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(54) **Device for lubrication of the fixing means of the rails of a track**

Einrichtung zum Schmieren der Schienenbefestigungsvorrichtungen eines Gleises

Appareil pour la lubrification des moyens de fixation des rails d'une voie ferrée

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Description

[0001] The present invention relates to the field of technology comprising means which are used for the lubrication of metal members for the purpose of protecting them against corrosion and prolonging their serviceability. In particular, the device according to the invention concerns the specific sector of lubrication of the plurality of elements provided with a projecting part which are arranged at regular intervals along a linear member for which they serve as anchoring, connection and/or jointing means.

[0002] A typical case in which the abovementioned device can be advantageously used is that of lubrication of the fixing means, such as bolts with or without ring nuts, washers or other small parts, which serve for fixing railway tracks on their support sleepers.

[0003] As is known, such bolts are arranged, with their heads projecting upwards, at regular intervals along the entire length of the tracks and are fixed on both bearing sides of each of the two parallel elements (the rails) which form a track. It is periodically necessary to carry out lubrication of the parts of said bolts, such as the head and the threaded shaft, to avoid oxidation reducing the reliability of their fixing with the passing of time and rendering their removal by means of unscrewing problematic and extremely difficult.

[0004] Indeed, the «welding» effect caused by the simultaneous oxidation of the bolt and of the member into which it is screwed is so great that it is often necessary to use expensive, complex equipment specifically designed for the purpose of unscrewing highly oxidized bolts.

[0005] According to the state of the art, the abovementioned lubrication is performed manually by an operative who, while walking along a track, uses a brush to take a lubricating fluid from a bucket containing it and apply it to said bolts.

[0006] It is clear how onerous and time-consuming the operation is: even with the greatest goodwill, a single operative will, in one hour of work, only manage to lubricate the bolts of a track over a section no longer than 400/500 m.

[0007] It is clear how urgent the need is to devise a faster, more reliable system: to this end, the inventor of the present invention has designed a device which, mounted on a rail, can run along the latter, pushed by an operative or by other means, and automatically effect the lubrication of all the fixing bolts that it encounters as it travels along.

[0008] Documents DE-A-37 09 390 and FR-A-2051740 show already machines for lubrication of the fixing bolts of the rails, with a reservoir for the lubricating fluid and with bearing wheels for supporting the machine on the rails.

[0009] Said device, which in fact forms the subject of the present invention, is described in the precharacterizing clause of the appended Claim 1 and is characterized by the characterizing part of the same claim.

[0010] A preferred exemplary embodiment of the device according to the invention will now be described in greater detail with reference to the appended drawings, in which:

Figure 1 shows a side view of said exemplary embodiment of a device according to the invention;
Figure 2 shows a rear view of the device;
Figure 3 shows a cross section of the body of the device in the part which contains the lubricating fluid, and
Figure 4 shows an enlarged partial cross section of that part of the hydraulic system associated with its positive-displacement mechanical pump.

[0011] Referring first to Figure 1, it can be seen how, in the example in question, the device 1 according to the invention comprises primarily a body 2, also constituting its bearing structure, which contains lubricating fluid 18 in a suitable tank 17 in its interior (see Figure 3).

[0012] Said body is supported by bearing members consisting of two small wheels 3, 4 made of insulating material, although they can also consist of one or more sliding blocks (not shown).

[0013] Said bearing members have a groove 14 which, in the case shown, extends over the entire external contact surface of the small wheels 3, 4 and has a shape which is complementary to that of the rail 8, as can be seen in Figure 2.

[0014] As a result, when the device 1 is supported on a rail 8, it remains to a certain extent «clamped» on the rail, and the possibility of it being derailed is prevented.

[0015] As can be seen in Figure 3, the ends of two tubes 5, 6, which are preferably each provided with a unidirectional valve 21 which prevents the fluid flowing back from the tubes 5, 6 to the tank 17, extend down into said tank 17 containing the lubricating fluid 18.

