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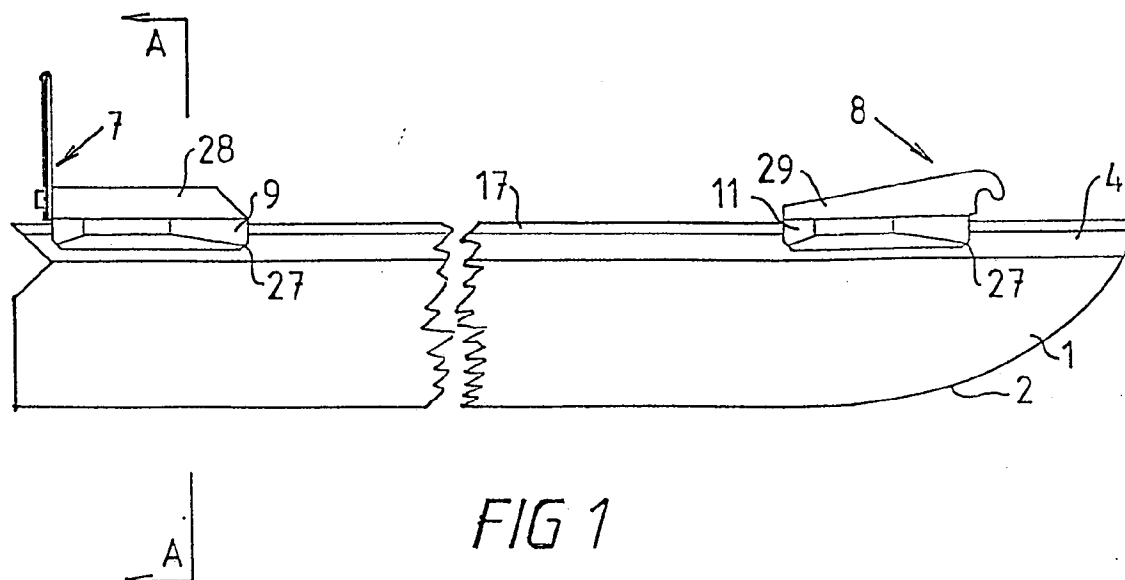
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AL LT LV MK RO SI(30) Priority: **30.01.1998 SE 9800277**(71) Applicant: **HARALD ALMGREN AB****S-760 17 Blidö (SE)**(72) Inventor: **Johansson, Bengt****760 17 Blidö (SE)**(74) Representative: **Ellner, Lars O.****AWAPATENT AB,****Box 45086****104 30 Stockholm (SE)**(54) **Skate**

(57) A skate comprising a blade (1) with an edge (2) and a longitudinal side edge (3) arranged opposite to the edge, an essentially T-shaped section element (4) fixed to the blade adjacent to and along the longitudinal side edge, a rear fastening (7) releasably fixed to the section element and a releasably fixed front fastening (8), said fastenings being adapted, in coaction, to releasably fix a boot (23) to the skate.

The invention is characterised in that the fastenings (7, 8) are arranged on at least one fixing plate (9, 11)

with a T groove (12) which extends along the longitudinal axis (13) of the entire fixing plate and which, with a play, encloses the outermost end portions (17) of the section element, which are positioned in parallel with the blade, whereby the fixing plate (9, 11) is displaceable with a sliding fit along the section element (4), and that each fixing plate (9, 11) has a locking means (21, 22) which cooperates with the circumferential surface (16) of the section element (4) for essentially infinitely variable adjustment of the fastenings (7, 8) along the longitudinal side edge (3) of the blade (1).

**FIG 1****EP 0 938 916 A2**

Description

[0001] The present invention relates to a skate which comprises a blade with an edge and a longitudinal side edge arranged opposite to the edge, an essentially T-shaped section element fixed to the blade adjacent to and along the longitudinal side edge, a rear fastening releasably fixed to the section element and a releasably fixed front fastening, said fastenings being adapted, in coaction, to releasably fix a boot to the skate.

