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

(11) Publication number: **0 113 515**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **83307056.8**

(22) Date of filing: **18.11.83**

(51) Int. Cl.³: **E 01 B 7/22**
E 01 B 7/02

(30) Priority: **02.12.82 GB 8234448**

(43) Date of publication of application:
18.07.84 Bulletin 84/29

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

(71) Applicant: **THOS. W. WARD (RAILWAY ENGINEERS) LTD**
Midland Foundry Osmaston Street
Sandiacre Nottingham NG10 5AN(GB)

(72) Inventor: **Brown, Stanley Herbert**
286 College Street
Long Eaton Nottingham(GB)

(72) Inventor: **Compton, Kenneth William**
31 The Paddocks
Sandiacre Nottingham(GB)

(72) Inventor: **Dawkins, Albert William**
34 The Orchard North Holmwood
Dorking Surrey(GB)

(74) Representative: **Orr, William McLean et al,**
Haseltine Lake & Co Hazlitt House 28 Southampton Buildings Chancery Lane
London WC2A 1AT(GB)

(54) **Slide plate arrangement for railway switch rail.**

(57) A slide plate (10) is secured to a base plate (11) on which a stock rail (12) is mounted, the slide plate serving to guide the slidable movement of a switch rail between opened and closed positions of a railway switch arrangement. A spring clip arrangement is engageable with the slide plate (10) and with the bottom flange (15) of the stock rail (12) in order to hold down the stock rail onto the base plate (11). The slide plate (10) comprises a first part (19) which is secured to the base plate (11) and a second part (20) which is removably engageable with the first part (19) so as to form therewith a joint slide surface for a switch rail. The second part (20) extends over an inner edge (18) of the bottom flange (15) of the stock rail to permit sliding movement of a switch rail up to the stock rail. The spring clip arrangement is engageable with the first and second parts (19,20) of the slide plate so as to maintain these parts in engagement with each other, and the spring clip arragement is also engageable downwardly onto the bottom flange (15) of the stock rail to locate the latter on the base plate (11). The second part (20) is removable from engagement with the first part (19) (upon disengagement of the spring clip arrangement) in order to free the inner edge (18) of the bottom flange (15) of the stock rail (12) to facilitate straight-lifting of the stock rail.

EP 0 113 515 A1

./...

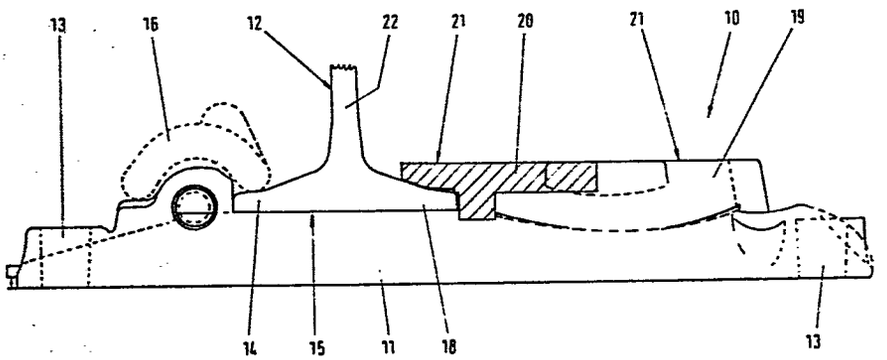


FIG. 2

Slide plate arrangement for railway switch rail

This invention relates to a slide plate arrangement for a railway switch rail, the arrangement comprising a slide plate secured to a base plate on which a stock rail can be mounted and serving to guide the slidable movement of a switch rail between open and closed positions of a railway switch or points arrangement.

It is known to provide slide plates, in the form of so-called "slide chairs" or base plate, which comprise a slide plate secured to the upper surface of a base plate which is anchored to a railway sleeper and onto which a stock rail is mounted. The bottom flange of the stock rail is held-down, in well known manner, along its outer edge (with respect to the track) by rail clips which engage downwardly onto the flange and which are received by clip housings formed in the base plate. The bottom flange is also held-down , along its inner edge, by a spring clip which is taken through a clip housing formed in the slide plate so as to engage with, and to apply downward pressure upon the flange of the stock rail. The upper surface of the slide plate extendsto a position closely adjacent to the web of the stock rail , and over the bottom flange, and serves to guide the slidable movement of the switch rail towards and away from the stock rail during a points-change operation.

In one known construction, a special tool is required to fit the spring clip in the clip housing of the slide plate during a rail-fastening operation, and to disengage the spring clip from the stock rail , both such operations involving manual manipulation of the special tool. In another known construction, a special tool is required which is driven by a hammer so as to

urge the spring clip through the housing in the slide plate and into downward engagement with the bottom flange of the stock rail.

