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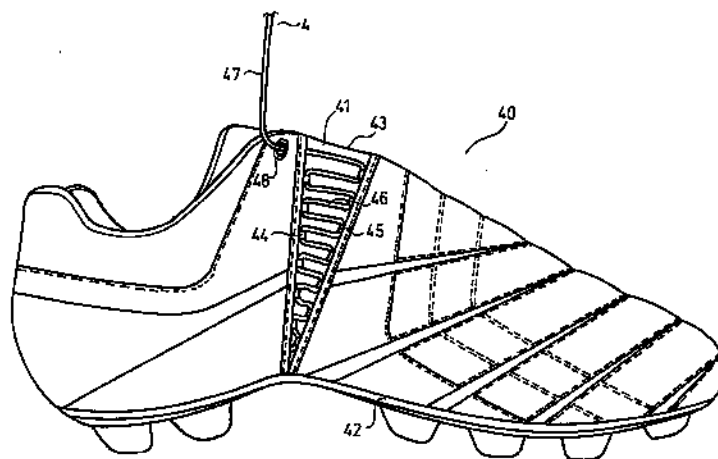
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(54) Title: LACING FOR SPORT SHOES AND A SPORT SHOE WITH SUCH A LACING



(57) Abstract: A lacing for sports shoes, whose upper (57) has an entrance opening for receiving the foot of the user. The entrance opening communicates with at least one slot (10, 41, 51) braced by the lacing. To the edges (1, 2) of the slot (1, 41, 51) spaced tabs (5, 6, 7; 26, 27) are attached, through the openings of which a lace (12, 32, 46, 56) is passed which sequentially straddles the slot 10, 41, 51). Between the lace (12, 32, 46, 56) and the opening of the tabs (5, 6, 7; 26, 27) a given frictional force is generated. At that part of the slot (1, 41, 51) which is distal from the entrance opening, the lace (12, 32, 46, 56) is held with a force significantly superior to the above-noted frictional force. The lacing has at least one lace (12, 32, 46, 56) which, following the tab closest to the entrance opening, leaves the upper (57) in an impeded manner as it approaches the entrance opening and terminates in a free thread (3 and/or 4), where the force of the hindrance is greater than the mentioned frictional force. The lacing is immobilized with a traditional binding by tying the two free threads (3, 4) projecting from the part of the upper (57) proximal to the entrance opening and further, the total number of the slots (1, 41, 51) and the laces (12, 32, 46, 56) is at least three.

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### Lacing for Sports Shoes and a Sports Shoe with such a Lacing

The invention relates to a lacing for sports shoes, whose upper has an entrance opening for receiving the foot of the user. The entrance opening communicates with at least one slot braced by the lacing. To the edges of the slot spaced tabs are attached, through the openings of which a lace is passed which sequentially straddles the slot. Between the lace and the opening of the tabs a given frictional force is generated. At that part of the slot which is distal from the entrance opening, the lace is held with a force significantly superior to the above-noted frictional force.

The invention further relates to a sports shoe having an upper, a sole attached thereto and an entrance opening for receiving the foot of the user. On the two sides of the upper, two slots are provided which extend from the sole to the entrance opening and which may be opened and closed by the lacing forming subject of the invention.

As known, it is a condition for comfortably wearing shoes, particularly sports shoes, that the shoe uniformly and positively follow the shape of the foot and surround it snugly. The relationship which develops between the upper of the shoe and the foot is correct if no increased pressure is generated at any surface, and if the force effect is uniform, that is, no gap or play appears at any location. Putting the shoe on or taking it off requires a dissolution of this form-fitting relationship. For this purpose, at the opening of the upper which receives and surrounds the leg, one or more apertures are formed which may be closed by a lace or by a flexible material. Such an aperture or apertures make possible (with a loosened lace, in case a lace is used) to increase the size of the entrance opening. The loosening and then the tightening of the shoe is traditionally effected by a lace. In case of sports shoes, hook-and-loop fasteners, buckles or an opening and closing by other fixing means have not become widely spread, because these are either not suitably strong or do not ensure sufficient adjustment possibilities for a comfortable and accurate hold of various feet. Solutions without lace, that is, entering the shoe based on its elastic expansion, cannot be used, because they are unable to ensure a shoe-holding function which would resist the forces generated.

It is a characteristic of the lace-type fastening mode that the connection is effected at the edges forming the two sides of the slot which receives the lacing and which forms part of the upper. The slot has V-shaped narrowing edges in the direction away from the location where tying takes place. The connection between the lace and the edges bordering the slot is established by passing the lace through the pass-through openings provided in the edge material. In case of sports shoes, the lace is passed through tabs projecting into the slot and sewn to the lace portion, rather than passing the lace through pass-through openings. It is characteristic of the lacing passed through the pass-through openings that the lacing is disposed in two mutually spaced surfaces, one part being above, and the other part being below the material of the upper. In such a case, the spatial requirement of the lacing in a direction perpendicular to the shoe surface is greater than or

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equal to twice the lace diameter. It is characteristic of a lacing passed through the thread-through eyelet that the lace, upon pass-through, changes direction, it directionally breaks 180°, and increased frictional forces appear between eyelet and lace. The friction and the directional break in the lace can also not be decreased below a certain magnitude by means of metal or plastic ringlets  
5 which protect the edges of the pass-through eyelets. After putting the shoe on, tying is the fastest if the lace is pulled at the tying location (that is, at that end of the slot which is closest to the user's leg), and in this manner the two lace parts approach one another automatically such that the shoe upper is uniformly tightened to the foot. In a lacing having pass-through openings, it is not sufficient to pull the lace at the tying location. This is so, because of the friction generated between  
10 the lace and the eyelets and the directional break in the lace in the individual eyelets, no sufficient pulling force remains for tightening regions at locations distal from the location of pull. Thus, in the distal locations the binding remains loose. A proper tightening may be ensured by pulling the lace in several stages, the last being a pull at the location of tying. Such a lacing procedure is relatively time-consuming, it is uncomfortable and it may easily occur that close to the distal  
15 portion, the lace is not sufficiently tight, resulting in a loosening during use. If the portions of the lace that are distal from the tying location are tightened with a greater force than necessary to ensure that they will not loosen, then the shoe may become unnecessarily tight, resulting in an uncomfortable wear. The unnecessarily large pulling forces weaken and cause wear of the lace and even of the shoe.

20 In case of sports shoes, because of the discomforts mentioned, the pass-through tab-type lacing method is more frequent. In such a case the guiding plane of the facing tabs and of those which are behind one another lie on one surface, that is, a height position of the lace does not change, which means that it does not alternatively take up a position above and below the lace portion. Nevertheless, the height dimension of the lacing is determined by twice the diameter of the  
25 lace, because the two branches of the lace cross one another. A further advantage of the lacing provided with pass-through tabs is a lesser friction generated between lace and tab, as a result of which the lace branch pulled in front (that is, at the location of tying) provides for a sufficient force between the two edges of the slot even in the region of the most distal tab. The effect of the pulling force appearing at the distal end is reduced by the friction generated due to the cross-over of the  
30 branches. In such a lacing solution too, it is a frequent occurrence that tightening has to be performed in at least two steps.

In case of both lacing modes, that is, in both solutions involving pass-through openings and pass-through tabs, the lace consists of a single thread which, during lacing, starting from the tying location, progresses by sequential thread-through, toward the distal end, then changes direction and  
35 progresses from the distal end forward and emerges in front of the other lace end, and tying is effected with the aid of the two free lace ends. Thus, the lacing consists essentially of two parts, and the parts tie together the proximal and distal ends of the slot. The two parts progressing in

opposite directions cross one another (or their planes diverge). During use not only an appropriate pulling causes difficulties, but the loosening of the lacing is also very uncomfortable. In case of the thread portions running in two directions, only one becomes loose, then, because of the fact that the two parts form one and the same thread, the other laced side is loosened too.

5 In some sports branches, particularly in soccer, the ball is directed by any surface of the tip and the upper of the shoe. The lacing occupies a relatively large area of the upper. The shorter the area occupied by the lacing proper, that is, the shorter the extension of the lacing in a direction perpendicular to the foot, the easier the covering and threading of the lacing.

The sports shoe described in International Published Patent Application No. WO  
10 2005/070246 has no lace opening at all in the middle of the upper, and thus the entire surface is available for directing the ball. In this arrangement, however, a simple fastening of the shoe on the foot is not resolved. Although some disadvantages were set forth above as concerns the traditional lacing solutions, the pulling of the lace and then its tying are doubtlessly the most wide-spread shoe-fastening methods which are rapid and comfortable.