[0002] More specifically, the invention relates to a skate which can utilise ski fastenings, known per se, together with the associated ski boots. The fastenings are adjustably fixed to the blade of the skate by means of a T section element designed for this purpose, which is permanently fixed to the blade and has a flange which is oriented perpendicularly to the blade in the longitudinal direction of the blade and essentially symmetrically therewith. The fastenings are fixed to said flange. Such skates are previously known in several variants, for instance, from the Almgren® brochure, Swedish Patents Nos 9303581-4 and 9500218-4 and US Patent No. 5,354,077. These prior-art skates are intended for use as so-called long-distance skates.

[0003] A common feature of the above-mentioned skates is that the perpendicularly oriented flange is provided with a number of pairs of through holes for fixing the rear and front fastenings, alternatively with through-going parallel slots for the front fastening. This results in the (rear) fastenings being adjustable on the blade step by step, not infinitely variable. Moreover the flange must be made wide for reasons of strength owing to the through bores and slots, which contributes to the weight of the skate and makes it impossible to fix the fastenings to the front and rear ends of the blade, for which reason the skate cannot be designed as a traditional skate for e.g. ice-skating rinks. For exchange of the fastenings, also a plurality of bolt connections must be loosened completely, which is both difficult and hazardous since a bolt or nut can be lost. Moreover it is necessary to tighten the bolt connections firmly, which can be laborious if the right tools are missing or if one's fingers are cold and stiff, to ensure that the fastenings are firmly fixed and are not unsteady when using the skate.

[0004] An object of the present invention is to obviate or reduce the above deficiencies by providing a skate with a narrower and lighter flange of the T section element.

[0005] A further object of the invention is to provide a skate with infinitely variable adjustment of the fastenings.

[0006] One more object is to provide a skate with fastenings, which are easy to exchange and which do not tend to be unsteady, not even if they are mounted on the T section element in a careless manner.

[0007] A further object is to provide a skate which is of a more all-round type than a conventional long-distance skate.

[0008] According to the invention, these objects are achieved by a skate according to the introductory part, which is characterised in that the fastenings are arranged on at least one fixing plate with a T groove which extends along the longitudinal axis of the entire fixing plate and which, with a play, encloses the outermost end portions of the section element which are positioned in parallel with the blade, whereby the fixing plate is displaceable with a sliding fit along the section element, and that each fixing plate has a locking means which cooperates with the circumferential surface of the section element for essentially infinitely variable adjustment of the fastenings along the longitudinal side edge of the blade.

[0009] Further developments of the invention are evident from the features stated in the subclaims.

[0010] Preferred embodiments of the invention will now be illustrated for the purpose of exemplification and with reference to the accompanying drawings, in which

Fig. 1 is a side view of an embodiment of the invention on a reduced scale;

Fig. 2 is a sectional view along line A-A through the skate in Fig. 1 on a larger scale;

Fig. 3 is a top plan view of the skate in Fig. 1;

Fig. 4 is a view from below of a life-size separate fixing plate without a fastening;

Fig. 5 is a top plan view of the separate fixing plate in Fig. 4 with a front fastening mounted; and

Fig. 6 is a top plan view of a fixing plate with a separately arranged front fastening according to Figs 1 and 3 mounted.

[0011] With reference first to Figs 1-3, the skate according to a preferred embodiment of the invention comprises a blade 1 with an edge 2 and an opposite, parallel longitudinal side edge 3, see especially Fig. 2. An essentially T-shaped section element 4, which consists of an essentially U-shaped web 5 and, extending perpendicularly to the web 5, a flange 6, is firmly fixed in a manner known per se to the blade 1 by the web 5 straddling the longitudinal side edge 3 and being glued or fixed by soldering thereto and to neighbouring portions of the blade 1. The T-shaped section element is made in one piece, preferably of extruded aluminium. What so far differs the inventive skate from prior-art technique is that the web 5 of the T-shaped section element 4 is considerably narrower than is usual. In prior-art long-distance skates, the width of the web is at least equal to the height of the blade 1, i.e. the distance between its edge 2 and its longitudinal side edge 3, and usually is twice as great. Contrary to this, the width of the web 5 of the skate according to the invention is considerably smaller than the height of the blade 1, down to half the height and, in extreme cases, even smaller.