[0016] Said tubes 5, 6 are bent in a U shape and their other end is terminated by an ejection nozzle 5u, 6u which is directed downwards, that is to say towards the fixing means 8 to be lubricated, with an appropriate inclination α in relation to the vertical, the purposes of which will be defined in the course of the description.

[0017] Each of said two tubes 5, 6 forms part, together with said tank 17, of a hydraulic system 11 provided with a mechanical pump 12 of the positive-displacement type, the pressure piston 19 of which is connected to a striker member, a simple mechanical arm 13 in this case, which is articulated on the body 2 and is directed downwards, that is to say towards the bearing plane of the rail 9.

[0018] Said arm 13 is shaped and dimensioned in such a manner that, during the translation of the device 1 along a rail 9, its free end 131 strikes against those parts 8s of the fixing means 8 of the rail 9 which project upwards in relation to said bearing plane γ, rotating (see arrow A) on account of the impact so as to overcome

the obstacle without causing the translation movement of the device 1 to stop or to decelerate appreciably. A counter-spring 15 fixed to the other end of the arm 13 then returns it to its starting position by making it counter-rotate (see arrow B).

[0019] On account of the rotation A of the arm 13 connected to it, the pressure piston 19 of the abovementioned pump 12 (see Figure 4) takes into a chamber 20 a predetermined quantity of lubricating fluid 18 from the tank 17 by means of the respective tube 5 and then, on account of the counter-rotation B, conveys it to the associated nozzle 5u in which the tube 5 terminates towards the outside. (The arrows C show the directions of motion of the pressure piston 19.) According to need, the hydraulic systems can be dimensioned in such a manner that the lubricating fluid 18, leaving the nozzles 5u, 6u at a predetermined pressure, is atomized to the appropriate degree by the latter, increasing its capacity to penetrate even the narrow gaps of the fixing means which is usually a captive bolt 8 as represented in the drawings.

[0020] It is clear that, depending on the geometry of the system and the speed of translation of the device 1 according to the invention, the pumping and ejection operation takes place with a certain advance in relation to the moment at which the ejection nozzle 5u, 6u passes through the vertical of the fixing means 8. The inventor has consequently made provision for the nozzles 5u, 6u, or the terminal length of the tubes 5, 6 connected thereto, to be orientated so as to achieve a predetermined inclination α in relation to the vertical, as can be seen in Fig. 1, which makes it possible to direct the jet towards the point where the fixing means 8 to be lubricated is situated at the moment when ejection of the fluid takes place.

[0021] To this end, it is possible to employ one of the known systems, such as, for example, the use of a number of articulated parts to form the terminal length of the tubes 5, 6 ending in the nozzles 5u, 6u.

[0022] In order to operate, the device 1 according to the invention must, as mentioned, be made to move on its bearing members 3, 4 along the rail 9, the fixing means 8 of which are to be lubricated. To this end, the inventor has made provision to equip the device 1 with handlebars 7 which can be held and manoeuvred with ease by an operative following the course of the rail 9 on foot. This is considered to be the most practical and economical system but, in other embodiments, the device can be made to move by a railway carriage or by a locomotive connected to it by an appropriate frame (not shown because it is easy to imagine and to put into effect), or can generate its own motion by means of a DC electric motor powered by batteries, which is secured with these on the body 2 of the device 1. (This case is not shown either for reasons similar to those in the preceding case.)

[0023] The examples described and mentioned thus far clearly do not represent all the embodiments an expert in the field can produce in various ways while remaining within the scope of the teachings contained in the appended claims.

[0024] The device according to the invention affords an effective means of easily carrying out the periodic lubrication of sections of railway line, reducing the effort and the danger involved for the operatives performing the work, appreciably increasing the functionality and the reliability of the result, and moreover allowing a considerable saving on the quantity of lubricating fluid used.