In both of the known constructions, there are two disadvantages. First of all, the slide plate is secured to the base plate (in that it is usually formed integrally therewith), and extends over the inside edge of the bottom flange of the stock rail, and problems are encountered during track maintenance and repair operations, when the stock rail requires to be lifted, since the stock rail must first be twisted about its longitudinal axis in order to be freed from engagement with the slide plate, even when the spring clip has been removed. Bearing in mind the length and weight of a stock rail, the necessary manipulation of the stock rail is not easy, especially as there will usually be a number of slide plates associated with each stock rail in a railway switch arrangement.

Accordingly, there exists a need to develop a slide plate arrangement which can be readily disengaged from the stock rail and which can allow the stock rail to be raised in a "straight lift" from the base plate without any prior twisting-manipulation of the rail.

The second disadvantage of the known construction is that the strength of the slide plate is reduced by the necessary formation, in the slide plate, of the clip housing through which the spring clip is taken. This reduction in strength means that the remainder of the plate has to be made thicker than would be the case if the slide plate did not have a clip housing formed therein.

According to the invention there is provided a slide plate arrangement for a railway switch rail, the arrangement comprising a slide plate secured to a base plate on which a stock rail can be mounted and serving to

guide the slidable movement of a switch rail between open and closed positions of a railway switch arrangement, and a spring clip arrangement which is engageable with the slide plate and with an edge of the bottom flange of a stock rail in order to hold-down the stock rail onto the base plate, in which:

the slide plate comprises a first part which is secured to the base plate and a second part which is removably engageable with the first part so as to form therewith a joint slide surface for a switch rail, the second part extending in use , when engaged with the first part, over an inner edge of the bottom flange of the stock rail when the latter is mounted on the base plate;

and the spring clip arrangement is engageable with the first and second parts of the slide plate, and with the bottom flange of the stock rail, so as to maintain the first and second parts in engagement with each other, the second part being removable from engagement with the first part in order to free the adjacent edge of the bottom flange of the stock rail to facilitate lifting of the latter upon disengagment of the spring clip arrangement from the parts of the slide plate and from the stock rail.

Preferably, the engagement of the spring clip arrangement with the first and second parts of the slide plate does not involve the formation of a housing or through-passage for the spring clip arrangement in the parts of the slide plate , but is provided by an (external) engagement with projecting elements of the first and second parts.

In one preferred arrangement, the spring clip arrangement comprises a U-shaped spring having each limb thereof taken successively under a respective projecting lug of the first part and over a respective projecting lug of the second part, before it engages with its free

end downwardly onto the bottom flange of the stock rail. This arrangement avoids the weakening of the parts of the slide plate, as in the known arrangements having spring clip housings formed therein.

The base of the U-shaped spring clip moves to snap-fitting engagement with a seating provided in the first part of the slide plate, as the clip moves to its fastening position.

In another arrangement, the spring clip arrangement is provided by a pair of clip pins which are individually driven to the rail-fastening position , each engaging with the projecting elements of the parts of the slide plate in similar manner to the limbs of the (single) U-shaped clip referred to above.

The second part of the slide plate is preferably formed of a high strength material, such as ductile iron made to British Standard 2789 Grade SNG 27/12. However, other high strength materials may be used , as desired.

In order to avoid the necessity for routine inspection and lubrication of the slide plate arrangement to be carried out, either one or both parts of the slide plate may be provided with a substantially self-lubricating arrangement. This may comprise the provision of a very low friction sliding surface e.g. by means of a low friction plastics coating. Alternatively, the sliding surface of the first and/or the second part of the slide plate may incorporate a separate low friction wear element. This wear element can be made relatively cheaply, as compared with the slide plate (so that replacement of a worn element will be much cheaper than replacement of a worn slide plate), and is arranged to bear the greater part of the frictional load as the switch rail is moved between its switched positions.

In one preferred arrangement, the wear element is made of low friction material, such as a block made of,

or incorporating a sliding surface of low friction plastics material. The block is received in a mounting recess formed in the surface of the slide plate which faces, in use, the underside of the switch rail.

Preferably, some form of resilient biasing is provided which raises the sliding surface of the wear block above the surface of the slide plate, though the block will be pressed downwardly against this biasing under the weight of the switch rail.

The wear element may be arranged on the slide plate and resiliently biased in such a way that the switch rail makes little or no frictional engagement with the upper surface of the slide plate proper, as it moves between its switched positions. Alternatively, the wear element may yield progressively as the switch rail moves towards the stock rail, so that the switch rail is finally deposited on the slide plate proper at the end of its movement to the switched position.

The invention also includes the application of a wear element, in any one or more of its constructions referred to above, in other constructions of slide plate arrangement e.g. in the known unitary constructions of slide plate.

