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## (54) FOOTWEAR LACE LOCKING ASSEMBLY.

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## Description

### Technical Field

This invention relates generally to improvements in the lacing assembly for an article of footwear, and more particularly to an improved lacing assembly for an article of footwear in which lower and upper vamp sections can be selectively adjusted and maintained to fit different portions of the foot independently while utilizing a continuous single lace between said vamp sections.

### Background Art

Three prior patents of particular interest in this field are US Patent No. 3,546,796, US Patent No. 4,200,998 and US Patent No. 4,538,367. All three patents are commonly owned by the owner of this invention. A fourth patent of interest is US Patent No. 1,434,723.

In this first patent an athletic shoe is disclosed having separate, or split, lower and upper vamp sections. In this shoe, each vamp section includes a separate lace and, while it is intended that each vamp section can be adjusted to suit separate portions of the foot, there are disadvantages in using separate laces for each vamp since this results in having four lace ends and two bows on each shoe. The second patent overcomes this problem to some extent by providing a single continuous lace which extends between split upper and lower vamp section and a central clamp which is disposed between the upper and lower vamp section for selectively adjusting the fit. This lacing arrangement overcomes the aforementioned problem of having additional lace ends and bows, but the single centralized clamp provided on each shoe is somewhat complicated and requires more manual dexterity to operate than is desirable in some cases. The third patent is the closest known prior art and discloses a continuous lace extending between multiple split vamp sections. At the upper end of the lower vamp section opposed lace-receiving locking means are provided in the form of D-ring connectors. While this is an effective locking means it requires the use of special attachment locking means.

The fourth patent discloses a variation of a conventional rolled eyelet having a V-shaped offset. The lace is bunched up into the eyelet V-shaped offset in order to hold it in place.

The present invention is defined in the appended claims and one embodiment provides a lacing assembly for an article of footwear, which is particularly suitable for use with an athletic shoe, the assembly providing for adjusting and maintaining the fit of the lower vamp section independently of the upper vamp section and utilizing a single continuous lace presenting a normal appearance and having the capability of being conventionally tied at the upper end.

This lacing assembly provides a first vamp section including opposed vamp portions and a second vamp section, disposed upwardly adjacent of the first vamp section and including opposed vamp portions; the first vamp portions having an upper end and a lower end and a plurality of lace-receiving eyelets including a pair of opposed eyelets disposed at said upper ends; the second vamp portions having an upper end and a lower end and a plurality of lace-receiving eyelets including a pair of opposed eyelets disposed at said lower ends, adjacent said first vamp portion upper end eyelets; at least one pair of adjacent end eyelets including locking means, and a single continuous lace having opposed side lengths, said side lengths being received by opposed lace-receiving eyelets in said first vamp portions, and said side lengths extending between said first and second vamp sections and being received by opposed lace-receiving eyelets in said second vamp portions, said lace being received by said lace-receiving locking eyelets in selectively lockable relation to permit the first vamp section to be adjusted and maintained in adjustment substantially independently of the second vamp section.

The locking means includes slits receiving said continuous lace in locking relation.

It is another aspect of this invention to provide that the upper end eyelets of the first vamp portions and the lower end eyelets of the second vamp portions both include locking means.

Another aspect of this invention is to provide that said locking means includes an eyelet opening and an apertured lock member disposed below said eyelet opening and attached to its associated vamp portion said lock member including overlap portions defining a slit receiving said continuous lace in locking relation.

It is still another aspect of this invention to provide that the locking means include an eyelet opening and a transversely disposed and inwardly extending slit communicating with said eyelet opening.

It is an aspect of this invention to provide that the locking means includes a plate portion having an opening and a communicating slit extending diagonally inwardly of said associated vamp portion.

Another aspect of this invention is to provide that each plate portion includes a substantially straight margin portion and an arcuate portion connecting the ends of said straight portion, said opening being disposed substantially closer to one end of said straight margin than the other end.

Still another aspect of this invention is to provide that the plate members at the upper end of the first vamp portion and the lower end of the second vamp portion are disposed in overlapping relation so that the lace portions connecting the first and second vamp sections are substantially perpendicular to the longitudinal axis of the lace assembly.

Yet another aspect of this invention is to provide that the slits of the first vamp plate portions extend upwardly and the second vamp plate portions extend downwardly and another aspect to provide that the angle of inclination is substantially in the range of about thirty to ninety degrees (30°-90°), and preferrably about fifty degrees (50°), to the straight margin portion.

Still another aspect of this invention is to provide that each plate portion includes a thickened, reinforcing, area disposed about said opening and said slit and another aspect to provide said thickening on the front and rear faces so that said faces are in mirror image of each other.

Another aspect of this invention is to provide that said first and second vamp portions are formed from at least two plies of material having said plate portions sandwiched therebetween and another aspect to provide that said plate portions are adhesively attached to at least one of said material plies and another aspect to provide that each ply includes an eyelet opening having a configuration corresponding substantially to said thickened oblong portion.

