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54	TITLE OF INVENTION
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**Device for elastically supporting mobile elements of a switch**

57	ABSTRACT (NOT MORE THAN 150 WORDS)
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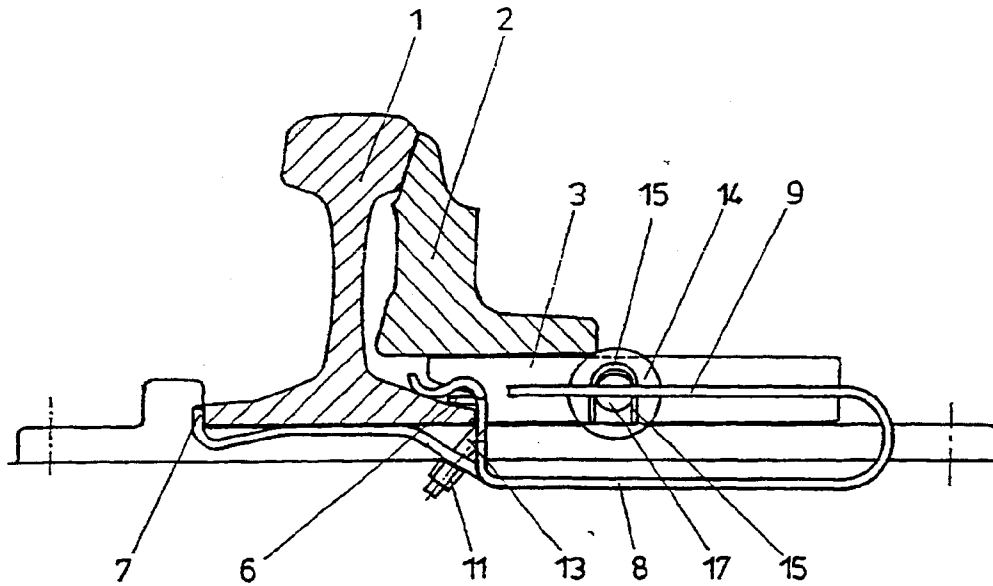
NUMBER OF SHEETS	<b>22</b>
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The sheet(s) containing the abstract is/are attached.

If no classification is furnished, Form P.9 should accompany this form.  
The figure of the drawing to which the abstract refers is attached.



WO 01/06060 A1



(5) Abstract: The invention concerns a device for elastically supporting the mobile elements (2) of a switch. Said device comprises an elastically mounted sliding element (10), or at least an elastically mounted pulley (14), by which means the mobile element (2) is lifted from the associated sliding bearings (3). The elastic mount consists of at least a U-shaped bracket (5) rigidly connected to a rail base (4) of a fixed switch element (1) or to the element linking a mobile switch element (8), by the free end of a branch (8), opposite the sliding element (10). The two branches (8, 9) of the U-shaped bracket are placed so as to be able to pivot relative to the rail base (4) or to the linking element of a mobile switch element (2).

[Fortsetzung auf der nächsten Seite]

Device for Resiliently Supporting Movable Switch Parts of a  
Railway Switch

5 The invention relates to a device for resiliently supporting  
movable switch parts of a railway switch, including a  
resiliently mounted sliding part or at least one resiliently  
mounted roller, by which the movable switch part is lifted off  
an associated slide chair, wherein the resilient mounting is  
formed by at least one leg of a U-shaped strap.

10

From DE 27 29 692 C3, a device of the initially defined kind  
comprising a resilient sliding means is known. In that known  
configuration, a U-shaped spring element by one leg is rigidly  
connected with a base, whereas the free leg of the U-shaped  
15 spring element carries a sliding part. Under the weight of a  
track vehicle running over a switch tongue, the spring force  
of the spring element is overcome and the switch tongue abuts  
on the associated slide chair. During the switching movement  
of such switch tongues, which, of course, is allowed to take  
20 place only in the untravelled state, the spring element lifts  
the switch tongue off the slide chair such that merely the  
frictional forces remaining between the sliding part and the  
tongue have to be overcome during the switching procedure. In  
that known configuration, only one leg of the U-shaped spring  
25 element is able to exert a spring force, because the second  
leg is rigidly fixed to a support connected with the foot of a  
stock rail. In order to obtain the necessary spring force, a  
relatively heavy spring element is, therefore, required, any  
subsequent adjustment following the arrangement of the support  
30 on the stock rail being no longer feasible.

US-A 5 501 408 discloses a resilient roller device in which a  
tongue rail is supported by resilient rollers during the  
switching procedure in order to reduce the displacement force.

35

The invention aims to provide a device of the initially  
defined kind, which may be designed in a substantially more  
light-weight manner than known configurations, which has a  
substantially simpler structure and which offers the

possibility of an adjustment subsequent to its fixation on the foot of a rigid switch part. To solve this object, the device according to the invention essentially consists in that the U-shaped strap, on the free end of a leg facing away from the sliding part, is rigidly connected with the rail foot of an immovable switch part, or the web of a movable switch part, and that both legs of the U-shaped strap are arranged to be pivotable relative to the rail foot, or the web of a movable switch part. By arranging both legs of a U-shaped strap to be pivotable relative to the rail foot of an immovable switch part, or the web of a movable switch part, both legs of the U-shaped strap are available to exert the required spring force such that, in the main, a more lightweight mode of construction may be chosen in order to attain the spring travel and spring force required. The attachment of the U-shaped strap to the free end of a leg, that faces away from the sliding part allows for a particularly simple fixation using an extremely small number of structural components and employing a simple clamping joint. Since both free legs are pivotable relative to the attachment site where the U-shaped strap is rigidly fixed, such a configuration in a simple manner allows for the subsequent adjustment and, in particular, the pre-adjustment of the pivoted position by particularly simple means.