15 US Patent No. 5,566,474 describes two independent lacing modes for sports shoes, particularly hiking shoes. In this solution the ends of the threads distal from the entrance opening are affixed to the upper. The two laces, after sequentially crossing the mutually facing two rows of tabs and their thread-through openings, progress toward the proximal end and leave the upper after  
20 which the lacing may be closed by simultaneously and together pulling the two projecting free threads. The resiliency of the foot seeks to loosen the slot after pulling. The tensioned condition is preserved only by a constant pulling of the free threads, that is, while constantly maintaining the pulling force. For the fixation of the threads in such a pulled state, the above-noted patent proposes the use of a special clasp, which is similar to the "sled" of slide fasteners. The "sled" connects the  
25 two free threads in the middle and immobilizes them in their pulled condition. Such a fastening differs to a great extent from the traditional, and does not provide for the safe hold necessary for sporting activities. The described hiking shoe is protected against loosening by a separate buckle band.

United States Patent No. 2,019,587 discloses a single-thread lacing affixed both at the  
30 distal and the proximal end, where the single thread, starting from the two fixed ends, progresses upward and, respectively, downward and in this manner passes through the series of thread-through openings formed on the two edges of the slot. Then the threads arriving from above and from below are led outward in a loop in the middle of the side, and the loop is fastened asymmetrically  
by introducing it into a flap at one side of the shoe. Such a solution cannot be used at all in sports  
35 shoes; the lacing cannot be pulled with the proper force, and the tensioned condition cannot be maintained during the sporting activity.

The publication No. FR 2 607 678 describes a similar lacing which is attached to the upper at the distal end and which emerges asymmetrically in front after passing through a few thread-through openings. The free end of the lace is placed into a flap in a condition that also cannot be properly tightened. This solution cannot be used in sports shoes.

5 Sportsmen and sportswomen and, in general, the entire population adheres to its customs; among others, to the fastening of shoes by tying. By the customary tying of the shoes it is meant that in the middle of the lacing two free threads of the lace project with which, by pulling, the lacing may be tightened, and the lacing may be immobilized by tying with a simple or double loop, while maintaining the tightened condition. The disadvantages of the traditional lacing solutions  
10 may be effectively eliminated only if the solution does not alter the customary tying modes and their customary properties.

It is accordingly the object of the invention to provide a lacing solution which preserves all the advantages of the traditional solutions, and, at the same time, reduces the danger of loosening and simplifies and facilitates the lacing procedure.

15 It is a further object of the invention to provide a lacing solution which is capable of ensuring an increase of the ball-directing surface by significantly reducing the spatial requirement of the lacing and in which the immobilization of the shoe is obtained by lacing and further, in which the lace is to be tied and has to be tied in the customary manner.

For achieving the first object of the invention, a lacing is provided in sports shoes whose  
20 upper has an entrance opening for receiving the foot of the user. The entrance opening communicates with at least one slot braced by the lacing. To the edges of the slot spaced tabs are attached through the openings of which a lace is passed which sequentially straddles the slot. Between the lace and the opening of the tabs a given frictional force is generated. At that part of the slot which is distal from the entrance opening, the lace is held with a force significantly superior to  
25 the above-noted frictional force. According to the invention, the shoe has at least one lace which, following the tab closest to the entrance opening, leaves the upper with a hindrance as it approaches the entrance opening and terminates in the free thread used for tying, where the force of the hindrance is greater than the earlier-noted friction. The lacing is immobilized traditionally by tying the two free threads projecting from the part of the upper proximal to the entrance opening.  
30 Further, the total number of the slots and the laces is at least three. The above-noted hindrance is needed for preserving, during tying, the tightening force of the lacing easily braced together by pulling the threads passed through the openings of the tabs, to provide for a briefly acting hindrance which prevents loosening while the loop is being tied. At the distal portion of the lace ensuring the significantly larger retaining force is sufficient, because the lacing may be pulled  
35 against it at the proximal end. The retaining force may be resolved by immobilizing the lace to the upper or by an interposition of a portion of increased friction.

The last-noted tying means that there are present one central slot and two laces or two slots and at least one lace.

According to an advantageous embodiment, the hindrance is constituted by the thread-through eyelet which is formed at the edge of the slot and on which the lace breaks as it changes  
5 direction which prevents a temporary loosening of the lacing.

According to a feasible embodiment of the invention, the shoe has a single slot formed in the middle of the upper, and the distal end of the lace is fixed to an edge of the slot. At the edge opposite the emerging location of the lace, an auxiliary thread is attached which terminates in a free thread used for tying and which assumes the role of a second lace. The total number of the laces  
10 and slots, which attains at least three, is reached by using the auxiliary thread as a further lace, and the auxiliary thread makes it possible to immobilize the otherwise asymmetrical lacing with the customary two-thread tying.

According to an alternative solution, again only a single central slot is used, at the edges of which two opposite rows of tabs are provided. A respective lace is threaded through the individual  
15 tab rows. The distal ends of the laces are affixed to the edges at opposite locations of fixation, and tying is effected between the free threads of the laces emerging at the proximal end. This variant resembles the earlier-noted US Patent No. 5,566,474 as concerns the use of two laces and the thread guidance, but differs therefrom significantly as concerns the fixation of the proximal end and the fixation of the threads.

According to a multi-slot variant, the sports shoe is provided with two slots which are  
20 arranged at the two sides of the entrance opening and which extend from the sole to the edge of the entrance opening. Obliquely opposite tabs are fastened to the edges of the slots. A lace is guided through the tabs of the individual slots, and the free ends of the threads leaving the individual slots are guided to the central part of the sports shoe, and, for the purpose of a traditional tying, they  
25 leave the upper at the central portion. It is indifferent from the point of view of the solution whether a single lace or two laces are used, in case the lace is immobilized with the appropriate force at the lower end of the slots.

In an advantageous solution of thread guidance, at least one respective thread-through eyelet is provided at the upper of the sports shoe following the uppermost tab of the slots, and the  
30 free threads leave the upper through these thread-through eyelets.

According to an advantageous variant thereof, following the above-noted two thread-through eyelets, at least one additional thread-through eyelet is provided, and the lacing, after leaving the first thread-through eyelets, is guided through these additional thread-through eyelets, and the location of tying is situated immediately after the last thread-through eyelet.

In accordance with a further embodiment, where the lace may be replaced in the traditional  
35 manner, the diverging portions of the only lace are guided through the two slots. At the end of the slots close to the sole and distal from the entrance opening, a lace-guiding groove and/or bore is

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provided. The lace bridges the sole through these and interconnects the two slots. The grasping of the lace is ensured by the broken direction of the thread guidance in the grooves and/or bores and by the reaction force of the respective other groove.

For immobilizing the lace, to the portion of the lace which is situated between the two slots 5 and which passes underneath the sole, an immobilizing strip is adjoined which, for immobilizing the position of the lace, is releasably coupled to the sole.

The use is assisted by providing at the lower portion of the two slots water-tight means in the laced condition.

Achieving the functioning sought after is facilitated by providing that the lace has a smooth 10 portion which is in contact with the openings of the tabs and which decreases friction, while at the hindering part it has a rougher portion which increases friction.

The invention provides a sports shoe which has an upper, a sole attached thereto and an entrance opening for receiving the user's foot. On the two sides of the upper, two slots are provided which extend from the sole to the entrance opening which may be opened and closed by the 15 discussed lacing. On the upper a short slot is provided which has a central axis coinciding with the longitudinal axis of the shoe and which permits an expansion of the upper in a determined permissible range in a direction perpendicularly to the longitudinal axis. The edges of the short slot are interconnected by a connecting leaf of elastic material. The short slot too, is in communication with the entrance opening.

20 It is to be noted that by the term "short slot" the part "short" is used only in comparison with the length of a traditional central slot used in sports shoes which have only a single, central lacing. According to the invention, the short slot does not serve for immobilizing the shoe on the foot, but only for assisting in the lateral opening of the upper. The actual immobilization is ensured by the two lacings provided in the two lateral slots. Accordingly, on the upper of the shoe, the ball- 25 directing surface is substantially larger than in cases where the lacing occupies a non-negligible surface of the upper. Although a realization is the simplest if only a single short slot is provided and it lies in the center line of the upper, the same function may be performed by several short slots.

It is advantageous to provide at least one respective thread-through eyelet in the material of 30 the upper in the region of the proximal end of the short slot, and the laces which brace the two lateral slots are brought out through these thread-through eyelets.

Covering is assisted by providing that the short slot is covered by shrouding flaps connected to the upper or by an outer layer of the upper.