## Brief Description of the Drawings

FIG. 1 is a perspective view of an athletic shoe having the lacing assembly;

FIG. 2 is an enlarged fragmentary view showing the details of the locking eyelets;

FIG. 3 is an enlarged plan view of the locking plate;

FIG. 4 is a sectional view taken on line 4-4 of FIG. 2;

FIG. 5 is a sectional view taken on line 5-5 of FIG. 4;

FIG. 6 is an enlarged fragmentary view showing details of the locking eyelets of a modified construction;

FIG. 7 is a fragmentary perspective view showing another modified construction with the upper vamp section unlaced;

FIG. 8 is a similar view showing the upper vamp section laced;

FIG. 9 is an enlarged cross-sectional view taken on line 9-9 of FIG. 8;

FIG. 10 is a fragmentary perspective view showing the attachment of the locking member of FIG. 7;

FIG. 11 is an enlarged perspective view of said locking member;

FIG. 12 is a cross sectional view taken on line 12-12 of FIG. 11;

FIG. 13 is a schematic view of the lacing arrangement of the modified construction of FIG. 7;

FIG. 14 is another schematic view of said lacing arrangement;

FIG. 15 is a similar view to FIG. 10 showing another modified construction; and

FIG. 16 is a cross sectional view taken on line 16-16 of FIG. 15.

## Best Modes for Carrying Out the Invention

Referring now by reference numbers to the drawings and first to FIG. 1 it will be understood that the athletic shoe 10 includes a sole 12, uppers 14 attached to the sole 12 and a tongue 16, attached to said uppers 14 as by stitching, and having a free upper end 18. The uppers 14 also include a toe portion 19, opposed side portions 20 attached to the sole and including side quarters 22. As shown, the shoe also includes a vamp generally indicated by numeral 24.

In the embodiment shown, the vamp 24 includes a first vamp section 26 disposed adjacent to the toe portion 19 and having oppositely disposed vamp portions 28 and a second vamp section 30 disposed upwardly adjacent of the first vamp section 26 and having oppositely disposed vamp portions 32. As clearly shown in FIG. 1, the first and second vamp sections 26 and 30 are disposed in separated overlapping relation from each other providing flexibility of the vamp in facilitating independent movement of the vamp sections.

Referring now more specifically to the lacing connection of the shoe 10, it will be understood that said shoe is provided with a single continuous lace 34 having opposed side lengths 36 terminating in reinforced ends 38. The lace 34 cooperates with the vamp sections to provide a lacing assembly, in which the lace interconnects the first and second vamp sections 26 and 30, respectively, and provides for adjusting the fit of the said vamp portions for the comfort of the wearer. More particularly, the first vamp portions 28 are provided with a plurality of opposed eyelets 42, constituting lace-receiving means, and opposed locking eyelets 44, constituting lace-receiving locking means. The second vamp portions 32, which are separated from the first vamp portions 28 by the split include a plurality of eyelets 46 constituting lace-receiving means and opposed locking eyelets 48 constituting lace-receiving locking means. As shown locking eyelets 48 are disposed in longitudinally spaced adjacent relation to said locking eyelets 44.

In one preferred embodiment, and as clearly shown in FIGS. 2-5, each of the opposed locking eyelets 44 includes an apertured plastic lock member 50 which is attached to the underside of the opposed vamp portions 28 and 32 as by stitching. The lock member 50 which, in the preferred embodiment is molded, includes an upper face 52 having an opening 54 conforming at least in part to the eyelet opening 45 which can be the same size or larger than the openings 42 and 46. The opening 54 includes an inwardly formed portion 56 and the lock member 50 includes an integrally formed portion 58 disposed in overlap relation to said portion 56 and spaced from said portion to provide a gap or slit indicated by numeral 60. It will be understood that opposed lock members 50 on opposed vamp portions are molded in mirror image of each other.

A second embodiment is clearly shown in FIG. 6. In this modification the locking action is provided by an inwardly formed slit 60' which is in the nature of a cut and receives the lace in friction relation. The opposed slits 60', both being inwardly formed are disposed in mirror image of each other.

Another embodiment is clearly shown in FIGS. 7-13 which incorporates some of the features of the two embodiments discussed above. For convenience, and where appropriate, similar parts have been given similar reference numerals with the addition of a prefix numeral 1 in describing this modification.

As with the embodiments already described the vamp 124 includes a first, lower, vamp section 126 having oppositely disposed vamp portions 128 and a second, upper, vamp section having opposed vamp portions 132. The single continuous lace 134, having side lengths 136, cooperates with the vamp sections 126 and 130 and interconnects said sections to provide a comfortable fit for the wearer. More particularly the first vamp portions 128 are provided with a plurality of opposed eyelets 142, constituting lace-receiving means and, at the upper end, opposed locking eyelets 144, constituting lace-receiving locking means. The second vamp portions 132, which are separated from and overlap the first vamp portions 128, include a plurality of eyelets 146, constituting lace receiving means and, at the lower end, opposed locking eyelets 148. Locking eyelets 144 and 148 include locking members 150 attached to the vamps at the corners as shown in FIG. 10.