Claims

1. Device (1) for lubrication of the fixing means (8) of the rails (9) of a track (10), said fixing means (8) being arranged on the opposite sides of each rail (9) and having a part (8s) projecting upwards in relation to the fixing plane (γ), comprising:

   - a body (2) containing lubricating fluid in its interior;
   - one or more bearing members (3, 4) which support said body (2) and are capable of moving in contact with the rail (9) when they are pushed by means of propulsion (7); **characterised by**
   - two tubes (5, 6) extending down at one end into the lubricating fluid contained within said body (2) and terminating at the other end in an ejection nozzle (5u, 6u) which is directed downwards at an angle (α) in relation to the vertical, each of said two tubes (5, 6) forming part of a hydraulic system (11) provided with a mechanical pump (12) of the positive-displacement type which conveys the lubricating fluid (18) to said ejection nozzles (5u, 6u) and is actuated by a striker member (13), which is articulated on the body (2) and is directed towards the bearing plane (γ) of the rail (9), when the same striker member (13) pushes against said projecting part (8s) of the fixing means (8) on account of the translation of the device (1) along the rail (9).

2. Device according to Claim 1, in which said bearing members consist of at least two small wheels (3, 4), over the entire extent of the outermost surface of which a groove (14) is formed, the shape of which is complementary to that of the rail (9) on which said small wheels (3, 4) are supported.

3. Device according to Claim 1, in which said bearing members consist of one or more blocks resting on a rail (9) by means of grooves which extend over the entire contact surface and have a shape which is complementary to that of the rail (9).

4. Device according to one of the preceding claims, in

which said means of propulsion which are capable of moving said bearing members (3, 4) by pushing them consist of manually operable handlebars (7) connected to the device (1).

5. Device according to one of Claims 1 to 3, in which said means of propulsion which are capable of moving said bearing members by pushing them consist of a frame which is capable of connecting the device to a carriage or to a railway locomotive.

6. Device according to Claim 2, in which said means of propulsion consist of an electric motor mounted integrally on said body (2) and powered by batteries fixed to the body (2).

7. Device according to one of the preceding claims, in which said striker member which projects downwards and actuates said mechanical pump (12) is an arm (13) connected to its pressure piston (19) and articulated on the body (2) of the device (1), which arm is shaped and dimensioned in such a manner that, during the translation of the device (1), the free end (13) of the arm strikes against said projecting part (8s) of the fixing means (8), being made to rotate by said part, and, after having passed said part, the arm returns to its starting position by counter-rotating by virtue of the action of a counter-spring (15), said rotation and counter-rotation bringing about respectively the intake of lubricating fluid contained in the body (2) and its ejection through said nozzles (5u, 6u).

Patentansprüche

1. Vorrichtung (1) zum Schmieren der Befestigungsmittel (8) der Schienen (9) eines Gleisstrangs (10), wobei die Befestigungsmittel (8) auf gegenüberliegenden Seite jeder Schiene (9) angeordnet sind und einen in Bezug auf die Befestigungsebene (γ) nach oben vorstehenden Teil (8s) besitzen, mit:

- einem Körper (2), der in seinem Innenraum Schmierfluid enthält; und
- einem oder mehreren Lagerelementen (3, 4), die den Körper (2) unterstützen und sich in einen Kontakt mit der Schiene (9) bewegen können, wenn sie durch eine Antriebskraft (7) angeschoben werden;

gekennzeichnet durch

- zwei Rohre (5, 6), die sich mit einem Ende nach unten in das in dem Körper (2) enthaltenen Schmierfluid erstrecken und am anderen Ende in einer Ausspritzdüse (5u, 6u) enden, die in Bezug auf die Vertikale unter einen Winkel nach unten gerichtet ist, wobei jedes der zwei Rohre (5, 6) einen Teil eines Hydrauliksystems (11) bildet, das mit einer mechanischen Pumpe (12) des Typs mit positiver Verdrängung versehen ist, die das Schmierfluid (18) zu den Ausspritzdüsen (5u, 6u) fördert und **durch** ein Schlagelement (13), das an dem Körper (2) angelenkt und zu der Lagerebene (γ) der Schiene (9) gerichtet ist, betätigt wird, wenn dieses Schlagelement (13) gegen den vorstehenden Teil (8s) der Befestigungsmittel (8) schiebt, wenn die Vorrichtung (1) längs der Schiene (9) translatorisch bewegt wird.