The solution of the invention is set forth below in greater detail in conjunction with 35 examples based on the drawing where

Figure 1 is a schematic view of a first embodiment of the lacing according to the invention,

Figure 2 is a schematic view of a second embodiment of the lacing,

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Figure 3 is a side elevational view of a sports shoe using the lacing and shown with an open lacing,

Figure 4 is a side elevational view similar to Figure 3 and shown with a closed lacing,

Figure 5 is a top plan view of a sports shoe,

5 Figure 6 is a top plan view of a further embodiment,

Figure 7 is a top plan view of a sports shoe provided with a covered upper,

Figure 8 is a side elevational view of the sports shoe shown in Figure 7,

Figure 9 shows, at the lateral slot, a groove guiding the lace to the sole,

Figure 10 is a schematic showing, similar to Figure 9, illustrating a lace guidance in a bore,

10 Figure 11 is a cross-wise magnified illustration of a dual-surface lace,

Figures 12 and 12a are schematic showings of a lace which may be attached to the middle of the sole,

Figure 13 is a side elevational view of a slot insert which may be attached to the edge of the slot, and

15 Figure 14 is a view of the lateral slot protected by a hook-and-loop fastener.

Figure 1 shows a V-shaped slot 10 formed in the middle of an upper of an otherwise not illustrated shoe. To the edges 1 and 2 of the slot 10 tabs 5, 6 and 7 are attached, for example, sewn, and in each a respective thread-through opening is provided. The lace 12 used for fastening the shoe to the foot is arranged, as shown in the drawing, in a zigzag fashion and guided through the thread-through openings of the tabs 5, 6 and 7. The narrower part of the V-shaped slot 10 is the most distal from the tying location (that is, from the user's leg) and therefore this narrowest part is referred to as the distal end of the slot 10. On the other hand, the widest part of the slot 10 defines the tying location and is referred to as the proximal end of the slot 10.

25 The lace 12, after leaving the rearward-most tab 7, is affixed to the edge 1. Such affixation may be effected by sewing, pinning or by embedding between the layers of the material of the edge 1. Therefore, as a departure from the traditional manner, the lace 12 of the lacing shown in Figure 1 has only one free end. For reducing the danger of loosening, at the location closest to the tying, that is, at the location which is obliquely opposite and at the front, instead of a tab a thread-through eyelet 8 is formed. The lace 12 passes through the thread-through eyelet 8 from the inside outward. The end of the lace 12, after attaining the length required for tying, is provided with a hardened portion 9 for assisting in the lacing. The tying of the laces and the fastening of the shoe are traditionally effected by a knot and loop, for which purpose the two facing threads arriving from the two facing lace parts 1 and 2 are needed. In the solution illustrated in Figure 1, for the lacing 30 only a single thread is used, whose rearward portion is attached. For the tying at the front only a single free thread 11 is available. The second thread required for tying is ensured by an auxiliary thread 13 which is attached to the proximal part of the edge 2 opposite the thread-through eyelet 8.



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The auxiliary thread 13 is of the same material as the lace 12, and is attached expediently in the same manner to the location of attachment 14 of the lace portion 2 as the rearward-most end of the lace 12 is attached to fastening location 15 of the lace portion 1. At the location of tying the free threads 3 and 4 formed from the projecting portion 11 of the lace 12 and from the auxiliary thread 5 13 are available, whose tying may be performed in the usual manner.

With the above-discussed, single-thread lacing mode it is much easier to pull and immobilize the lacing as compared to the traditional, forward and backward-directed lacing, the danger of loosening is reduced, the stress on the lace is significantly lower and the height of the lacing is less, since no cross-over point is encountered. The lacing is disposed on the surface 10 connecting the thread-through openings determined by the tabs and its thickness equals the diameter of the lace.

After putting the shoe on, for the lacing procedure the free thread 3 projecting from the edge 1 should be pulled in such a manner that the direction of the pulling force coincide with the center line of the thread-through eyelet 8. In such a case the thread undergoes no directional break 15 at the thread-through eyelet 8, and the pulling force attacks the fastening location 15 through the tabs 5, 6 and 7. Between the lace 12 and the tabs 5, 6 and 7 the frictional force is relatively small, and the force of the lace 12 is directed perpendicularly to the two edges 1 and 2 to be braced together and perpendicularly to the center line of the slot 10. As a result of the reduced friction developing between the lace 12 and the tabs, an appreciable force component which coincides with 20 the axis of the slot 10 is not imparted on the edges 1 and 2, and therefore the two edges 1 and 2 and the upper are tensioned to the foot. As a result of the reduced friction, it is not necessary to perform the lacing operation in several steps. If, during the lacing operation, the user feels that the upper of the shoe is already properly tensioned on his/her foot, a knot is tied on the two free threads 3, 4, at which time the tensioned portion 11 breaks on the thread-through eyelet 8, and the friction 25 appearing in the broken condition does not allow a loosening of the tension during the tying of the knot. After tying the knot, the binding at that point maintains the lace 12 in its tightened state. By virtue of the fact that the rearward end of the lace 12 is fixed, the lacing cannot loosen from the rearward end, and therefore the shoe engages the foot in a much more stable manner. The lace 12 may also be configured in such a manner that, at its portion passed through the tabs 5-7, it has a 30 smooth (for example, plastic-coated) surface which reduces friction, and the portions continuing in the free thread 3 passed through the thread-through eyelet 8 has a non-coated, knit structure of greater friction.

Since the lacing is formed on a single curved surface, and the oppositely running threads do not cross one another, the height of the lacing too, is less and no pressure-causing local areas are 35 developing, for the elimination of which a thick and pressure-equalizing tongue would be required.

The lacing according to the invention may also be realized in a two-thread version. In such a case the two threads necessarily cross one another. Figure 2 shows such a two-thread variant. In

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Figure 2 elements corresponding to those of Figure 1 are given the same reference numerals. In this case, at the edges 1 and 2 not only the tabs 5, 6 and 7 are provided, but, facing the same, tabs 25, 26 and 27 are also present, through which the second lace 32 passes. Facing the thread-through eyelet 8, the edge 2 is provided with a thread-through eyelet 28, and the portion 31 of the lace 32 usable for tying the shoe, is led out through the thread-through eyelet 28 and constitutes the free thread 4. The rearward-most end of the lace 32 is attached to the edge 2 at the fastening location 35. The solution shown in Figure 2 is such, as if the lace of a traditional lacing were cut at the rearward-most portion and the thus-obtained two lace ends were attached to the facing edges. It is an advantage of this solution that two mutually crossing laces 12 and 32 are used, whose pulling generates forces independent from one another. In case one of the threads constituting the laces 12 or 32 loosens, then the loose lacing does not result in the loosening of the other thread. The single thread used in the traditional lacing is twice the length compared to the individual length of the laces 12 and 32 shown in Figure 2 and, as concerns loosening, the elastic expansion of the entire thread length has to be taken into consideration. In case of identical dimensions and thread diameters, the elastic deformation is one half in the solution according to Figure 2. Fastening the two laces 12 and 32 at the distal end results in a more efficient tightening of the threads or their ability to be tightened. In the solution according to Figure 2, the advantages of the solution according to Figure 1 appear but, on the other hand, the two laces cross one another at several locations and there the height dimension will double. The locations of cross-over increase the friction but, at the same time, reduce the danger of loosening. It is the advantage of the solution that tying the free threads 3, 4 is effected in the customary, traditional manner.

The advantages of the single-thread lacing according to the invention manifest themselves particularly if putting on and taking off the shoe is made possible not by the only slot 10 arranged in the center line of the upper, but, according to the solution set forth in the earlier-noted International Published Application No. WO 2005/070246, by two slots which are disposed on the two sides of the sports shoe and which extend to the edge of the sole and the entrance opening. In such a case, in the middle of the sports shoe, because of the lacing, no slot is needed at all, or, even if some slot is present, it is not necessary to lace it for closing purposes. For this reason, the central slot may be much shorter than the customary slots used for lacing, and the entire upper and frontal surface of the shoe is available for directing the ball.

Turning now to Figures 3 and 4 which show the thus-formed sports shoe 40 in side elevation in an open (Figure 3) and in a closed (Figure 4) state. At the side of the upper of the sports shoe 40 a slot 41 is provided which extends from the sole 42 of the shoe to edge of the foot-entrance opening of the upper. The sports shoe 40 is basically of symmetrical design, and therefore the slot 41 is situated not only on the right side as shown in Figure 3, but may be found also on its left side.

