(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 149 278**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **84201884.8**

(51) Int. Cl.⁴: **E 01 B 29/24**

(22) Date of filing: **17.12.84**

(30) Priority: **11.01.84 IT 8330284**

(43) Date of publication of application:
24.07.85 Bulletin 85/30

(84) Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

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(54) **Improvements to platelayer waggons for rails.**

(57) This invention concerns improvements to platelayer waggons (10) for rails, the platelayer waggons (10) being of a self-propelled type equipped with positioner trolley means (14) and guide means (17-18-19-20) to deposit components (21-22-23-24) for fixture, the improvements comprising positioner unit means (29) together with means (25) to pre-assemble at least part (22-23-24) of such components before the latter are fitted.

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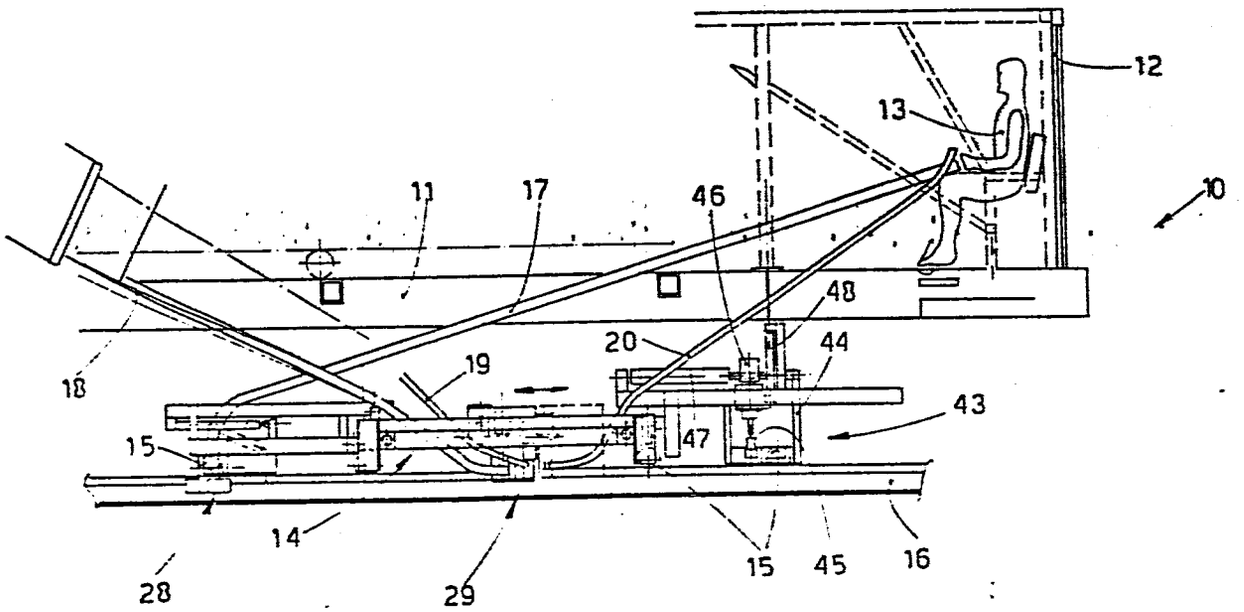

fig.1

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"IMPROVEMENTS TO PLATELAYER WAGGONS FOR RAILS"

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This invention concerns improvements to platelayer waggons for rails. To be more exact, the invention concerns improvements to mechanical platelayer waggons for rails, the platelayer waggons being of the type described in the pending application No.83487 A/83 for a patent in Italy in the name of the present applicant. This type of platelayer waggon consists of a self-propelled waggon which is equipped with several stores to distribute clips for fixture of the rails and also to distribute the relative accessory components, namely bolts, washers and nuts.

Various devices and machines are known in the art for the maintenance and/or fixture of rails.

Patent FR-A-2.253.872 (DEHE) discloses a device for the pre-assembly of fixture elements (clips, nuts and washers). Several guides deliver these components to a rotary pre-assembly table. When thus pre-assembled, the components are taken by means of an arm and placed in a suitable position for their final installation by suitable means, which are not disclosed, nor is it disclosed how the final installation takes place.

Patent FR-A-2.295.170 (PLASSER) discloses a self-propelled machine particularly intended for the removal of components that anchor the rails. This machine comprises various work

units or tools (9-10-11-12) suspended below the machine and able to move synchronously with the forward movement of the machine.

Patent FR-A-2.021.555 (PLASSER) is directed in particular to the alignment of the tools in relation to the working station; this is obtained by having the tools themselves fitted resiliently in relation to their support trolley. The machine shown as an example is intended only to screw and unscrew the nuts and forms a part of a wider system to renew the rails which comprises other machines that are neither described nor shown.

In the waggon of Italian patent application 83487 A/83such components are deposited in succession in correspondence with the various sleepers by means of suitable guides.

A purpose of this invention is to improve the placement of such components. The invention can also be adapted for the placement of components either for so-called "K" type attachments or for "Nabla" attachments or for other types of indirect attachments.

Likewise, the number of the guides which deposit the components will be adapted to the number of components to be assembled at each fixture point.