[0012] A rear fastening 7 and a front fastening 8 are fixed to the blade 1 by means of the T-shaped section element 4. The fastenings 7 and 8 are each arranged

on a fixing plate 9 and 11, or alternatively arranged on a common fixing plate (not shown). With reference to Figs 2 and 4, each fixing plate 9, 11 has an essentially T-shaped groove 12, which extends along the longitudinal axis or symmetry axis 13 of the fixing plate between the front terminal edge portion 14 of the fixing plate and its rear terminal edge portion 15 in the longitudinal direction of the blade 1. The T groove 12 encloses with a sliding fit the top face 16 of the flange 6 of the T-shaped section element 4 and the end portions 17 of the section element which are oriented in parallel with the blade 1, by means of a pair of opposite channel-like recesses 18. Each fixing plate 11, 12 can be displaced in an infinitely variable manner and fixed in the longitudinal direction of the blade 1 for the desired adjustment of the fastenings 7, 8. The fixing plate has a locking means which in cooperation with the above-mentioned enclosed portions 16, 17 of the T-shaped section element fixes each fixing plate and, thus, the associated fastening 7, 8 in the selected position. Said locking means comprises at least one, and preferably two, threaded holes 21 in each fixing plate, said holes being in the embodiment shown positioned on the longitudinal axis 13 of the fixing plate. In each hole 21, a screw 22 is coaxially arranged to be moved with its end into frictional engagement with the top face 16 of the flange 6. For an increased frictional engagement, the surface of the T-shaped section element 4 can be provided, wholly or partly, with a friction-increasing coating or pattern, such as knurls, fine tooth-ing etc. The screw head is advantageously completely enclosed in its hole 21 as illustrated in Fig. 2. If desired, the locking means can each be arranged on one side of the longitudinal axis 13 or in some other suitable place, for instance, adjacent to the longitudinal channel-like recesses 18. Clamping joints, snap-on joints and the like may also be used as alternative locking means.

[0013] The rear and front fastenings 7, 8 are preferably of a design which is previously known in the field of long-distance skates and skis and are adapted to a pre-determined boot, see especially Figs 1 and 5, in which a boot 23 is indicated by a dash-dot line. In the embodiment according to Figs 1-3, the fastenings are made in one piece with the associated fixing plate 9, 11 and are, in an alternative embodiment according to Figs 4-5, releasably fixed to a common or two separate fixing plates to be exchangeable. It goes without saying that also combinations of the above embodiments are possible.

[0014] With reference to Figs 4-5, a front fastening 8 is illustrated, which can easily be exchanged for another front fastening (not shown) if and when desired. To this end, each fixing plate comprises one or more pairs of threaded holes 24 and 24', the holes in each pair of holes 24 or 24' being positioned in an essentially symmetrical or mirror-inverted manner with respect to the longitudinal axis 13 of the fixing plate 11 and outside the recesses 18. A pair of bolts 25 are inserted through associated holes or slots 26 in the fastening 8 and are in threading engagement with the holes 24 of the fixing

plate in the embodiment here illustrated. The holes 24, 24' suitably extend through the fixing plate, and the length of the bolts 25 is selected so that the bolt end does not essentially protrude under the fixing plate and cannot interfere with the use of the skate. For the same reason, the front terminal edge portion 14 of the fixing plate, which faces the front portion of the skate (in the normal skating direction), is advantageously bevelled, as indicated by reference numeral 27, especially in the portions enclosing the end portions 17 of the T-shaped section element 4. Of course, also its rear terminal edge portion 15 can be bevelled.

[0015] The slots 26 in the front fastening 8, which are shown in Fig. 5 and which thus can also be formed in the rear fastening (not shown), are aligned with each other essentially perpendicularly to said longitudinal axis 13. As a result, the fastening can be laterally displaced to be adjusted and can also be angularly displaced in relation to the longitudinal axis by there being a certain play between the side walls of the slot 26 and the shank of the bolt 25. For the latter purpose, the slots 26 can also be slightly curved, i.e. be positioned on a circular arc having its centre in the central portion of the skate.