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of a slide plate arrangement according to the invention for a railway switch rail;

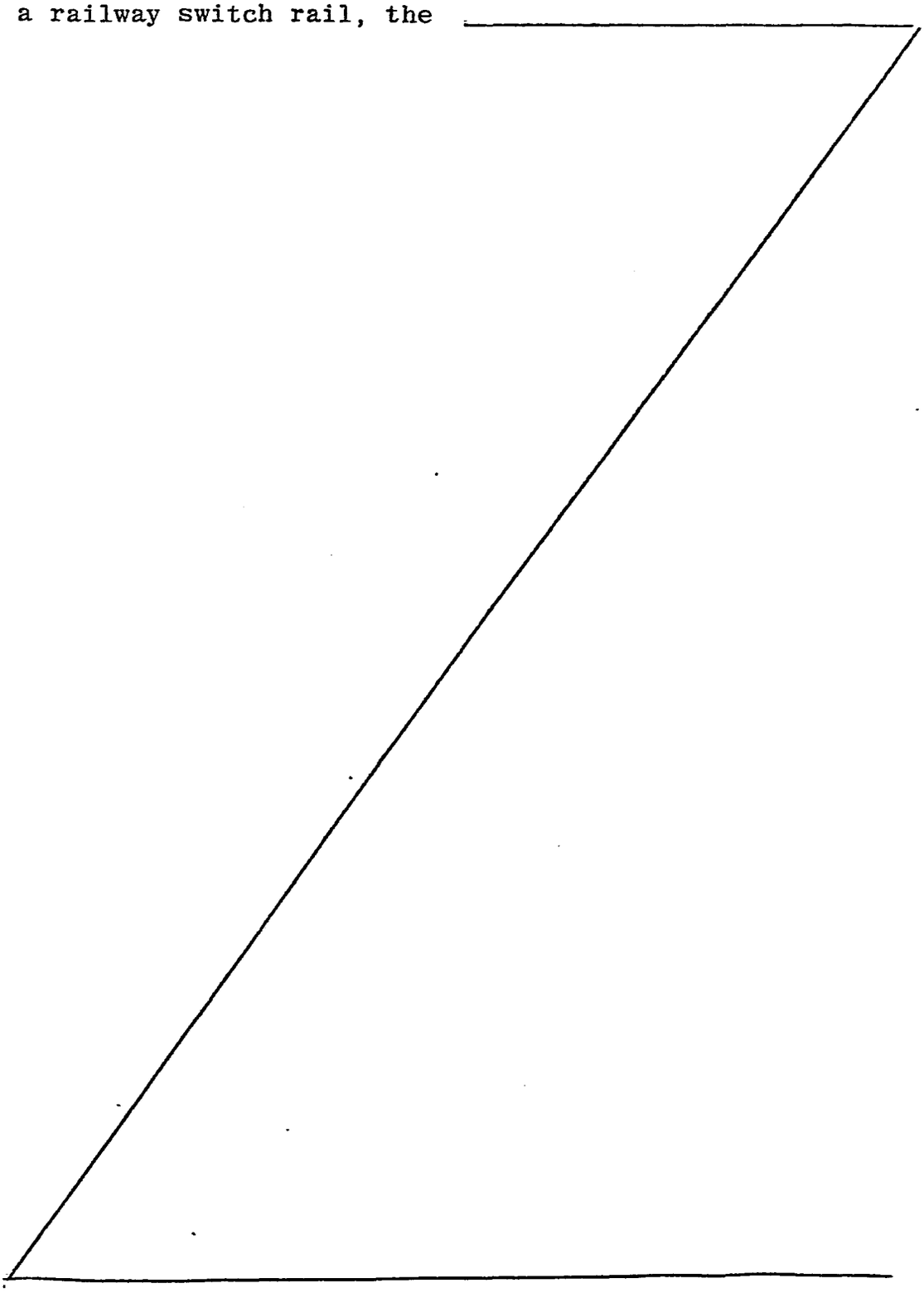
Figure 2 is a longitudinal vertical sectional view of the slide plate arrangement, taken in a direction perpendicular to the direction of a stock rail mounted on a base plate of the arrangement;

Figure 3 is a plan view of an alternative slide plate arrangement according to the invention; and

Figure 4 is a longitudinal vertical sectional

view, similar to Figure 2, of the alternative arrangement.

Referring now to Figures 1 and 2 of the drawings, there is shown a slide plate arrangement for a railway switch rail, the



arrangement comprising a slide plate which is designated generally by reference numeral 10 and which is secured to a base plate 11 on which a stock rail 12 can be mounted. The slide plate 10 serves to guide the slidable movement of a switch rail (not shown) between open and closed positions of a railway switch or points arrangement, with respect to the stock rail 12.

The base plate 11 is anchored to a sleeper (not shown) in any convenient manner, such as fasteners taken downwardly through four holes 13 provided one at each corner of the base plate 11. The stock rail 12 is held-down, along the outer edge 14 of its bottom flange 15, by a pair of rail clips 16 which engage downwardly onto the upper surface of edge 14 and which are received in rail clip housings 17 provided in the base plate 11.

The bottom flange 15 of the stock rail 12 is further held-down, by downward engagement of the slide plate arrangement with the upper surface of its inside edge 18 (with respect to the track). A spring clip arrangement (not shown) is provided which engages with the slide plate 10 and with the upper surface of the edge 18 in order to further hold-down the bottom flange 15 of the stock rail 12 on the base plate 11.