2. Vorrichtung nach Anspruch 1, bei der die Lagerelemente aus wenigstens zwei kleinen Rädern (3, 4) bestehen, auf deren gesamter äußerster Oberfläche eine Nut (14) ausgebildet ist, deren Form zu jener der Schiene (9), auf der die kleinen Räder (3, 4) unterstützt werden, komplementär ist.

3. Vorrichtung nach Anspruch 1, bei der die Lagerelemente aus einem oder mehreren Blöcken bestehen, die mittels Nuten, die sich über die gesamte Kontaktfläche erstrecken und eine Form haben, die zu jener der Schiene (9) komplementär ist, auf dieser Schiene (9) liegen.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der die Antriebsmittel, die die Lagerelemente (3, 4) durch Schieben bewegen können, aus manuell betätigbaren Handhebeln (7) bestehen, die mit der Vorrichtung (1) verbunden sind.

5. Vorrichtung nach einem der Ansprüche 1 bis 3, bei der die Antriebsmittel, die die Lagerelemente durch Schieben bewegen können, aus einem Rahmen bestehen, der die Vorrichtung mit einem Schlitten oder mit einer Eisenbahnlokomotive verbinden kann.

6. Vorrichtung nach Anspruch 2, bei der die Antriebsmittel aus einem Elektromotor bestehen, der einteilig an dem Körper (2) angebracht ist und durch an dem Körper (2) befestigte Batterien mit Leistung versorgt wird.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der das Schlagelement, das nach unten vorsteht und die mechanische Pumpe (12) betätigt, ein mit ihrem Druckkolben (19) verbundener Arm ist und am Körper (2) der Vorrichtung (1) angelenkt ist, wobei der Arm so geformt und bemessen ist, dass während der translatorischen Bewegung der Vorrichtung (1) das freie Ende (13) des Arms gegen den vorstehenden Teil (8s) der Befestigungsmittel (8) schlägt, die ihrerseits so beschaffen sind, dass sie durch diesen Teil gedreht werden,

woraufhin der Arm, nachdem er sich an dem Teil vorbeibewegt hat, in seine Ausgangsposition zurückkehrt, indem er sich kraft der Wirkung einer Gegenfeder (15) in entgegengesetzter Richtung dreht, wobei die Drehung und die Gegendrehung das Ansaugen des in dem Körper (2) enthaltenen Schmierfluids bzw. dessen Ausstoß durch die Düsen (5u, 6u) herbeiführen.

Revendications

1. Dispositif (1) pour lubrifier les moyens de fixation (8) des rails (9) d'une voie ferrée (10), lesdits moyens de fixation (8) étant disposés sur les côtés opposés de chaque rail (9) et comportant une partie (8s) qui fait saillie vers le haut par rapport au plan de fixation (γ), comprenant :

   - un corps (2) à l'intérieur duquel est contenu un fluide de lubrification ;
   - un ou plusieurs éléments d'appui (3, 4) qui supportent ledit corps (2) et sont aptes à se déplacer en contact avec le rail (9) lorsqu'ils sont poussés par des moyens de propulsion (7) ; **caractérisé par**
   - deux tubes (5, 6) qui s'étendent vers le bas au niveau de l'une de leurs extrémités pour pénétrer dans le fluide de lubrification contenu dans ledit corps (2) et qui se terminent au niveau de leur autre extrémité par une buse d'éjection (5u, 6u) dirigée vers le bas à un angle (α) par rapport à la verticale, chacun desdits deux tubes (5, 6) faisant partie d'un système hydraulique (11) équipé d'une pompe mécanique (12) du type volumétrique, qui transfère le fluide de lubrification (18) auxdites buses d'éjection, (5u, 6u) et qui est actionnée par un organe percuteur (13) articulé sur le corps (2) et dirigé vers le plan d'appui (γ) du rail (9), lorsque ledit organe percuteur (13) exerce une poussée contre ladite partie saillante (8s) des moyens de fixation (8) du fait de la translation du dispositif (1) le long du rail (9).