[0016] Fig. 6 shows that the slots 26 can alternatively be arranged side by side and in parallel with each other and be positioned essentially perpendicularly to the longitudinal axis 13. This yields essentially the same possibilities of adjustment as mentioned above. Of course, shorter bolts 25 must be used in this alternative since the holes 24 are positioned above the T-shaped section element 4. The threaded holes 21 of the fixing plate 11 can in this alternative be reached by the fact that the separate fastening 7 or 8 has a through opening or hole (not shown) which can be placed directly above the associated threaded hole 21 and give access to its screw 22.

[0017] In Figs 5 and 6, the slots 26 are oriented transversely of the longitudinal axis 13. However, it is also possible to design the slots 26 parallel or coinciding with the longitudinal axis 13, if desired for adjustment in the longitudinal direction of the skate.

[0018] With a view to adapting the skate to specially designed boots, for instance boots having one or two longitudinal recesses or grooves in the sole, each fixing plate advantageously has a guide means extending essentially along its longitudinal axis 13. The guide means is in the form of an elevation of the fixing plate or of the fastening, for instance, at least one ridge 28, 29, see Figs 1 and 3. The ridge 28 preferably diverges slightly from its top in the direction of the actual fixing plate. Moreover, the guide means or ridge 28 can be designed in a tapering or converging manner towards the central portion or centre of the skate, as indicated by the ridge 29 in Fig. 3, to allow a certain angular displacement between the longitudinal axis of the sole of the boot and the longitudinal axis 13 of the T-shaped section element. The ridge can also taper in the vertical plane towards said central portion, as also illustrated by the ridge 29

in Fig. 1.

[0019] In the description of different embodiments of the invention, an essentially T-shaped section element has been stated and illustrated in the drawings as a section with a U-shaped web and a relatively narrow flange. The designation T-shaped section element, however, should in this context also be considered to comprise a relatively thick flange, such as a rectangular flange and also a polygonal and even an oval or circular flange in cross-section. The only limiting condition of the above-mentioned definition is that the width of the flange should be substantially greater than the thickness of the web. It goes without saying that the same applies to the T-shaped groove, which should be congruent with the T-shaped section element.

[0020] The invention is not limited to that described above and shown in the drawings, and can be modified within the scope of the appended claims.

Claims

1. A skate comprising a blade (1) with an edge (2) and a longitudinal side edge (3) arranged opposite to the edge, an essentially T-shaped section element (4) fixed to the blade adjacent to and along the longitudinal side edge, a rear fastening (7) releasably fixed to the section element and a releasably fixed front fastening (8), said fastenings being adapted, in coaction, to releasably fix a boot (23) to the skate, **characterised** in that the fastenings (7, 8) are arranged on at least one fixing plate (9, 11) with a T groove (12) which extends along the longitudinal axis (13) of the entire fixing plate and which, with a play, encloses the outermost end portions (17) of the section element, which are positioned in parallel with the blade, whereby the fixing plate (9, 11) is displaceable with a sliding fit along the section element (4), and that each fixing plate (9, 11) has a locking means (21, 22) which cooperates with the circumferential surface (16) of the section element (4) for essentially infinitely variable adjustment of the fastenings (7, 8) along the longitudinal side edge (3) of the blade (1).
2. A skate as claimed in claim 1, **characterised** in that the rear fastening (7) and the front fastening (8) are each arranged on a separately displaceable fixing plate (9, 11).
3. A skate as claimed in claim 1 or 2, **characterised** in that the rear fastening (7) and/or the front fastening (8) is/are integrated with the fixing plate (9, 11).
4. A skate as claimed in any one of the preceding claims, **characterised** in that the rear fastening (7) and/or the front fastening (8) is/are exchangeably fixed to the associated fixing plate (9, 11) with the

aid of fixing means (24, 25).