Where not otherwise stated, we shall refer from now on to "K" type attachments for the sake of simplicity of explanation.

Another purpose of this invention is to provide a preassembly of components before they are deposited.

According to the invention it is also possible to correct any mistakes in the alignment of the bolt positioned on the fixture surface.

The invention envisages that the outlets of the guides which deliver the clip, the washer and the nut to be screwed onto the bolt respectively are positioned next to each other

at a point lying downstream from the position of placement of the bolts.

In this way, with reference to one single working position corresponding to one sleeper, a bolt is deposited first by means of an appropriate guide. When the waggon moves forward, the clip ,the washer and clamp nut, already pre-arranged in an assembled position, are deposited then on this bolt by positioner means envisaged in the invention.

As we said earlier, the invention enables positioning mistakes, such as an oblique positioning of the bolt in relation to the vertical, to be corrected.

As we said, the invention provides also pre-positioner means which can perform assembly of the clip, washer and nut leaving their respective guides. In this way any possibility of mistakes in the depositing of the individual components is obviated.

The invention visualises also a pre-engagement of the nut with the end of the relative bolt.

According to a preferred embodiment the pre-positioner means include a positioner pin means, which is movable suitably and can lodge momentarily the above components in the order in which they are to be fitted. This positioner pin is mounted on trolley means, so that the pre-positioned components remain unmoved in relation to the position at which they are to be tightened by being screwed onto their respective bolt, which has already been positioned in relation to the rail, when the waggon moves forward. Moreover, engagement means are provided which cooperate momentarily with the foregoing components (clip, washer and nut) pre-assembled on the positioner pin means.

The engagement means take such components from the positioner pin means. The engagement means and the pre-assembly means are visualised as being able to move reciprocally in a

transverse direction. The purpose of this is to enable the pre-assembled components to be engaged and to be released from the pre-assembly means and to be positioned on the bolt which has already been deposited.

Thus the engagement means may be immovable in a transverse direction while the pre-assembly means can move transversely, or vice versa.

Such pre-assembly means and engagement means can also be envisaged as being movable, both of them, in a coordinated manner crosswise to the rail.

With the forward movement of the waggon, when the engagement means arrive in correspondence with the position of the bolt, they are lowered so as to position the nut, washer and clip components on the bolt. As we said before, the engagement means of the invention are equipped with means able to apply a pre-screwing action of some turns to the nut against the bolt.

When the position where the pre-assembled components have been deposited is surpassed and the nut has been applied to the end of the bolt in the above manner, the forward movement of the waggon brings the nut to a clamping device, which performs the definitive clamping of the nut itself with the required torque.

This clamping device too can be moved in relation to the waggon in such a way as to remain momentarily unmoved in relation to the position where the nut is screwed down.

In particular, the pre-assembly means have a return path displaced sideways in relation to their forward movement so as not to come into contact with the components deposited just beforehand in correspondence with the rail.

The present invention is therefore embodied with improvements to platelayer waggons for rails, the platelayer waggons being of a self-propelled type equipped with positioner trolley means and guide means to deposit components for fixture of

the rails, the improvements being characterized by comprising positioner unit means together with means to pre-assemble at least a part of such components before the latter are fitted.

We shall describe hereinafter,as a non-restrictive example, a preferred embodiment of the improvements of the invention as applied to a mechanical platelayer waggon for rails, with the help of the attached figures, in which:-

Fig.1 gives a diagrammatical view of the improvements of the invention as applied to a platelayer waggon, which is shown partially;

Fig.2 is a detail of outlets of the guides together with an assembly pin means;

Figs.3 and 4 are respectively a side view and a front view of the means which withdraw pre-assembled components;

Fig.5 shows the path of the pre-assembled components to be engaged and fitted in correspondence with a bolt already deposited;

Fig.6 shows the positions of assembly and depositing of the components in relation to the rail in a front view;

Fig.7 gives a plan view of the paths of the assembly pin means and withdrawal means.

In Fig.1 a platelayer waggon for rails bears the reference 10. A part of the platelayer waggon 10 is shown which comprises a portion of a frame 11 on which a cab 12 lodging an operator 13 is supported in a known manner.

The operator 13 has the task of introducing into appropriate guides the components withdrawn from suitable stores, which are not shown here but are arranged in a suitable position in the platelayer waggon 10.

The figure shows a guide 17 for bolts,a guide 18 for clips, a guide 19 for washers and a guide 20 for nuts.

The guide 17 for bolts, into which the bolts are inserted in this case by hand by the operator 13, deposits the bolts

themselves in correspondence with a bolt positioner unit 28, which occupies a forward position on a positioner device, or positioner trolley, 14. This device 14 is located substantially centrally to and below the frame 11 of the waggon 10, as is already known from the cited pending application No.83487 A/83 for a patent in Italy in the name of the present applicant. Such trolley 14 has wheels 15 able to cooperate with a rail 16, these wheels 15 having a conformation suitable for obtaining automatic alignment of the positioner device 14 in relation to the rail 16 according to methods described in the patent application cited above.