25

In a particularly advantageous manner, the configuration according to the invention is devised such that the U-shaped strap carries at least one projection encompassing the rail foot. Such a projection directly formed to the U-shaped strap and encompassing a rail foot enables the whole spring element to be readily attached to the foot of a rail so as to provide particularly simple immobilization. The retention force required for the clamping to a rail foot can be ensured in a particularly simple manner in that the projection encompassing the rail foot is designed to be resilient.

35

A particularly simple adjustment of the pivoted position, and hence adjustment of the device according to the invention, is feasible if, as in correspondence with a preferred further

development, the configuration is devised such that the projection encompassing the rail foot, or the strap end connected with the web of the movable switch part, is connected by the aid of a clamping means via a cranked portion  
5 of the spring strap. In such a configuration, both the projection encompassing the rail foot and the cranked portion may, in the main, be produced in one piece of the material of the spring strap, a particularly simple clamping means being designed in the form of a hook-shaped mounting strap, which  
10 engages from behind a stiffening plate connected with the U-shaped strap in the region of the cranked portion. As a result, a basic pivotal movement of the U-shaped strap relative to the rail foot may be allowed, thus ensuring the correctly installed position aimed to reach the desired  
15 function. The stiffening plate follows the contour of the U-strap and includes, for instance, a rectangular recess to enable screwing from top. Consequently, the spring stiffness of the U-strap is substantially enhanced in the clamping region without having to carry out any dimensional changes on  
20 the strap itself.

In a particularly simple manner, not only a sliding part but also a roller may be fixed to a free leg of the U-shaped strap. In order to safeguard the appropriate adjustability and  
25 adaptation to the desired shape of the rail foot or the tongue rail, respectively, the configuration advantageously is devised such that the free leg of the strap carrying the sliding element is designed to be slotted in the longitudinal direction of the leg and that at least one supporting roller  
30 is mounted in the slot in a manner capable of being displaced in the longitudinal direction of the leg and immobilized in its displaced position. Also in this case, the appropriate mounting for a roller can, thus, be realized without any additional structural components merely by providing a slot in  
35 one of the legs of the U-shaped strap, which roller, in addition, may be mounted so as to be displaceable in the longitudinal direction of the leg and immobilized in its displaced position in a particularly simple manner.

In a particularly advantageous manner, the configuration in this respect is devised such that the supporting roller(s) is (are) displaceable in the longitudinal direction of the leg via a spindle which is supported, in particular resiliently supported, in the region of the curvature of the U-shaped strap, a one-piece design made of the material of the U-shaped strap being again feasible in a particularly simple manner by simply bending out accordingly punched-out or cut-out portions. Advantageously, the configuration in this case is devised such that the projection overlapping the rail foot, and optionally the supporting part for the spindle, are bent out of the material of the U-shaped strap in one piece.

A particularly simple configuration of the displaceable bearings provided for a supporting roller displaceable in the longitudinal direction of a leg of the U-shaped strap may be realized in that the displaceable bearings of the supporting rollers encompass the edges of the slot in a claw-like manner and, in particular, are formed by bearing axles including diametrical grooves on their ends.

In the main, a compact structural unit is provided in this manner, which is comprised of a single specially shaped resilient retention element that can be fastened to the foot of a stock rail in a particularly simple manner while, at the same time, serving as a carrying element for sliding elements or rolling elements. Due to the fact that the spring element does not possess any further support following the fixation on the stock rail, both the lower and the upper legs of the U-shaped spring element are used as spring elements, the shaping of the base body allowing for to do without any further separate holding elements. In the region of the stock rail, stops may be provided on this structural component on one side thereof and resilient counter straps in the form of an overlapping projection may be provided on its other side, so that the whole device can be fixed directly to the foot of a stock rail without any tools. The use of clamping means or a spindle to displace supporting rollers renders feasible the adjustment of the sliding or rolling elements in the

horizontal and vertical direction, thus providing a particularly simple and operationally safe resilient sliding or rolling mounting for switch tongues, which can be adjusted within wide limits.

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In the following, the invention will be explained in more detail by way of exemplary embodiments schematically illustrated in the drawing. Therein, Fig. 1 is a cross sectional view through a first embodiment of the device according to the invention including a sliding element; Fig. 2 shows a modified embodiment in an illustration analogous to that of Fig. 1 including a supporting roller; Fig. 3 is a top view on the embodiment according to Fig. 2; Fig. 4 depicts a modified embodiment comprising two supporting rollers; Fig. 5 is a further modified embodiment comprising a supporting roller that is adjustable in the horizontal direction; Fig. 6 is top view on the embodiment according to Fig. 5; Fig. 7 is a top view according to the illustration of Fig. 6, comprising two interconnected rollers; Fig. 8 depicts a modified embodiment fixed to the web of the movable switch part, i.e., the switch tongue; and Figs. 9 and 10 illustrate further modified embodiments of the device according to the invention.

Fig. 1 depicts a stock rail 1 and a switch tongue 2 capable of being displaced on a slide chair 3 in the horizontal direction. To the foot 4 of the stock rail is fixed a U-shaped spring element 5, said fixation being realized by a resilient projection 6 overlapping the rail foot 4 and a stop 7 of the U-shaped strap 5. In order to fix the U-shaped strap 5 to the rail foot 4, it will do to slip the U-shaped strap onto the rail foot while overcoming the spring force of the encompassing projection 6, and subsequently pivot the same to such an extent that the stop 7 engages the rail foot 4 from behind, on the side of the rail foot facing away from the projection 6. The fixation is, thus, effected simply by slipping on and pivoting the U-shaped strap 5. The U-shaped strap 5 has a lower leg 8 and an upper leg 9 extending substantially parallel with the lower leg, whereby both of these legs enter into effect as spring elements, since no

additional support is provided in the region of the legs 8 and 9. A sliding element 10 is fixed to the upper leg 9, whereby the spring force is dimensioned such that the tongue 2 is lifted off the slide chair 3 during the switching procedure.

5 The correct positioning of the spring strap 5 and, in particular, the pivoted position of the two legs 8 and 9 may be adjusted by the aid of a clamping means 11 which is supported on a cranked portion 12 of the U-shaped strap 5 and comprised of a nut cooperating with a screw bolt 13.