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In Figure 3, the slot 41 of the sports shoe 40 is entirely open, at which time the sole 42 is at an obtuse angle in a slightly bent position. The inside of the sports shoe 40 is closed watertight by the elastic closing flap 43 positioned behind the slot 41. Along the slot 41 on either side, in a dense distribution a respective row of tabs is provided, of which the tabs 44 belonging to the rearward portion and the tabs 45 belonging to the forward portion are shown. The slot 41 may be opened and closed by the lace 46. In the embodiment according to Figures 3 and 4, the lower end of the lace 46 is fastened in the vicinity of the sole 42, and its upper portion 47 constitutes the free thread 4 which extends freely beyond the thread-through eyelet 48 and may be used for tying. It is to be noted that because of the symmetrical design, the same kind of lace thread extends outward from the slot (not visible) on the left side of the sports shoe 40. The position of the thread-through eyelet 48 is essentially identical to the thread-through eyelets 8 and 28 shown in the central-slot solution of Figures 1 and 2. The single thread per lacing of the two lacings arriving from the two lateral slots emerges from the upper of the sports shoe 40 as in the traditional, single-slot shoes, and therefore their pulling and tying too, occur in the usual manner.

While Figure 3 shows the sports shoe in the open state, Figure 4 illustrates the same sports shoe in a closed position. The slot 41 is entirely covered by the edges approached to one another. The edges are closed in such a manner that the slot 41 only appears as a decorative seam, its openable structure is entirely covered. In this state the sole 42 assumes its normal position.

The shoe illustrated in Figures 3 and 4 is provided on either side with a respective slot, each of which is of the single-thread design, as already shown in Figure 1. Since on both sides a respective slot may be found, the auxiliary thread 13 shown in Figure 1 is not needed, because its role is assumed by the portion of the lace on the opposite side, as it leaves the shoe.

Figures 5-8 show several expedient configurations of the central portion of the sports shoe 40. Entering into and taking off the sports shoe 40 are assisted to a significant extent if besides the bilaterally provided slots 41 and 51 the upper resiliently expands in the middle, at the foot-entrance opening. The extent of the expansion is much less than in case of the so-called loafers, where such an elastic change of dimension makes possible to put the shoe on. In the middle of the shoe a short slot 52 is provided whose edges are interconnected by a bridge 53 made of an elastic material. The bridge 53 expands to a given extent, but its expansion is limited. It is of advantage to provide that the bridge 53 is covered by two covering flaps 54, 55 which lie in the plane of the upper of the shoe. Below the bridge 53 and the covering flaps 54, 55 a traditional tongue 56 is situated. It may be seen in Figure 5 that the presence of the slot 52 barely reduces the ball-directing surface of the shoe, because the covering flaps 54, 55 may be used without hindrance for directing the ball. Besides, they are short and take up much less space than lacings of the central slot type. In the sports shoe described here, two free threads 3, 4 led out of the respective thread-through openings at the usual location may again be found.

Figure 6 shows an alternative solution, where in the middle the slot 52 is relatively larger (but smaller than in the case of traditional lacings), and on either side of the slot 52 respective two thread-through eyelets 48, 49 are provided. The laces 45, 56 on the two sides are provided with the traditional cross-over tying. From viewing above, this sports shoe has a tying arrangement, as if it were a normal gymnastics shoe, yet the force of tying is basically determined by the bracing of the two laterally provided slots 41 and 51. The single central cross-over provides for an increase in protection against loosening, and, at the same time, it also has an aesthetic role.

In the solution shown in Figures 7 and 8, the upper of the shoe has a configuration that determines its entire ball-directing surface. In its middle it is formed in a tongue-like fashion, and the upper 57 covers the underlying middle slot by means of the bridge of elastic material and also the bilaterally formed slots 41, 51. Of these slots the slot 41 is visible in Figure 8 which is the side elevational view of the same shoe. Tying is performed in the traditional manner by means of the free threads 3 and 4.

In case of the sports shoe having two lateral slots 41, 51 shown in Figures 3-8, increased attention has to be given to a watertight closure of the slots, that is, care has to be taken that when the lacing is closed, no moisture be able to penetrate into the shoe. Apart from a suitable seal, a further aspect has to be considered, namely, that the athletes, as concerns their shoes used earlier, have become accustomed to the fact that every shoe has but one lace and, if needed, it can be easily replaced.

In the embodiments discussed so far, the distal end of the lace is fastened to the edge of the slot; such a fastening may be expediently loosened. Each shoe, however, is provided with two laces, or with one lace and an auxiliary thread. The discussed lacing principle requires only that the slot be closable by means of the free thread of the lace at the proximal end, for which at the distal end a resisting force required for the closing has to be ensured. For such a purpose, however, a (releasable or permanent) fastening of the distal lace end to the upper is not the only solution; in case bilaterally a respective slot is used, there is no absolute need for two separate laces.

Figures 9-14 illustrate the use of a single lace in shoes provided with two lateral slots 41, 51 and also show several advantageous embodiments as concerns a watertight closure.

In Figure 9 a lace 46 is shown which is threaded through the tabs 44, 45 and whose upper portion continues in the free thread 4 projecting beyond the thread-through eyelet 48 and is usable for tying. The sole 42 of the sports shoe is, for clarity, shown in an exaggerated thickness in Figures 9 and 10; the customary thickness is better shown in Figures 3-7. For the lace 46 a groove 60 is formed as a continuation of the lower end of the V-shaped slot 41. The lace 46, after leaving the lowermost tab and fitting into the groove 60, passes across the (not visible) sole of the shoe to a groove which is formed below the other slot 51 structured on the other side identically to the slot 41, and then passing through the tabs provided there, has, on the top, a free end adapted for tying. By virtue of threading through the sole, slots 41 and 51 may be opened and closed by pulling the

two free threads 3 and 4 of the single common lace 46. Nevertheless, the thread fastening necessary for closing, does take place at the bottom of the slots 41 and 51. This is so since the lace 46, leaving the lower tab and lying in the groove 60, on the sole and in the opposite groove, gives rise to a frictional force which will be much greater than the friction which appears in one tab row. Pulling  
5 the other side, the lace is stressed in the direction of tensioning which increases the degree of fastening. As a result, the single lace 46 passed through the tab rows of the bilateral slots, is also satisfactory as concerns the functioning according to the invention, that is, by pulling each thread led out of the proximal end of each slot, the latter may be closed or may be released. The retaining force may be increased in a known manner by a wedge-like shape of the groove. While it is not  
10 shown in Figure 9, but is nevertheless self-evident that for the lace to be guided through the sole, in the latter a suitable depression or groove has to be provided. Instead of the groove 60 open at both ends, the variant shown in Figure 10 may also find application, according to which the groove 60 does not run through the entire thickness of the sole 42, but terminates in a respective bore 61, 62. The upper bore 61 leads to the lower inner end of the slot 51, while the lower bore 62 either leads  
15 through the sole 42 or merges obliquely into the bottom of the sole. The path of the lace 46, after leaving the lower tab, continues in the groove 63 through the upper bore 61 and leaves the groove 63 through the lower bore 62. Thereafter, the lace 46 arrives to the other side of the sports shoe at the similarly arranged lace-guiding system through a non-illustrated groove or the throughgoing bore 62 and there proceeds along the lacing of the other slot 41 and terminates in the free thread 3.

20 Figure 11 shows an advantageous solution of the lace 12 which is illustrated on a distorted scale in the transverse direction and which may be used in connection with the lacings illustrated in Figure 1-8. The lace 12 has a smooth portion 64 leading through the tabs 5-7 and as a continuation, has a rougher portion 65; the free thread 3 or 4 constitutes one part of such a rougher portion 65. At the distal end of the lace 12 which, at the same time, terminates the smooth portion 64, a conical  
25 stop 66 is provided which fits into the ring eyelets formed at the distal end of the slot braced by the lace 12 and immobilizes it with its base of greater dimension than the ring eyelet. Such an immobilization may be arranged, for example, at the fastening locations 15 and 35 shown in Figures 1 and 2. The lace 12 may be simply pulled out of the lacing in the other direction and may be replaced.

30 The two smooth portions 64 of the lace 12 according to Figure 11 may be moved with little friction in the openings of the tabs 5-7 and, at the same time, the portion 65, made of an appropriate woven material, passes through the thread-through eyelet 8 at the proximal end. When its direction breaks at that location, a large friction is generated between it and the thread-through eyelet which maintains in place the pulled lace 12 with the earlier force during knotting and tying. Because of its  
35 large surface friction, the lacing of the shoe is protected from loosening and from release.

