



Europäisches Patentamt
European Patent Office
Office européen des brevets

⑪ Publication number:

0 262 697
B1

⑫

EUROPEAN PATENT SPECIFICATION

④ Date of publication of patent specification: **30.01.91**

⑤ Int. Cl.⁵: **E 01 B 29/24**

⑥ Application number: **87201458.4**

⑦ Date of filing: **31.07.87**

⑧ **Device to feed and position washers.**

③ Priority: **22.09.86 IT 8341286**

④ Date of publication of application:
06.04.88 Bulletin 88/14

⑤ Publication of the grant of the patent:
30.01.91 Bulletin 91/05

⑥ Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

⑦ References cited:
EP-A-0 149 278
FR-A-2 196 219
GB-A-1 181 815

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Courier Press, Leamington Spa, England.

EP 0 262 697 B1

Description

The present invention concerns a device to feed and position washers which is particularly suited to be fitted to systems performing the automatic or semi-automatic connection of rails to sleepers.

To be more exact, the invention tends to provide a device for the feeding and positioning of washers which is suitable for employment in systems which secure rails to sleepers.

Such washers are often suitably conformed spring washers which are placed between the clips and nuts so as to clamp the nuts when tightened, but the washers may also be conformed otherwise.

The device of the invention is fitted correctly to machines which bolt rails as described and claimed in EP 143.477, EP 149.278 and EP 153.772 and to like and analogous machines.

The device is also employed correctly where systems are being installed for use in machines bolting rails of the type indicated above.

Many problems are entailed where rails are bolted with complex machines which arrange at least for the positioning and/or prior positioning of washers.

A first problem lies in the fact that the washers have to be fed, one by one, to the neighbourhood of the bolts before being positioned on the bolts or on a unit performing prior installation or prior positioning.

Another problem is that the washers may possess wide tolerances as regards their inner and outer diameters and their height. This involves great difficulties in the guides for the washers since it is not always possible to sort the sets of washers according to their tolerances.

In particular, spring washers entail the problem that, when positioned next to each other, they tend to become caught on each other and therefore cannot be placed in a row and caused to slide along chutes or chute-type selectors since, when they touch each other, they may easily engage each other and become jammed.

Moreover, the washers have to be free to be pre-positioned properly and therefore to be taken only when they are needed for correct positioning on a bolt or on a means which is to pre-position them.

Furthermore, automatic or semi-automatic machines bolting rails to sleepers should logically deliver any washers not properly positioned or pre-positioned to the neighbourhood of the bolts with which they are to collaborate, the purpose of this being that the members of the inspection and test gang following the bolting machine will thus be able to find the washers readily and position them by hand.

To obviate all these drawbacks and obtain a plurality of advantages, which will become clear in the following description, the present applicant has studied, tested and embodied the present invention.

According to the invention the washers are positioned on their axis by being threaded from above on a pin and by being withdrawn from the

lower end of the pin. This makes it necessary for the pin to be kept constantly suspended on a movable foot which is withdrawn momentarily.

The washers can be threaded on the pin until they cover substantially the whole of its height.

When a washer is to be withdrawn from the bottom of the pin, the penultimate washer is clamped temporarily by an appropriate gripper and thus supports the whole row of washers positioned above itself.

When the gripper has clamped the penultimate washer, or simultaneously therewith, an appropriate toe is positioned against the lower end of the pin and supports the same. When the pin is supported by such toe, the foot is displaced and frees the bottom of the pin.

This enables the lowest washer, which was positioned on the foot and not clamped by the gripper, to slide on the toe to the neighbourhood of a lower slide surface of a chute.

When the lowest washer has descended on the toe, the foot returns to its previous position and supports the pin anew, while the gripper opens and lets the stack of washers fall, thus positioning the lowest washer on the foot.

With the foot now in position again, the toe descends and enables the washer resting on the lower surface of the chute to leave the toe and slide to the front part of the chute.