As shown in FIG. 11 each locking member 150 is molded or otherwise formed to include a flexible plate portion 152 having a straight margin 151 and an arcuate margin 153. The plate portion is apertured to provide a circular opening 154 disposed closer to one end of margin 151 than the other, which is generally the same diameter as the other eyelets 142 and 146, and a communicating slit 160. The circular opening 154 and slit 160 are reinforced by a generally oblong-shaped thickened portion 158, disposed about said opening and said slit and tapering somewhat toward the end of the slit. This additional thickness also provides an anti-fray feature by increasing the friction area available to grip the lace 134. The slit 160 in the embodiment shown extends diagonally across the plate portion 152 on a line which passes from one corner, at an angle A to the straight margin 151 in the range of about thirty to ninety degrees (30°-90°) the selected angle in the embodiment shown being about fifty degrees (50°). In the embodiment shown the plate portion 152 is generally parabolic in configuration having a straight margin of 23.5mm and a height of 19.0 mm. The opening is 4.0mm and is offset from the base about 6.0mm and from the axis about 5.0mm. The slit is about 8.0mm long, the thickness of the plate portion is 1.0mm and the total thickness of the thickened area about 3.5mm. This size of locking member has been found to have substantially universal applicability from children's to adult's shoe sizes.

The configuration of the locking member 150 facilitates attachment between the plies of the material forming the vamp portions which are rounded at the corners. For example, as shown in FIG. 10, the upper vamp corner 170 is formed essentially of upper and lower plies 172 and 174, attached as by generally parallel lines of stitching 176 and 178 connected by an arcuate portion 180. In addition, if desired, edge piping 179 may be provided between the two plies. The stitching generally encloses the locking member 150 but the plate portion 152 is sufficiently thin, of the order of 1.0mm in the embodiment shown, that it can, if desired, be connected at least in part by stitching as, for example, adjacent the locking member straight margin 151 or by catching the front corner. Preferably, the locking member 150 is formed from thermoplastic or thermosetting resin such as nylon or urethane, or other suitable plastic, having flexible yet readily penetrable characteristics. In addition, the locking member 150 is, in the embodiment shown, adhesively attached to the plies of material 172 and 174 by applying a thin coating of adhesive 182 such as latex between each ply and a corresponding face of the locking member 150 said adhesive acting as a pre-stitching locating means.

It will be observed, by reference to FIGS. 8-10, that each ply of material 172, 174 is apertured to provide an oblong-shaped opening 145, 147 corresponding substantially to the shape of the reinforcing oblong portion 158 so that said thickened portion extends, at least in part, within said openings 145, 147.

As will readily be understood by reference to FIGS. 12 and 13 the provision of an oblong portion 158 on both faces of the locking member 150 provides that when said locking member is turned over the configuration of the rear face is substantially in mirror image of the configuration of the front face. The result of this is that it is a simple matter to arrange the locking members 150 such that the diagonal slits 160c and 160d of the upper locking members 150 are inclined downwardly and inwardly relative to the opening 154 while the diagonal slits 160a and 160b of the lower locking members 150 are inclined upwardly and inwardly. The result of this arrangement, as shown in FIG. 13, is that the angles of inclination of the lace portion 190 between the slits 160a and 160d respectively, of the lower vamp left locking member and the upper vamp right locking member, and the angle of inclination of the lace portion 192 between the slits 160b and 160c respectively of the lower vamp right locking member and the upper vamp left locking member and are relatively flat, which tends to increase effectiveness of the the locking action.

It will be understood from FIG. 13 that the relationship between the ends of the slits is a function of the offset of the opening 154, the angle of inclination of the slit 160 and also the overlap of the plate portions at the upper end of the first vamp portions and the lower end of the second vamp portions. With the characteristics of the locking member 150 described above and the placing of the locking members in register, as opposed to being longitudinally spaced as shown in FIG. 13, the angle of inclination of the lace portions would be substantially zero degrees and said lace portions would be substantially perpendicular to the longitudinal axis of the lacing assembly. As will be understood this perpendicularity can be achieved by other locking member arrangements. For example, as shown in FIG. 14, in which similar parts use the same numeral with a prime suffix, with the opening 154 disposed on the axis of the plate member and the angle A (FIG. 11) made ninety degrees (90°) the slits 160a', 160c' and 160b', 160d' would be aligned and lace portions 190' and 192' would be perpendicular. It will also be understood that the theoretical considerations discussed above are affected by the width of the lace and that the arrangement of the locking member 150 shown in FIG. 11 has produced good results with the overlapping locking members substantially in register. As will also be understood the other characteristics of the lace such as texture, material, and elasticity also affect the locking capability of the slit 160. In general, the width of the slit is less than the thickness of the lace so that said lace is received in friction relation within said slit.

Another embodiment of the locking member is shown in FIGS. 15 and 16 by numeral 250. This embodiment is similar to locking member 150 except that, in lieu of a reinforced opening and slit, an opening 254 is provided in the plate portion 252 in conjunction with a communicating slit 260 which is formed from overlapping flexible plate portions 258 and 259 hooked at the ends. This arrangement provides a clamping effect by virtue of the flexible nature of the plate portions which must be sprung apart to receive the lace. In other respects this locking member 250 is similar to locking member 150.

It is thought that the structural features and functional advantages of this lacing assembly have become fully apparent from the foregoing description of parts, but for completeness of disclosure the adjustment of the fit of the vamp sections and the locking of the lacing assembly will be briefly described and first with respect to the embodiment shown in FIGS. 2-4.