10

In the illustration according to Fig. 2, a roller 14 is provided instead of the sliding element 10. The roller itself may be fixed in several positions, as is apparent, in particular from the illustration according to Fig. 3, to which  
15 end a retention strap or a split pin 15 is provided, which may be inserted and locked in a plurality of recesses 16 provided in the upper leg 9 of the spring strap 5. The roller axle is denoted by 17.

20

The illustration according to Fig. 4 shows two rollers 14 each capable of being fixed in different positions by spring clamps or spring straps 15, the displacement of said rollers being appropriately supported by a tongue rail 2. Otherwise, the reference numerals of the preceding Figures have been retained  
25 unchanged.

30

In the embodiment according to Fig. 5, a roller 14 capable of being displaced and adjusted in the longitudinal direction of the upper leg 9 of the U-shaped strap 5 is employed. The  
30 roller 14 in this case is mounted in a strap 18 with the roller axle being denoted by 19. The strap 18 is connected with a spindle 20 which is supported on a projection 21 bent up and out of the material of the U-shaped strap and is inserted, in particular, in a groove of this projection 21  
35 from top. The displacement of the roller 14 is effected by means of the nut 22 which cooperates with the spindle 20. As is apparent, in particular, from Fig. 6, the upper free leg 9 of the U-shaped spring strap, to this end, is designed to be slotted, the edges of this slot being denoted by 23 in Fig. 6.



The fixation of the spindle 20 in the respective slot of the bent-up projection 21 is realized with the interposition of spring elements 24, thus rendering feasible, with the appropriate adjustment, also a resilient application at the  
5 movable rail part or the tongue rail, respectively.

In the embodiment according to Fig. 7, which corresponds substantially to that of Fig. 6, two rollers 14 and 25 are connected by brackets 26 in a manner that the two rollers 14  
10 and 25 can be displaced and adjusted together by the nut 22 and the spindle 20. The resilient support is again realized by means of cup springs 24.

In the configuration according to Fig. 8, the spring element  
15 is again comprised of a U-shaped strap 5, fixation in the instant case being effected on the displaceable switch part, i.e., the switch tongue 2. For that purpose, one end of the U-shaped strap 5 is connected with the web of the tongue rail 5 via a screw connection including a screwing means 27, wherein  
20 a clamping means comprised of a screw bolt 28 and a nut 29 is again provided in the cranked portion 12. By changing the nut 29, the U-shaped spring element 5 as a whole can be pivoted relative to the fixation on the web of the tongue rail so as to enable appropriate adjustment. The support in this case is  
25 again provided via a roller 14 whose fine tuning and adjustment may be effected via the spindle 20. In order to obtain the appropriate resilient securing of the end position, a bearing 30 is arranged on the slide chair, whereby the roller 14, in the applied position illustrated in Fig. 8,  
30 slides down onto the base of the slide chair 3 via an edge 31 of the bearing 30 so as to ensure a resilient application. Lifting is effected by the roller 14 running onto the surface of the bearing 30 via the edge 31 so as to cause the tongue rail 2 to lift off the slide chair 3 during the displacement  
35 or adjustment course.

In Fig. 8, usual elements of a stock rail fixation and, in particular, a resilient fixation are schematically indicated by 32.

In Figs. 9 and 10, a stiffening plate is denoted by 33. The stiffening plate follows the contour of the U-shaped strap and includes, for instance, a rectangular recess to enable  
5 screwing from top. The spring stiffness of the U-strap will, thus, be substantially enhanced in the clamping region without having to carry out any dimensional changes on the strap itself.

10 Mounting may be substantially facilitated in that no screwing has to be effected from below. A mounting strap 34 is introduced into the stiffening plate 33, whereby blocking of the hook-shaped mounting strap 34 is ensured by the pivoting  
15 of the stiffening plate 33 by 90°.

The mounting strap 34 includes a conical rectangular end part which is clamped within the stiffening plate 33. Adjustment may be conveniently effected from top by the screwing of this tension strap. The tension strap in the instant case is no  
20 longer formed out of the U-strap as in Figs. 1 to 7, but is formed by a separate structural component 34. The U-strap, furthermore, is now held on the stock rail by a separate tension spring 35. Thus, it is additionally safeguarded that the U-strap will not be detached from the stock rail along  
25 with the projections 7 despite vibration stresses occurring. If the U-strap is moved from the lower side of the stock rail, the additional tension spring 35 will clamp the same against the stock rail.

30 The embodiment according to Figs. 9 and 10 renders feasible the use for differently required switching forces without having to change the dimension of the U-shaped strap and the parts directly connected therewith. Mounting to the stock rail is facilitated as well. The tension spring enhances the safety  
35 of the fixation to the stock rail.

Claims:

1. A device for resiliently supporting movable switch parts of a railway switch, including a resiliently mounted sliding part or at least one resiliently mounted roller, by which the movable switch part is lifted off the associated slide chairs, wherein the resilient mounting is formed by at least one leg of a U-shaped strap, characterized in that the U-shaped strap (5), on the free end of a leg (8) facing away from the sliding part (10), is rigidly connected with the rail foot (4) of an immovable switch part (1), or the web of a movable switch part (2), and that both legs (8, 9) of the U-shaped strap (5) are arranged to be pivotable relative to the rail foot (4), or the web of a movable switch part (1).
2. A device according to claim 1, characterized in that the U-shaped strap (5) carries at least one projection (6) encompassing the rail foot (4).
3. A device according to claim 1 or 2, characterized in that the projection (6) encompassing the rail foot (4) is designed to be resilient.
4. A device according to claim 1, 2 or 3, characterized in that the projection (6) encompassing the rail foot (4), or the end of the strap (5) connected with the web of the movable switch part (2), is connected by the aid of a clamping means (11) via a cranked portion (12) of the spring strap (5).
5. A device according to claim 1, 2, 3 or 4, characterized in that the U-shaped strap (5) is connected with a stiffening plate (33) in the region of the cranked portion (12).
6. A device according to claim 5, characterized in that the clamping means (11) is comprised of a hook-shaped mounting strap (34) which engages the stiffening plate (33) from behind.