According to the improvements of the invention the outlets of the clip guide 18, washer guide 19 and nut guide 20 are located in the order indicated and close to each other in correspondence with a positioner unit 29 supported by the above positioner device 14. The whole positioner unit 29 can move; according to the invention the unit 29 can move lengthwise to the rail 16 but can also be envisaged as being able to move also crosswise to the rail for any requirements of crosswise positioning or alignment of the components.

Fig.2 shows in particular the positioner unit 29 with the outlets of the various guides. A clip 22, washer 23 and nut 24 can be seen in their release positions at the outlets of the respective guides 18, 19 and 20.

The above components 22-23-24 are those which are deposited in the event of "K" type attachment of the rails to the sleepers, but it is possible to employ the invention with other types of indirect attachment, such as "Nabla" type attachments where a vibration-damper support seating and relative washer and nut are deposited.

According to the invention a pre-assembly means 25 cooperates momentarily with the outlets of the guides 18-19-20 and comprises a movable support 26, which is shaped like a bracket

and bears a pre-assembly pin 27 at its end.

This pin 27 collects in succession, while moving towards the rear of the platelayer waggon 10, the components 22, 23 and 24, which are pre-assembled thus on the pin 27 before being deposited on the rail 16.

In this way the pre-assembly of three components at a time, or more than three components in the case of special types of attachment, is carried out in one work unit alone 29.

Figs.3 and 4 show engagement,or withdrawal, means 30, which transfer the nut 24, washer 23 and clip 22, already assembled on each other, from the positioner pin 27 to a bolt 21 already placed in its position by the positioner unit 28.

The engagement means 30 include two jaws 31, which are clamped against the clip 22 by the action of two stationary cams 35 that cooperate with rollers of the jaws, as is shown in the figure.

Vertical movement of the jaws 31 thus causes the opening and closure of the same 31. Such movement of the jaws 31 is actuated by an actuator means 34, which in this case consists of a jack.

A screw-tightener headstock 32 is located in the centre of the jaws 31 and has a shape able to cooperate with the nut 24 for pre-application of the nut 24 by being screwed onto the bolt 21. In this example the headstock 32 is always kept in rotation and is displaced vertically together with the jaws 31 by the action of the actuator 34.

According to the invention the pre-screwing of the nut 24 has to be performed only so as to lay the nut 24 on the end of the bolt 21; the headstock 32 can therefore have a form such as not to be able to tighten the nut 24 fully, that is to say, a form able to produce only a slight screwing and then to release the nut 24 at once, or else the headstock 32 can be provided with a clutch or other means to limit the torque ex-

erted on the nut 24.

The headstock 32 is powered by a motor unit 37 of a known type located in the upper part of the positioner device 14.

A guide column 33 can be seen in Figs.3 and 4 and can slide within a side frame 38 of the device 14.

The device works in the following way, with reference to Figs. 5 and 7, which show the paths of the various parts.

In Fig.7, while the waggon 10 moves forward towards the left in the figure, the positioner unit 29 holding the support 26 with the pre-assembly pin 27 is displaced in this example towards the right, that is, towards the rear of the waggon 10.

During this movement the pin 27 collects at positions A1, A2 and A3 the clip 22, washer 23 and nut 24 in that order from the respective outlets of the relative guides 18, 19 and 20 (see Fig.2).

In this way, when the pre-assembly pin 27 reaches position A3, it is already inserted into the clip 22, washer 23 and nut 24, placed against each other in that order on the pin 27.

The support 26 with the pin 27 bearing the pre-assembled components 22-23-24 now moves towards the inside of the waggon 10 and closer to the rail 16 in correspondence with position A4.

This movement takes place when a roller 40 is brought to the end of a cam 39 at the extreme right of the latter 39 and is driven in this example by a spring 42, which thrusts inwards the support 26 and therewith the pin 27 with the pre-assembled components 22-23-24.

In this way the components 22-23-24 are brought into the zone of the engagement means 30, which are located in the position shown with B4 and lines of dashes in Fig.7 (see also Fig.5). The engagement means 30 are lowered by the action of the actuator means 34 onto the pre-assembled components 22-23-24 and are then raised (position B5) while the whole

assemblage is displaced towards the front of the waggon 10 (see also Fig.7).

While passing from position B4 to position B5, the engagement means 30 are raised and free the pin 27 (Fig.5). The pre-assembled clip 22, washer 23 and nut 24 components are now engaged by the engagement means 30 (position B5).

The positioner unit 29 is displaced further towards the front of the waggon 10 and the engagement means 30 are lowered (position B6).

In the meanwhile, during this forward displacement of the whole positioner unit 29, the cam 39 acting on the roller 40 has displaced the support 26, so that the pin 27 is brought from A5 to A6 with a diagonal movement. In this way the pin 27 and relative support 26 do not come into contact with the position of the bolt 21, which has been deposited beforehand by the guide 17 alongside the rail 16 (see also Fig.6).

The pre-screwing operation now begins (position B1 coinciding with B6).

The whole positioner unit 29 is displaced in relation to the waggon 10 with a speed equal and contrary to the speed of the waggon 10 in relation to the rail 16 and remains clamped to the rail 16 by a gripper which is not shown here. In this way the positioner unit 29 is not moved in relation to the position of the bolt 21.

