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Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmat az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

ANGULAR GUIDE PLATE FOR RAILWAY PROFILE

The present invention relates to an angled guide plate as well as to a track arrangement, more particularly for rail fastening systems.

Angled guide plates are known from the prior art. They are used in fastening systems for railway superstructures. More particularly the rails are fixed and guided with the angled guide plates of the type in question. For this the angled guide plates are arranged on (railway) sleepers, generally of concrete, and are screwed to these by way of already cast-in dowels with screws, together with corresponding tension clamps, which press from above onto a rail foot of the corresponding rail. Highest forces thereby act on the angled guide plate. Whereas the angled guide plates were formerly made of cast iron, nowadays it is known to make them from plastic. The angled guide plates currently made from plastic have however no plastic-compliant configuration and are more particularly not designed specifically for plastic. The drawback with this is more particularly that the in part unnecessarily high amount of material used causes high costs and leads to long cycle times during the manufacture thereof.

The DE 10 2012 100440 A1 describes a plate element for fixing a rail in a rail fastening point. The plate element can thereby be made with optimum useful properties according to the invention in a particularly simple commercially viable manner whereby the plate element comprises at least two parts made spatially separate from one another and which are then fixedly connected to one another. To manufacture a plate element according to the invention the parts of the plate element are accordingly made in a first work step in spatially separate tools and are then assembled into one plate element in a second work step.

It is therefore the object of the present invention to provide an angled guide plate, more particularly for rail fastening systems, which has optimum configuration taking into account the forces which occur, and thus enables cost savings and the shortest possible cycle times for manufacture.

This is achieved by an angled guide plate according to Claim 1 as well as by a track arrangement according to Claim 16. Further advantages and features of the invention are apparent from the dependent claims as well as from the description and the accompanying figures.

According to the invention an angled guide plate, more particularly for rail fastening systems, comprises a basic body which has an upper side and an underside, wherein the underside is configured to be arranged on a further element, more particularly a (railway) sleeper, whilst the upper side describes a plane which is substantially transversely opposite to a (railway) sleeper, wherein the angled guide plate consists of a guide region and a supporting region, wherein the guide region and the supporting region extend substantially parallel and adjacent to one another, transversely to a track direction, and wherein the upper side and the underside are spaced apart from one another in such a



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way that a thickness of the supporting region which is measured substantially perpendicular to the underside is greater than a thickness of the guide region, wherein seen along the track direction the basic body is configured tapering substantially in wedge form from the supporting region to the guide region, and that a minimum thickness of the guide region is less than 10 mm. The main tasks of the angled guide plate are to mechanically uncouple the horizontal wheel force between the rail and (railway) sleeper, to provide the electrical insulation between the rail and the (railway) sleeper as well as to fix and guide the rail in the track direction via friction connection. The track direction describes then the direction along which the track extends. In order to fulfil these tasks the angled guide plate is configured for locking and supporting further rail fastening means, such as for example (tension) clamps. In a particularly preferred manner the angled guide plates of the type in question are used in the case of so-called elastic direct fastenings, such as more particularly the "W-fastening". The W-fastening essentially comprises the following components: angled guide plate, intermediate bearing, (tension) clamp, (sleeper) screw and dowel. Angled guide plates of the type in question more advantageously replace the known angled guide plates of cast iron. The angled guide plates known from the prior art and made from plastic do not however have a plastic-compliant configuration and are not cost-efficient. The consequences are a higher amount of material used and high component costs resulting therefrom, long cycle times during manufacture which result in low production capacities as well as a high expense for ensuring the geometry and the mechanical properties through the non-plastic-specific construction. The angled guide plate has a basic body which has both a guide region and a supporting region wherein the thickness of the supporting region is greater at least in some regions than the thickness of the guide region. It should be noted that the "thickness" can always only refer to a specific region or cross-section since the thickness more advantageously reduces constantly from the supporting region to the guide region. There is so to speak not "one thickness" of the guide region or supporting region. The "in some regions" applies both along the track direction and also transversely thereto. In the embodiment according to the invention the thickness of the supporting region is greater than the thickness of the guide region. The supporting region and guide region preferably merge flowing or seamlessly into one another so that as a rule there is no visible transition nor separating line. One decisive factor here is that the thickness of the basic body decreases more or less continuously from the supporting region in the direction of the guide region. It should be noted here that the basic body does not comprise any projections, recesses, run-off and/or supporting faces etc., but that the basic body is in the literal sense the basic form of the angled guide plate. It should more particularly also be mentioned that as regards the thickness no local projections or recesses are to be meant which can naturally likewise influence the thickness of the angled guide plate, at least locally. The continuous decreases of the thickness of the basic body from the supporting region in the direction of the guide region need not take place along a line, but can also take place stepwise (like a step). The decisive factor is only the "basic body" of the angled guide plate which is characterized in that its thickness in the guide region is less (at least in some regions) than in the supporting region. The supporting region of the angled guide plate is more particularly that region which adjoins the rail directly or indirectly, and thus supports the latter transversely to the track direction. The thickness of the supporting region is configured greater than the thickness of the guide region. The guide region

preferably serves to align and guide the angled guide plate on the (railway) sleeper. The thickness of the guide region is accordingly configured smaller than the thickness of the supporting region. According to the invention a minimal thickness of the guide region is less than 10 mm. For arranging on the underside on the further element, more particularly the (railway) sleeper, the underside can advantageously be made smooth, but it can however also have a structure which is not smooth at least in some areas, by way of example studs, grooves or ribbing. In a likewise preferred manner the underside can comprise a wear-resistant layer which is characterized more particularly in that its hardness and/or coefficient of friction is higher (or even lower, depending on the further element, on which the angled guide plate is mounted) than a hardness or coefficient of friction of the remaining material of the angled guide plate. It is obvious that with advantage a wear-resistant layer can also be provided oriented towards the rail, thus on a stop face of the angled guide plate which will be described in more detail later on. It should hereby be noted that the angled guide plate is preferably made from a plastic material, and more particularly preferred from a compound material consisting of a plastic and an additive material, such as for example glass fibre. In a preferred embodiment the angled guide plate is made from a polyamide 6 with 30% glass fibre proportion (PA6GF30). The wear-resistant layer mentioned can be formed by surface treatment, but can however also consist of an additive material which can be applied or sprayed onto the underside. More expediently the supporting region and the guide region divide up the angled guide plate roughly in a ratio of 1:1, seen transversely to the track direction. It is clear that any other ratios are however also possible, such as by way of example 2:1 or 1:2, or even ratios lying in-between these. The load-optimized angled guide plate enables a reduction of about 10 to 30% in the amount of material used, depending on the design. This contributes to a clear reduction in the production costs. Furthermore the cycle times during manufacture are massively reduced, more particularly through the reduced wall thicknesses and the plastic-compliant design, and observing the geometry data becomes easier and thus the product quality is increased. As regards the plastic-compliant design explicit reference is made here to the fact that the angled guide plate has no sharp edges or radii less than roughly R1 to R2.