7. A device according to any one of claims 4 to 6, characterized in that the clamping means (12) comprises a screw bolt (13).

5 8. A device according to any one of claims 1 to 7, characterized in that the free leg (9) of the strap (5) carrying the sliding element (10) is designed to be slotted in the longitudinal direction of the leg (9) and that at least one supporting roller (14) is mounted in the slot in a manner  
10 capable of being displaced in the longitudinal direction of the leg (9) and immobilized in its displaced position.

9. A device according to any one of claims 1 to 8, characterized in that the supporting roller(s) (14) is (are)  
15 displaceable in the longitudinal direction of the leg (9) via a spindle (20) which is supported, in particular resiliently supported, in the region of the curvature of the U-shaped strap (5).

20 10. A device according to any one of claims 1 to 9, characterized in that the displaceable bearings of the supporting rollers (14) encompass the edges (23) of the slot in a claw-like manner and, in particular, are formed by bearing axles (19) including diametrical grooves on their  
25 ends.

11. A device according to any one of claims 1 to 10, characterized in that the projection (6) encompassing the rail foot (4), and optionally the supporting part (21) for the  
30 spindle (20) are bent out of the material of the U-shaped strap (5) in one piece.

12. A device according to any one of claims 1 to 11, characterized in that a tension spring (35) overlapping the  
35 rail foot (4) is provided on the side of the U-shaped strap (5) facing away from the roller (14).