5. A skate as claimed in claim 4, **characterised** in that the fixing means (24, 25) of each fastening (7, 8) comprise at least one pair of threaded holes (24, 24') in the associated fixing plate (9, 11), said holes (24, 24') being positioned essentially symmetrically with the longitudinal axis (13) of the fixing plate (9, 11), and a pair of bolts (25) which cooperate with said holes (24) and which are inserted through associated holes or slots (26) in the fastenings (7, 8).
6. A skate as claimed in any one of the preceding claims, **characterised** in that each fixing plate (9, 11) has a guide means in the form of at least one ridge (28, 29) which is positioned essentially symmetrically with the longitudinal axis (13) of the fixing plate (9, 11) and which cooperates with an associated recess in the sole of the boot (23).
7. A skate as claimed in claim 6, **characterised** in that the guide means (28, 29) is designed in a tapering manner towards the central portion of the skate.
8. A skate as claimed in any one of the preceding claims, **characterised** in that said locking means (21, 22) comprises at least one threaded hole (21) in each fixing plate (9, 11), in which hole a coacting screw (22) is arranged for frictional engagement with the circumferential surface (16) of the section element (4).
9. A skate as claimed in any one of the preceding claims, **characterised** in that the width of the section element (4) perpendicular to the blade (1) is considerably smaller than the height of the blade (1).
10. A skate as claimed in any one of the preceding claims, **characterised** in that the terminal edge portion (14) of each fixing plate (9, 11), which faces the front portion of the skate, is bevelled (27) in its portions (18) enclosing the end portions (17) of the section element (4), which are positioned in parallel with the blade (1).