According to the invention the basic body is configured to run substantially wedge-shaped from the supporting region to the guide region. In other words, the upper side and underside are configured to run substantially wedge-shaped from the supporting region to the guide region seen transversely to the track direction. The basic body preferably has a wedge shape which tapers continuously from the supporting region towards the guide region. The angled guide plate or basic body thus advantageously tapers towards the guide region. The guide region which is thinner compared with the supporting region thus advantageously also enables a flexibility of the angled guide plate seen in a track plane. The track plane corresponds so to speak to a roadway plane and thus represents a substantially horizontal plane. The torsional rigidity of the angled guide plate can advantageously be affected by the thickness of the guide region, whereby position tolerances between the rail to be supported and (railway) sleeper or the region of the (railway) sleeper on which the angled guide plate is arranged can be compensated. As already mentioned, the angled guide plates are arranged in corresponding engagement regions/depressions. If depressions of this kind now do not lie exactly flush with the rail,

they are thus not exactly parallel, and so with the arrangement of the angled guide plate distortions may occur. Advantageously through the thin guide region which enables a slight torsion or pliability in the track plane, an optimum arrangement, more particularly a substantially tension-free arrangement becomes possible. It is evident that the wedge form mentioned need not be present throughout. This means that regions can also be provided which so to speak interrupt the wedge form. More advantageously the lateral rigidity of the angled guide plate can be affected by the wedge form or also by one or more interruption(s) in the wedge form. The rigidity in the track plane is thus meant here. Advantageously by way of example a "soft" angled guide plate can be produced which in the bottom region activates a lateral rail clamping action, or a rail fastening action. A wheel load is thereby distributed over several sleeper support points. Advantageously the wedge form is matched to an actual rail contact height in order to ensure an optimum force transfer. Advantageously the wedge form is optimally adapted to a height of the rail or the corresponding rail foot. The angled guide plate advantageously further continues the form of the rail foot so to speak, and thus enables an optimum deflection of the forces which occur as a train passes over. The imaginary extension of the wedge form of the angled guide plates more expediently merges seamlessly into the rail foot, in that a maximum thickness of the supporting region is adapted to the height of the rail foot. The angled guide plate acts like a pressure wedge transversely to the track direction. Decisive then again is the overall view of the basic body or upper side and underside relative to one another. The same applies for different cross-sections of the angled guide plate seen transversely to the track direction and along this. Thus a local cross-section region is provided throughout which does not have the said wedge form. The decisive factor is the form of the basic body as a whole.

The underside is preferably configured substantially planar, wherein the upper side is configured arcuate and/or inclined or sloping towards the underside. In other words the upper side preferably has a curvature or arc wherein the curvature or arc of the upper side is configured more expediently towards the underside. In a preferred embodiment an arcuate surface merges into an upper side running inclined/sloping towards the underside. The upper side is then more advantageously configured curved or arcuate in the supporting region whilst it is configured substantially inclined or sloping towards the underside in the guide region.

In a preferred embodiment the angled guide plate is substantially trapezoidal in plan view whereby a length of the supporting region is longer than a length of the guide region. A reduction in wear can thereby advantageously be achieved. This is possible through the high flexibility and mobility of the guide plate which is more expediently achieved in that the guide region is not only thinner but also narrower than the supporting region.

More expediently the underside has in the guide region at least one preferably bead-like engagement region which extends away from the underside and along the track direction. The underside preferably has in the guide region at least one engagement region wherein the underside merges into the engagement region in a first radius. The engagement region is advantageously provided so as to be arranged inside or on a corresponding engagement region of the further element, by way of example

the (railway) sleeper. The arrangement is then preferably by form-fitting connection. It is obvious that the engagement region extends advantageously along a length of the angled guide plate which is oriented along the track direction. However two, three, four, five or more engagement regions can advantageously also be provided on the underside. In a particularly preferred embodiment however two engagement regions are provided whose shape, position and bearing is matched to the (tension) clamp which is to be arranged on the upper side. The engagement region is advantageously configured bead-like, thus in side view (seen along the track direction) has a cross-section which is arcuate or circular at least in some areas. In other words, the engagement region has in cross-section in a preferred embodiment the shape of a triangle whose tip is rounded. The shape of a semi-circle or a quarter-circle is likewise also preferred. The extension or expansion, in other words, the length of the engagement regions seen along the track direction is adapted with great advantage optimally to the forces which arise. A particularly preferred embodiment of the engagement region advantageously starts at one end of the angled guide plate and occupies about 20 to 50% of the overall length of the angled guide plate in this region, in a particularly preferred embodiment about 30 to 45%, more particularly preferred about 35 to 40%. Since as already mentioned two engagement regions are advantageously provided, a clearance or spacing is advantageously provided between the two engagement regions and this helps to reduce costs by reducing the amount of material used. The spacing preferably amounts to about 0.5 to 6 cm, more particularly preferred about 1 to 5 cm, and even more particularly preferred about 1.5 to 4 cm.