In Fig.5 the engagement means 30 are lowered progressively (from B1 to B2), so that they bring the clip 22 and washer 23 so as to be threaded onto the bolt 21, and thereafter the rotation of the headstock 32 (from B2 to B3) brings the nut 24 onto the end of the bolt 21 and screws the nut 24 onto the bolt 21 by a few turns.

The engagement means 30 are then released (position B3) by the opening of the jaws 31 and the raising of the headstock 32, which disengages the nut 24.

While the displacement from position B1 to position B2 is in progress, a new cycle takes place at the same time for the pre-positioning on the pin 27, which has passed along the corresponding positions A1, A2 and A3 and has collected a new clip 22, new washer 23 and new nut 24.

Everything is thus ready for a new cycle, which is repeated with methods identical to those detailed before in this description.

Fig.4 shows an orientation means or feeler 36, which has the function of orienting the bolt 21 properly if the latter 21 is positioned wrongly. The feeler 36 may consist, for instance, of a fork which is positioned against the bolt 21 and keeps it 21 in a vertical position for the correct lowering of the engagement means 30 and the corresponding positioning of the pre-assembled components 22-23-24 on the bolt 21.

A perfect alignment of the bolt 21 already deposited and of the components 22-23-24 is obtained in this way.

At the next forward movement of the waggon 10 (see Fig.1) clamping means 43, which may comprise, as in the figure, a clamping headstock 45 fitted to a trolley 44 and powered by suitable motor means 46 takes action. The trolley 44 can be moved suitably in the direction of forward movement of the waggon 10 so as to remain unmoved in relation to the rail and therefore to the components 21-22-23-24 to be tightened. This can be obtained with horizontal actuator means 47 consisting of a jack means or screw-threaded means, for instance.

Vertical actuator means 48 enable the clamping headstock 45 to be lowered until it 45 engages the nut 24.

Tightening is carried out by actuation of the headstock 45 by the motor means 46. Means to regulate torque, such as a clutch or like means may be included.

INDEX

10 - platelayer waggon for rails
11 - frame
12 - cab
13 - operator
14 - positioner device or trolley
15 - wheels
16 - rail
17 - guide for bolts
18 - guide for clips
19 - guide for washers
20 - guide for nuts
21 - bolt
22 - clip
23 - washer
24 - nut
25 - pre-assembly means
26 - movable support
27 - pre-assembly pin
28 - bolt positioner unit
29 - positioner unit
30 - engagement or withdrawal means
31 - jaws
32 - headstock for screwing
33 - guide column
34 - actuator means or jack
35 - closure cams
36 - orientation means or feeler
37 - motor unit
38 - side frame
39 - drive cam
40 - roller
41 - axis

42 - spring

43 - clamping means

44 - trolley

45 - clamping headstock

46 - motor means

47 - horizontal actuator means

48 - vertical actuator means.

CLAIMS

1 - Improvements to platelayer waggons (10) for rails, the platelayer waggons (10) being of a self-propelled type equipped with positioner trolley means (14) and guide means (17-18-19-20) to deposit components (21-22-23-24) for fixture, the improvements being characterized by comprising positioner unit means (29) together with means (25) to pre-assemble at least part (22-23-24) of such components before the latter are fitted.

2 - Improvements to platelayer waggons (10) for rails as claimed in Claim 1, in which the positioner unit means (29) are able to move at least axially to the platelayer waggon (10).

3 - Improvements to platelayer waggons (10) for rails as claimed in Claim 1, in which the positioner unit means (29) are able to move at least crosswise to the platelayer waggon (10).

4 - Improvements to platelayer waggons (10) for rails as claimed in any claim hereinbefore, which have the outlets of the guides (18-19-20) close to each other.

5 - Improvements to platelayer waggons (10) for rails as claimed in any claim hereinbefore, in which the pre-assembly means (25) comprise a pre-assembly pin means (27) able to move at least in a direction substantially crosswise to the rail (16).

6 - Improvements to platelayer waggons (10) for rails as claimed in Claims 1 and 5, in which the pre-assembly pin means (27) has its crosswise movement conditioned by stationary actuator cam means (39).

7 - Improvements to platelayer waggons (10) for rails as claimed in any claim hereinbefore, which comprise means (30) for momentary engagement of the pre-assembled components (22-23-24).

8 - Improvements to platelayer waggons (10) for rails as claimed in Claims 1 and 7, in which the engagement means (30) and pre-assembly pin means (27) are able to move in relation to each other crosswise to the axis of the rail (16).

9 - Improvements to platelayer waggons (10) for rails as claimed in Claims 1 and 8, in which the engagement means (30) are able to move crosswise to the axis of the rail (16).

10 - Improvements to platelayer waggons (10) for rails as claimed in Claims 1 and 8 or 1 and 9, in which the engagement means (30) comprise in cooperation:

- jaw means (31) to engage the pre-assembled components (22-23-24), and
- rotatable headstock means (32) to screw a nut (24) at least partially.