Initially the lace 34 is loosely threaded into place within the lower eyelets 42 and locking eyelets 44 of the first vamp portions 28, and the locking eyelets 48 and the upper eyelets of the second vamp portions 32. The foot of the wearer can then be easily inserted into the shoe 10. When this has been accomplished, the fit of the first vamp section can be adjusted by pulling the slack out of the lace side lengths 36 below the locking eyelets 44 of the first vamp and pulling the lace lengths from the locking eyelets 44 into position between the slit defined by overlapping portions 56 and 58 as shown in FIGS. 3 and 4. The lace lengths 36 in the first vamp section are adjusted by pulling on the upward portion of these lace lengths which because of the overlapping portions 56 and 58 effectively locks the lace in place. The lace portions 36 tend to bind in the slit 60 thereby being inhibited from moving by the frictional effect of the pressure from the overlapping elements 56 and 58 which are spaced closer together than the thickness of the lace. Following this adjustment, the forward foot portion and the toes of the wearer are comfortably gripped by the lower first vamp section to the desired fit of the wearer. The remainder of the lace lengths above the locking eyelet 48 of the upper vamp section can then be adjusted while maintaining the fit of the first vamp section and, because of the provision of said second locking eyelets, the lace can also be adjusted between two pairs of adjacent locking eyelets 48. The second vamp sections can then be adjusted substantially independently of the first vamp section to comfortably grip the portion of the foot to which they are adjacent. The adjustment of the upper vamp sections is accomplished independently of, and without disturbing the fit of, the lower vamp section

because of the locking action of both sets of locking eyelets 44 and 48. When this is accomplished the free ends of the lacing at the top of the shoe 10 can then be tied or otherwise secured in a conventional fashion.

The lacing of the embodiment shown in FIG. 6 is accomplished in a similar manner to that described above. The lacing of the embodiment shown in FIGS. 7-13 is also similar but the particular arrangement of the locking members 150 presents certain advantages which will be described with reference to FIGS. 7, 8 and 13.

Initially, the first vamp section 128 is laced by threading the lace 134 through eyelets 142 and the locking member opening 154 of locking eyelets 144, inserting the foot and adjusting the fit for comfort. When this has been accomplished the lace side lengths 136 are, as shown in FIG. 7, pulled upwardly into the associated locking member slits of the locking eyelets 144. When this has been accomplished the side lengths are crossed over and inserted into the locking member openings 154 of locking eyelets 148 and loosely threaded through eyelets 146. When this has been accomplished the lace side lengths can be adjusted for fit between the vamp sections, and said side lengths pulled downwardly into the associated locking member slits of locking eyelets 148. Following this the slack in the lace in the second vamp section can be taken up and the lace tied in a bow conventionally or locked by using locking members 150 as shown in FIG. 13. Because of the inwardly directed and inclined arrangement of the lace assembly, as best shown schematically in FIG. 13, the lace connection between the connected upper and lower vamp locking member slits 160a, 160d and 160b, 160c is inclined at a substantially flatter angle than is the case with the inclination of the lace which passes through the eyelets, above and below the locking eyelets. The result of this arrangement is that the lace tends to be locked more securely in place.

It will be understood that although the preferred embodiment is shown as an athletic shoe, the lacing assembly can be used for other articles of footwear having two or more vamp sections. In addition, the locking member described can be used at any eyelet where locking the lace is desirable.

## Claims

1. A lacing assembly for an article of footwear (10) comprising a first vamp section (26;126) including opposed vamp portions (28;128) and a second vamp section (30;130), disposed upwardly adjacent the first vamp section (26;126) and including opposed vamp portions (32;132), the first vamp section (26;126) having an upper end and a lower end and a plurality of lace-receiving eyelets (42;142) including a pair of opposed eyelets (44;144) disposed at said upper end, the second vamp section (30;130) having an upper end and a lower end and a plurality of lace-receiving eyelets (46;146) including a pair of opposed eyelets (48;148) disposed at said lower end, adjacent said first vamp section upper end eyelets (44;144), a single continuous lace (34;134) having opposed side lengths (36;136), said side lengths being received by opposed lace-receiving eyelets (42;142) in said first vamp portions (28;128), and said side lengths (36;136) extending between said first and second vamp sections (26;126;30;130) and being received by opposed lace-receiving eyelets (46;146) in said second vamp portions (32;132), and lace locking means (50;150;250)

   characterised in that :

   the lace locking means (50;150;250) form part of at least one pair of said upper end eyelets (44;144) of the first vamp section (26;126) or lower end eyelets (48;148) of the second vamp section (30;130) and include a plate portion (52;152) providing an eyelet opening (54;154) and a communicating slit (60;160;260), the single continuous lace (34;134) also being received by said lace-receiving locking eyelets (44;144,48;148) in selectively lockable relation to permit the first vamp section (26;126) to be adjusted and maintained in adjustment substantially independently of the second vamp section, each communicating slit having a width less than the thickness of the received lace to grip the lace in friction relation.

2. A lacing assembly as defined in claim 1, in which each said slit (60;160;260) is elongate.

3. A lacing assembly as defined in claim 1 or 2, in which at least said upper end eyelets (44;144) of the first vamp portions include the locking means (50;150;250).