The engagement region advantageously forms on its surface projections and/or recesses which more expediently run substantially transversely to the track direction. A local flexibility of the engagement region is thereby advantageously achieved which optimizes the arrangement and support of the engagement region of the angled guide plate in the corresponding engagement regions of the further element. Thus in particular the form-fitting engagement and as a result also the force-fitting engagement of the angled guide plate with the further element, thus the (railway) sleeper, is increased, since the projections and/or recesses enable a pliability which optimizes the aforementioned form-fitting engagement in that a very uniform bearing contact of the engagement regions is possible seen along and transversely to the track direction. Advantageously the projections and/or recesses can be bent slightly locally by way of example and thus adapt optimally to the corresponding substructure. Through the configuration of the projections and/or recesses and the resulting pliability of the engagement region the precision fit of the engagement region of the angled guide plate to the underlying/corresponding substructure, generally the sleeper or a channel in the sleeper, is increased. Furthermore a further material saving can thus preferably be achieved. Thus the increased material use through moulding the engagement regions can be reduced again by the purposefully arranged recesses. More expediently the recesses are formed as grooves which seen transversely to the track direction occupy substantially the form of a semi-circle or quarter circle. An elliptic or angular shape, by way of example in the manner of a square or triangle, is however also conceivable. Advantageously three grooves are provided per engagement region which run entirely or even only in sections over the surface of the engagement region, thus along an outer contour of the engagement region. Tests have

shown that the grooves more expediently also need not extend over the entire outer contour. Thus it can be expedient if the grooves extend only from a highest point of the engagement region in the direction of the supporting region. The section of the engagement region which faces away from the rail so to speak is preferably substantially smooth or at least has no special surface structure. Through the thereby larger contact surface area the surface pressure can be deliberately reduced in this region or in this direction. The three grooves are particularly preferred arranged at equal spacing relative to one another, wherein however the respective outer grooves have an unequal spacing from the respective edges of the engagement region. Thus in particular the spacing of the groove which is the outermost in relation to the angled guide plate, from the next closest edge of the engagement region is greater than the spacing of the groove which is the innermost in relation to the angled guide plate, from the next closest edge of the engagement region. Through this asymmetric arrangement and/or through the aforementioned features an optimum force introduction or transfer with the angled guide plates with the simultaneously best possible use of material can be achieved with the (tension) clamps, known from the prior art, which are used in the case of W-fastenings.

In a preferred embodiment one or more recesses of the engagement region or in the engagement region are formed where the underside merges in a second radius into the engagement region wherein the second radius is larger than the previously mentioned first radius. A rib-type engagement region can thereby preferably be formed with the maximum flexibility particularly in the track direction, and highest strength, particularly transversely to the track direction.

As seen along the track direction the engagement region preferably terminates at a distance before the end of the angled guide plate. In this connection it is important to mention that the engagement region is provided not only to ensure and optimize the guidance and arrangement of the angled guide plate in the element which is underneath. Another important function of the engagement region lies particularly in passing on the forces of further rail fastening means, more particularly the already mentioned (tension) clamp, which are introduced via the upper side into the angled guide plate, in optimum manner through the or each engagement region into the element underneath. Therefore engagement regions are advantageously only formed on the underside of the angled guide plate where forces introduced from the upper side are to be transferred. When using (tension) clamps known from the prior art therefore the engagement regions are more expediently not formed up to the ends of the angled guide plate whereby additional material can be saved. Similarly preferred, the surface pressure can thereby be increased since the actual surface area of the engagement region is reduced. This is furthermore also achieved by the configurations of the engagement regions by projections and/or recesses.

Advantageously the upper side has in the supporting region a shoulder which at least regionally increases the thickness of the supporting region in certain sections in such a way that a stop surface for a rail is increased. In other words the supporting region more expediently forms a shoulder which increases the thickness of the angled guide plate at least in certain sections so that the stop surface for the rail is increased. More expediently the upper side of the angled guide plate in the region of the

shoulder is formed substantially parallel to the underside. The shoulder is further preferably formed whereby the upper side has the previously mentioned arc or curvature whereby the shoulder is formed. The stop surface advantageously extends substantially transversely to the underside of the angled guide plate and then forms the surface which supports the rail directly and/or indirectly. Advantageously the shoulder can also extend beyond the underside. The shoulder enables a regionally further thickening of the supporting region in order to create an optimum form-fitting and more particularly force-fitting connection with the rail which is to be supported. It is evident that the shoulder need not be formed continuous along the length of the angled guide plate. More expediently the angled guide plate has however corresponding shoulders at least at its ends in order to support the rail.

More expediently the upper side has at least one force introduction region wherein the at least one force introduction region is configured as material thickening and/or material thinning compared with the basic body. As already mentioned the force introduction regions serve essentially to take up and dissipate the forces which can occur when mounting further rail fastening elements such as by way of example (tension) clamps. More particularly the force introduction regions serve to take up forces which act substantially transversely to the underside of the angled guide plate. Following the idea of the present invention the basic body is configured substantially planar on its plane and has a material thickening or where applicable a material thinning only at those places which serve for the force introduction by way of example through rail fastening means such as (tension) clamps or the like. The material used is thus at very specific targets and only where it is absolutely necessary.

More expediently at least one force introduction region is configured as a depression in the guide region which extends substantially along the track direction, and which reduces the thickness of the angled guide plate in this region. Advantageously the depression is, seen along the track direction, substantially rounded or of circular segment shape. Advantageously the depression is configured for mounting a rail fastening means, by way of example a (tension) clamp. In a preferred embodiment two such depressions are arranged at a distance one behind the other along the length of the angled guide plate. The distance preferably amounts to about 0.5 to 7 cm, more particularly preferred about 1 to 5 cm, and quite particularly preferred about 1.5 to 4 cm. In a preferred embodiment the depression is restricted along the track direction entirely at least in certain sections by a transition section to the supporting region. Seen along the track direction the transition section has approximately the shape of a triangle in cross-section which extends away from the upper side of the basic body and thus continues the contour or surface of the depression beyond the upper side. The arrangement of rail fastening means is thus optimized even further since the surface of the depression, and thus of the force introduction region, is increased.

Advantageously the force introduction region in the guide region and the at least one engagement region on the underside are arranged opposite one another. Advantageously the angled guide plate can thereby as a whole be formed extremely thin in the guide region, more particularly thinner than in the supporting region. Advantageously the angled guide plate is thickened and reinforced by using at least one engagement region only locally where forces have to be introduced. This configuration which

improves the force flow enables an optimum use of material and thus a cost-effective manufacture. It must thus not be forgotten that a very large number of angled guide plates of this kind is required for fastening the rails so that even the smallest material savings add up to great cost advantages. More expediently a depression and an opposing engagement region seen along the track direction extend over the same or substantially the same length. Advantageously two depressions are provided which are arranged opposite two engagement regions of the same length.

