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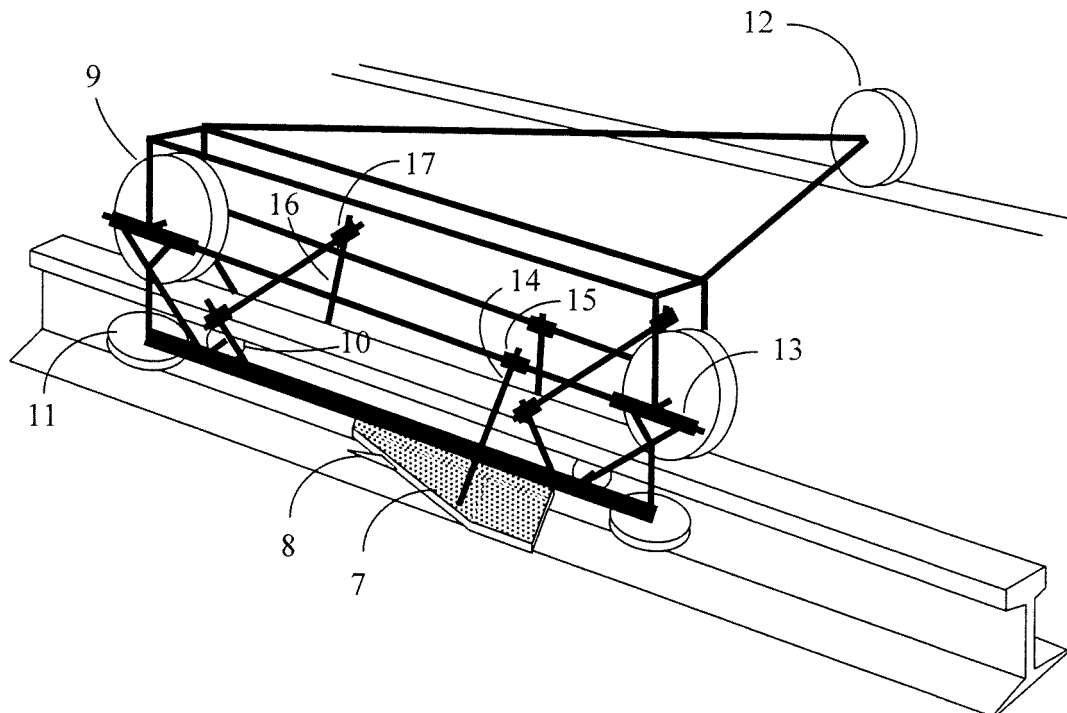
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(54) **A DEVICE FOR CONNECTING AND DISCONNECTING RAILS TO AND FROM SLEEPERS**

(57) A device that can be driven along a railway, and by the use of a wedge, press the rail-fastening clips in or out. Instead of a wedge hinged bars or pistons, powered by an electromagnet, electric motor or hydraulics, can be

used. The device is constructed to, by the means of runners or wheels, follow rails and be kept in a position for pushing mentioned rail-fastening clips to or from rails.

Figur 4.



Description

[0001] One of the greatest challenges in the maintenance of a country's infrastructure is to be able to do the reparations of a railway with a minimum use of time. Upcoming delays for trains causes both problems for passengers and extra costs for the affected operators, who might have to both pay reimbursements to their passengers and pay for hire of buses. Long lasting interruptions could lead to logistic problems for an industry, which could lead to increased costs and/or less earnings. Every contribution to a more effective maintenance of railways will therefore translate into great savings in society, in addition to the direct savings for the maintenance itself. The latter will also be less complicated when the job can be done so fast that it can be done during the time that is for disposal between two scheduled trains, or at least with a minimal disturbance of the concerned traffic.

[0002] There are patents today that describe different solutions to facilitate the work with connecting and disconnecting rails to sleepers. The American patent (US 2006/0130697 A1) for example describes a device that uses hydraulic for this coupling. This solution is however time consuming as the device needs to stop at every sleeper. Another American patent (US 4 457 060 A) describes a solution for an older type of attaching rails to sleepers, and can therefore not be applied on the current standard for connectors. A third and British patent (GB 2 092 647 A) describes a solution for another old standard for connectors. Thus; this solution cannot either be used other than on places where this old type of connector has not yet been replaced.