13. A device as claimed in claim 1, substantially as herein described and illustrated.
  
14. A new device, substantially as herein described.

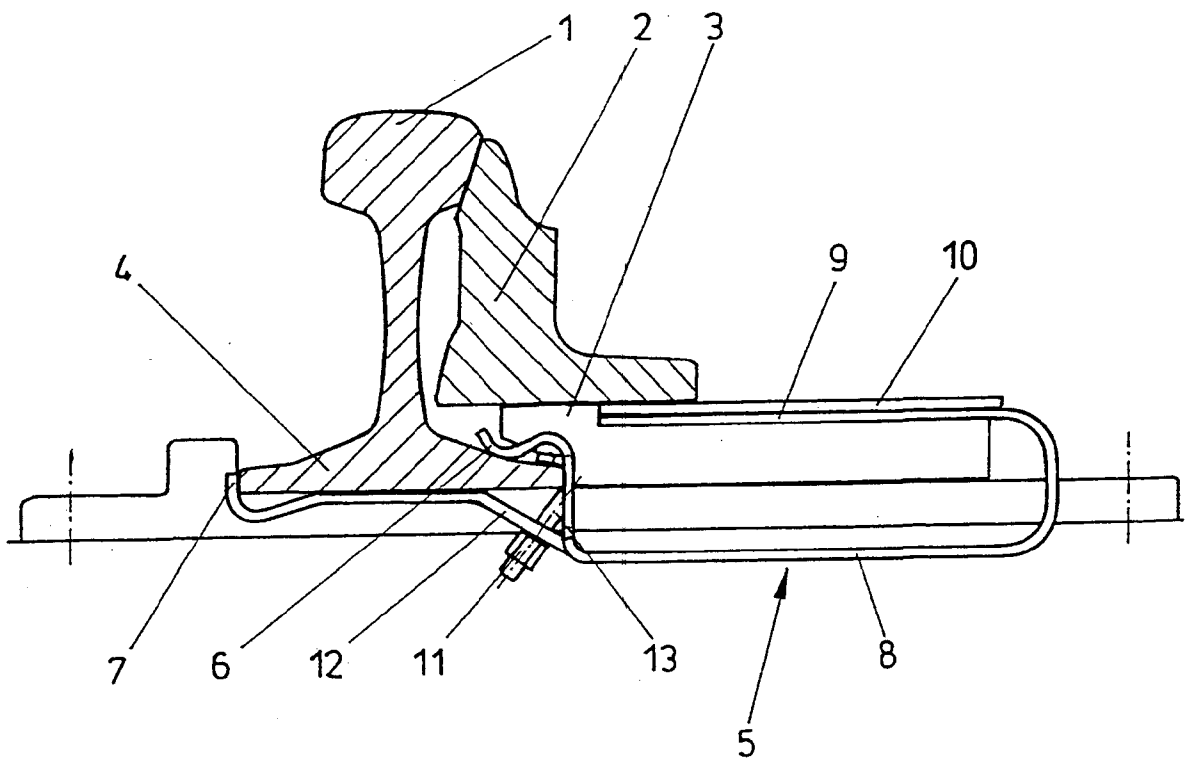


FIG. 1