More expediently a material thinning and/or a material cutout are arranged between two depressions or engagement regions arranged along the track direction. A targeted force introduction is thus possible. It was already mentioned that in one preferred embodiment two engagement regions on the underside and two depressions on the upper side are arranged at suitable spaces one behind the other. Thus advantageously the material thinning and/or the material cutout is formed by way of example in the manner of a hole in these spaces or in the region of these spaces. Expressed differently the space can also be formed just by the material thinning or by the material cutout. The material thinning is to be interpreted as the thickness of the guide region being further reduced in this region which is already very thin. Advantageously it is thereby possible that the two depressions and the correspondingly opposing engagement regions on the underside of the angled guide plate take up the forces of the rail fastening element, by way of example the (tension) clamp, in an ideal manner and transfer them to the further element, by way of example the (railway) sleeper. Tests have shown that – expressed in simple terms – the regions between the depressions and between the engagement regions are not required so that they can advantageously be “omitted”, so to speak, through the material thinning and the material cutout. It is clear that even just by these features a further material, and thus cost, saving becomes possible.

The angled guide plate preferably forms on the outside at the guide region along the track direction a bead which preferably adjoins the at least one depression. Advantageously the depression and the bead merge into one another in an arc or a curve. The bead preferably produces a local thickening of the guide region. This advantageously serves to support a rail fastening means, by way of example a (tension) clamp which is to be mounted, seen transversely to the track direction. On the other hand the arrangement or the form-fitting connection of the angled guide plate onto the further element, by way of example the (railway) sleeper, can also be optimized here. The guide region of the angled guide plate is thus basically already designed very thin at the outer end of the angled guide plate mentioned here, so that it can be advantageous to increase the thickness of the guide region on the outside at least regionally by a projection such as a bead or the like. The contour of the depression advantageously merges directly into the bead so that the bead and the depression form in cross-section a continuous contour.

More expediently at least one force introduction region is configured in the supporting region which extends substantially away from the upper side and serves to support a fastening means, more particularly a (tension) clamp. The force introduction region in the supporting region advantageously

represents an additional thickening in order to provide optimum support for the fastening means which are to be mounted, and to optimize the force introduction.

More expediently the force introduction region is formed in the supporting region by two projections which are arranged off-set along the track direction and which each have a bearing support face for mounting the fastening means which extend substantially transversely to the track direction. The bearing support faces have a substantially circular segment form, seen along the track direction. The shape or configuration of the bearing support faces is generally advantageously adapted to the shape of the fastening means correspondingly used. In order to increase the stability and strength the projections are connected by at least one web which extends along the track direction.

The angled guide plate advantageously has a recess, by way of example in the form of a hole, for passing through a fastening means, more particularly a (sleeper) screw. The recess is advantageously arranged in the supporting region but can also however extend into the guide region or even be arranged only in the latter.

It is more particularly preferred that a length of the supporting region be greater than a length of the guide region. In plan view the angled guide plate is thus advantageously configured substantially trapezoidal. The length of the guide region is preferably approximately 1 to 20% shorter than the length of the supporting region, particularly preferably about 2 to 15% and more especially preferred about 3 to 10%.

In order to restrict the amount of material required to a minimum, the angled guide plate has on its underside advantageously one or more pockets which are designed to reduce the thickness of the basic body in certain sections or regions even further. A configuration has proved particularly advantageous where the pocket extends perpendicularly away from the stop face over the entire length of the supporting region in the direction of the guide region in a form where in the region of the edges of the basic body, more particularly in the supporting region (apart from the section in the region of the stop) and in the region around the recess, the thickness of the basic body is not further reduced. The pockets advantageously end before the engagement regions.

The regions whose thickness is not reduced advantageously form force redirection regions. The force redirection regions are thus the regions on the underside of the angled guide plate which are in contact with the (railway) sleeper. The force redirection regions are advantageously configured just large enough or only wide enough so that the forces being introduced from the upper side into the angled guide plate, more particularly the clamping forces, are sufficiently supported.

According to the invention a track arrangement comprises an angled guide plate according to the invention. It is clear that all the features and advantages of the angled guide plate also apply for the track arrangement.

Further advantages and features are apparent from the following description of preferred embodiments of the angled guide plate according to the invention as well as the track arrangement according to the invention with reference to the accompanying drawings.

In the drawings:

Fig. 1 shows a preferred embodiment of an upper side of an angled guide plate in a perspective view;

Fig. 2 shows a preferred embodiment of an underside of the angled guide plate known from Fig. 1 in a perspective view;

Fig. 3a shows a schematic illustration of a preferred embodiment of an angled guide plate in a side view;

Fig. 3b shows a schematic illustration of a preferred embodiment of an angled guide plate in an installed situation;

Fig. 4 shows a schematic view of a track arrangement;

Fig. 5 shows a view of a preferred embodiment of an angled guide plate transversely to a track direction viewed from a guide region towards a supporting region;

Fig. 6 shows a side view of a further preferred embodiment of an angled guide plate;

Fig. 7 shows a plan view of an upper side of an angled guide plate in a diagrammatic view;

Fig. 8 shows a side view of a further preferred embodiment of an angled guide plate.

Fig. 1 shows a preferred embodiment of an upper side 20 of an angled guide plate 10 in a perspective view. The angled guide plate 10 has a basic body 12 and extends along the track direction G. An (imaginary) separating line between a guide region 40 and a supporting region 50 is shown in dotted lines along the track direction G. It can clearly be seen that a thickness d_{50} (selected by way of example) of the supporting region 50 is greater than a thickness d_{40} (selected by way of example) of the guide region 40. The supporting region 50 has a force introduction region 22 which is formed by two projections 26. The projections 26 are connected to one another along the track direction G by a web 27. The supporting region 50 furthermore has a shoulder 52 towards a rail (not shown here) which increases a stop face 54 of the basic body 12 which extends substantially perpendicular to an underside 30. The guide region 40 has two force introduction regions 22 which are formed as depressions 24 and which are arranged spaced out one behind the other along the track direction G. A material thinning or material cutout 70 in the form of a hole is configured between the two depressions 24. The depressions 24 are arranged at a spacing a_{24} along the track direction G. The depressions are restricted on the upper side 20 in relation to the supporting region 50 by a transition section 25 which in turn is formed as a protrusion with an approximately triangular cross-section.