11 - Improvements to platelayer waggons (10) for rails as claimed in Claim 10, in which the opening and closure of the jaws (31) is conditioned by stationary cams (35) and coordinated with the vertical displacement of the jaws (31) themselves.

12 - Improvements to platelayer waggons (10) for rails as claimed in any claim hereinbefore, which comprise orientation means (36) to align bolts (21).

13 - Improvements to platelayer waggons (10) for rails as claimed in any claim hereinbefore, in which the pre-assembly pin means (27) cooperates with the outlets of the different guides (18-19-20) in succession (Fig.2).

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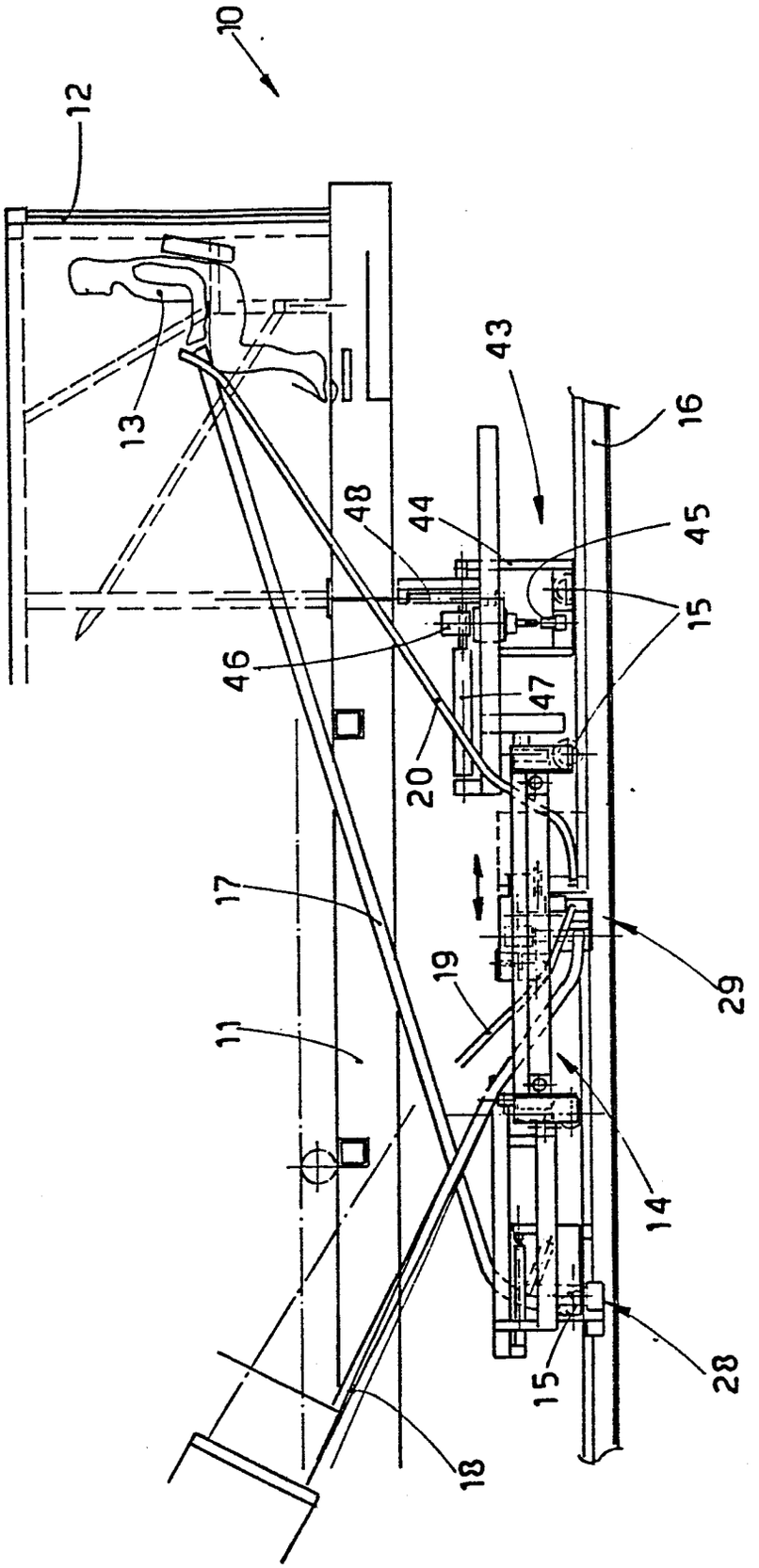