The lace 46 shown in Figures 12 and 12a braces the two lateral slots 41, respectively, 51 of the sports shoe by passing through the sole 42 of the shoe. In the middle of the lace 46 a fastening

plate 67 is releasably fitted and attached to the sole 42 and provided with several bores 68. It is seen in Figure 12a that downward projecting pins 69 made of the material of the sole 42 fit into the bores 68 of the fastening plate 67 and prevent a displacement of the latter. The lace 46 has two smooth portions 64a and 64b connected to the fastening plate 67 and further has, as their  
5 continuation, two rougher portions 65a and 65b, whose role is the same as discussed in connection with Figure 11. The pins 69 expediently have a spherical head which is wider than their neck and which may be introduced with a resilient deformation into the bores 68 of the fastening plate 67; their task is to temporarily immobilize the fastening plate 67.

Figure 13 shows a slot insert 70 which may be fixed, for example, by sewing, to the inside  
10 of the edges bordering the two lateral slots. The slot inserts 70 may be made of a watertight plastic sheet material which enhances the watertight closure of the two slots. The broken line indicates, for example, the seam line. The slot insert 70 simplifies the manufacture and provides for an increased watertight property by virtue of its configuration.

Figure 14 shows a second solution for augmenting imperviousness to water. In this solution  
15 the lower region of the opposite outer, lower edges of the slot 41 are covered by inserts of a hook-and-loop fastener 71, 72, and in the closed state of the slot 41 the closing flap 73 shown in its out-folded position in Figure 14, may be bent back onto the inserts of the hook-and-loop fastener 71, 72. As a result, the bottom of the slot 41 is protected from the penetration of dirt, mud or water.

The above-discussed embodiments of the solution according to the invention provide  
20 teachings to those skilled in the art for realizing further, non-illustrated embodiments. Of the numerous advantages of the solution, the stable, easy and simple opening and closing of the lacing are to be underlined and that they ensure comfort while putting on the shoe, during its wear and also ensure a stable support by the shoe. The increased ball-directing surface is particularly advantageous due to the omission of the large-dimension central slot and lacing. The fastening of  
25 the shoe is traditional, but simpler and further, the danger of loosening is significantly less.

While the invention was demonstrated in the described embodiments particularly for sports shoes, the described advantages, or their significant part also manifest themselves in case of ordinary street shoes or special-purpose shoes.

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## Claims

1. A lacing for sports shoes, whose upper (57) has an entrance opening for receiving the foot of the user; the entrance opening communicates with at least one slot (10, 41, 51) braced by  
5 the lacing; to the edges (1, 2) of the slot (1, 41, 51) spaced tabs (5, 6, 7; 26, 27) are attached through the openings of which a lace (12, 32, 46, 56) is passed which sequentially straddles the slot  
10 10, 41, 51); between the lace (12, 32, 46, 56) and the opening of the tabs (5, 6, 7; 26, 27) a given frictional force is generated; at that part of the slot (1, 41, 51) which is distal from the entrance opening, the lace (12, 32, 46, 56) is held with a force significantly superior to the above-noted  
15 frictional force, **characterized** in that the lacing has at least one lace (12, 32, 46, 56) which, following the tab closest to the entrance opening, leaves the upper (57) in an impeded manner as it approaches the entrance opening and terminates in a free thread (3 and/or 4), where the force of the hindrance is greater than the mentioned frictional force; the lacing is immobilized with traditional binding by tying two free threads (3, 4) projecting from the part of the upper (57) proximal to the  
20 entrance opening and further, the total number of the slots (1, 41, 51) and the laces (12, 32, 46, 56) is at least three.

2. The lacing as defined in claim 1, **characterized** in that the hindrance is caused by a thread-through eyelet (8) which is formed at the edge (1, 2), through which the lace (12, 36, 46, 56) is passed and on which it breaks as it changes direction during tying.

20 3. The lacing as defined in claim 1, **characterized** in that a single slot (10) is provided in the middle of the upper of the shoe, and the distal end of the lace (12) is attached to one edge of the slot (10), and an auxiliary thread (13) is attached to the other edge opposite the pass-through location of the lace (12), wherein the auxiliary thread (13) performs the role of a second lace and terminates in a free thread (1) used for the tying.

25 4. The lacing as defined in claim 1, **characterized** in that a single slot (10) is provided in the middle of the upper of the shoe, and in an opposite arrangement two rows of tabs (5, 6, 7; 25, 26, 27) are provided at the slot edges (1, 2), and a respective lace (12, 32) is passed through the respective tab rows; the distal ends of the laces (12, 32) are affixed to the edges (1, 2) at fastening locations (15, 35), and the tie is realized between the free threads (11, 31) of the laces (12, 32)  
30 emerging from the proximate end.

5. The lacing as defined in claim 1, **characterized** in that the lacing has, on either side of the entrance opening, two slots (41, 51) which extend from the sole (42) of the sports shoe (40) to the edge of the entrance opening, and to the edges of which mutually obliquely opposite tabs (44, 45) are attached, wherein a lace (46, 56) is passing through the tabs (44, 45) of the respective slots  
35 (41, 51), and the free threads (3, 4) leaving the respective slots (41, 51) are guided to the mid portion of the sports shoe (40) and leave the upper at the mid portion for allowing the traditional tying.

6. The lacing as defined in claim 5, **characterized** in that at least one respective thread-through eyelet (48) is provided in the upper (57) of the sports shoe (40) following the uppermost tab of the slots (41, 51), and the free threads (3, 4) leave the upper (57) through them.

7. The lacing as defined in claim 6, **characterized** in that at least one further respective  
5 thread-through eyelet (49) is provided in the shoe (40) following the two noted thread-through eyelets (48), and the lacing is passed through these further thread-through eyelets (49) after leaving the first thread-through eyelets (48), and the location of tying is situated immediately after the last thread-through eyelet (49).

8. The lacing as defined in claim 5, **characterized** in that divergent portions of a single  
10 lace (46) pass through the two slots; wherein a lace-guiding groove (60) or bore (61, 62) is formed at the end of the slots (41, 51) proximal to the sole (42) and at its distal end from the entrance opening; the lace (46) bridges the sole through the lace-guiding groove (60) or bore (61, 62) and interconnects the two slots, and the grasping of the lace (46) is ensured by the reaction force of the thread guidance of the directional break in the grooves or the bores and by the reaction force of the  
15 respective other groove.

9. The lacing as defined in claim 8, **characterized** in that a fastening plate (67) joins the portion of the lace (46) which passes below the sole (42), wherein the fastening plate (67) releasably joins the sole for immobilizing the position of the lace (46).

10. The lacing as defined in claim 5, **characterized** in that watertight sealing means are  
20 provided at the lower portion of the two slots (41, 51) active in the laced state of the slots.

11. The lacing as defined in claim 1, **characterized** in that the lace (12) has a smooth portion (64) which joins the openings of the tabs and which reduces friction and the lace (12) has, at the hindered part, a rougher portion (65) which increases friction.

12. A sports shoe having an upper (57), a sole (42) affixed thereto and an entrance opening  
25 for receiving the foot of the user; on either side of the upper (57) two slots (41, 51) are provided which extend from the sole to the entrance opening; the slots (41, 51) are openable and closable by means of the lacing defined in claim 5, **characterized** in that on the upper (57) a short slot (52) is provided which has a central axis coinciding with the longitudinal axis of the shoe and which permits in a determined region an expansion of the upper in a direction perpendicular to the  
30 longitudinal axis, wherein the edges of the short slot (52) are connected by an elastic connecting strip (53) and further wherein the short slot (52) too, is in communication with the entrance opening.

13. The sports shoe as defined in claim 12, **characterized** in that in the region of the proximal end of the short slot (52) at least one respective thread-through eyelet (48) is formed on  
35 the upper material which borders the short slot (52), and the laces (46, 56) which brace the two lateral slots (41, 51) are led out through the thread-through eyelets (48).



14. The sports shoe as defined in claim 12, **characterized** in that the short slot (52) is covered by covering flaps (54, 55) adjoining the upper (57) or by an outer layer of the upper (57).