Fig. 2 shows a preferred embodiment of an underside 30 of the angled guide plate 10 known from Fig. 1 with the basic body 12 in a perspective view. The guide region 40 has along the track direction G two bead-like engagement regions 32 which have projections and/or recesses or grooves 34 on the upper surface. A depression 24 can be seen in outline on the front side of the angled guide plate 10 opposite the engagement regions 32. On the outside adjoining the depression 24 the angled guide plate 10 has corresponding beads 42. The transition section 25 is formed opposite the beads. The two engagement regions 32 are arranged at a spacing a_{32} along the track direction G. The engagement regions 32 are arranged offset by a distance a relative to the edge of the angled guide plate 10. With the preferred embodiment illustrated in Fig. 2 the underside 30 is not formed completely flat but has pockets 31 which enable an additional material saving. Force redirection regions 33 are formed corresponding to the pockets 31 and serve as contact faces for a (railway) sleeper (not shown).

Fig. 3a shows a schematic illustration of an angled guide plate 10 in a side view. The wedge shape of the basic body 12 can be clearly seen which comprises an upper side 20 and an underside 30. The dotted lines show that when determining the thickness d_{40} and d_{30} of the angled guide plate it relates to the basic body 12 and local protrusions or recesses or the like are not to be taken into consideration when calculating or determining the thicknesses. Advantageously the wedge form is matched in optimum manner to the rail 90 or the rail foot thereof. The angled guide plate continues the form of the rail foot so to speak and thus enables an optimum dissipation of the forces as a train passes over. The imaginary extension of the wedge form of the angled guide plate merges practically seamlessly into the rail foot, in that a maximum thickness d_{50} of the supporting region is adapted to a height of the rail foot. The angled guide plate 10 shown schematically in Fig. 3a has on its upper side 20 a projection 26 as well as a force introduction region 22 formed as a depression 24. The depression 24 is adjoined by a bead 42. An engagement region 32 is formed underneath the depression 24 and extends away from the upper side 30. A supporting region 50 has a stop face 54 at its end oriented towards a rail (not shown here). The vertically aligned dashed line indicates a supporting region 50 and a guide region 40.

Fig. 3b shows the schematic diagram known from Fig. 3a in an installed situation. A (tension) clamp 80 is arranged on the angled guide plate 10 in a recess 60 via a (sleeper) screw 82. The (tension) clamp 80 is supported on the projections 26 and the depression 24. A rail 90, more particularly a rail foot, is arranged on the stop face 54 and is locked from above by the tension clamp 80.

Fig. 4 shows a schematic view of a preferred form of a track arrangement. An angled guide plate 10 is shown in section so that a recess 60 is possible for arranging by way of example a corresponding fastening means (not shown here). The angled guide plate 10 is arranged with an underside 30 on a (railway) sleeper 92 which is shown here by shading. An engagement region 32 of a guide region 40 of the angled guide plate 10 engages in a corresponding form of the (railway) sleeper 92. The angled guide plate 10 has on an upper side 20 a bead 42 for mounting on the (railway) sleeper 92. The angled guide plate 10 is mounted by a stop face 54 on a rail 90 which extends along a track direction G. The rail 90 sits on an intermediate bearing 93.

Fig. 5 shows a view of a preferred embodiment of an angled guide plate 10 transversely to a track direction G looking from a guide region to a supporting region (without reference numerals here). Two engagement regions 32 can be clearly seen which each have three grooves 34. The grooves 34 are arranged equidistant from one another wherein they are however offset inwards in relation to the respective engagement region 32. A force introduction region 22 formed by two projections 26 is further shown which comprises two bearing faces 26'. The engagement regions 32 merge directly into beads 43 adjoining same.

Fig. 6 shows a side view of a further preferred embodiment of an angled guide plate 10. Again the wedge shape of a basic body 12 can be seen which has an upper side 20 and an underside 30 and which tapers from the supporting region 50 towards the guide region 40. A force introduction region 22 designed as a projection 26 extends away from the upper side 20. The supporting region 50 is defined with regard to a rail (not shown here) by a shoulder 52 with a stop face 54. In this region a pocket 31 is also arranged on the underside 31. An engagement region 32 is formed opposite a depression 24. The guide region 40 terminates in a bead 42 which in turn merges seamlessly into the depression 24. The depression 24 is defined with regard to the upper side 20 by an approximately triangular-shaped transition section 25.

Fig. 7 shows a plan view of an upper side 20 of a trapezoidal-shaped angled guide plate 10 in a schematic illustration. The different lengths of the supporting region L50 and the guide region L40 are clearly apparent which help to reduce the wear on the angled guide plate. A basic body 12 comprises a recess 60 as well as a material cutout 70 in the form of a hole. The illustration of further features was omitted in this figure.

Fig. 8 shows essentially the embodiment known from Fig. 7 wherein an engagement region 32 is formed in that an underside 30 merges into the latter in a first radius. One or several recesses are formed in that the underside merges into the engagement region in a second radius R2 wherein the second radius is greater than the first radius.