The slide plate 10 comprises a first part 19 which is permanently secured to the base plate 11 in any convenient manner e.g. by being formed integrally therewith. The slide plate 10 also comprises a second part 20 which is removably engaged with the first part 19 so as to form therewith a joint sliding surface 21 along which the under side of a switch rail is movable between its switched positions. As will be seen from Figure 2, the second part 20 extends, when engaged with the first part 19, towards the web 22 of the stock rail 12 so as to overlie the inner edge 18 of the bottom flange 15.

The spring clip arrangement, in one embodiment, comprises a U-shaped clip which engages with the first and second parts 19, 20 of the slide plate 10, and with the upper surface of the edge 18 of bottom flange 15 of the stock rail 12, so as to maintain the first and second parts 19,20 of the slide plate in engagement with each other. However, the second part 20 can be removed from engagement with the first part 19 in order to free the adjacent edge 18 of the bottom flange 15 of the stock rail , to facilitate lifting of the latter in a "straight-lift". i.e. without any prior twisting of the stock rail about its longitudinal axis, upon disengagement of the spring clip arrangement from the parts 19, 20 of the slide plate 10 and from the stock rail 12.

The engagement of the spring clip arrangement with the first and second parts 19,20 of the slide plate does not involve the formation of a housing or through-passage for the spring clip arrangement in the parts of the slide plate, but is provided by an external type engagement with projecting elements of the first and second parts. Thus, the U-shaped spring clip has each limb thereof taken successively under a respective laterally projecting lug 23 of the first part 19 and over a respective laterally projecting lug 24 of the second part 19 before it engages with its free end downwardly onto the upper surface of inside edge 18 of the bottom flange 15 of the stock rail. This external type of engagement between the spring clip arrangement and the slide plate 10 avoids any weakening of the parts of the slide plate, as in the known arrangements having spring clip housings formed therein.

The base of the U-shaped spring clip moves to snap-fitting engagement with a U-shaped (as seen in plan) seating 25 provided at the right-hand end of the first part 19. The spring clip is maintained in position, once

the free ends of the pair of limbs of the clip have moved to engagement with the bottom flange of the stock rail.

In another arrangement, the spring clip arrangement is provided by a pair of clip pins (not shown) which are individually driven to the rail-fastening position, each engaging with the projecting elements of the parts 19 and 20 of the slide plate 10, in similar manner to the limbs of the unitary construction of U-shaped clip referred to above.

The base plate 11 may be formed in any suitable material , preferably any of the conventional materials used in railway switch arrangements e.g. cast iron. The first part 19 of the slide plate 10 will preferably be fabricated at the same time as the base plate 11, but the second part 20 of the slide plate is formed as a removable component which is fabricated separately. The part 20 is preferably fabricated from high strength material, such as ductile iron made to British Standard 2789 Grade SNG 27/12.

In order to avoid the necessity for routine inspection and lubrication of the slide plate arrangement to be carried out, either one or both of the parts 19,20 of the slide plate may be provided with a substantially self-lubricating arrangement. This may comprise the provision of a very low friction sliding surface e.g. by means of a low friction plastics coating. Alternatively, the sliding surface of the first part 19 and/or the second part 20 of the slide plate may incorporate a separate low friction wear element. This wear element can be made relatively cheaply, compared with the slide plate, and is arranged to bear the greater part of the frictional load as the switch rail is moved between its switched positions.

The wear element (not shown) may be made of low friction material, such as a block made of, or incorporating

a sliding surface of low friction plastics material, which is received in a mounting recess formed in the surface of the slide plate which faces, in use, the underside of the switch rail.

If desired, some form of resilient biasing may be provided which raises the sliding surface of the wear block above the surface of the slide plate, though the block will be pressed downwardly against this biasing under the weight of the switch rail.

The wear element may be arranged on the slide plate and resiliently biased in such a way that the switch rail makes little or no frictional engagement with the upper surface of the slide plate proper, as it moves between its switched positions. Alternatively, the wear element may be arranged to yield progressively as the switch rail moves towards the stock rail , so that the switch rail is finally deposited on the slide plate proper at the end of its movement to the switched position.

In another aspect of the present invention, a wear element, in any one or more of its constructions referred to above, may be provided in other constructions of slide plate arrangement, including the known unitary constructions of slide plate referred to in the introduction to the specification..

The construction of slide plate arrangement described above with reference to the drawings provides an easy-to-assemble construction, which is also easy to disassemble and enables the stock rail to be lifted easily during track maintenance and repair operations. This is a significant technical advantage over the known constructions, in which prior pivoting of the stock rail about its longitudinal axis is necessary before it can become freed from the parts of the known slide plate arrangements which overlie the bottom flange of the stock rail. The construction , as illustrated in the

drawings, also avoids the necessity to weaken the slide plate by formation of any spring clip housing in the slide plate, as in the known constructions.

An alternative arrangement of slide plate is shown in Figures 3 and 4, which is designed for use with a pair of separate spring clip pins, rather than the U-shaped clip for which the arrangement of Figures 1 and 2 has been designed. Parts corresponding with Figures 1 and 2 are designated by the same reference numerals, and will not be described in detail again.