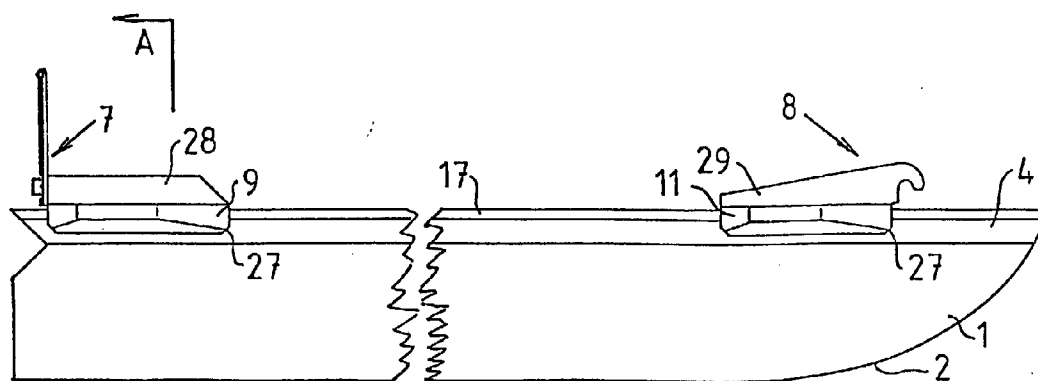


FIG 1

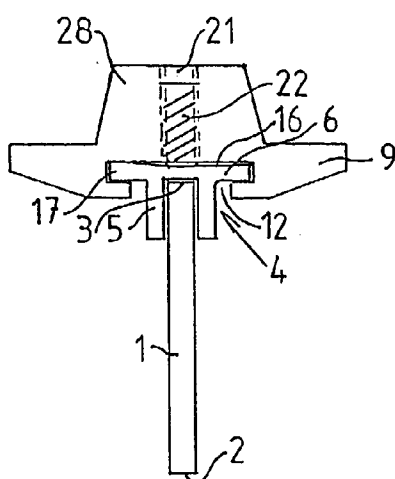


FIG 2

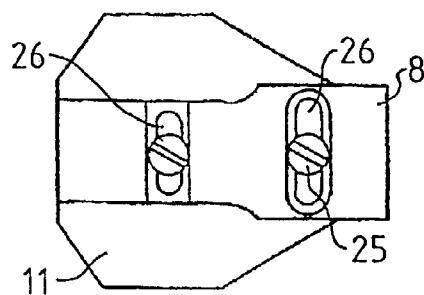


FIG 6

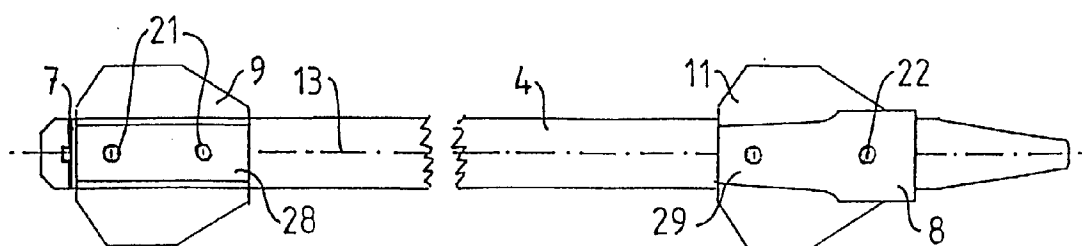


FIG 3

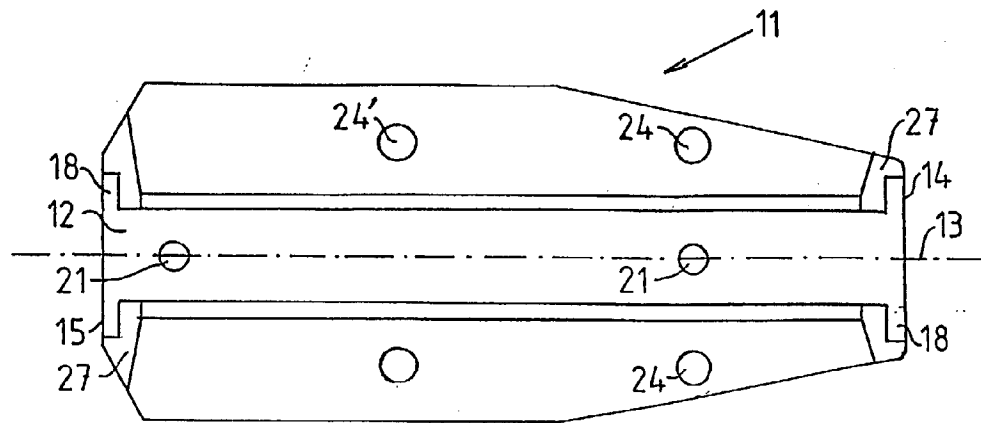


FIG 4

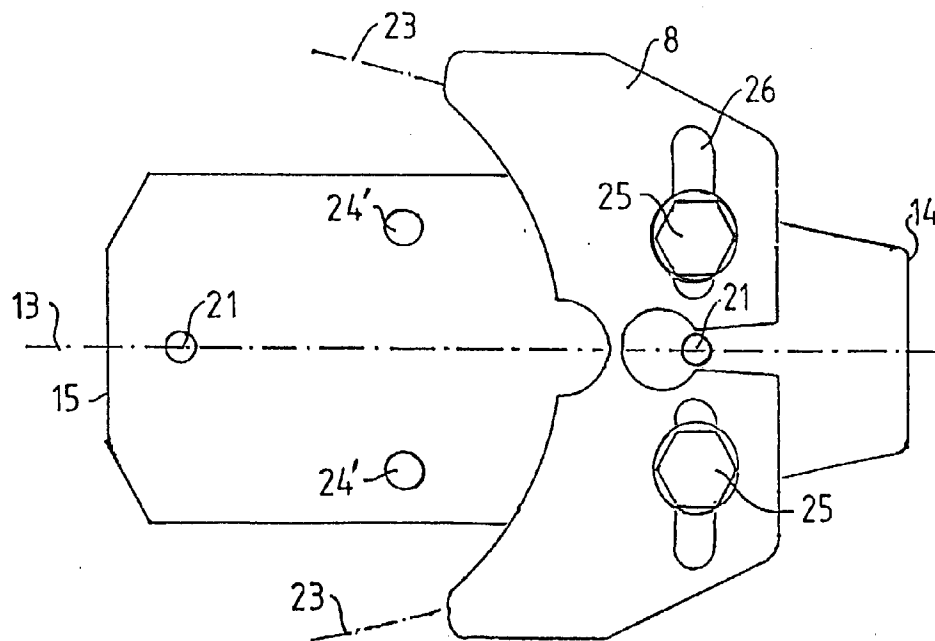


FIG 5