REFERENCE NUMERAL LIST

10	Angled guide plate
12	Basic body
20	Upper side
22	Force introduction region
24	Depression
25	Transition section

26	Projection
26'	Bearing support face
27	Web
30	Underside
31	Pocket
32	Engagement region
33	Force redirection region
34	Projections and/or recesses, grooves
40	Guide region
42	Bead
50	Supporting region
52	Shoulder
54	Stop face
60	Recess
70	Material thinning and/or material cutout
80	Fastening means, (tension) clamp
82	Fastening means, (sleeper) screw
90	Rail
92	(Railway) sleeper
93	Intermediate bearing
a24,a32	Distance
L40,L50	Lengths
d ₄₀	Thick guide region
d ₅₀	Thick supporting region

G Track direction

R1 First radius

R1 Second radius

Szögvezető lemez egy sínprofil számára



Szabadalmi igénypontok

1. Szögvezető lemez (10) egy vágány sínleerősítő rendszere számára, amely szögvezető lemez (10) egy alaptestet (12) tartalmaz, amelynek egy felső oldala (20) és egy alsó oldala (30) van, ahol az alsó oldal (30) egy aljon, különösen vasúti aljon (92) való elrendezéshez van kiképezve, míg a felső oldal (20) egy, az aljhoz képest lényegében keresztirányú szemközti síkot ír le, és ahol a szögvezető lemez (10) egy megvezető tartományból (40) és egy támasztó tartományból (50) áll, ahol a megvezető tartomány (40) és a támasztó tartomány (50) lényegében párhuzamosan és egymással szomszédosan, a vágányirányra (G) keresztirányban terjed ki, és ahol a felső oldal (20) és az alsó oldal (30) olyan távolságra van egymástól, hogy a támasztó tartománynak (50) az alsó oldalra (30) merőlegesen méretezett vastagsága (d_{50}) nagyobb, mint a megvezető tartomány (40) vastagsága (d_{40}), **azzal jellemezve**, hogy az alaptest (12) a támasztó tartománytól (50) a megvezető tartományig (40) a vágányirányra (G) keresztirányban lényegében ék alakúan elkeskenyedő módon van kiképezve, és hogy a megvezető tartomány legkisebb vastagsága (d_{40}) kisebb, mint 10 mm.
2. Az 1. igénypont szerinti szögvezető lemez (10), ahol az alsó oldal (30) síkként van kiképezve, és ahol a felső oldal (20) ív alakúan és/vagy az alsó oldal (30) felé döntötten van kiképezve.
3. Az 1. vagy a 2. igénypont bármelyike szerinti szögvezető lemez (10), ahol a szögvezető lemez (10) felülnézetben trapéz alakúan van kiképezve, amennyiben a támasztó tartomány (50) hosszúsága nagyobb, mint a megvezető tartomány (40) hosszúsága.
4. Az előző igénypontok bármelyike szerinti szögvezető lemez (10), ahol az alsó oldalnak (30) a megvezető tartományban (40) legalább egy kapcsolódási tartománya (32) van, ahol az alsó oldal (30) egy első sugárral (R1) megy át a kapcsolódási tartományba (32).
5. A 4. igénypont szerinti szögvezető lemez (10), ahol a kapcsolódási tartomány (32) a felületén kiugrásokkal és/vagy beugrásokkal (34) rendelkezik, amelyek előnyösen lényegében a vágányirányra (G) keresztirányban húzódnak.

6. A 4-5. igénypontok bármelyike szerinti szögvezető lemez (10), ahol a kapcsolódási tartomány (32) egy beugrása (34) azáltal van kiképezve, hogy az alsó oldal (30) egy, az első sugárnál (R1) nagyobb második sugárral (R2) megy át a kapcsolódási tartományba.

7. A 4-6. igénypontok bármelyike szerinti szögvezető lemez (10), ahol a kapcsolódási tartomány (32), a vágányirány (G) mentén tekintve a szögvezető lemez (10) egyik vége előtt bizonyos távolságra (a) végződik.

8. Az előző igénypontok bármelyike szerinti szögvezető lemez (10), ahol a támasztó tartomány (50) egy vállat (52) képez, amely a szögvezető lemez (10) vastagságát (d_{50}) szakaszonként, legalább tartományonként oly módon növeli meg, hogy ezáltal meg van növelve egy ütközőfelület (54) egy sín (90) számára.

9. Az előző igénypontok bármelyike szerinti szögvezető lemez (10), ahol a felső oldálnak (20) legalább egy erőbevezető tartománya (22) van, és ahol a legalább egy erőbevezető tartomány (22) anyagvastagításként és/vagy anyagvékonyításként van az alaptesthez (12) képest kiképezve.

10. A 9. igénypont szerinti szögvezető lemez (10), ahol legalább egy erőbevezető tartomány (22) bemélyítésként (24) van a megvezető tartományban (40) kiképezve, amely bemélyítés (24) lényegében a vágányirány (G) mentén terjed ki, és amely bemélyítés (24) a szögvezető lemez (10) vastagságát ebben a tartományban lecsökkenti.

11. A 10. igénypont szerinti szögvezető lemez (10), ahol a megvezető tartományban (40) lévő erőbevezető tartomány (22) és az alsó oldalon (30) lévő legalább egy kapcsolódási tartomány (32) egymással szemben van elrendezve.

12. A 10-11. igénypontok bármelyike szerinti szögvezető lemez (10), ahol kettő, a vágányirány (G) mentén elrendezett bemélyítés (24), illetve kapcsolódási tartomány (32) közötti egy anyagvékonyítás és/vagy anyagkivágás (70) van elrendezve.

13. Az előző igénypontok bármelyike szerinti szögvezető lemez (10), ahol a szögvezető lemez (10) kívül a megvezető tartományon (40) a vágányirány (G) mentén egy domború peremei (42) képez.

14. Az előző igénypontok bármelyike szerinti szögvezető lemez (10), ahol legalább egy erőbevezető tartomány (22) van a támasztó tartományban (50) kiképezve, amely erőbevezető tartomány (22) lényegében a felső oldaltól (20) terjed ki és egy rögzítőeszköz (80), különösen egy szorítókegnyel, megtámasztására szolgál.