2. Dispositif selon la revendication 1, dans lequel lesdits organes d'appui consistent en au moins deux roulettes (2, 4) comportant, formée sur la totalité de l'étendue de leur surface située le plus à l'extérieur, une gorge (14) dont la forme est complémentaire de celle du rail (9) sur lequel lesdites roulettes (3, 4) sont supportées.

3. Dispositif selon la revendication 1, dans lequel lesdits organes d'appui consistent en un ou plusieurs blocs reposant sur un rail (9) au moyen de gorges qui s'étendent la totalité de la surface de contact et qui ont une forme complémentaire de celle du rail (9).

4. Dispositif selon l'une quelconque des revendications précédentes dans lequel lesdits moyens de propulsion qui sont aptes à déplacer lesdits organes d'appui (3, 4) en les poussant consistent en des manches de poignée (7) manoeuvrables manuellement et reliés au dispositif (1).

5. Dispositif selon l'une quelconque des revendications 1 à 3, dans lequel lesdits moyens de propulsion qui sont aptes à déplacer lesdits organes d'appui en les poussant consistent en un châssis apte à relier le dispositif à un wagon ou à une locomotive.

6. Dispositif selon la revendication 2, dans lequel lesdits moyens de propulsion consistent en un moteur électrique monté de manière solidaire sur ledit corps (2) et alimenté par des batteries fixées au corps(2).

7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel ledit organe percuteur qui fait saillie vers le bas et actionne ladite pompe mécanique (12) est un bras (13) relié au piston de pression (19) de celle-ci et articulé sur le corps (2) du dispositif (1), bras qui est conformé et dimensionné de telle façon que, pendant la translation du dispositif (1), l'extrémité libre du bras (13) percute ladite partie saillante (8s) des moyens de fixation (8), et est ainsi contrainte à pivoter par celle-ci, et qu'après avoir franchi ladite partie, le bras revient à sa position initiale en pivotant en sens inverse grâce à l'action d'un ressort de rappel (15), ledit pivotement et ledit pivotement en sens inverse entraînant respectivement l'admission du fluide de lubrification contenu dans le corps (2) et son éjection à travers lesdits buses (5u, 6u).