[0003] The device for disconnecting rails from sleepers described in this application is developed to fit the current standard for connecting rails to sleepers. **Figure 1** shows, from one side, the parts that are involved, and how they are applied for this standard. **Figure 2** shows same parts from above. In addition it shows a wedge (7), described in this application.

[0004] Referred standard describes a movable part (4) that locks rail (2) to sleeper (1). This movable part will from now on be referred to as a clip. Its movement to and from a rail is governed by the shape of a metal plate (3) in which it resides. This metal plate is hold by a sleeper of concrete into which it is molded, and the clip can be moved so that one of its ends moves from a position from the inside of the metal plate to a position where it is placed over the foot of the rail. This end is also dressed in a plastic cover (5) with bevelled sides (6). The clip's other end is hold by tracks on the metal plate's outer side.

[0005] Thus; one may use a skewer for disconnecting rails from sleepers, by placing it against the rail and bend the attached clip away from the rail. Normally an apparatus is used for this, an apparatus that is moved from sleeper to sleeper that is to be disconnected. But even with such a machine the work may be time consuming. The alternative to use many men, each equipped with a skewer, is neither practical nor in terms of costs viable.

[0006] What this patent application therefore describes is a wedge (7), to be used for the described disconnection of rails, and an apparatus that this wedge is connected to, for its operation. This apparatus is from now on referred to as a sledge in the description. To this sledge may other constructions, for disconnecting and connecting rails, be mounted. This is also described in this patent application. Mentioned constructions may also be designed to be operated from a vehicle like for example a tractor. **Figure 3** shows how this sledge's wheels are placed against the rails. **Figure 4** shows how the sledge in principle may be designed in order to be placed on the rails, and to perform the disconnection of rails with the described wedge.

[0007] Mentioned wedge is designed to be pressed between the rail's vertical part and described clip's plastic cover, so that clips can be pushed away from the rail's foot, and by doing this rails will be disconnected from sleepers. The wedge could, by using the sledge, be moved forward with a relative high speed and in a short period of time release long distances of rails. This has been tested by the use of a tractor, which for this purpose, used a tooth on an excavator. As this was not a precise and for the purpose designed tool, and due to the risk for damages on the clips, it cannot be permanent solution. But the test showed that the principle works, and this with a velocity only limited by the tractor's velocity.

[0008] The wedge can be connected to springs that prevent damages, both on clips that are stuck and on the wedge itself with mounting. In order to reduce the sideways pressure on clips, the wedge's side towards the clips could be made in a material that has low friction and/or be equipped with automatic lubrication of this surface. The tip of the wedge could also be given an extra wedge shaped tip (8), which lifts the clips enough to reduce their friction against the rail's foot. The construction of the wedge's mounting should be done in a way that facilitates its replacements, as it will, despite different measures, be worn out. In stead of described wedge a bar (18) suspended on a hinge as shown by figure 5 or a piston, powered by electromagnetism, an electric motor or hydraulic, can be used to push a clip away from the rail. A spring loaded switch for an electric governing circuit could by a direct or indirect physical contact with a clip or pertaining metal plate, make a connection for this. A corresponding construction to push a clip towards a rail for connecting it to a sleeper may also be done. As clips hold both sides of the foot to a rail, the sledge may be designed to hold the described constructions on both sides of the rail. Depending on the wedge's design it may have to adapt to which side it is to be used.

[0009] The sledge can be equipped with wheels (9-11) to fixate it in a correct position in relation to the rails. These wheels can be locked towards each side of a rail, and towards the rails upper- and underside of the rails upper part. The sledge will have to have a sufficient length and described wheels in both ends in order to maintain a stable direction when moved. To prevent the sledge