fig.1

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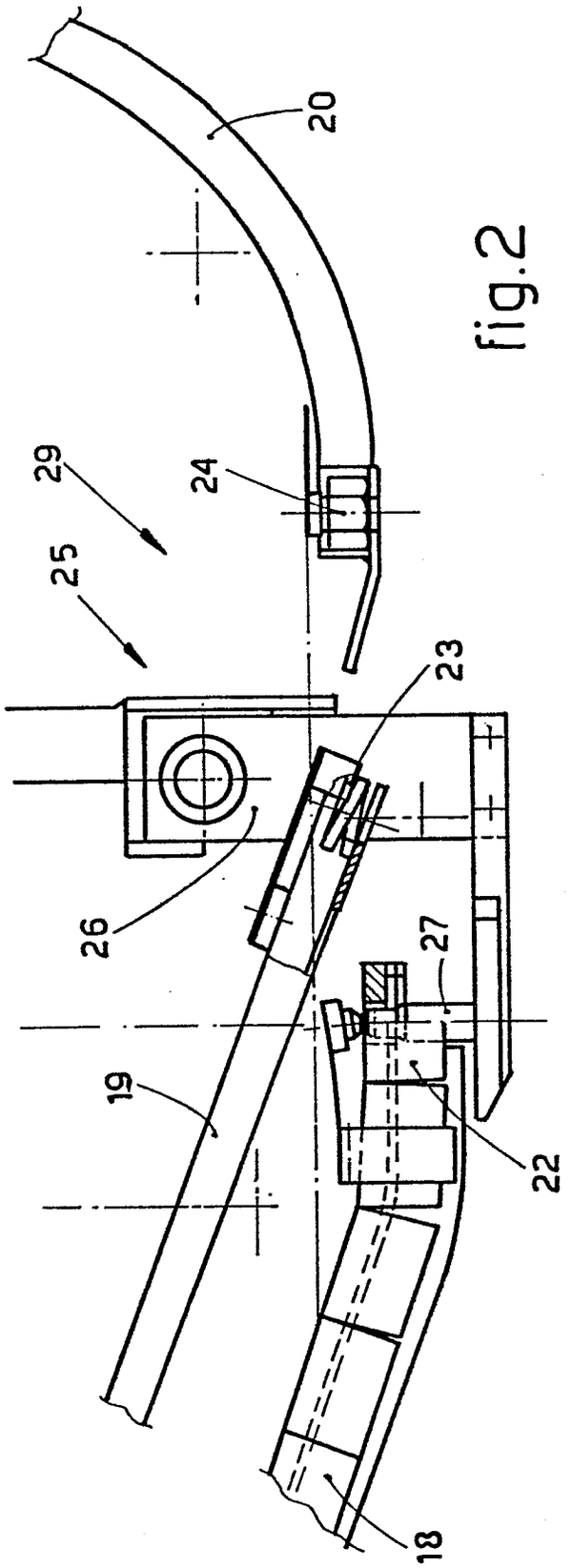