FIG.1

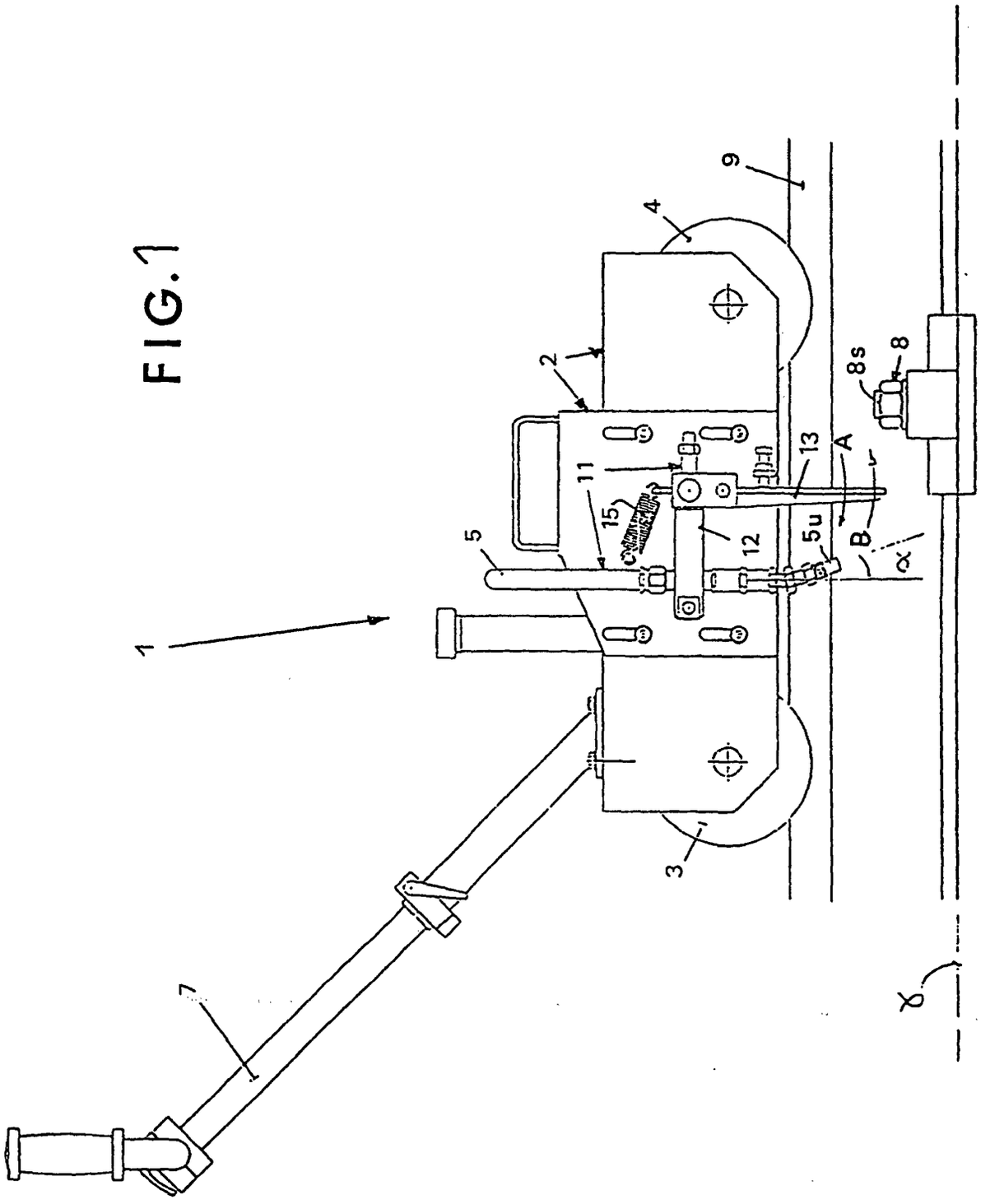