At the lower end of the chute a retainer spring positions the washer correctly and enables a passing bolt to be aligned with the hole of the washer and to lift by a necessary amount the resiliently supported chute.

According to the invention one device to feed and position washers is comprised for each clamping bolt (in a direction transverse to the railway line) tightened at substantially the same time by the machine described above.

According to the invention the drive systems may be provided individually for each device included or may be provided to drive at least sets of two devices able to work on the respective bolts positioned transversely to the rail.

The invention is therefore embodied with a device to feed and position washers for the connection of rails to sleepers, which is suitable to be fitted to machines or units delivering connecting and clamping components and/or to machines which bolt rails to sleepers, the device being able to deliver washers directly to bolts already installed at the sides of the rails, or to means carrying out such prior installation, or to means which pre-position connecting and clamping components, a chute being provided on which the washers can slide by gravity and which cooperates with the ends of the bolts or of means performing prior installation or prepositioning, the device being set forth and characterized in the main claim, while the dependent claims describe variants of the idea of the solution.

The attached figures, which are given as a non-restrictive example, show the following:

Fig. 1 shows a preferred formulation of the device diagrammatically;

Figs. 2a and 2b show a preferred embodiment of the end portion of the chute.

In the figures all the rotation pivots bear the reference number 15 as they all perform substantially the same function.

To make the description of Fig. 1 clearer, the drive systems of the various elements consist of jacks 16, and for the sake of clarity the positioner supports bearing the jacks have not been shown but can be readily identified by any person skilled in the art. However, such drive systems could be embodied with other means such as cams, motors or other systems used for the purpose.

Jacks 16 are thus the means most often used for drive systems for descriptive purposes but can be replaced with any mechanical equivalent which can be employed for the purpose.

A pin 12 is supported normally on a foot 17 of a lever and rests thereon. Washers 11 are threaded vertically with their holes on the pin 12 and thus enfold the pin, the lowest washer resting on the foot 17.

An alignment element 13 is provided in the neighbourhood of the upper end of the pin 12 and serves to align the washers better with the pin and to keep the pin 12 properly aligned and upright, whether the stack of washers 11 reaches the height of the alignment element 13 or is lower.

The foot 17 which supports the lower end of the pin 12 comprises at its front end a slot 18 having a width substantially smaller than the diameter of the pin 12 and is actuated by a first lever 26, which in turn is actuated by a first jack 16.

A connecting rod 23 is pivoted on the foot 17 and connects such foot to an ejector 22 which is able to sweep along the end portion of a chute 14, as we shall see later.

The washers 11 threaded on the pin 12 are normally supported, together with the pin, on the foot 17. When the lowest washer 11 is to be withdrawn, a second jack 216 is actuated and acts on a pair of second levers 28-128, which in turn act on a gripper 27-127.

The gripper 27-127 clamps at least the penultimate washer 11 on the pin 12 but leaves free the lowest washer positioned about the pin and resting on the foot 17.

When the second jack 216 has actuated the gripper 27-127, or substantially simultaneously therewith, a third jack 116 acts on a third lever 25, thus causing a toe 24 of that lever to rotate and be positioned in alignment with the pin 12, so that the pin 12 is now supported by the toe 24 and no longer by the foot 17.

When the toe 24 is supporting the pin 12, the first lever 26 is actuated by the first jack 16 and retracts the foot 17, thus freeing the pin 12 of any conditioning by the foot 17.

Now that the lower end of the pin has been freed from the foot 17, the lowest washer 11, which was resting on the foot 17, slides on and about the toe 24 until it rests about the edge of a hole 29 included in the surface 32 of the chute 14.

When the lowest washer 11 has slid until it

touches the surface 32 of the chute 14 and is positioned about the hole 29, the foot 17 is moved once more below the pin 12 while the toe is retracted, thus allowing the pin 12 to rest again on the foot 17.