fig.2

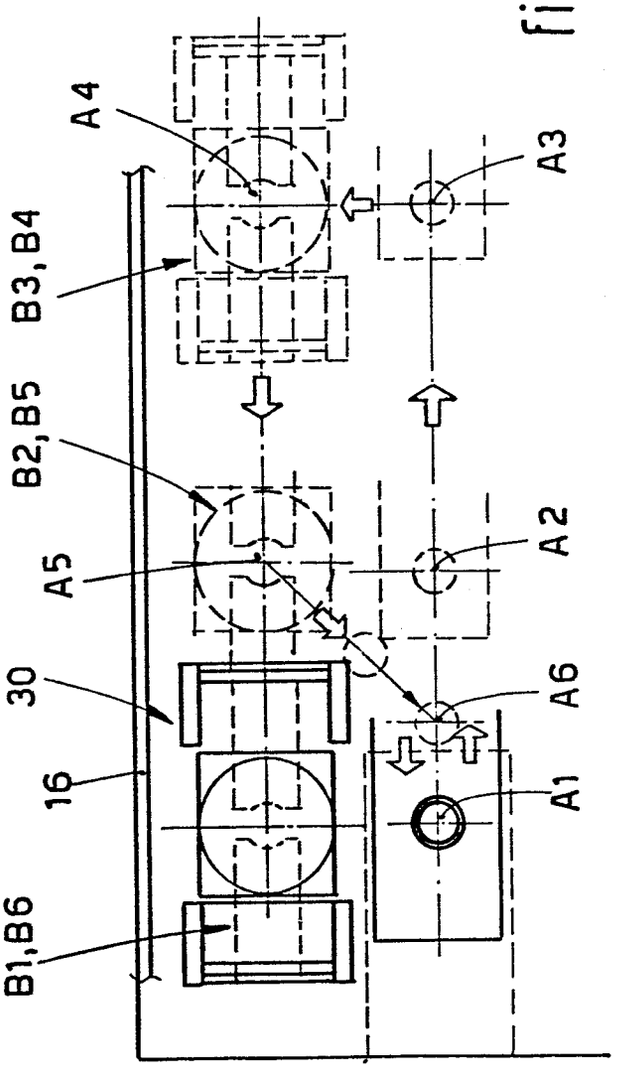

fig.7

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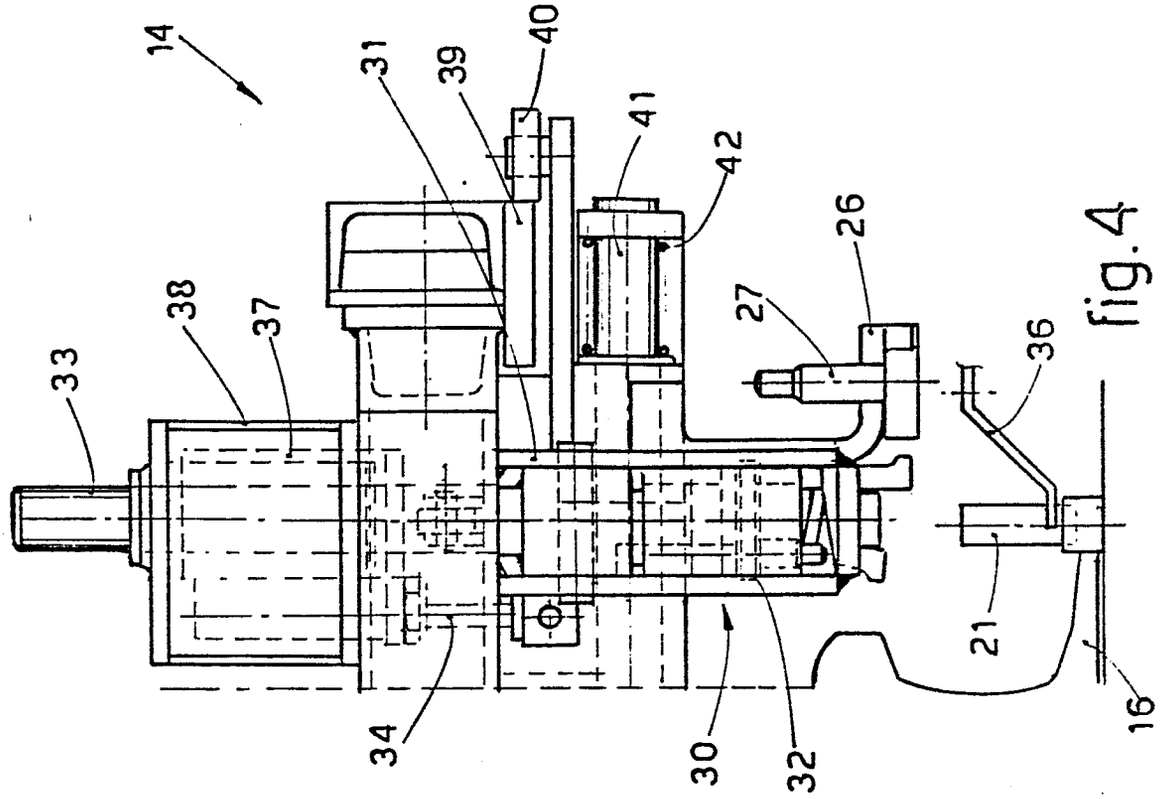