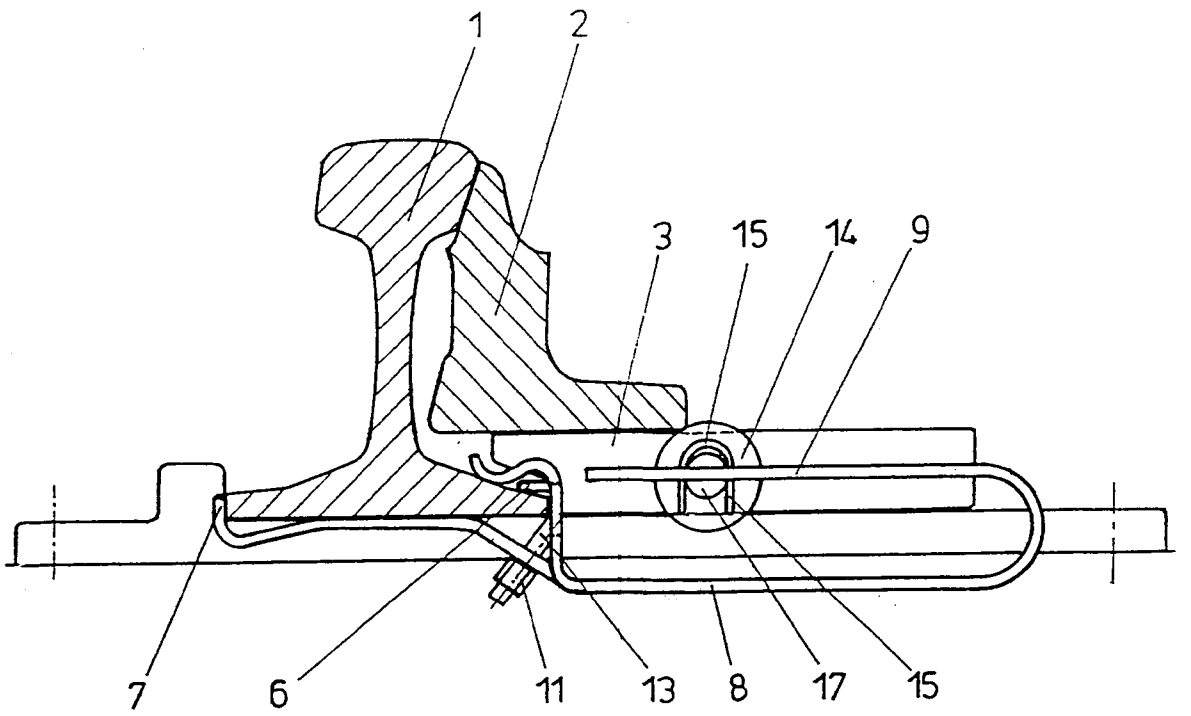


FIG. 2

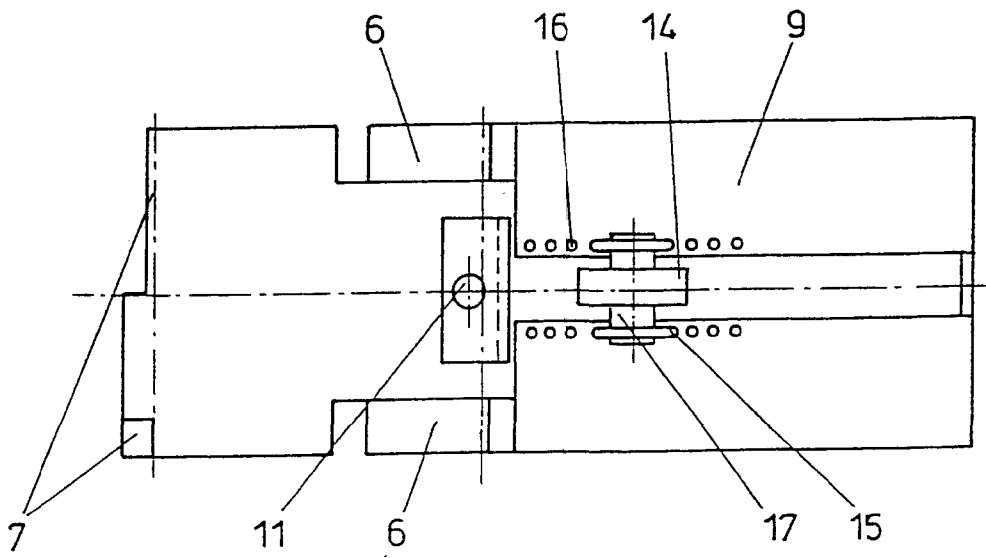


FIG. 3

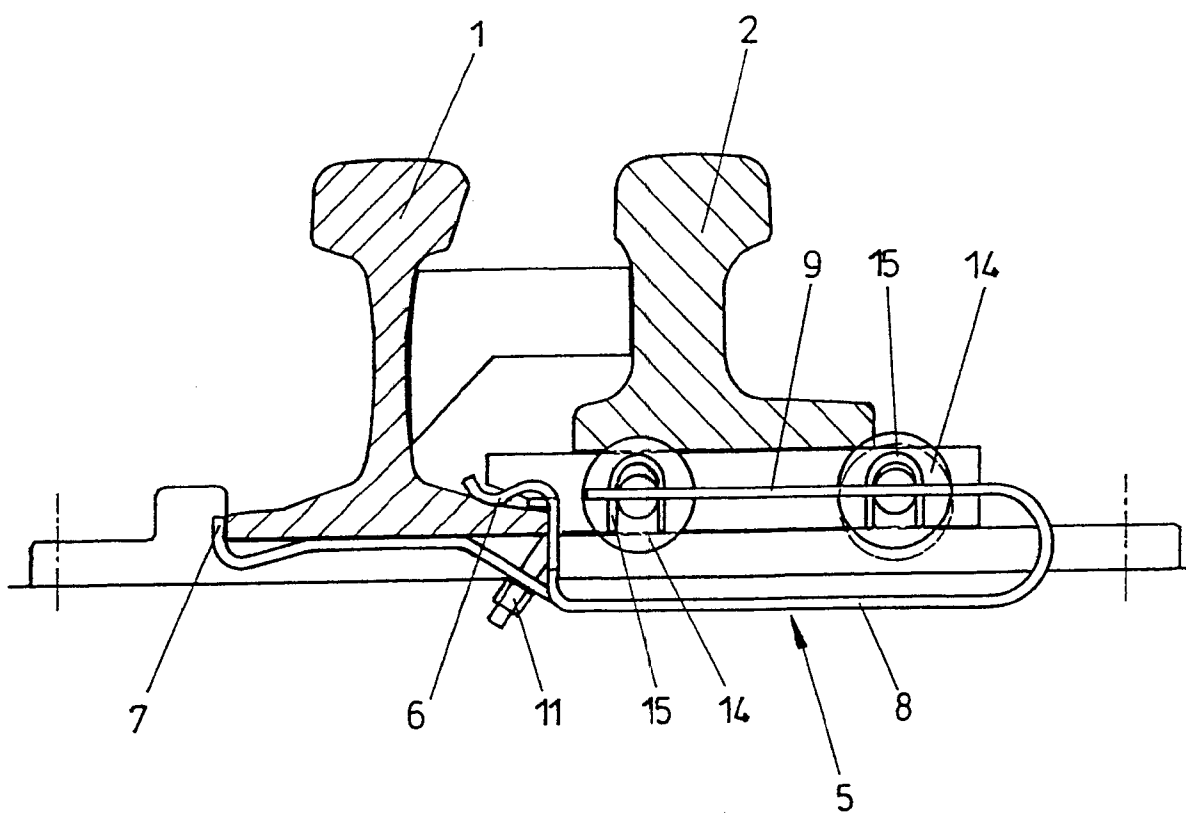
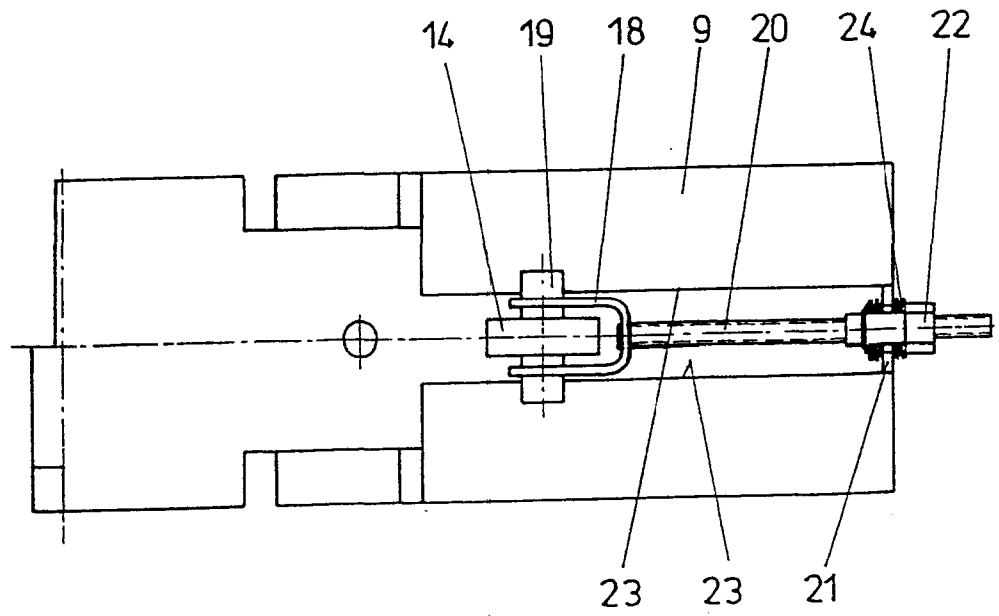
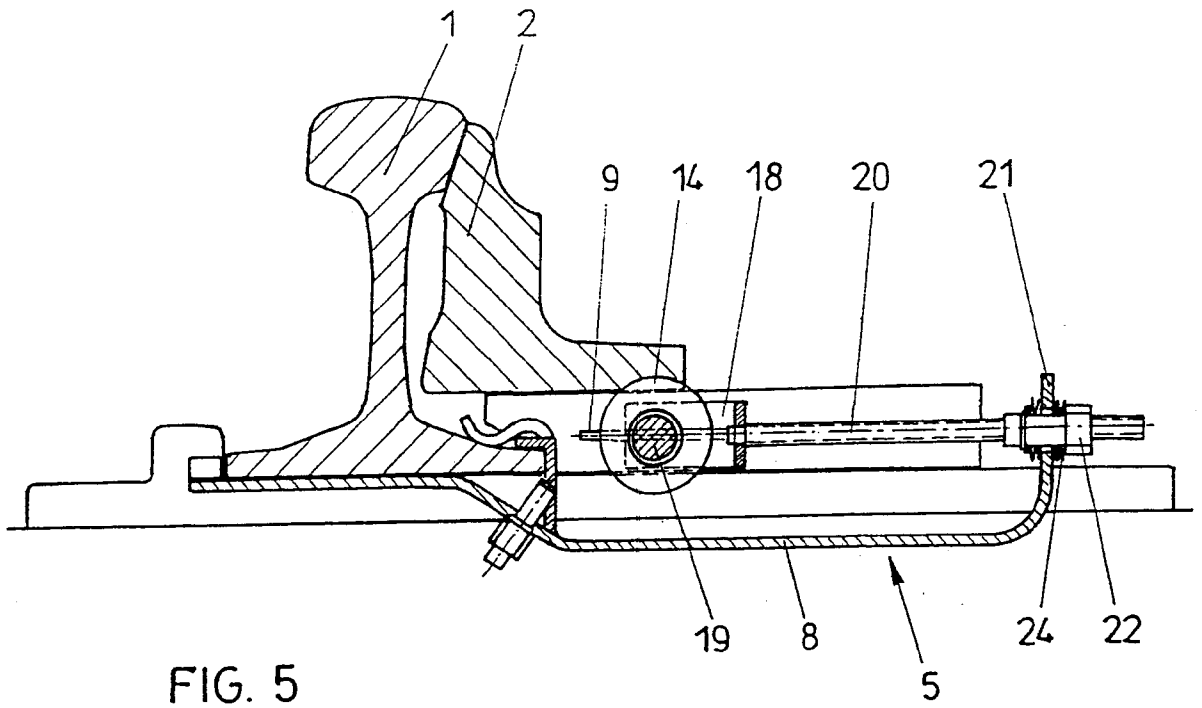