The gripper 27-127 is then opened and therefore the whole stack of washers 11 previously retained by the gripper 27-127 drops until the lowest washer 11 rests on the foot 17, all the washers now being correctly positioned for the next step.

When the toe 24 is retracted from the hole 29, the washer 11 which had been threaded on that toe 24 is left free to slide on the surface 32 of the chute 14 until it reaches the lower front portion of the chute.

In the front portion of the chute the washer 11 is held by a momentary retaining means or spring 31, which positions the washer in relation to a lower slot 30.

When the feeder device in its forward movement encounters a bolt 35, on which a clip 34 is already installed to clamp the rail 33 to a sleeper, the chute 14 (Fig. 2b) is lifted slightly by the head of the bolt 35.

The head of the bolt 35 slides for a short tract against the outside of the bottom of the chute 14, being guided by lateral guides 37, and when it reaches the front lower slot 30 of the chute 14, it meets the hole in the washer 11 and introduces itself therein, while the chute 14 rises again and takes up its normal vertical position.

While the device travels along its normal path, a washer 11 which is positioned exactly on a bolt 35 is withdrawn from the device and stays positioned on that bolt 35.

If for any reason a washer 11 has been unable to detach itself from the retaining spring 31 since a bolt 35 has not been introduced properly into it or has not been introduced at all and the washer has therefore stayed on the surface 32 of the chute 14, the connecting rod 23 acts, with the next actuation of the foot 17, on the ejector 22, which is inserted into an upper slit 36 of the chute (Fig. 2b) and discharges the washer 11 by making it fall in the neighbourhood of the bolt 35.

Thus the inspection and test gang which next passes along the line will find the washer 11 in the neighbourhood of its respective bolt 35.

The chute 14 is supported resiliently by a tie rod 21 and spring 19, or other suitable means, which presses against a stationary abutment 20. This enables the chute 14 to discharge onto the bolt 25 only a limited part of its weight, the remainder being withstood by the spring 19. The chute 14 is thus able to oscillate on its pivot 15 without excessive stresses.

Claims

1. Device to feed and position washers for the connection of rails to sleepers, which is suitable to be fitted to machines or units delivering connecting and clamping components and/or to machines which bolt rails to sleepers, the device

being able to deliver washers (11) directly to bolts (35) already installed at the sides of the rails, or to means carrying out such prior installation, or to means which pre-position connecting and clamping components, a chute (14) being provided on which the washers (11) can slide by gravity and which (14) co-operates with the ends of the bolts (35) or of means performing prior installation or pre-positioning, the device being characterized in that it comprises a free pin (12) to guide the washers (11) vertically, the pin (12) being supported momentarily and alternately by a movable foot (17) of a lever and by a toe (24) of another lever, the toe (24) being able to move vertically through the chute (14), and comprises also a gripper (27-127) which clamps momentarily the penultimate lowest washer (11) so that when the pin (12) is supported by the toe (24) the movable foot (17) is withdrawn so that the lowest washer (11) is free to slide axially downwards on the toe (24) to a slide surface of the chute (14), and when the toe (24) is retracted the washer (11) which had been threaded on the toe (24) is left free to slide on the slide surface of the chute (14) to the lower front portion of the chute (14).

2. Device as claimed in Claim 1, in which the toe (24) co-operates with a hole (29) comprised in the surface (32) of the chute (14) below the pin (12).

3. Device as claimed in any claim hereinbefore, in which the toe (24) supports the pin (12) at about the transient period of the clamping of a washer (11) by the gripper (27-127).

4. Device as claimed in any claim hereinbefore, in which an alignment means (13) which enfolds the pin (12) at least partially is included in a high position on the pin.

5. Device as claimed in any claim hereinbefore, in which the chute (14) contains at its end a lower slot (30) and a retaining spring (31) to position washers (11).

6. Device as claimed in any claim hereinbefore, in which the chute (14) contains at its end an upper slit (36) which co-operates with an ejector (22).