15. Vágányelrendezés, amely az előző igénypontok bármelyike szerinti szögvezető lemezzel rendelkezik.



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Fig. 1

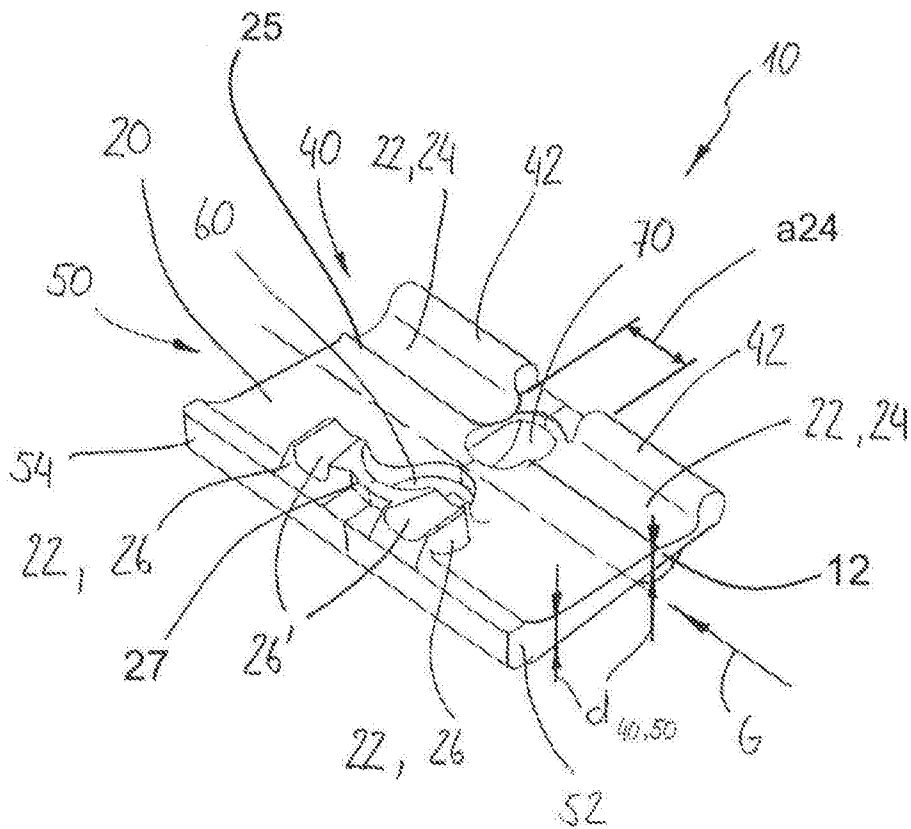


Fig. 2