FIG. 4





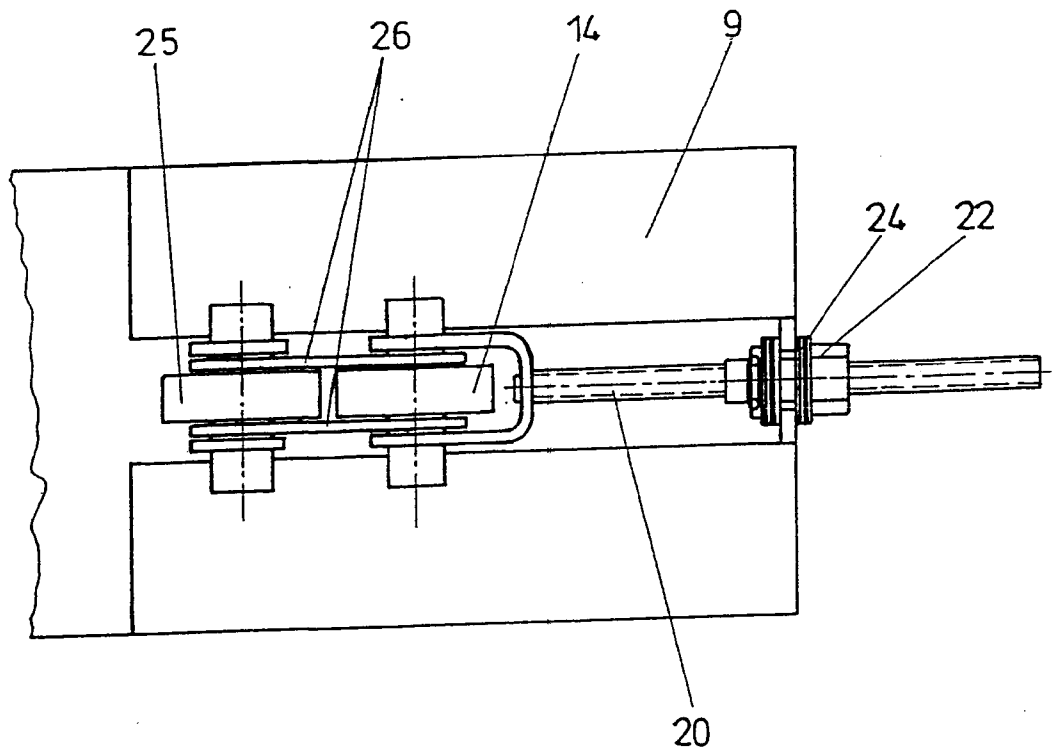


FIG. 7

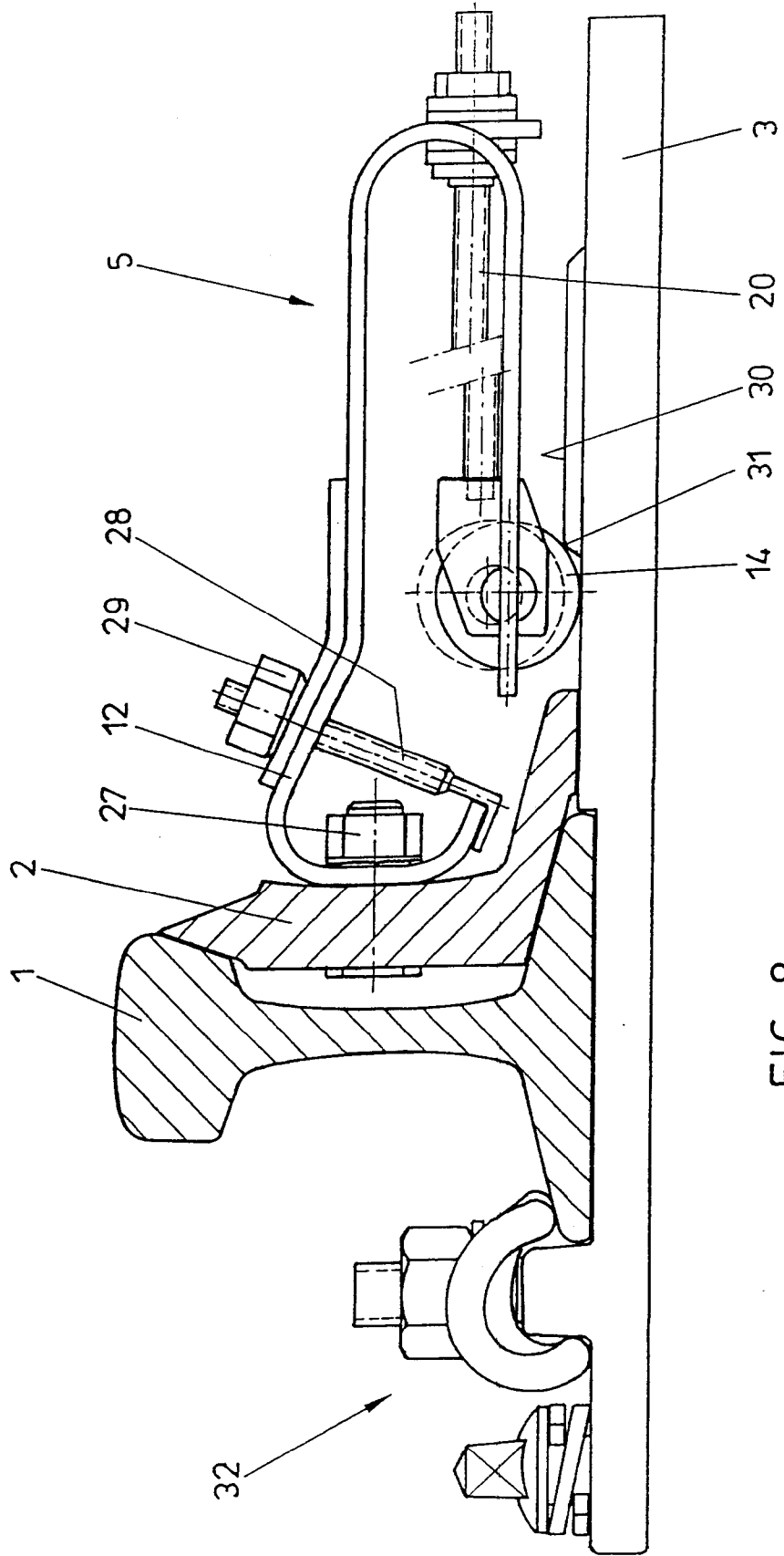