7. Device as claimed in any claim hereinbefore, in which the ejector (22) is conditioned according to the movement of displacement of the foot (17).

8. Device as claimed in any claim hereinbefore, in which the chute (14) is pivoted (15) and supported resiliently (19-21).

9. Device as claimed in any claim hereinbefore, in which the foot (17) comprises at its front end a slot (18) having a width substantially smaller than the diameter of the pin (12) and able to co-operate with the toe (24).

10. Device as claimed in any claim hereinbefore, in which the chute (14) comprises on its lower side guides (37) which condition the transverse position of the bolt (35).

Patentansprüche

1. Vorrichtung zum Zuführen und Ausrichten von Scheiben für die Befestigung von Schienen an Schwellen, die an Maschinen oder Einheiten

angebracht werden kann, die Verbindungs- und Klemmteile zuführen, und/oder an Maschinen, die Schienen mit Schwellen verschrauben, wobei die Vorrichtung Scheiben (11) direkt zu bereits an den Seiten der Schienen eingebauten Bolzen (35) führen kann, oder zu Mitteln, die einen solchen vorgehenden Einbau durchführen, oder zu Mitteln, die Verbindungs- und Klemmteile vorbereitend ausrichten, wobei eine Rutsche (14) vorgesehen ist, in der die Scheiben (11) zufolge der Schwerkraft gleiten können, und die mit den Enden der Bolzen (35) oder der Mittel, welche den vorgehenden Einbau oder das vorbereitende Ausrichten durchführen, zusammenwirken, und die Vorrichtung dadurch gekennzeichnet ist, daß sie einen freien Zapfen (12) zur vertikalen Führung der Scheiben (11) aufweist, der Zapfen (12) vorübergehend und abwechselnd von einem bewegbaren Fuß (17) eines Hebels und von einem Finger (24) eines anderen Hebels abgestützt wird und sich der Finger (24) in vertikaler Richtung durch die Rutsche (14) bewegen kann, und daß sie weiters einen Greifer (27-127) besitzt, der vorübergehend die letzte, unterste Scheibe (11) erfaßt, sodaß, falls der Zapfen (12) von dem Finger (24) abgestützt ist, der bewegbare Fuß (17) zurückgezogen wird, damit die unterste Scheibe (11) frei ist und axial auf dem Finger (24) bis zu einer Gleitfläche der Rutsche (14) gleiten kann und, falls der Finger (24) zurückgezogen wird, die Scheibe (11), die auf dem Finger (24) aufgefädelt war, freigegeben wird, um auf der Gleitfläche der Rutsche (14) zu dem unteren Vorderabschnitt der Rutsche (14) zu gleiten.

2. Vorrichtung nach Anspruch 1, bei welcher der Finger (24) mit einer Öffnung (29) zusammenwirkt, die in der Oberfläche (32) der Rutsche (14) unterhalb des Zapfens (12) ausgebildet ist.

3. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher der Finger (24) den Zapfen (12) etwa während des Übergangszeitraumes des Erfassens einer Scheibe (11) durch den Greifer (27-127) abstützt.

4. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher an einer höheren Stelle am Zapfen ein Ausrichtmittel (13) vorgesehen ist, welches den Zapfen (12) zumindest teilweise umgibt.

5. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher die Rutsche (14) an ihrem Ende einen unteren Schlitz (30) sowie eine Rückhaltefeder (31) zum Ausrichten der Scheiben (11) besitzt.

6. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher die Rutsche (14) an ihrem Ende einen oberen Schlitz (36) besitzt, der mit einem Ausstoßer (22) zusammenwirkt.

7. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher der Ausstoßer (22) entsprechend der Versetzungsbewegung des Fußes (17) gesteuert ist.

8. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher die Rutsche (14) schwenkbar gelagert und federnd (19-21) abgestützt ist.

9. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher der Fuß an seinem Vorderende einen Schlitz (18) besitzt, dessen Breite wesentlich kleiner als der Durchmesser des Zapfens (12) ist, und der mit dem Finger (24) zusammenwirken kann.

10. Vorrichtung nach irgendeinem der vorgehenden Ansprüche, bei welcher die Rutsche (14) an ihrer Unterseite Führungen (37) besitzt, welche die Querausrichtung des Bolzen (35) vorbereiten.

Revendications

1. Appareil permettant l'alimentation et le positionnement des rondelles pour la fixation des rails aux traverses, convenant pour un montage sur des machines ou unités destinées à distribuer des composantes de raccordement et de fixation et/ou sur des machines destinées à boulonner les rails aux traverses, l'appareil étant à même de distribuer les rondelles (11) directement au niveau des boulons (35) préalablement installés sur les côtés des rails, au niveau des instruments réalisant cette pré-installation, ou au niveau des instruments qui pré-positionnent les composantes de raccordement et de fixation, une goulotte (14) étant prévue sur laquelle les rondelles (11) peuvent glisser par gravité et qui (14) coopère avec les extrémités des boulons (35) ou des instruments réalisant la pré-installation ou le pré-positionnement, l'appareil étant caractérisé en ce qu'il comprend une broche libre (12) permettant de guider les rondelles (11) verticalement, la broche (12) étant soutenue momentanément et alternativement par un pied mobile (17) d'un levier et par un ergot (24) d'un autre levier, l'ergot (24) étant à même de se déplacer verticalement à travers la goulotte (14), et comprend également une pince (27-127) qui fixe momentanément l'avant-dernière rondelle inférieure (11) de manière à ce que, lorsque la broche (12) est soutenue par l'ergot (24), le pied mobile (17) soit retiré afin que la rondelle inférieure (11) soit libre de glisser axialement vers le bas sur l'ergot (24) en direction d'une glissière de la goulotte (14), et lorsque l'ergot (24) est escamoté, la rondelle (11) qui avait

été enfilée sur l'ergot (24) soit libre de glisser sur la glissière de la goulotte (14) jusqu'à la partie avant inférieure de la goulotte (14).

2. Appareil selon la revendication 1, dans lequel l'ergot (24) coopère avec une perforation (29) prévue dans la surface (32) de la goulotte (14) sous la broche (12).

3. Appareil selon l'une quelconque des revendications précédentes, dans lequel l'ergot (24) soutient la broche (12) durant la période transitoire de la rétention d'une rondelle (11) par la pince (27-127).

4. Appareil selon l'une quelconque des revendications précédentes, dans lequel un instrument d'alignement (13) enveloppant la broche (12) au moins partiellement est inclus dans une position élevée sur la broche.

5. Appareil selon l'une quelconque des revendications précédentes, dans lequel la goulotte (14) contient à son extrémité une encoche inférieure (30) et un ressort de retenue (31) destinés à positionner les rondelles (11).

6. Appareil selon l'une quelconque des revendications précédentes, dans lequel la goulotte (14) contient à son extrémité une encoche supérieure (36) coopérant avec un éjecteur (22).

7. Appareil selon l'une quelconque des revendications précédentes, dans lequel l'éjecteur (22) est conditionné conformément au mouvement de déplacement du pied (17).

8. Appareil selon l'une quelconque des revendications précédentes, dans lequel la goulotte (14) est articulée (15) et soutenue d'une manière résiliente (19-21).

9. Appareil selon l'une quelconque des revendications précédentes, dans lequel le pied (17) comprend à son extrémité avant une encoche (18) présentant une largeur largement inférieure au diamètre de la broche (12) et capable de coopérer avec l'ergot (24).

10. Appareil selon l'une quelconque des revendications précédentes, dans lequel la goulotte (14) comprend sur sa face inférieure des guides (37) conditionnant la position transversale du boulon (35).