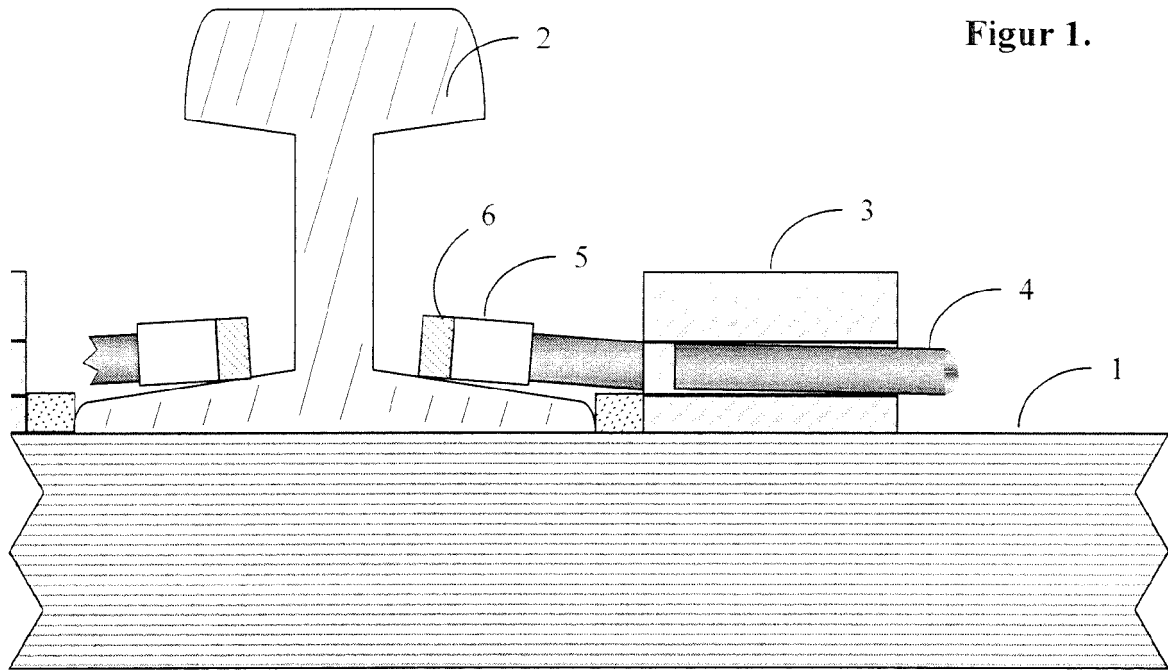
from twisting around one rail this stability can be accomplished by connection to wheels (12) following the railway's other rail. The part of the sledge with wheels enclosing a rail will have to, for example with hinges (13), be able to open, before the sledge is placed on rails, and then be closed. To lock this closure, extra bars (16) with a latch (17), or a locking mechanism by the hinges (13), can be used. The wheels suspension should be adjustable for an optimal fit towards the rails. Sledge-runners can be used instead of wheels.

[0010] For enabling transportation of the sledge on rails it must be possible to put the described parts, for disconnecting and connecting rail, in a position that prevents them to come in contact with the clips. One way to solve this is to make their suspension in a way that allows them to be turned upwards, and to use bar (14) with latch (15) to fixate them in this position. Same bars may also be used to fixate them in a correct position before use, and thus add stability to their suspension.