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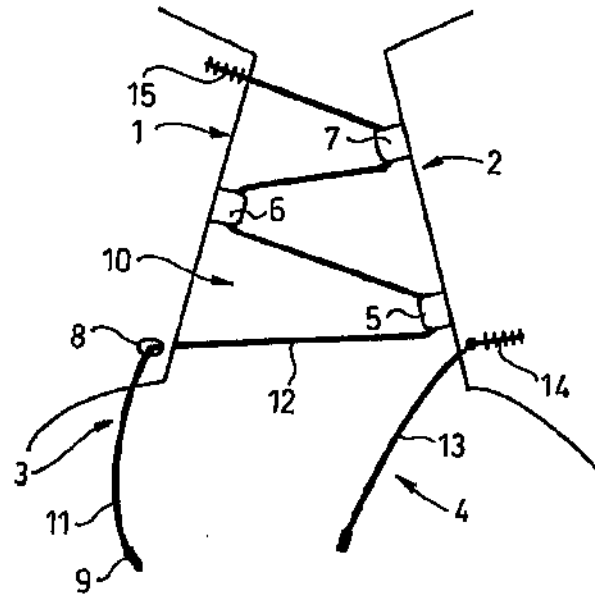


Fig. 1

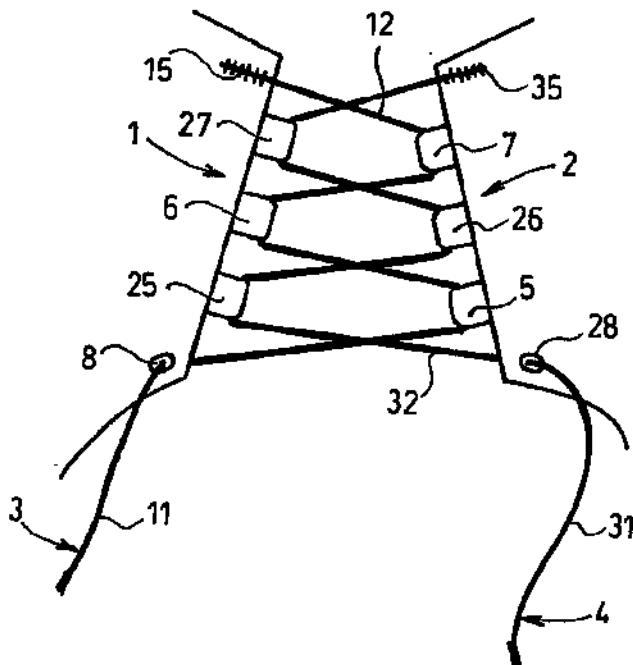


Fig. 2