4. A lacing assembly as defined in any of the preceding claims, in which said upper end eyelets (44;144) of the first vamp portions (28;128) and said lower end eyelets (48;148) of the second vamp portions (32;132) both include locking means (50;150) for each opposed eyelet (48;148), the slit (60;160;260) of each locking means (50;150) extending inwardly of the associated vamp portion.

5. A lacing assembly as defined in any of the preceding claims, in which the lacing assembly includes a longitudinal axis and the plate portions (52;152;252) at the upper end of the first vamp portions (26;126) and the lower end of the second vamp portions (32;132) are disposed in overlapping relation so that the lace portions (36;136) connecting the first vamp section (26;126) and the second vamp section (30;130) are substantially perpendicular to said longitudinal axis.

6. A lacing assembly as defined in any of the preceding claims, in which each plate portion (152;252) includes a substantially straight margin portion (151) and an arcuate margin portion (153) connecting the ends of said straight margin portion (151) and said opening (154;254) is disposed substantially closer to one end of said straight margin (151) than said other end.

7. A lacing assembly as defined in any of the preceding claims, in which said slits (160) of said first vamp plate portions (152) extend upwardly and said slits (160) of said second vamp plate portions (152) extend downwardly.

8. A lacing assembly as defined in claim 4, in which each plate portion (152) includes a substantially straight margin portion (151) and an arcuate margin portion (153) connecting the ends of said straight margin portion (151) and said opening (154) is disposed substantially closer to one end of said straight margin (151) than said other end, and said slits of said first vamp plate portions (152) extend upwardly and said slits (160) of said second vamp plate portions (152) extend downwardly.

9. A lacing assembly as defined in any of the preceding claims, in which each plate portion (152) includes a thickened reinforcing portion (158) disposed about said opening (154) and said slit (160).

10. A lacing assembly as defined in claim 4, in which each plate portion (152) includes a substantially straight margin portion (151) and an arcuate margin portion (153) connecting the ends of said straight margin portion (151) and said opening (154) is disposed substantially closer to one end of said straight margin (151) than said other end, said slits (160) of said first vamp plate portions (152) extend upwardly and said slits (160) of said second vamp plate portions (152) extend downwardly and each plate portion (152) includes opposed front and rear faces each having a thickened reinforcing portion (158) disposed about said opening (154) and said slit (160) said front and rear faces being in mirror image of each other.

11. A lacing assembly as defined in any of the preceding claims, in which said first vamp portions (128) and said second vamp portions (132) are formed from at least two plies of material (172;174) and said plate portions (152) are disposed in sandwich relation between said material plies (172;174).

12. A lacing assembly as defined in claim 11, in which said plate portions (152) are adhesively attached to at least one of said material plies (172;174).

13. A lacing assembly as defined in claim 11 or 12, in which each ply of material (172;174) includes an eyelet opening (145;147) having a configuration corresponding substantially to said thickened reinforcing portion (158).

14. A lacing assembly as defined in claim 8 or 10, in which the angle of inclination of the slits (160) to the straight margin (117) is in the range of substantially 30°-90°.

15. A lacing assembly as defined in claim 9 or 10, in which each plate portion (152) includes front and rear faces each having a thickened portion (158) disposed about the opening (154) and the slit (160), the front and rear faces being disposed in mirror image of each other.

16. A lacing assembly as defined in claim 8 or 10, in which the lacing assembly includes a longitudinal axis and the angle of inclination of said slits (160) is at substantially fifty degrees (50°) to said longitudinal axis.

17. A lacing assembly as defined in any of the preceding claims, in which each plate portion slit is provided by overlapping flexible plate portions (258;259).

18. A lacing assembly as defined in any of the preceding claims, in which said slits (160) have substantially parallel sides.

19. A lacing assembly as defined in any of claims 1 to 4, the assembly having a longitudinal axis and the slits (160) having parallel sides and having a length substantially greater than the size of the communicating opening (154) and extending inwardly at an angle of inclination of between thirty and ninety degrees (30°-90°) to said longitudinal axis.

20. A lacing assembly as defined in claim 19, in which each plate portion (150) includes a thickened, reinforcing portion (158) disposed about said slit.

21. A lacing assembly as defined in claim 20, wherein said thickened portion is disposed about said opening (154).

22. A lacing assembly as defined in any of claims 19 to 21, in which each plate portion (150) includes a substantially straight margin portion (151) and an arcuate margin portion (153) connecting the ends of said straight portion (151), said opening (154) being disposed closer to one end of said straight margin (151) than said other end, and said slits (160) extending upwardly at an angle to the straight margin.