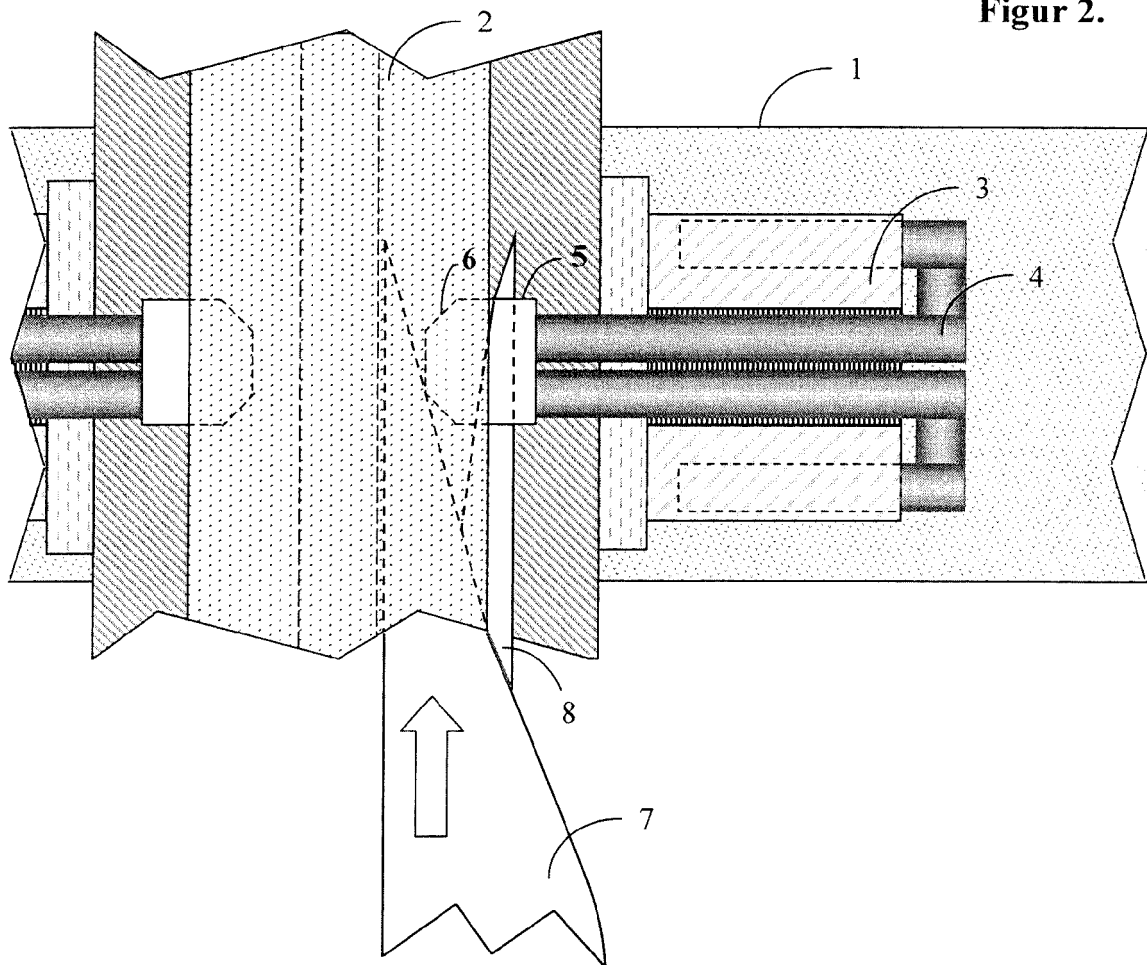
Claims

1. A device for connecting and disconnecting rails from sleepers with rail-fastening clips (4) that are pushed to or from the rails, comprising a wedge (7) with its narrow end less thick than the distance between a rail-fastening clip and rail, and with its thicker end thick as the width of one side of the rail's foot, so that when this wedge is driven with one of its long sides parallel along a rail and with its narrow end pointing in the direction of movement between a rail and a rail-fastening clip, the rail-fastening clips will be pressed away from the rail, and that when this wedge (7) is driven with its narrow end pointing in its direction of movement on the rail-fastening clip's other side, the latter will be pressed towards the rail by the wedge's thicker end.
2. A device according to claim 1, wherein the described wedge (7) at its narrow end also has an extra tip (8) that follows the rail's foot and shaped in an angle so that this wedge-shaped tip is wedged under the rail-fastening clip and lifts it sufficient to reduce its friction when pressed away from the rail by the wedge (7).
3. A device according to claim 1, wherein the described wedge (7) has channels that are fed with a lubricant, and that these channels lead to the sides of the wedge that are exposed for friction and/or these sides or the entire wedge is made in a material with minimal friction against iron.
4. A device for connecting and disconnecting rails from sleepers with rail-fastening clips (4) that are pushed to or from the rails, comprising a part shaped as a disc (18) and suspended by a hinge, so that this disc can be turned towards the rail-fastening clip.
5. A device according to claim 4, wherein described disc (18) is powered by an electric motor, an electromagnet or by hydraulics, governed by a switch connecting a governing electric circuit either by the switch's physical contact with the holder (3) for the rail-fastening clip or by an electronic circuit for continuous distance calculation between the holder (3) and the disc (18).
6. A device according to claim 1 to 5, wherein a sledge or a trolley, from now on referred to as a trolley, holds the wedge (7) or the disc (18) and that the trolley is constructed to hold these parts towards one or both sides of the rails the trolley is moved on, and that this trolley is guided along rails either by runners or by wheels (9) that follow the rail's top side, and wheels (10) that follow the underside of the rail's top part, and wheels (11) that follow the rail's vertical sides, and that these wheels (9-11) are placed in both ends of the trolley, and that the trolley can hold its own engine for transportation and/or have holds for towing or for being pushed or pulled.
7. A device according to claim 6, wherein the trolley's wheels (9-11) are covered by rubber and/or with an adjustable suspension to the trolley.
8. A device according to claim 6 and 7, wherein the trolley, in a design for maintenance of only one rail, has runners or wheel (12) resting on the other rail.
9. A device according to claim 6, 7 and 8, wherein one or both sides to the trolley, that hold wheels (10, 11) and the wedge (7) or disc (18), are suspended in hinges (13), so that these sides can be folded to or from the rail's sides, and that they can be kept in chosen position by the use of bars (16), and that this position can be locked by the use of hooks or screws (17).
10. A device according to claim 6, 7 and 8, wherein the wedge (7) or the disc (18) is attached to the trolley with hinges so that they can be turned to or from the rail's foot, and that they can be kept in chosen position by the use of bars (14), and that this position can be locked by the use of hooks or screws (15).