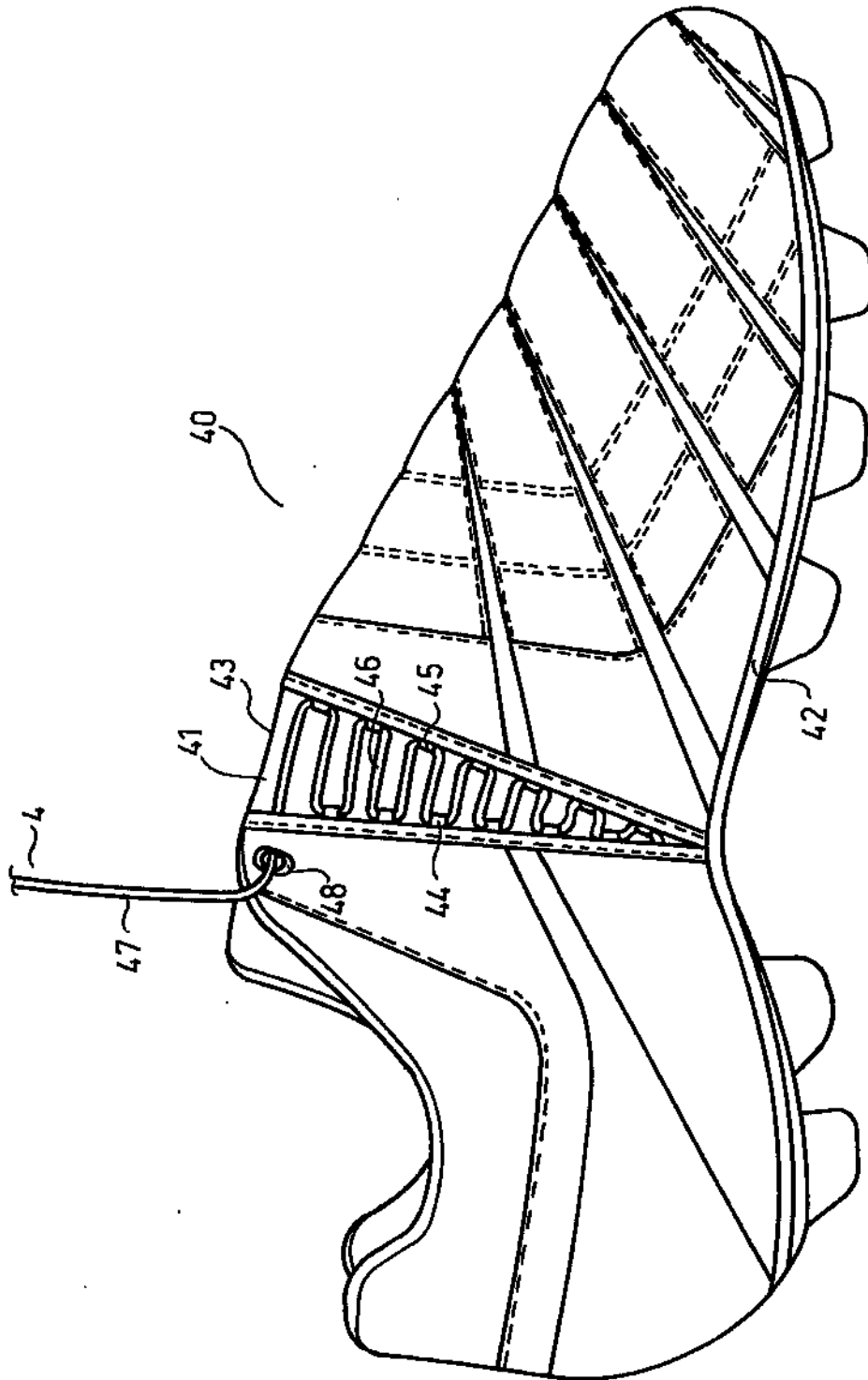


Fig. 3

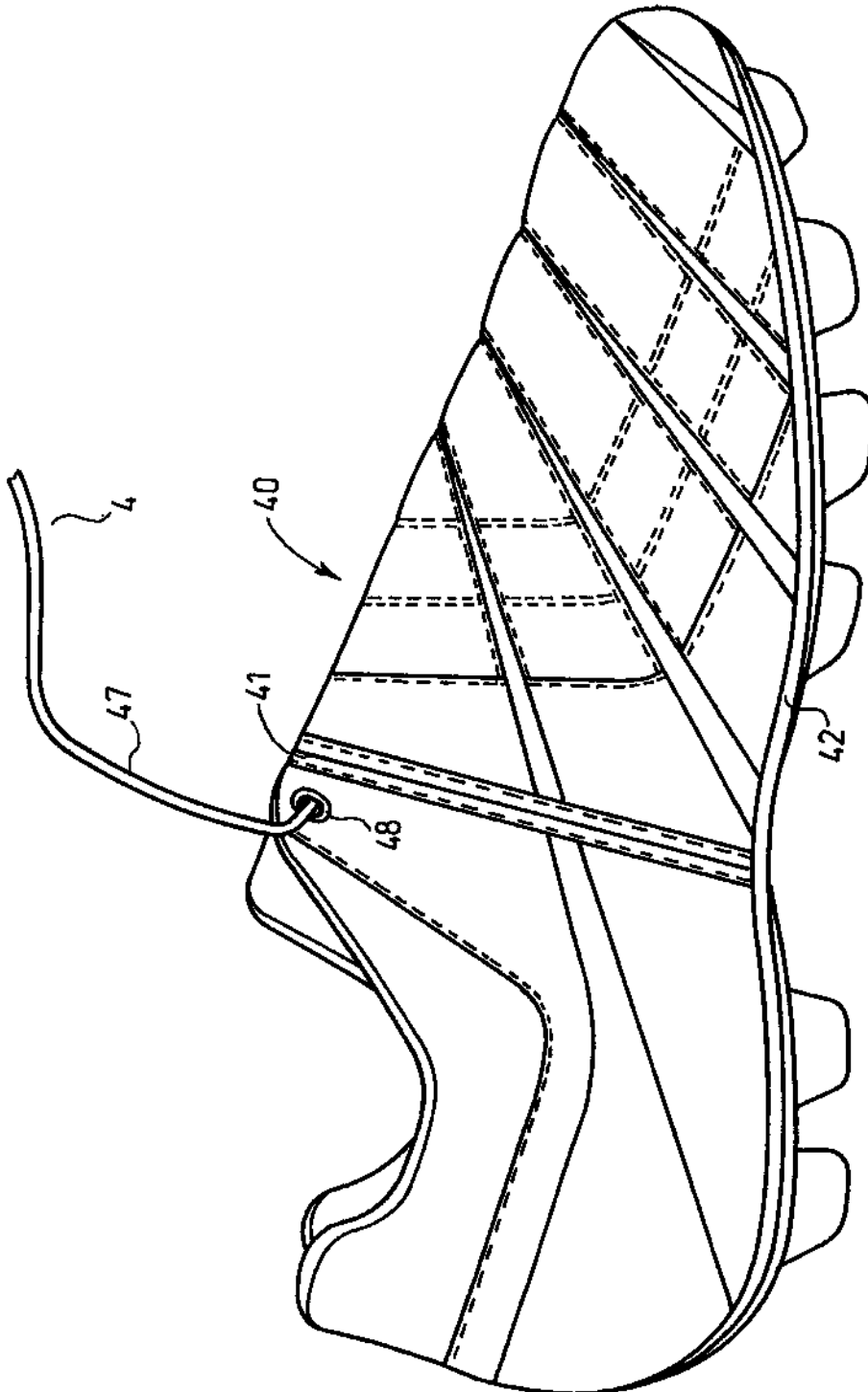


Fig. 4

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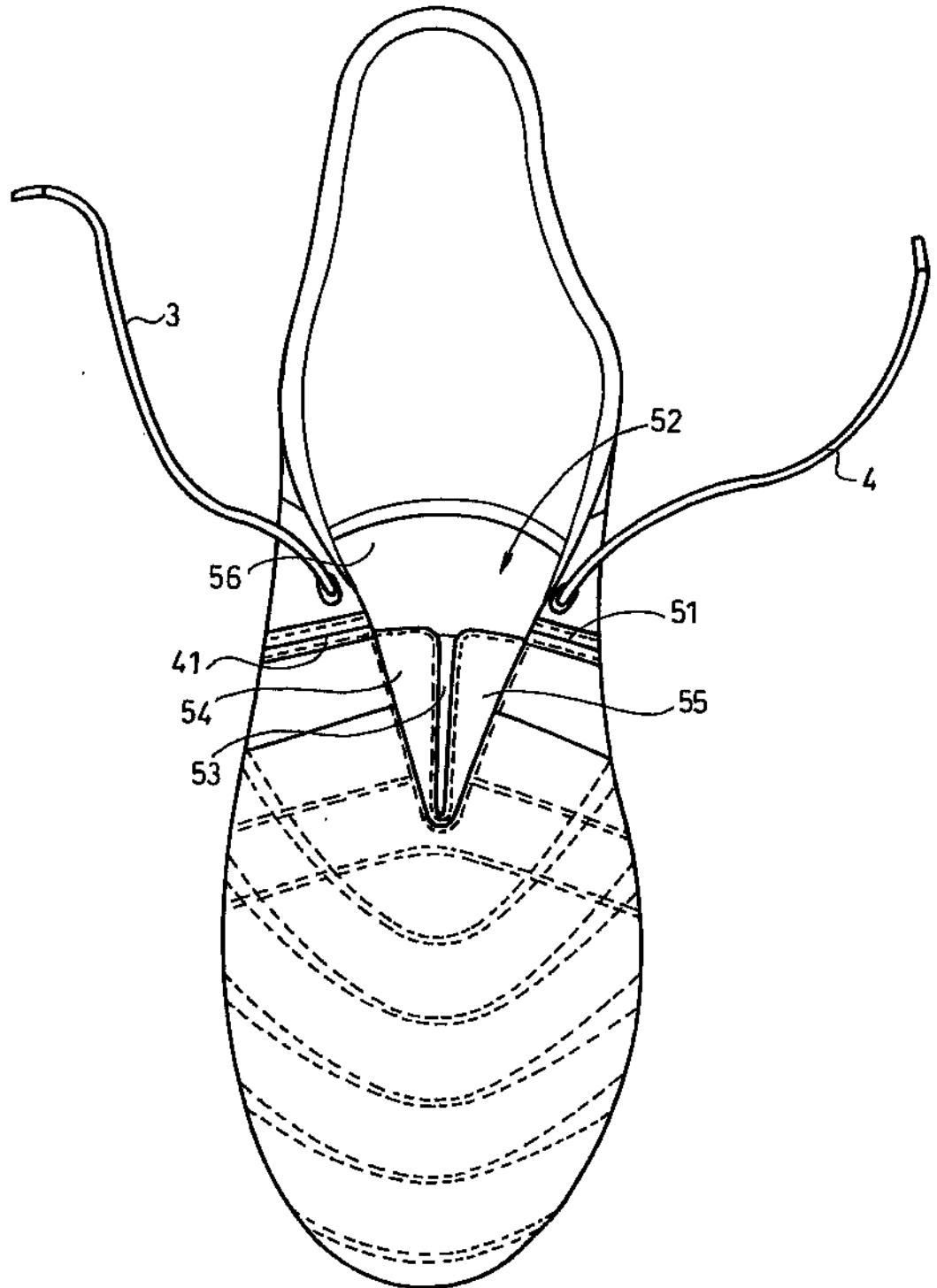