**Patentansprüche**

1. Schnürungsanordnung für einen Schuhwerksartikel (10), umfassend eine erste Besatzsektion (26; 126) mit gegenüberliegenden Besatzabschnitten (28; 128) und eine zweite Besatzsektion (30; 130), die aufwärts anschließend an die erste Besatzsektion (26; 126) angeordnet ist und gegenüberliegende Besatzabschnitte (32; 132) aufweist, wobei die erste Besatzsektion (26; 126) ein oberes Ende und ein unteres Ende sowie eine Anzahl von Schnürsenkelaufnahmeösen (42; 142) mit zwei gegenüberliegenden, am oberen Ende angeordneten Ösen (44; 144) aufweist, die zweite Besatzsektion (30; 130) ein oberes Ende und ein unteres Ende sowie eine Anzahl von Schnürsenkelaufnahmeösen (46; 146) mit zwei gegenüberliegenden, am unteren Ende neben den oberen Endösen (44; 144) der ersten Besatzsektion angeordneten Ösen (48; 148) aufweist; mit einem einzigen durchgehenden Schnürsenkel (34; 134) mit gegenüberliegenden Seitenstükken (36; 136), die von gegenüberliegenden Schnürsenkelaufnahmeösen (42; 142) in den ersten Besatzabschnitten (28; 128) aufgenommen sind, und wobei die Seitenstücke (36; 136) zwischen den ersten und zweiten Besatzabschnitten (26; 126; 30; 130) verlaufen und von gegenüberliegenden Schnürsenkelaufnahmeösen (46; 146) in den zweiten Besatzabschnitten (32; 132) aufgenommen sind; und mit Schnürsenkelklemmitteln (50; 150; 250);

dadurch gekennzeichnet, daß

die Schnürsenkelklemmittel (50; 150; 250) Teil mindestens eines Paars der oberen Endösen (44; 144) der ersten Besatzsektion (26; 126) oder unterer Endösen (48; 148) der zweiten Besatzsektion (30; 130) bilden und einen Plattenabschnitt (52; 152) beinhalten, der eine Ösenöffnung (54; 154) und einen Verbindungsschlitz (60; 160; 260) aufweist, der einzige durchgehende Schnürsenkel (34; 134) auch von den Schnürsenkelaufnahmeklemmösen (44; 144; 48; 148) in selektiv verklemmbarer Beziehung aufgenommen ist, um zu ermöglichen, daß die erste Besatzsektion (26; 126) im wesentlichen unabhängig von der zweiten Besatzsektion eingestellt und in Einstellung gehalten wird, wobei jeder Verbindungsschlitz eine Breite aufweist, die kleiner ist als die Dicke des aufgenommenen Schnürsenkels, um den Schnürsenkel in Reibungsbeziehung zu erfassen.

2. Schnürungsanordnung nach Anspruch 1, wobei jeder Schlitz (60; 160; 260) langgestreckt ist.

3. Schnürungsanordnung nach Anspruch 1 oder 2, wobei zumindest die oberen Endösen (44; 144) der ersten Besatzabschnitte die Klemmittel (50; 150; 250) aufweisen.

4. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei die oberen Endösen (44; 144) der ersten Besatzabschnitte (28; 128) und die unteren Endösen (48; 148) der zweiten Besatzabschnitte (32; 132) beide Klemmittel (50; 150) für jede gegenüberliegende Öse (48; 148) aufweisen und der Schlitz (60; 160; 260) jedes Klemmittels (50; 150) zum zugeordneten Besatzabschnitt einwärts verläuft.

5. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei die Schnürungsanordnung eine Längsachse aufweist und die Plattenabschnitte (52; 152; 252) am oberen Ende der ersten Besatzabschnitte (26; 126) und am unteren Ende der zweiten Besatzabschnitte (32; 132) in (einander) überlappender Beziehung angeordnet sind, so daß die ersten Besatzabschnitt (26; 126) und zweiten Besatzabschnitt (30; 130) verbindenden Schnürsenkelabschnitte (36; 136) im wesentlichen senkrecht zu dieser Längsachse liegen.

6. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei jeder Plattenabschnitt (152; 252) einen im wesentlichen geraden Randabschnitt (151) und einen die Enden des geraden Randabschnitts (151) verbindenden gekrümmten Randabschnitt (153) aufweist und die Öffnung (154; 254) im wesentlichen näher am einen Ende des geraden Rands (151) als am anderen Ende angeordnet ist.

7. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei die Schlitze (160) der ersten Besatzplattenabschnitte (152) aufwärts und die Schlitze (160) der zweiten Besatzplattenabschnitte (152) abwärts verlaufen.

8. Schnürungsanordnung nach Anspruch 4, wobei jeder Plattenabschnitt (152) einen im wesentlichen geraden Randabschnitt (151) und einen die Enden des geraden Randabschnitts (151) verbindenden gekrümmten Randabschnitt (153) aufweist und die Öffnung (154) im wesentlichen näher am einen Ende des geraden Rands (151) als am anderen Ende angeordnet ist und die Schlitze der ersten Besatzplattenabschnitte (152) aufwärts und die Schlitze (160) der zweiten Besatzplattenabschnitte (152) abwärts verlaufen.

9. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei jeder Plattenabschnitt (152) einen um die Öffnung (154) und den Schlitz (160) herum angeordneten verdickten Versteifungsabschnitt (158) aufweist.