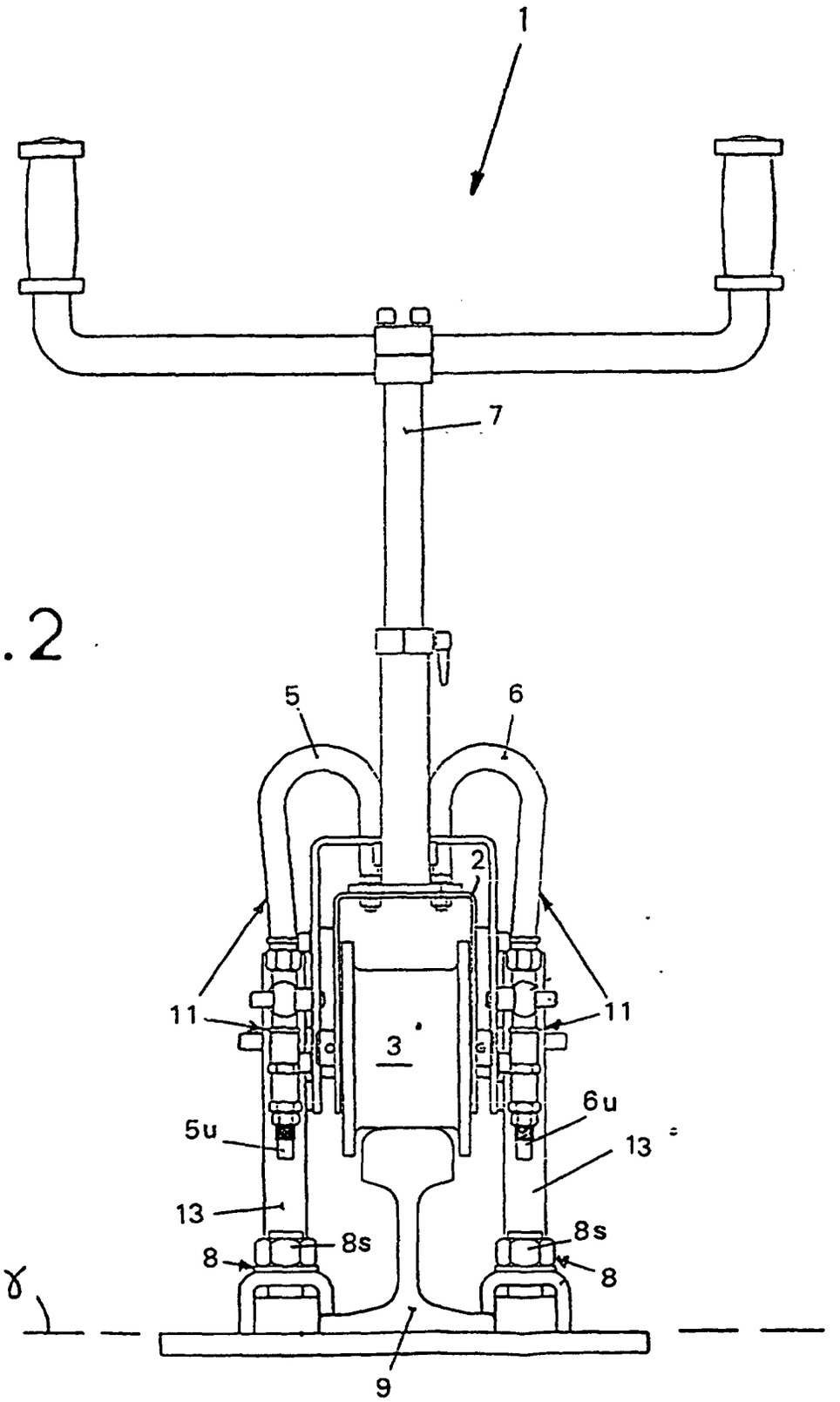