FIG. 8

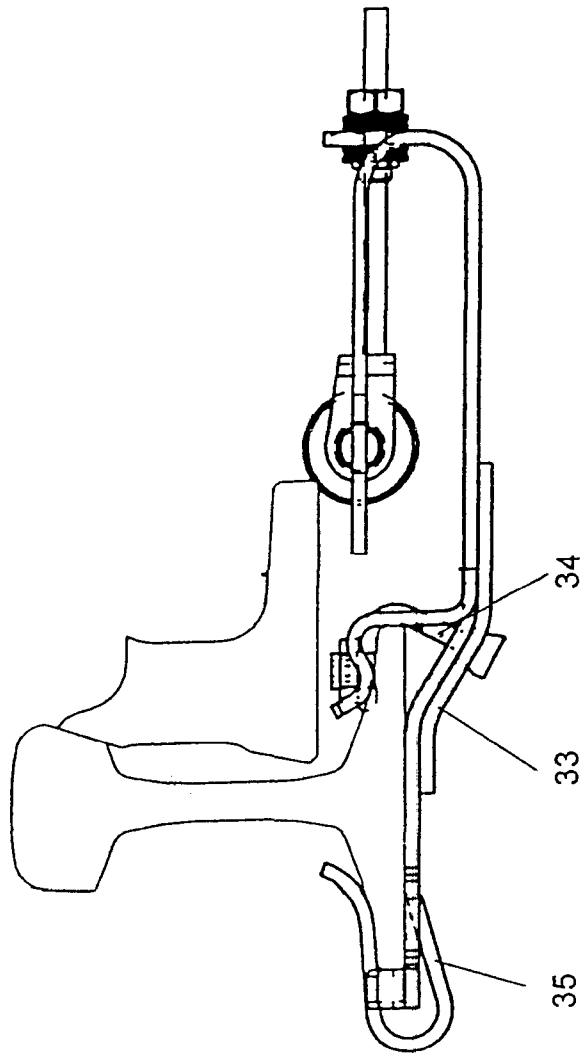


Fig. 9

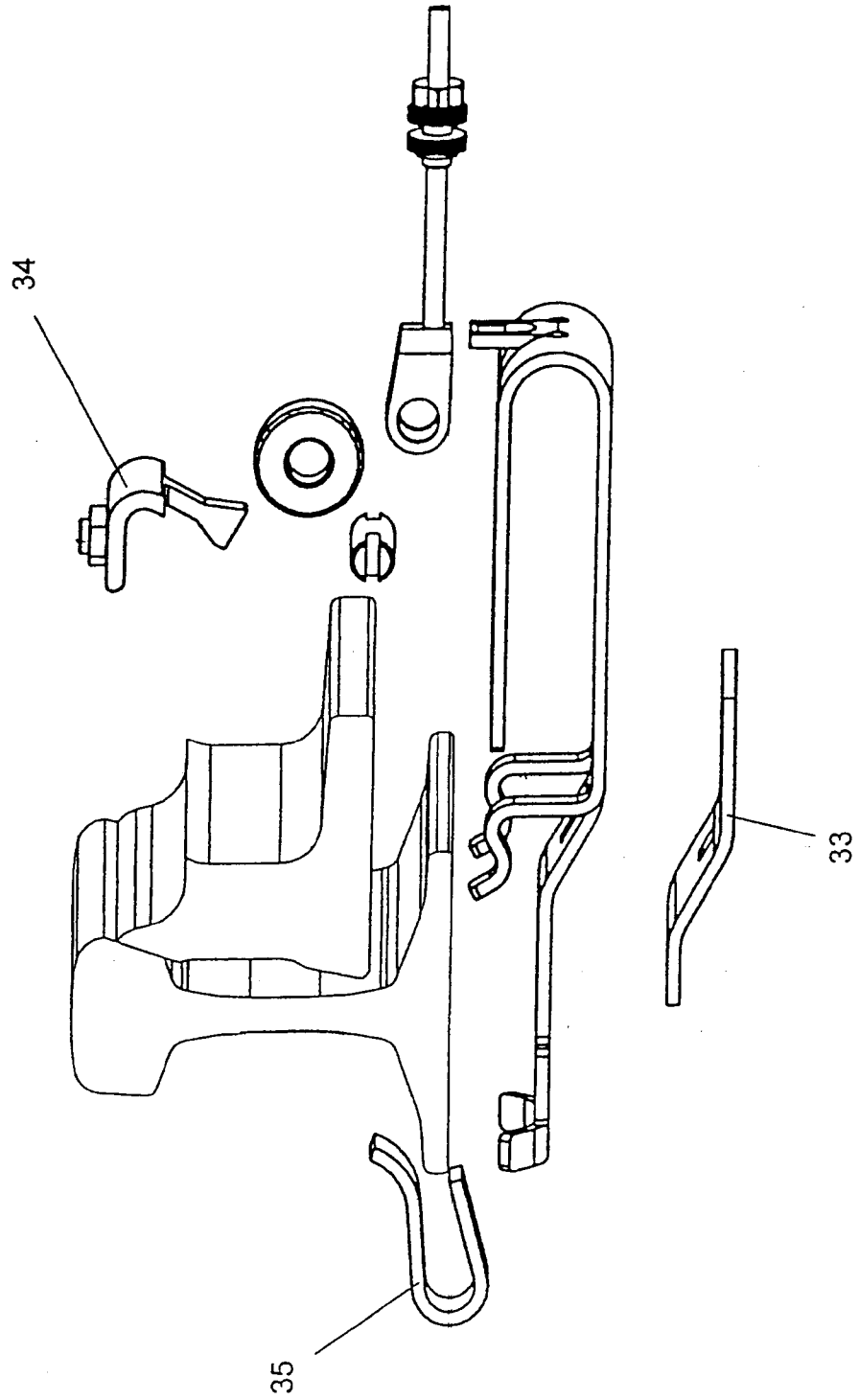


Fig. 10