10. Schnürungsanordnung nach Anspruch 4, wobei jeder Plattenabschnitt (152) einen im wesentlichen geraden Randabschnitt (151) und einen die Enden des geraden Randabschnitts (151) verbindenden gekrümmten Randabschnitt (153) aufweist und die Öffnung (154) im wesentlichen näher am einen Ende des geraden Rands (151) als am unteren Ende angeordnet ist, die Schlitze (160) der ersten Besatzplattenabschnitte (152) aufwärts und die Schlitze (160) der zweiten Besatzplattenabschnitte (152) abwärts verlaufen und jeder Plattenabschnitt (152) gegenüberliegende Vorder- und Rückseiten mit jeweils einem um die Öffnung (154) und den Schlitz (160) herum angeordneten verdickten Versteifungsabschnitt (158) aufweist, welche Vorder- und Rückseiten zueinander spiegelbildlich geformt sind.

11. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei die ersten Besatzabschnitte (128) und die zweiten Besatzabschnitte (132) aus mindestens zwei Materiallagen (172; 174) geformt sind und die Plattenabschnitte (152) in eingefügter Beziehung (sandwich relation) zwischen den Materiallagen angeordnet sind.

12. Schnürungsanordnung nach Anspruch 11, wobei die Plattenabschnitte (152) durch Kleben an mindestens einer der Materiallagen (172; 174) angebracht sind.

13. Schnürungsanordnung nach Anspruch 11 oder 12, wobei jede Materiallage (172; 174) eine Ösenöffnung (145; 147) mit einer Konfiguration entsprechend im wesentlichen dem verdickten Versteifungsabschnitt (158) aufweist.

14. Schnürungsanordnung nach Anspruch 8 oder 10, wobei der Neigungswinkel der Schlitze (160) zum geraden Rand (117) im Bereich von praktisch 30 - 90° liegt.

15. Schnürungsanordnung nach Anspruch 9 oder 10, wobei jeder Plattenabschnitt (152) Vorder- und Rückseiten mit jeweils einem um die Öffnung (154) und den Schlitz (160) herum angeordneten verdickten Anschnitt (158) aufweist, welche Vorder- und Rückseiten spiegelbildlich zueinander angeordnet sind.

16. Schnürungsanordnung nach Anspruch 8 oder 10, wobei die Schnürungsanordnung eine Längsachse aufweist und der Neigungswinkel der Schlitze (160) zur Längsachse praktisch fünfzig Grad (50°) beträgt.

17. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei jeder Plattenabschnittsschlitz durch Überlappung flexibler Plattenabschnitte (258; 259) gebildet ist.

18. Schnürungsanordnung nach einem der vorangehenden Ansprüche, wobei die Schlitze (160) im wesentlichen parallele Seiten aufweisen.

19. Schnürungsanordnung nach einem der Ansprüche 1 bis 4, wobei die Anordnung eine Längsachse aufweist und die Schlitze (160) parallele Seiten und eine Länge, die wesentlich größer ist als die Größe der Verbindungsöffnung (154), aufweisen und sich unter einem Neigungswinkel zwischen dreißig und neunzig Grad (30-90°) zur Längsachse einwärts erstrecken.

20. Schnürungsanordnung nach Anspruch 19, wobei jeder Plattenabschnitt (150) einen um den Schlitz herum angeordneten verdickten Versteifungsabschnitt (158) aufweist.

21. Schnürungsanordnung nach Anspruch 20, wobei der verdickte Abschnitt um die Öffnung (154) herum angeordnet ist.

22. Schnürungsanordnung nach einem der Ansprüche 19 bis 21, wobei jeder Plattenabschnitt (150) einen im wesentlichen geraden Randabschnitt (151) und einen die Enden des geraden Abschnitts (151) verbindenden ge-

krümmten Randabschnitt (153) aufweist, die Öffnung (154) näher am einen Ende des geraden Abschnitts (151) als am anderen Ende angeordnet ist und die Schlitze (160) unter einem Winkel zum geraden Rand aufwärts verlaufen.

**Revendications**

1. Ensemble de laçage pour chaussure (10) comprenant une première section (26;126) d'empeigne comportant des parties opposées (28;128) d'empeigne et une seconde section (30;130) d'empeigne disposée vers le haut de façon adjacente à la première section (26;126) d'empeigne et comportant des parties (32;132) d'empeigne opposées, la première section (26;126) d'empeigne ayant une extrémité supérieure et une extrémité inférieure et une pluralité d'oeillets (42;142) recevant un lacet comprenant une paire d'oeillets (44;144) opposés disposés à ladite extrémité supérieure, la seconde section (30;130) d'empeigne ayant une extrémité supérieure et une extrémité inférieure et une pluralité d'oeillets (46;146) recevant un lacet comprenant une paire d'oeillets (48;148) opposés disposés à ladite extrémité inférieure, de façon adjacente auxdits oeillets (44;144) d'extrémité supérieure de la section d'empeigne, un lacet (34;134) continu unique ayant des longueurs (36;136) latérales opposées, lesdites longueurs opposées étant reçues par des oeillets (42,142) recevant un lacet dans lesdites premières parties (28;128) d'empeigne et lesdites longueurs (36;136) latérales s'étendant entre lesdites première et deuxième sections (26;126;30;130) d'empeigne et étant reçues par des oeillets (46;146) opposés recevant un lacet dans lesdites secondes parties (32;132) d'empeigne, et des moyens (50;150;250) de blocage de lacet,