FIG.2



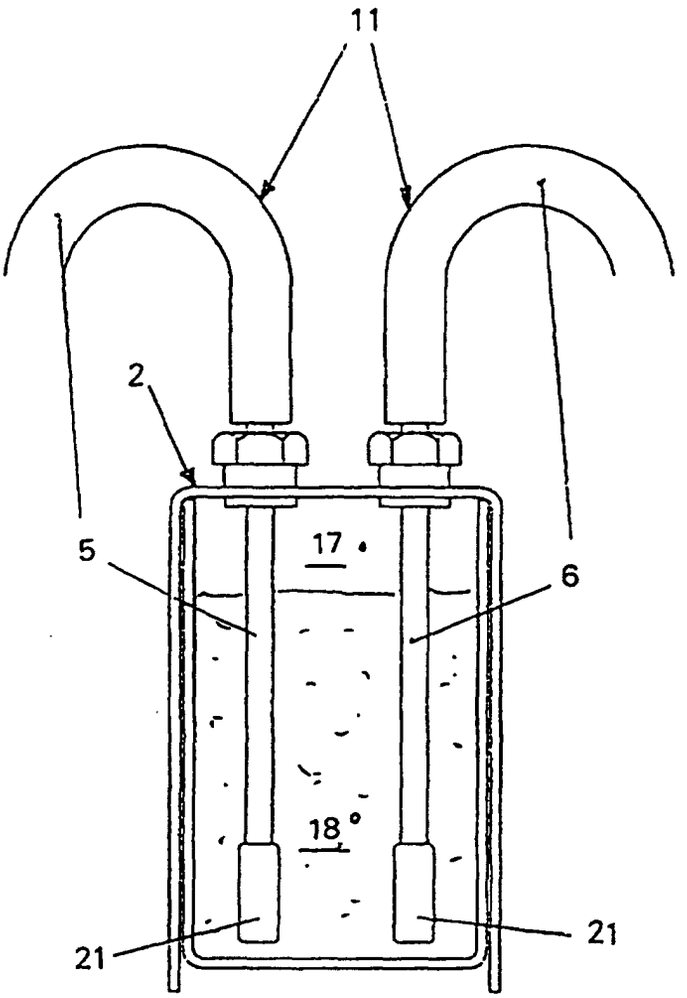


FIG.3

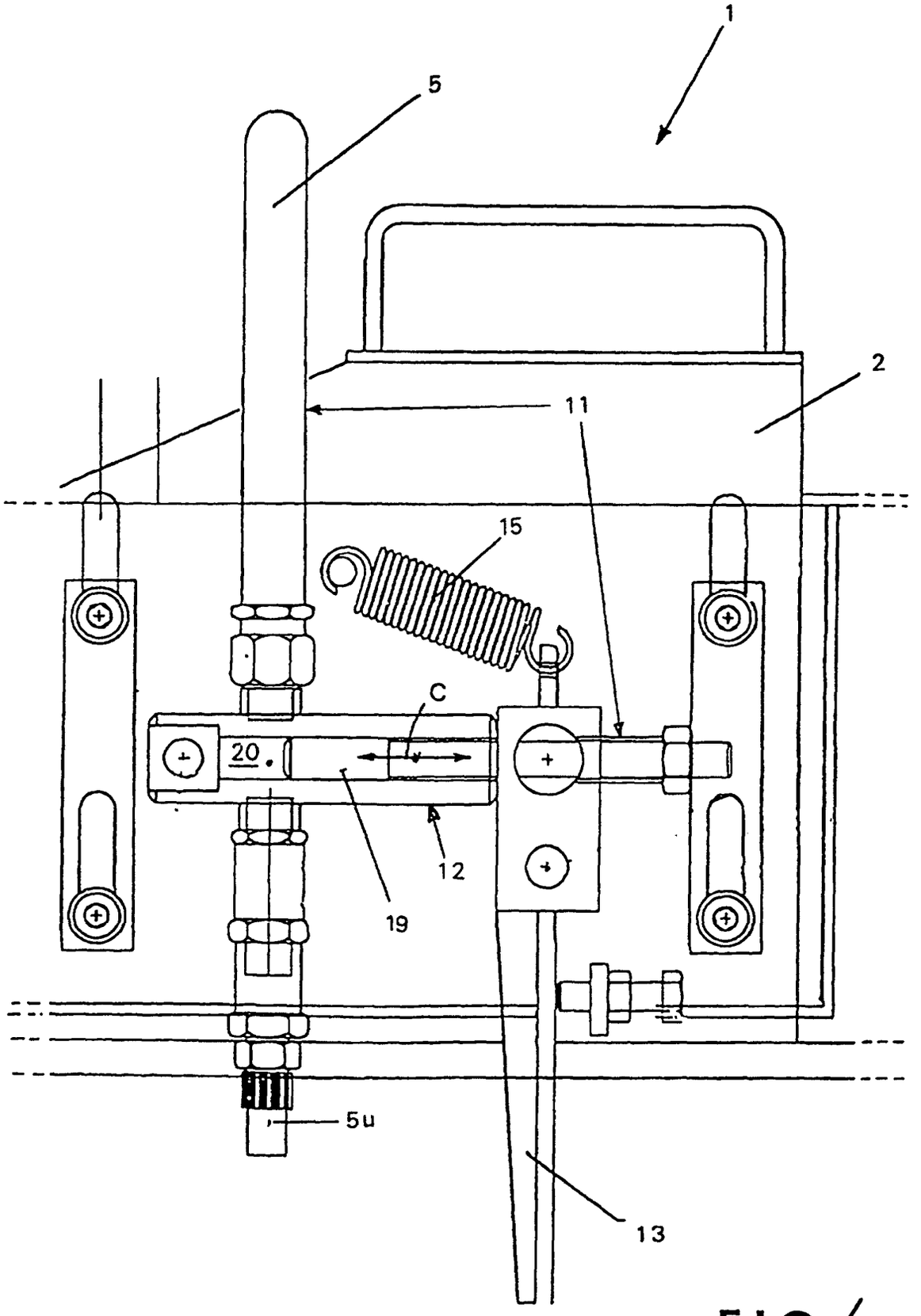


FIG.4