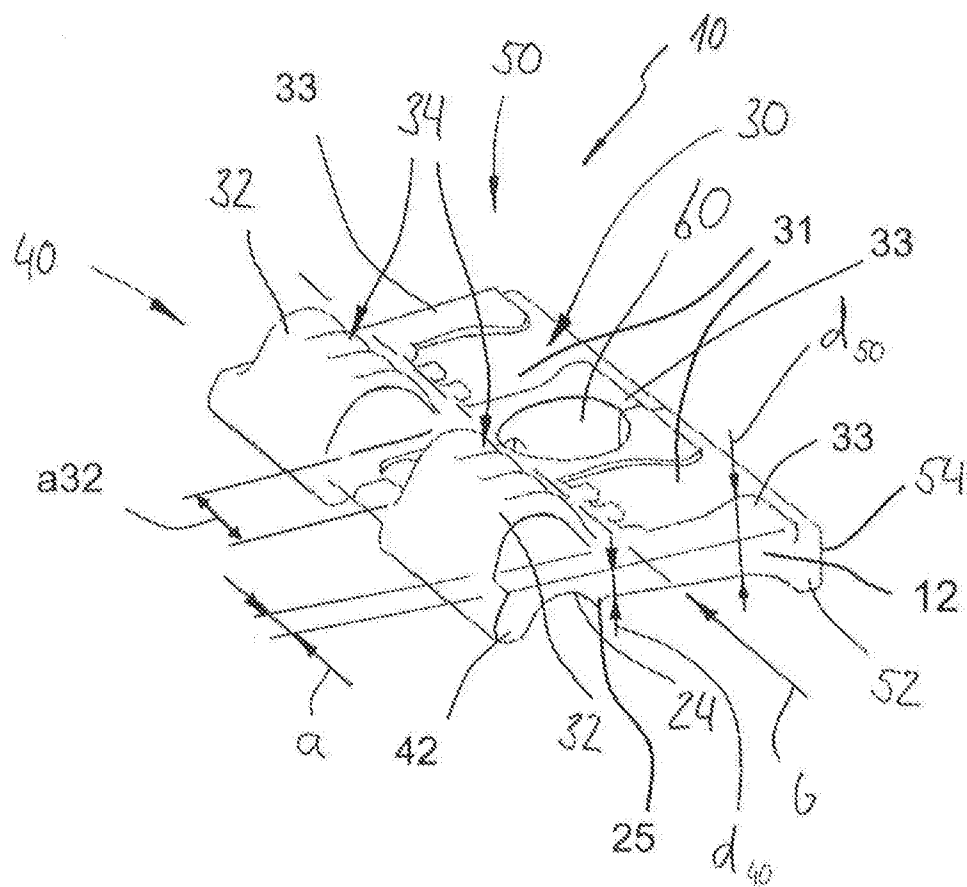


Fig. 4

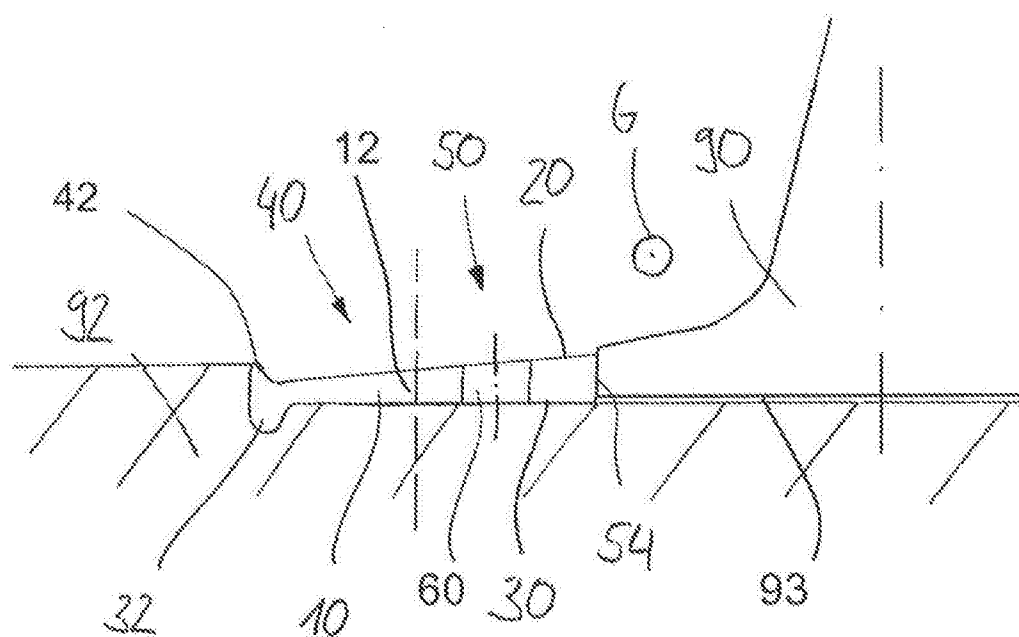


Fig. 5

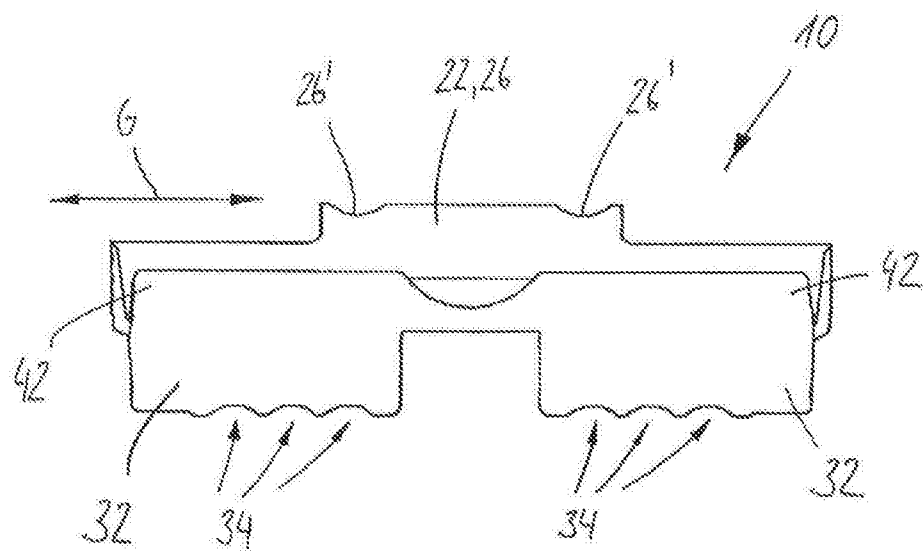


Fig. 6

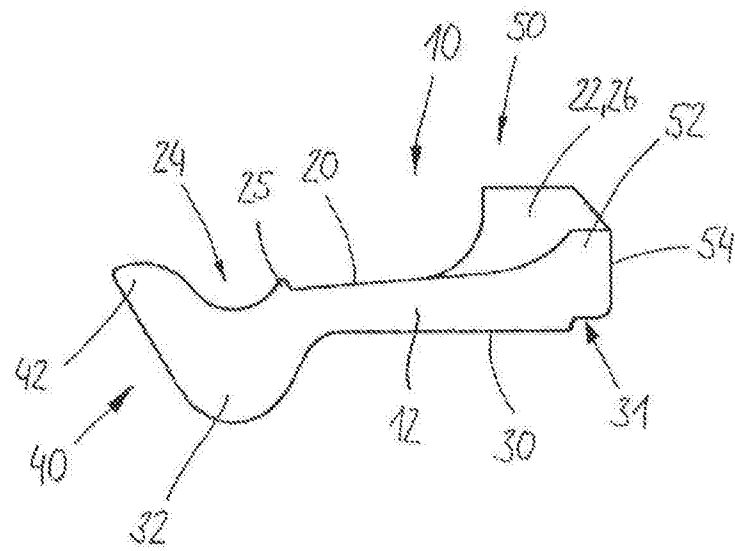


Fig. 7

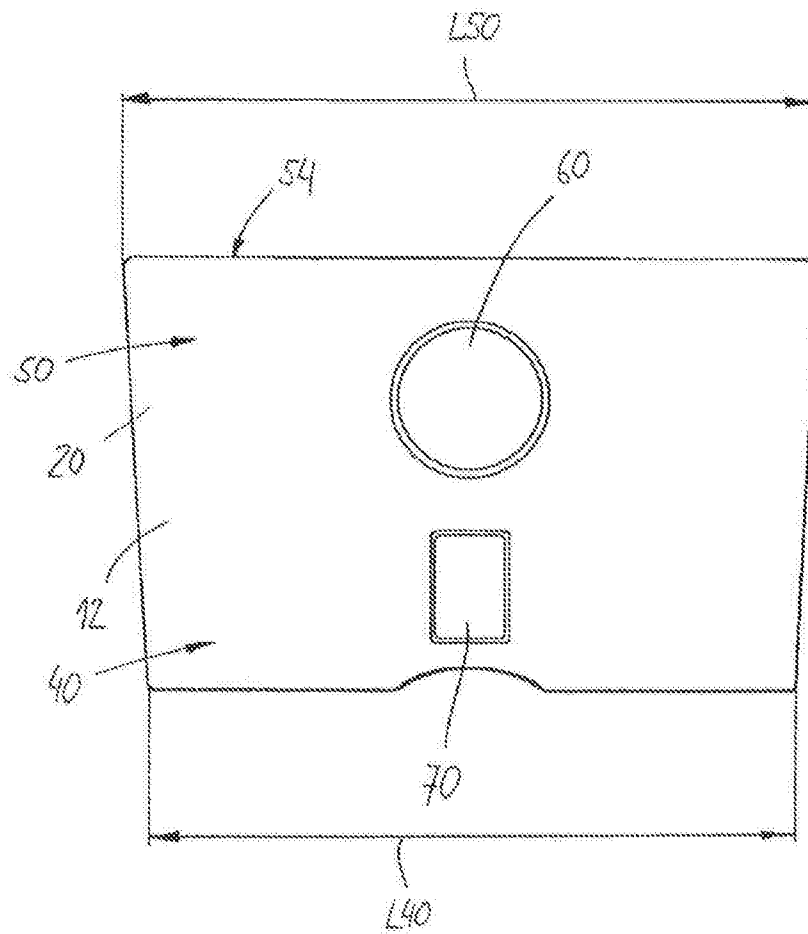


Fig. 8

