the handle 25 pulled and utilizing the auxiliary gripping handle 31, a rotation opposite to the preceding is imparted to the handle 25 until the forked pin 18 enters first the upper holes 24 of the base 25, then the holes 12 of the plate 11, then the lower holes 24 of the base 14 and finally the holes 21 of the rod 20. In this operation it may be necessary to effect small corrections of position in order to make said holes coincide. Once the handle 25 is completely rotated and the forked pin 18 has completely entered the above mentioned holes, the next step is to release the handle 25 itself which, under the force of the spring 28, returns to a resting position pulling the right-angled pivot 29 back to the seat 30 of the supports 15 and thus preventing accidental rotation of the handle 25. The hole 15a of the flat supports 15 is elongated in order to allow the pin 18 to be entered or extracted from the holes 12, 24 and 21 because the axes of these holes do not lay on the circular trajectory that the pin 18 should follow.

The locking device 7 therefore requires, as described above, a single manoeuvre to carry out the operations of positioning the stopping means 8 and 9 against the wheel resting on the platform. Furthermore the box-type form of the support element 10 and the presence of the plate 11 allow for a better and more strong distribution of the load which is derived from the sharp movements of the railroad car on which the platform 1 is mounted. Infact, the load burdening the stopping means 8 and 9 is distributed on the lower faces of the ends 10a and 10b of the support element 10, which rests on the numerous drawn holes 6 of the projections 5 of the platform 1.

Finally, the device described above, has been proven efficient also in the case of ice formation and dirt deposits and incrostations, in particular in correspondence with the pin 18. This is due to the length of the arm 25a which allows, with a not very strong force, the extraction of the fork 18 from the holes with which it is engaged even in these cases of greater resistance.

Variations and/or modifications can be brought to the improved device for locking the wheels of vehicles on a railroad car used for their transport according to the invention, without departing from the scope of the invention itself.

Claims

1. Improved device for locking the wheels of vehicles on a railroad car used for their transport having a platform (1) with transversal parallel grooves (4), with rows of upwardly drawn holes (6) formed between said grooves (4), comprising stopping means (8,9) for one of said wheels (R), a rod (20) with a plurality of longitudinal holes (21)

which can be fitted in one of said grooves (4), a guide (19) slidable on said rod (20) and integral with a base (14) with which a support element (10) for the stopping means (8,9) of the wheel (R) is slidably engaged, characterized in that said support element (10) comprises an elongated structure with box-type ends (10a,10b) to one of which (10a) said stopping means (8,9) is fixed and a plate (11) on which said base (14) is slidably guided, extending between said ends (10a, 10b) and having a plurality of through holes (12) in the middle part between said ends, there being provided mobile locking means (18) engageable contemporaneously with said support element (10), said base (14) and said rod (20) in order to lock with a single manoeuvre their relative movements, as well as a stopping equipment for said mobile locking means (18) .

2. Improved device according to claim 1 wherein on said base there are formed: a cavity (13) in which said plate (11) slides; at least a pair of through-holes (24) orthogonal to the sliding plane; and a pair of supports (15) to which a tubular sleeve (16) with axes parallel to said rod (20) is pivotally connected, said mobile locking means comprising a forked pin (18) which is fixed to an arm (17) integral with said sleeve (16), and which can be engaged with said through-holes (24) and in the through-holes (12,21) of said plate (11) and said rod (20), as well as means for commanding the rotation of said arm (17).

3. Improved device according to claim 2 wherein said means for commanding the rotation of said arm (17) comprise a substantially L-shaped handle (25) one end of which (25a) is suited for being grasped by a user, while the other end (25b) slidably engages with said sleeve (16), at least one pivot (29) being provided extending from said handle (25) for engaging with a seat (26) formed in a bent projection (17a) fixed to said arm (17) integral with said sleeve (16) , whereby the rotation of said handle (25) by means of said pivot (29) causes said arm (17) to rotate and said forked pin (18) to engage or disengage with said through holes (12,21,24).

4. Improved device according to claims 1 to 3, wherein said stopping equipment of said mobile locking means comprise said pivot (29) and a housing (15a) formed in one of said supports (15) within which the end of said pivot (29) is engageable or disengageable by the movement of said handle (25) parallelly to said sleeve (16).