Fig. 5

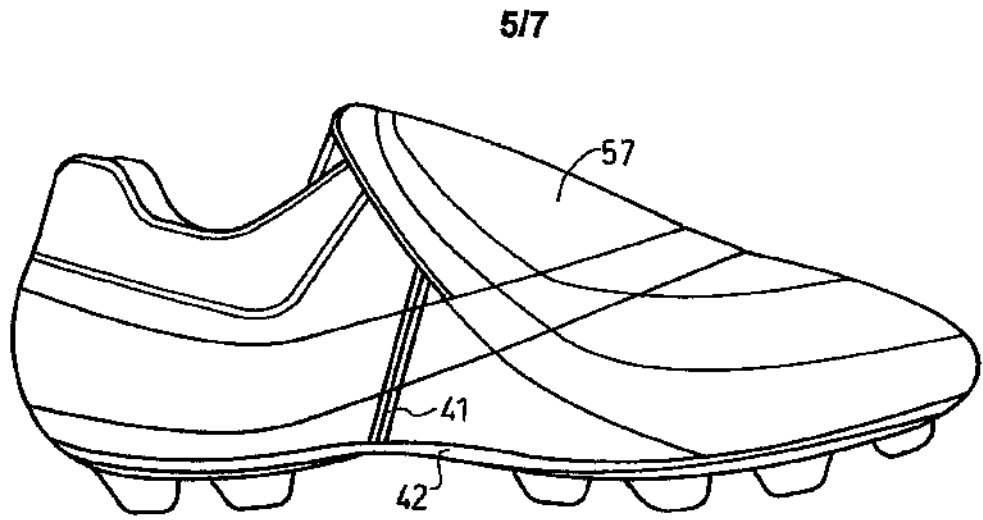


Fig. 8

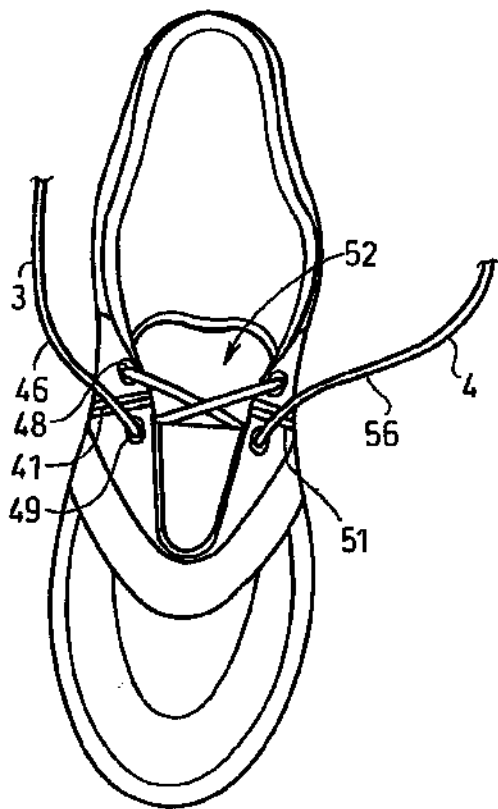


Fig. 6

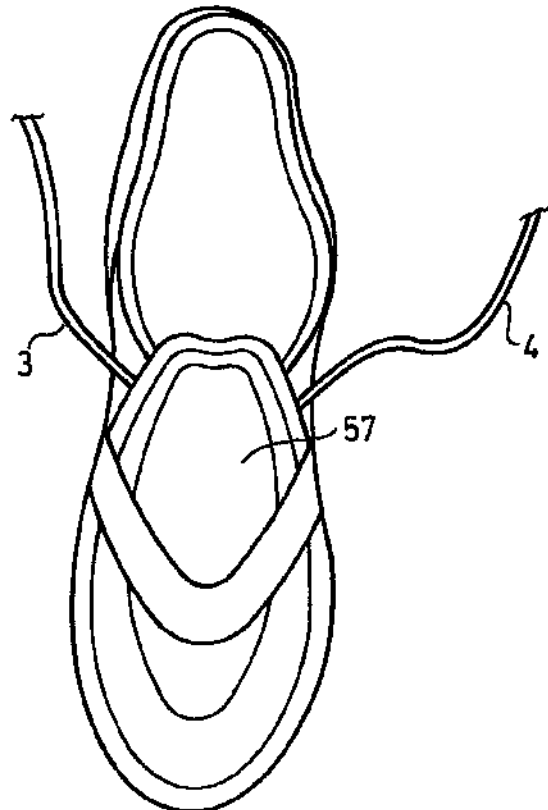


Fig. 7

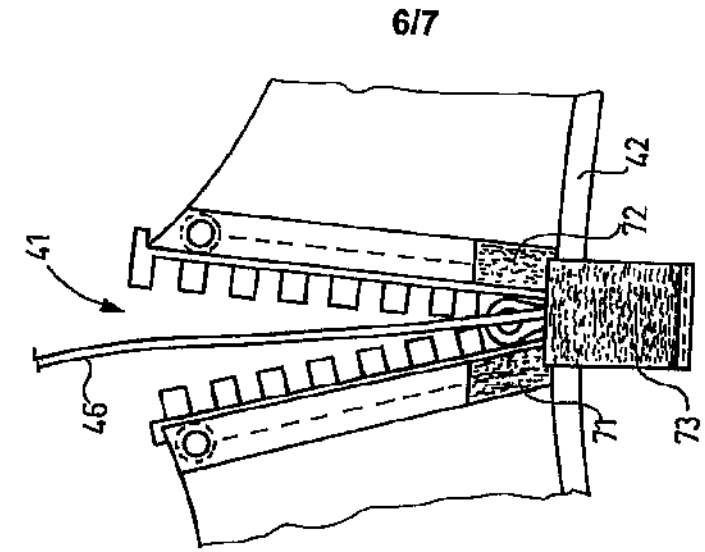


Fig. 14

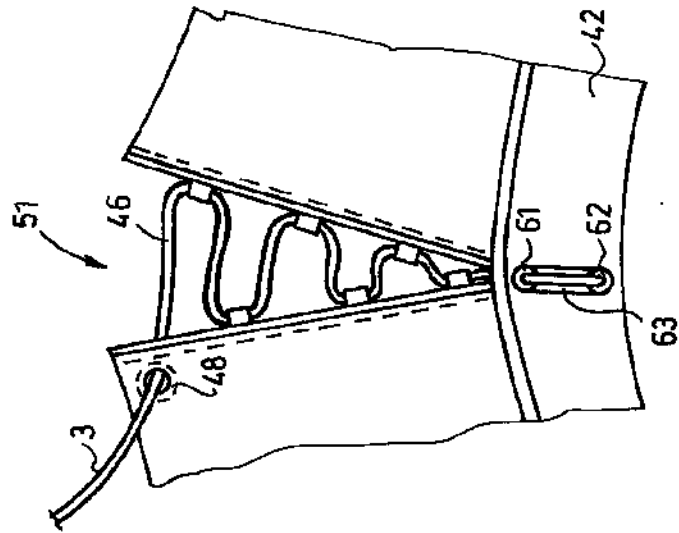


Fig. 10

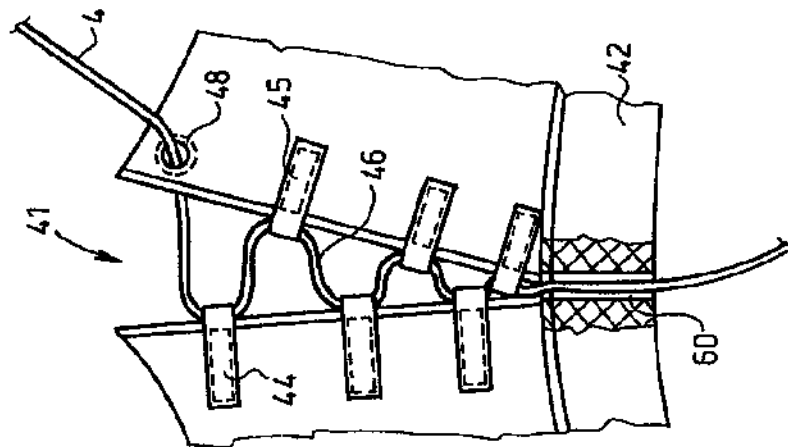


Fig. 9

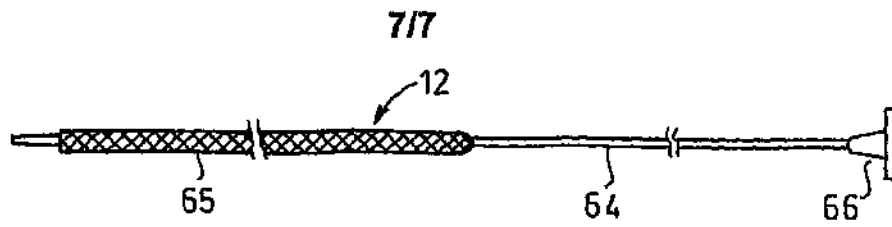


Fig. 11

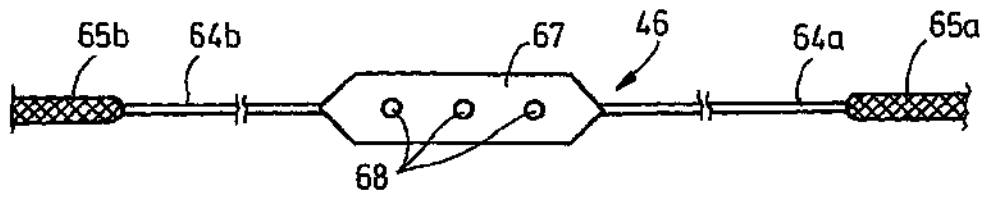


Fig. 12

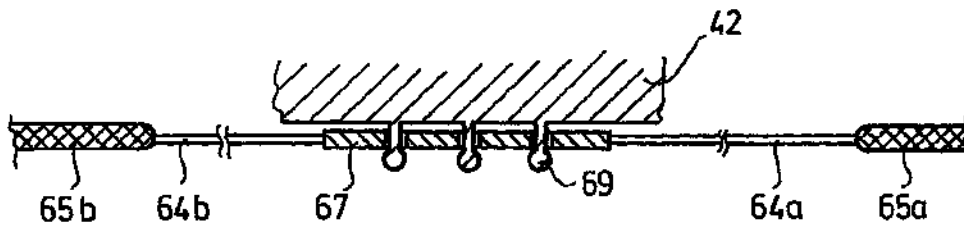


Fig. 12a

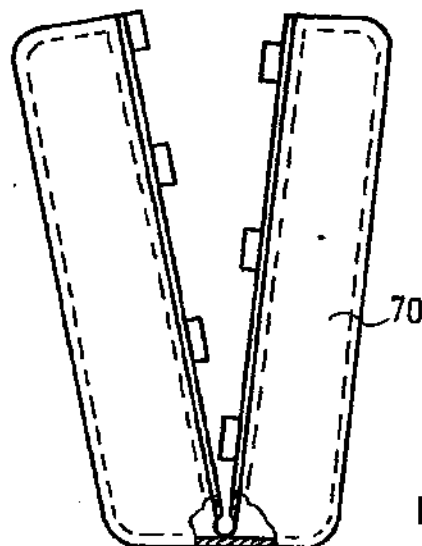


Fig. 13



**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/HU2006/000066

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
INV. A43C1/04	A43C9/00	A43C7/00 A43C1/00
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) A43C A43B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 4 817 303 A (SELBINGER LAWRENCE [US]) 4 April 1989 (1989-04-04) column 5, line 45 - line 66; figures	1,2,5-7, 12-14 10,11 8
Y A	FR 2 783 678 A1 (BIBOLLET JEAN CLAUDE [FR]) 31 March 2000 (2000-03-31) the whole document  page 5, line 17 - line 18; figures	10  1,5, 12-14
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	-/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the International filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the International filing date but later than the priority date claimed "T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the International search  30 November 2006		Date of mailing of the International search report  07/12/2006
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3018		Authorized officer  Schölvinck, Thérèse

## INTERNATIONAL SEARCH REPORT

International application No

PCT/HU2006/000066

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Information on patent family members

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