In this alternative arrangement, the construction of the second part 20 remains substantially the same. However, the first part (19a) is slightly modified so as to receive individual clip pins, and to retain such pins in position after being driven to latching engagement with the parts 20 (by bearing down onto the lugs 24). Therefore, clip passages 26 are defined under lateral projections 27 of the first part 19a, each of which receives a respective clip pin (not shown). Each clip pin is driven over the respective lug 24 until it engages downwardly onto the upper surface of the edge 18 of the flange 15 of the rail 12. The clip exerts downward pressure onto the lug 24 to retain the second part 20 in engagement with the first part 19a, and adjacent to the edge of the bottom flange of the stock rail.

Each clip is retained in its driven position by its inherent resilience, reacting between the roof of the passage 26, the lug 24 and the upper surface of the bottom flange of the rail.

It is preferred that any of the spring clip arrangements should engage downwardly with their free ends onto the bottom flange 15 of the stock rail 12. This then enables the second part 20 to be primarily concerned with functioning as a slide on which a switch rail can be

moved up to the stock rail. The second part 20 need not be arranged to provide any significant downward holding action on the bottom flange of the stock rail. Indeed, it is preferred that the second part should exert no downward action, or only minimal downward action, on the bottom flange of the stock rail, so that no appreciable stresses can be generated in the second part via the stock rail.

However, evidently the slide plate arrangement described herein may be modified, if desired, so that the second part of the slide plate does, in fact, exert appreciable downward locating action on the bottom flange of the stock rail, to supplement the downward action provided by the spring clip arrangement. Indeed, it is within the scope of the invention for the slide plate and the spring clip arrangement to be modified in such a way that the spring clip arrangement exerts downward action only onto the second part 20 of the slide plate, and the second part 20 applies the necessary downward locating action onto the bottom flange 15 of the stock rail.

CLAIMS

1. A slide plate arrangement for a railway switch rail, the arrangement comprising a slide plate (10) secured to a base plate (11) on which a stock rail (12) can be mounted and serving to guide the slidable movement of a switch rail between open and closed positions of a railway switch arrangement, and a spring clip arrangement which is engageable with the slide plate (10) and with the bottom flange (15) of the stock rail (12) in order to hold-down the stock rail onto the base plate (11):

characterised in that the slide plate (10) comprises a first part (19) which is secured to the base plate (11) and a second part (20) which is removably engageable with the first part (19) so as to form therewith a joint slide surface for a switch rail, the second part (20) extending in use, when engaged with the first part, over an inner edge (18) of the bottom flange (15) of the stock rail (12) to permit sliding movement of a switch rail up to the stock rail ;

and in that the spring clip arrangement is engageable with the first and second parts (19,20) of the slide plate so as to maintain the first and second parts in engagement with each other, and also is engageable downwardly onto the bottom flange (15) of the stock rail, the second part (20) being removable from engagement with the first part (19) in order to free the inner edge (18) of the bottom flange (15) of the stock rail (12) to facilitate lifting of the latter upon disengagement of the spring clip arrangement from the parts (19,20) of the stock rail.

2. A slide plate arrangement according to claim 1, characterised in that the spring clip arrangement engages downwardly onto the inner edge (18) of the bottom flange (15) of the stock rail (12) after it is driven to engagement with the first and second parts (19,20) of the slide plate.

3. A slide plate arrangement according to claim 1 or 2, characterised in that the spring clip arrangement is engageable with projecting elements (23,24) of the first and second parts (19,20).

4. A slide plate arrangement according to claim 3, characterised in that the spring clip arrangement comprises a U-shaped spring having each limb taken successively under a respective projecting lug (23) of the first part (19) and over a respective projecting lug (24) of the second part (20), before it engages with its free end downwardly onto the bottom flange (15) of the stock rail.

5. A slide plate arrangement according to claim 4, characterised in that the U-shaped spring clip is movable to snap-fitting engagement with a seating (25) provided on the first part (19) of the slide plate , as the clip moves to its fastening position.

6. A slide plate arrangement according to claim 3, characterised in that the spring clip arrangement comprises a pair of clip pins which are individually driven to the rail-fastening position, each pin being taken successively under a respective projecting lug (23,27) of the first part (19,19a) and over a respective lug (24) of the second part (20), before engaging with its free end downwardly onto the bottom flange (15) of the stock rail.

7. A slide plate arrangement according to any one of the preceding claims, characterised in that at least one of the first and second parts (19,20) is provided with a self-lubricating arrangement.

8. A slide plate arrangement according to claim 7, characterised in that the self-lubricating arrangement comprises a low friction plastics coating.

9. A slide plate arrangement according to claim 7, characterised in that the self-lubricating arrangement

comprises a removable wear element housed in the upper surface of the first and/or second parts (19,20).

10. A slide plate arrangement according to claim 9, characterised in that the removable wear element is resiliently mounted in the upper surface of the first and/or second parts (19,20).