fig.4

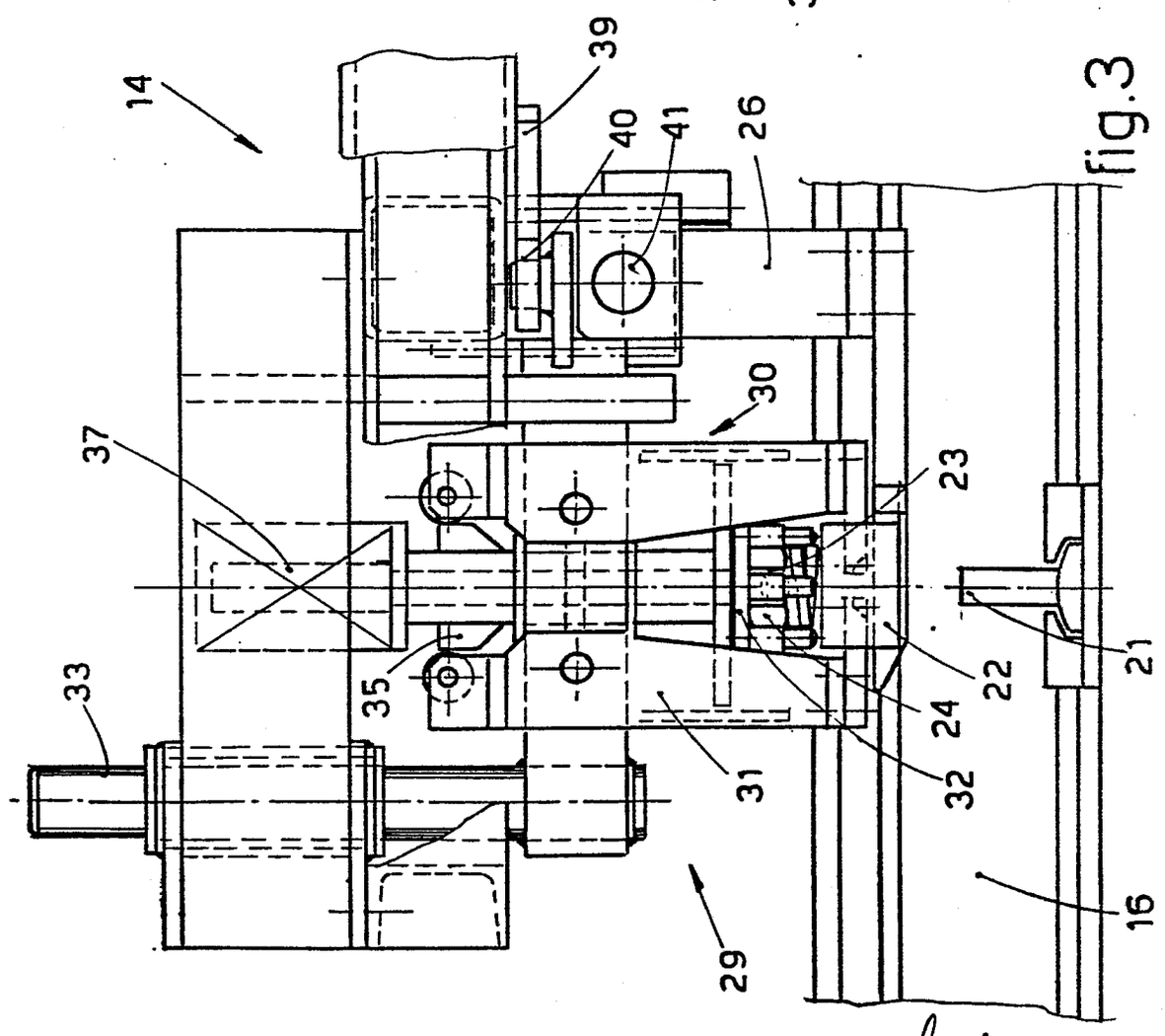

fig.3

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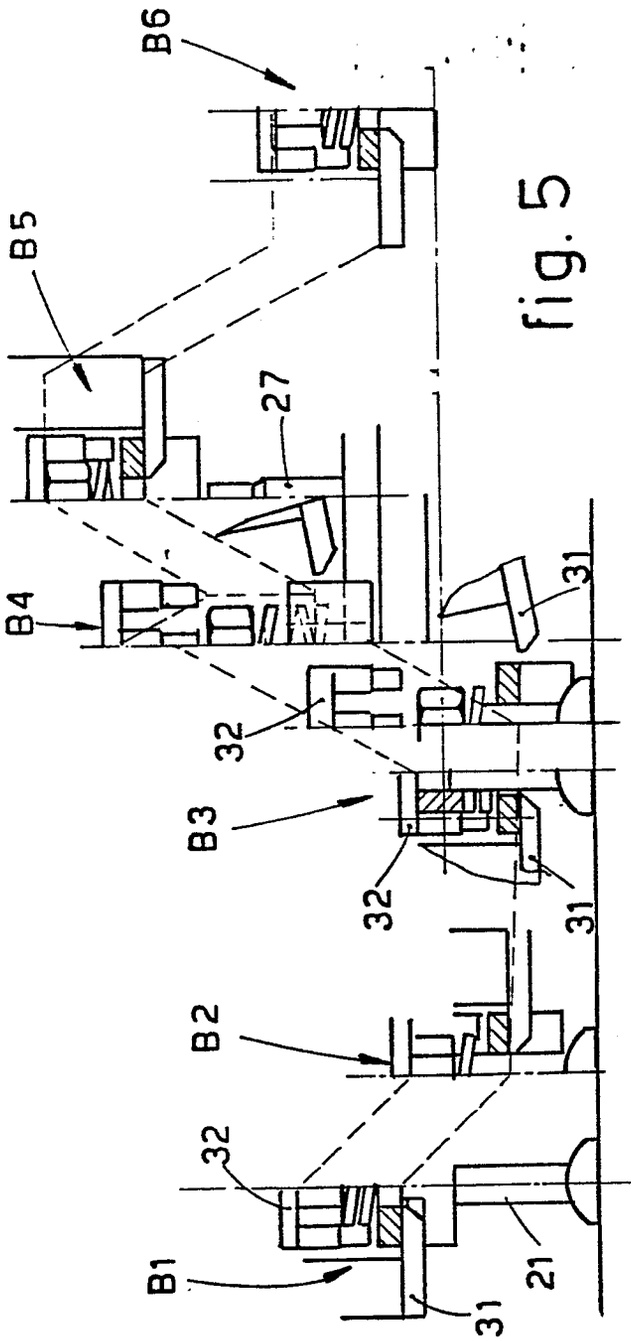

fig. 5

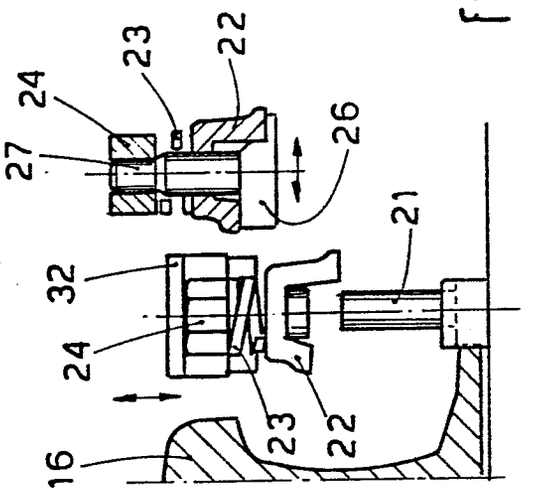

fig.6