5. Improved device according to claim 4, wherein resilient means acting against the sliding of said

handle (25) and the resultant disengagement of said pivot (29) from said supports (15, 15a) are provided.

- 6. Improved device according to claim 5, wherein said resilient means comprise a spring (28) placed on the head (25b) of said handle (25) which engages with said sleeve (16) and operates between a shoulder (27) formed on said end and a corresponding enlarged edge formed on said sleeve (16). 5
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- 7. Device according to the previous claims, wherein said rod (20) is channelled and turned with its concavity facing the bottom of said grooves (4), said holes (21) formed on it being made on the flat arch equidistant from one another. 15

- 8. Device according to claim 7, wherein at least one end of said rod is provided with a projecting plate (22) comprising at least one stopping pin (23) for engaging with one of said holes (6) formed between said grooves (4). 20

- 9. Device according to the previous claims, wherein an auxiliary gripping handle (31) fixed to a side face of said support element (10) is provided from the same side as said manoeuvring handle (25,25a). 25

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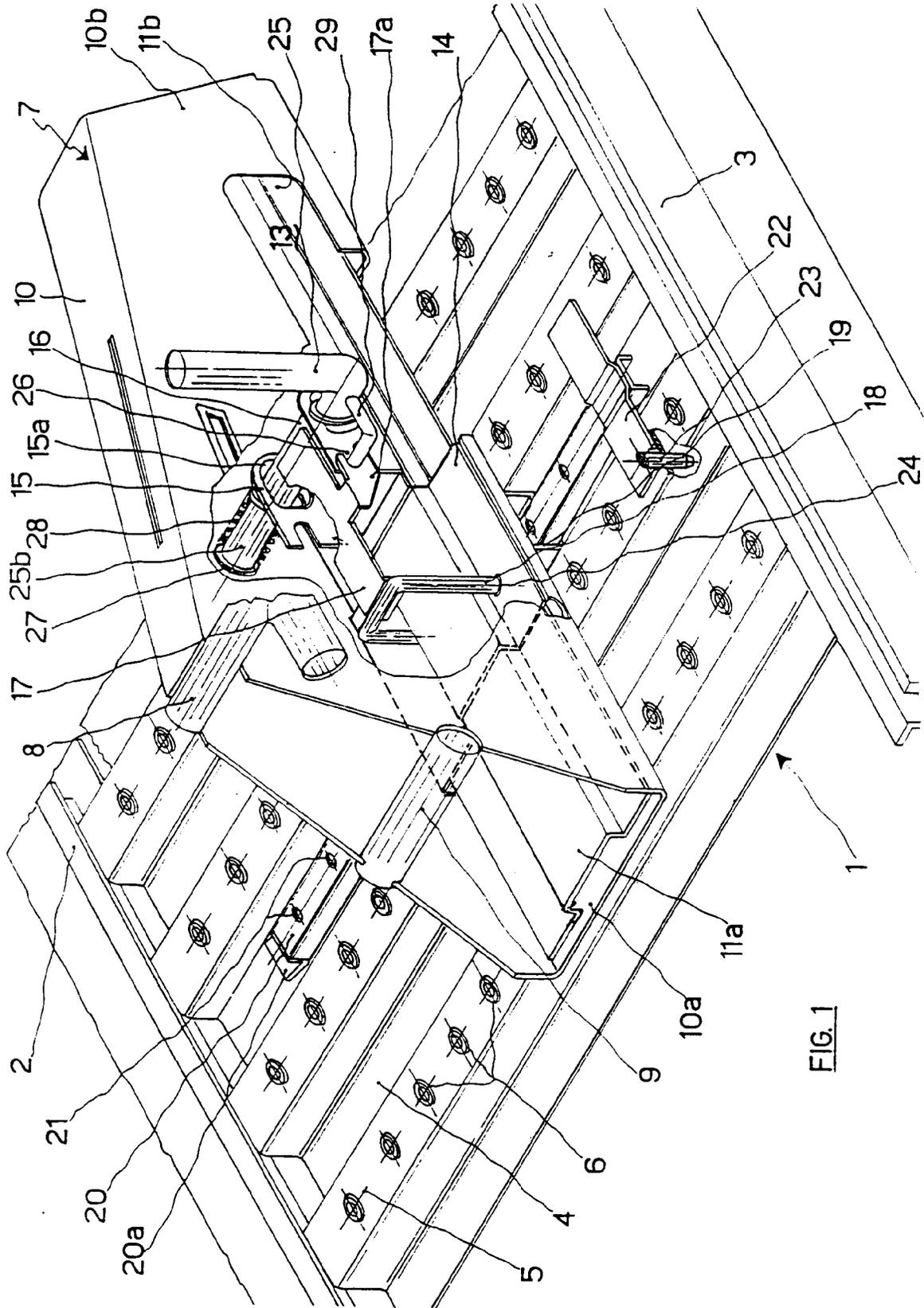