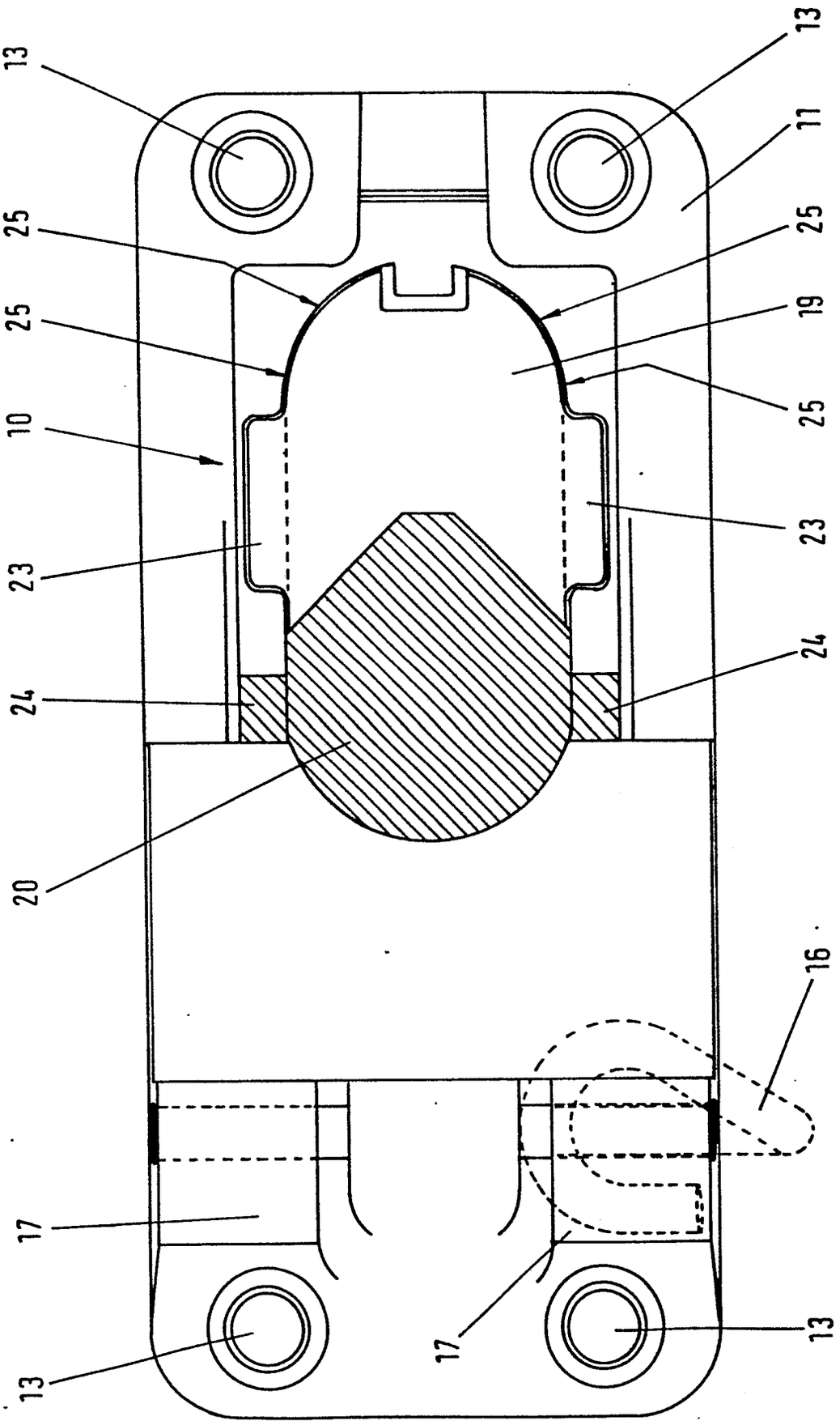


FIG. 1

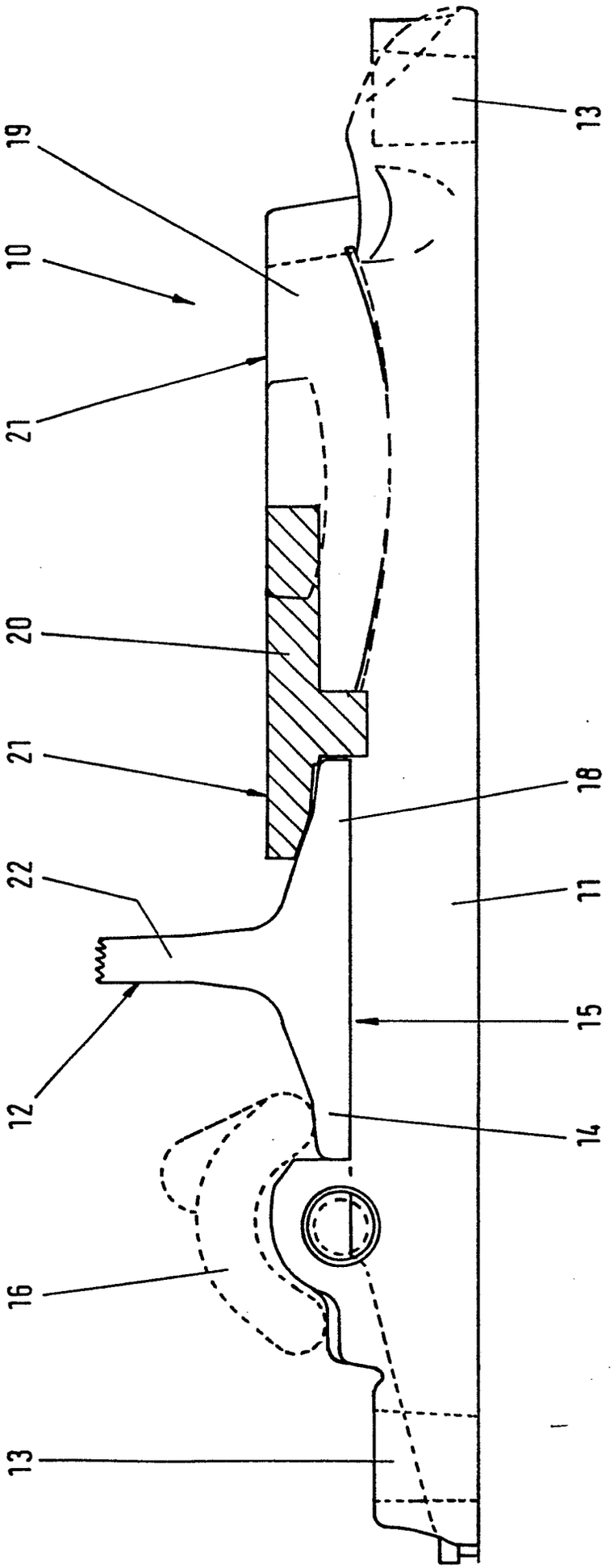


FIG. 2

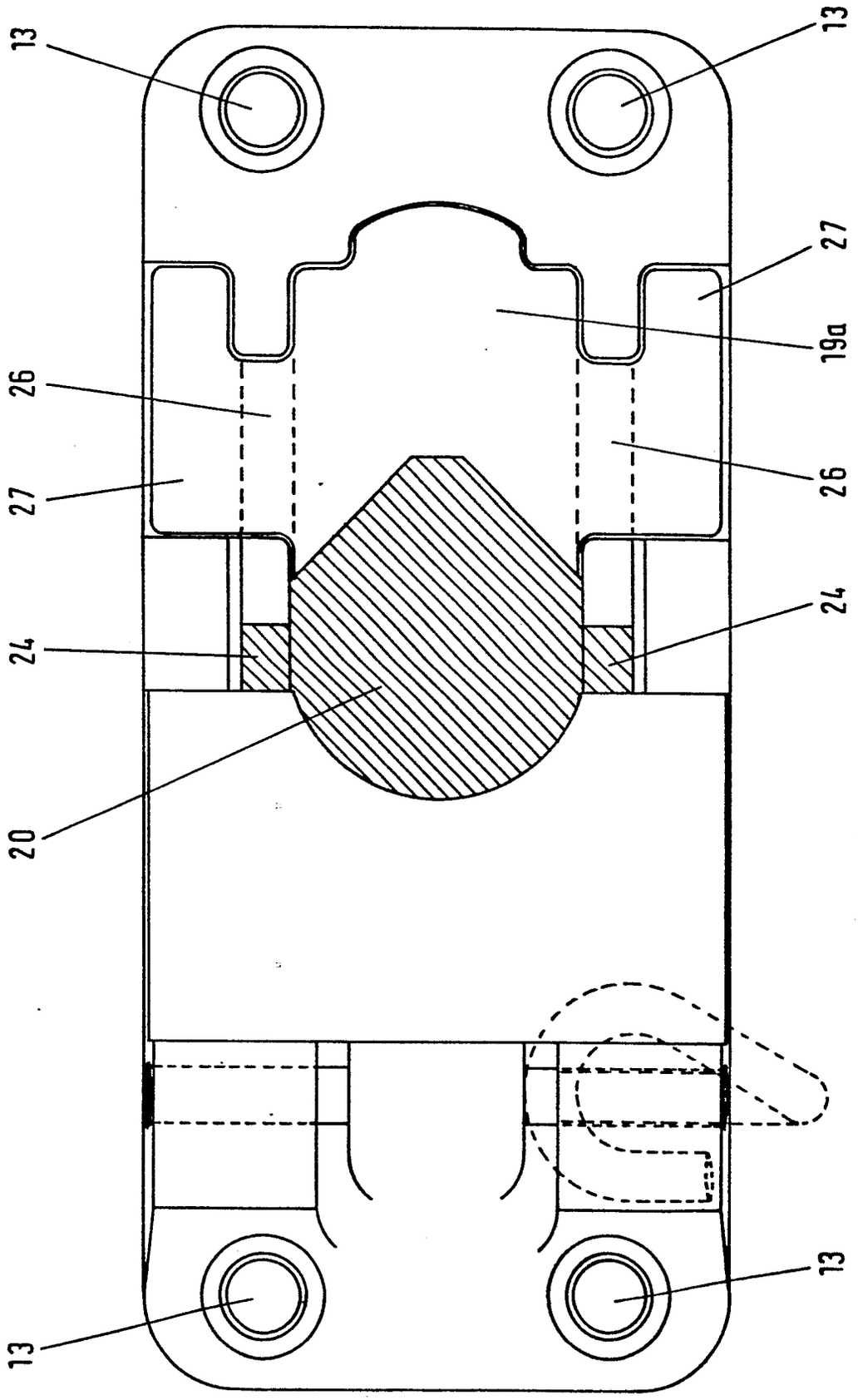


FIG. 3

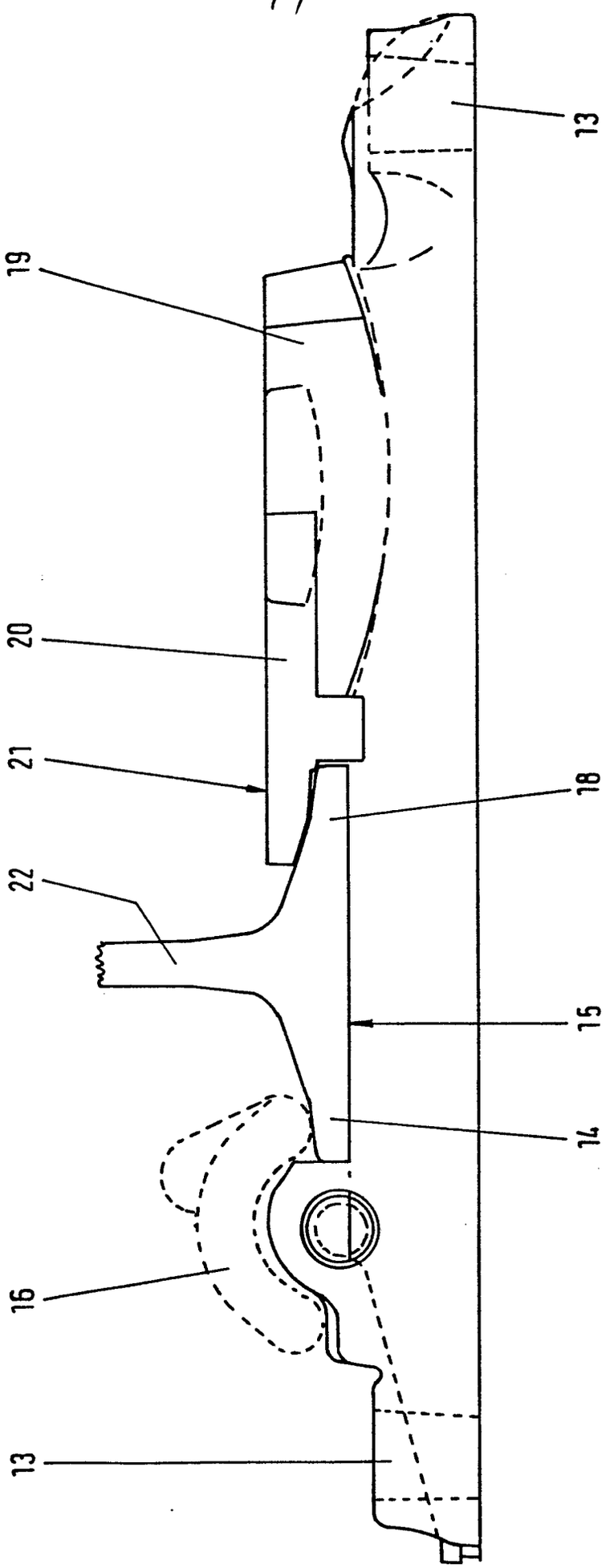


FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

0113515
Application number

EP 83 30 7056

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	DE-A-2 729 723 (KÖLLMANN U. VORLAENDER) * Complete document *	1	E 01 B 7/22 E 01 B 7/02
A	DE-U-7 037 186 (F. KRUPP HÜTTENWERKE AG) * Figures 1-3 *	1-4	
A	DE-U-7 148 502 (SCHRECK-MIEVES KG) * Figures 1-4 *	6	
A	DE-U-7 538 525 (RHEINSTAHL AG) * Figures 1,2 *	6	
A	DE-U-1 716 338 (DEUTSCHE BUNDESBAHN, BUNDESBAHN-ZENTRALAMT MINDEN) * Claims 1-3 *	7	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) E 01 B 7/00
A	DE-B-2 631 594 (ENSINGER) * Claim 1; column 6, lines 4-12 *	8,9	
A	EP-A-0 011 285 (ENSINGER) * Claim 1 *	10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	24-02-1984	PAETZEL H-J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503. 03.82