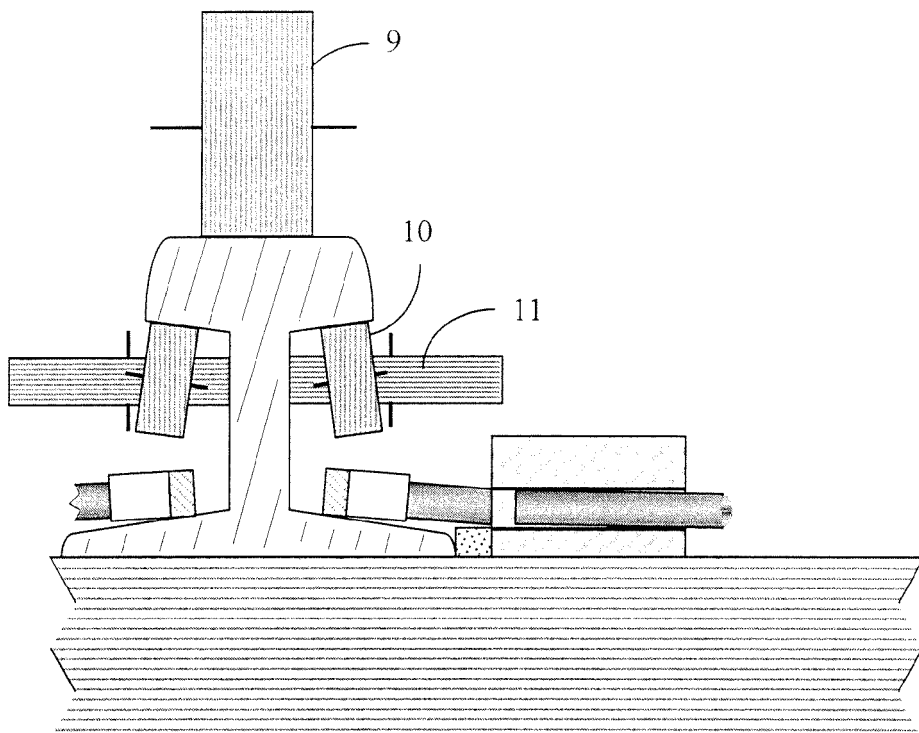
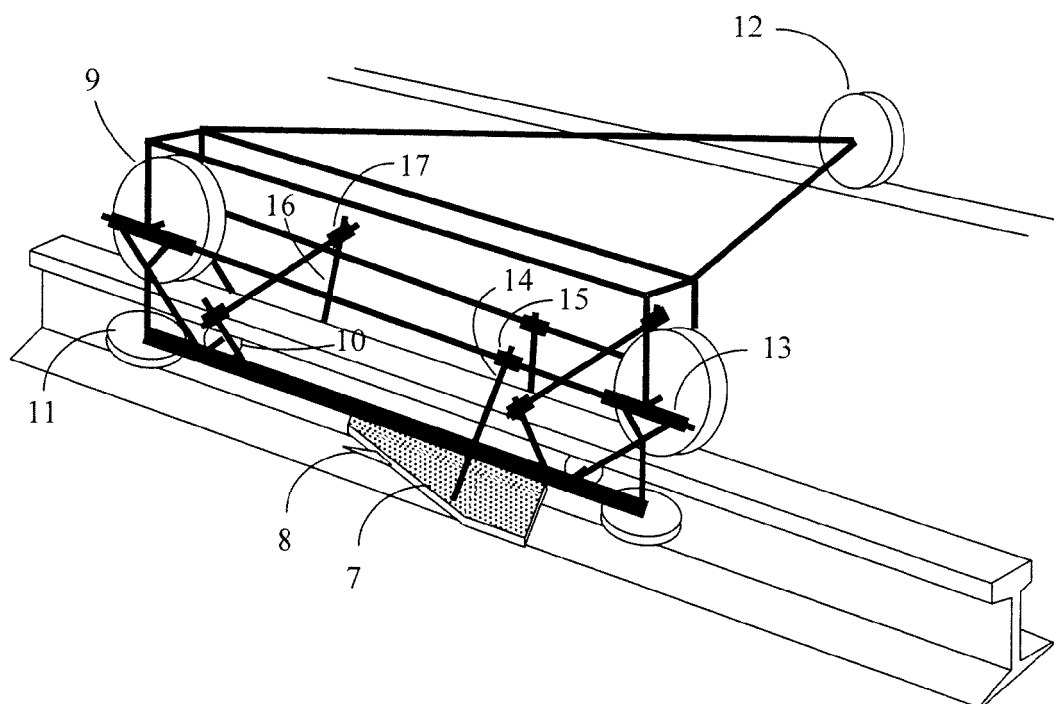
Figur 1.