FIG. 1

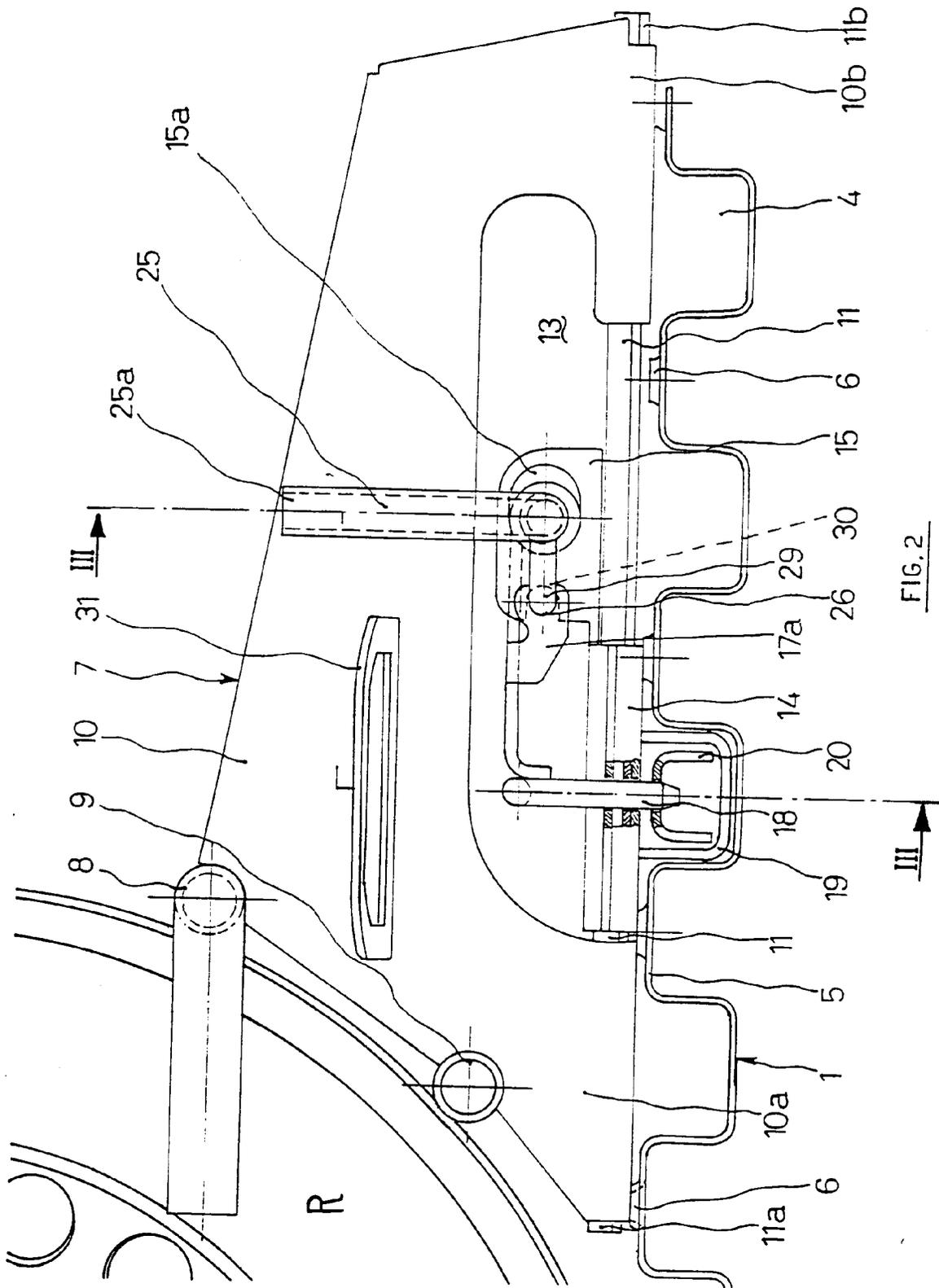


FIG. 2

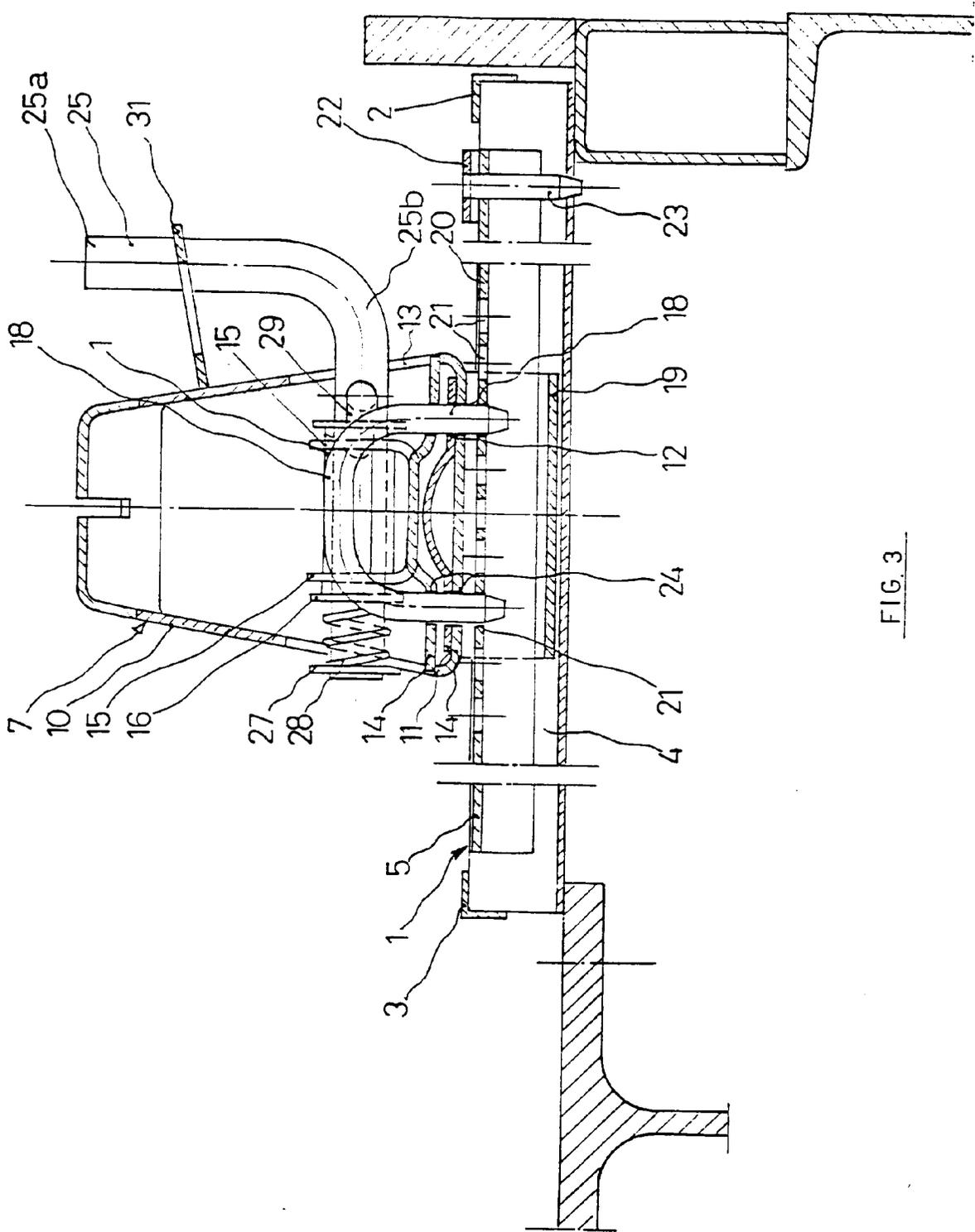
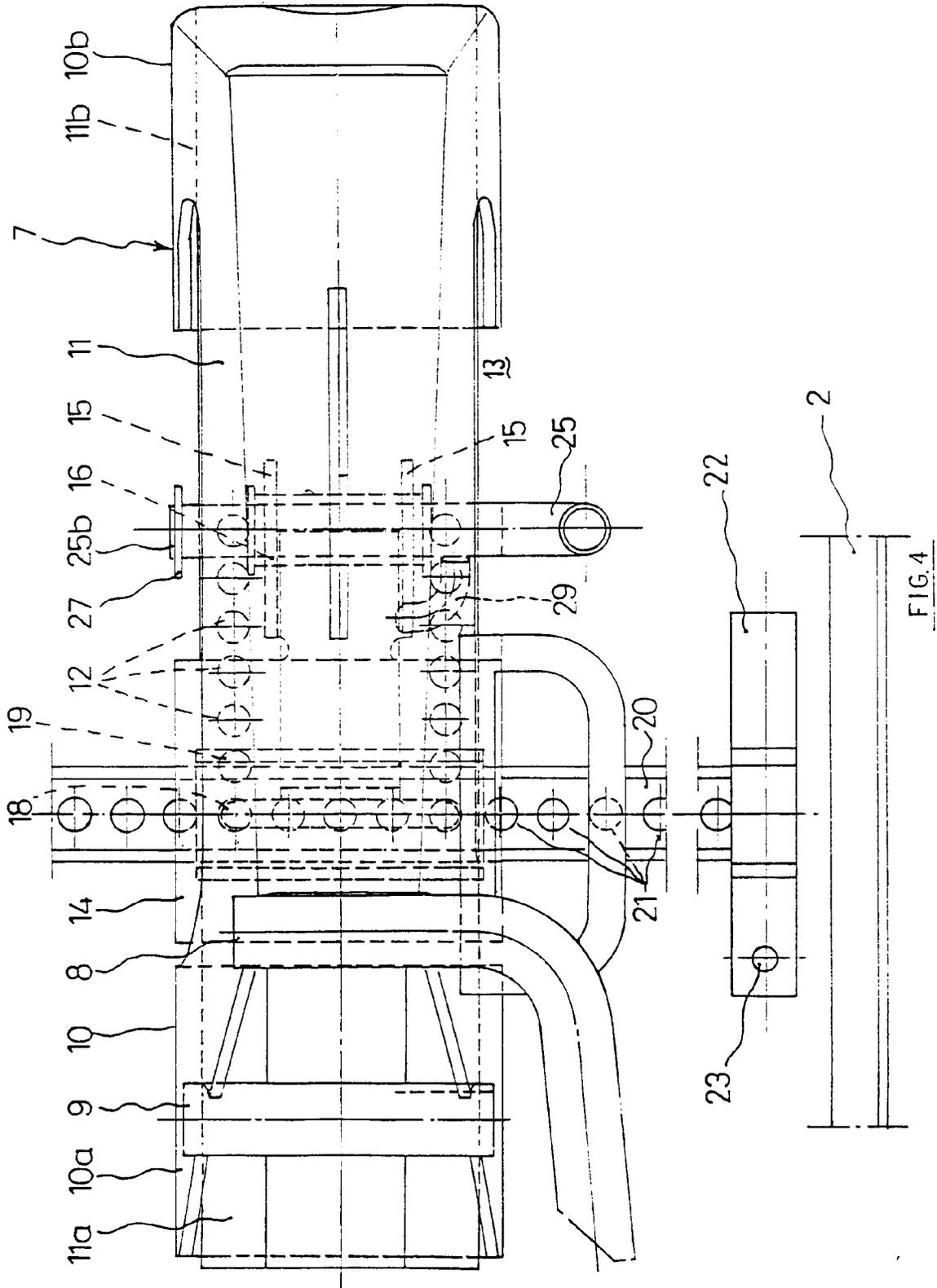


FIG. 3





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EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0343

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-1 564 196 (OFFICINE DI COSTAMASNAGA) * page 2, line 23 - line 37; figures 1-4 * ---	1	B61D45/00 B61D3/18
A	DE-C-1 265 771 (SOCIETE NOUVEAU DES ATELIERS DE VENISSIEUX) * column 4, line 11 - column 6, line 34; figures 1-5 * ---	1	
A	US-A-4 836 726 (J. C. ROBERTSON AND W. R. BAKER) * claim 1; figures 1-7 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B61D B60P
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 SEPTEMBER 1992	Examiner P. CHLOSTA
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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