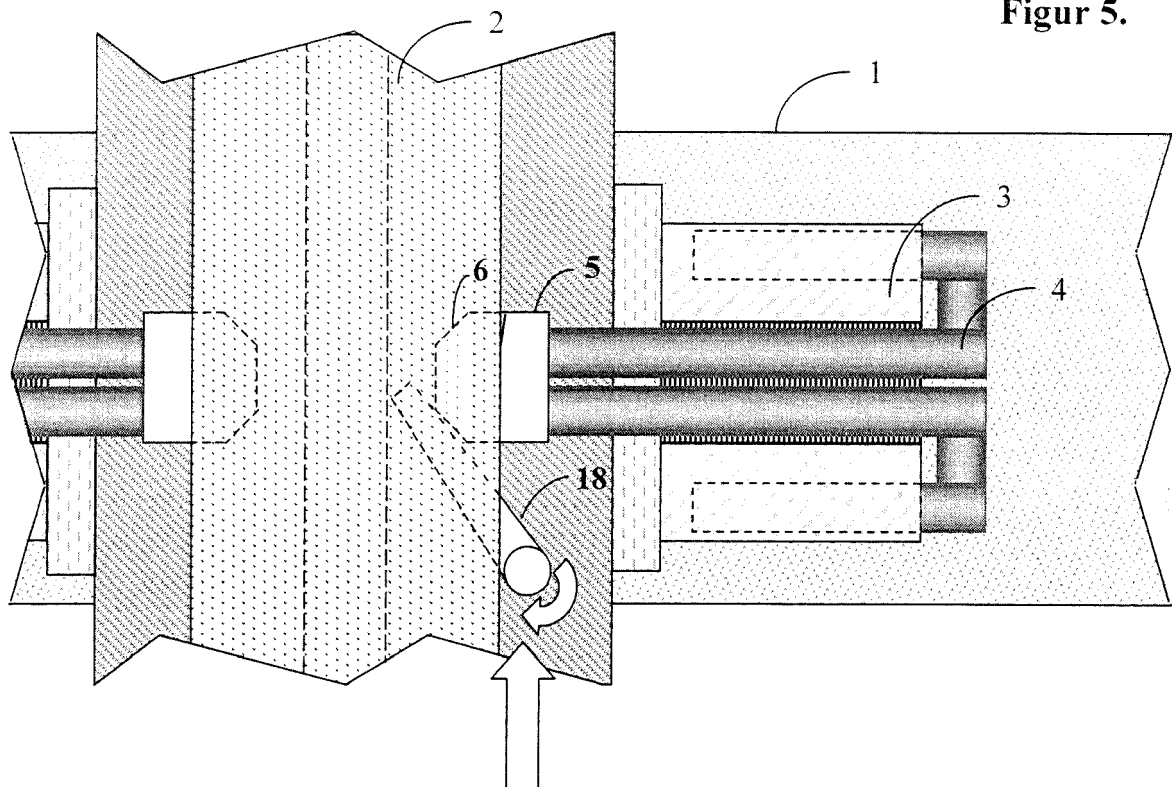
Figur 2.



Figur 3.

**Figur 4.**

Figur 5.





EUROPEAN SEARCH REPORT

Application Number
EP 15 44 5002

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	WO 98/59113 A1 (ROSENQVIST FOERVALTNINGS AB A [SE]; HOLMBERG LARS ERNE [SE]; RICKLUND) 30 December 1998 (1998-12-30) * the whole document *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E01B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 March 2016	Examiner Movadat, Robin
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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