caractérisé en ce que:

les moyens (50;150;250) de blocage font partie d'au moins une paire desdits oeillets (44;144) de l'extrémité supérieure de ladite première section (26;126) d'empeigne ou desdits oeillets (48;148) de l'extrémité inférieure de la seconde section (30;130) d'empeigne et comprennent une partie (52;152) formant plaque et fournissant une ouverture (54;154) d'oeillet et une fente (60;160;260) de communication, le lacet (34;134) continu unique étant également reçu par lesdits oeillets (44;144, 48;148) de blocage de façon sélectivement blocable pour permettre à la première section (26;126) d'empeigne d'être ajustée et maintenue ajustée sensiblement indépendamment de la seconde section d'empeigne, chaque fente de communication ayant une largeur inférieure à l'épaisseur du lacet reçu pour saisir le lacet par frottement.

2. Ensemble de laçage selon la revendication 1, dans lequel chacune desdites fentes (60;160;260) est oblongue.

3. Ensemble de laçage selon les revendications 1 ou 2, dans lequel au moins lesdits oeillets (44;144) de l'extrémité supérieure des premières parties d'empeigne comportent les moyens (50;150;250) de blocage.

4. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel lesdits oeillets (44;144) de l'extrémité supérieure desdites premières parties (28;128) d'empeigne et lesdits oeillets (48;148) de l'extrémité inférieure des secondes parties (32;132) d'empeigne comportent dans les deux cas des moyens (50;150) de blocage pour chaque oeillet (48;148) opposé, la fente (60;160;260) de chaque moyen (50;150 de blocage s'étendant vers l'intérieur de la partie d'empeigne associée.

5. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel l'ensemble de laçage présente un axe longitudinal et les parties (52;152;252) formant plaques situées à l'extrémité supérieure des premières parties (26;126) d'empeigne et à l'extrémité inférieure des secondes parties (32;132) d'empeigne sont disposées de façon à se chevaucher afin que les parties (36;136) de lacet reliant la première section (26;126) d'empeigne à la seconde section (30;130) d'empeigne soient sensiblement perpendiculaires audit axe longitudinal.

6. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel chaque partie (152;252) formant plaque comporte une partie (151) de marge sensiblement rectiligne et une partie (153) de marge incurvée reliant les extrémités de ladite partie (151) de marge rectiligne, et ladite ouverture (154;254) est disposée sensiblement plus près d'une extrémité de ladite marge (151) rectiligne que l'autre extrémité.

7. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel lesdites fentes (160) desdites premières parties (152) formant plaques s'étendent vers le haut et lesdites fentes (160) desdites secondes parties (152) formant plaques d'empeigne

s'étendent vers le bas.

8. Ensemble de laçage selon la revendication 4, dans lequel chaque partie (152) formant plaque comporte une partie (151) de marge sensiblement rectiligne et une partie (153) de marge incurvée reliant les extrémités de ladite partie (151) de marge rectiligne, ladite ouverture (154) est disposée sensiblement plus près d'une extrémité de ladite marge (151) rectiligne que l'autre extrémité, et lesdites fentes desdites premières parties (152) formant plaques d'empeigne s'étendent vers le haut, et lesdites fentes (160) desdites secondes parties (152) formant plaques d'empeigne s'étendent vers le bas.

9. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel chaque partie (152) formant plaque comporte une partie (158) de renforcement épaissie disposée au voisinage de ladite ouverture (154) et de ladite fente (160).

10. Ensemble de laçage selon la revendication 4, dans lequel chaque partie (152) formant plaque comporte une partie (151) de marge sensiblement rectiligne et une partie (153) de marge incurvée reliant les extrémités de ladite partie (151) de marge rectiligne, ladite ouverture (154) est disposée sensiblement plus près d'une extrémité de ladite marge (151) rectiligne que ladite autre extrémité, lesdites fentes (160) desdites premières parties (152) formant plaques d'empeigne s'étendent vers le haut, et lesdites fentes (160) desdites secondes parties (152) formant plaques d'empeigne s'étendent vers le bas, et chaque partie (152) formant plaque comporte des faces avant et arrière opposées ayant chacune une partie (158) de renforcement épaissie disposée au voisinage de ladite ouverture (154) et de ladite fente (160), lesdites faces avant et arrière formant une image dans un miroir l'une de l'autre.

11. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel lesdites premières parties (128) d'empeigne et lesdites secondes parties (132) d'empeigne sont formées à partir d'au moins deux plis de tissu (172;174) et lesdites parties (152) formant plaques sont disposées en sandwich entre lesdits plis (172;174) de tissu.

12. Ensemble de laçage selon la revendication 11, dans lequel lesdites parties (152) formant plaques sont fixées de façon adhésive à au moins l'un desdits plis (172;174) de tissu.

13. Ensemble de laçage selon les revendications 11 ou 12, dans lequel chaque pli de tissu (172;174) comporte une ouverture (145;147) d'oeillet ayant une configuration correspondant sensiblement à ladite partie (158) de renforcement épaissie.

14. Ensemble de laçage selon les revendications 8 ou 10, dans lequel l'angle d'inclinaison des fentes (160) par rapport à la marge (117) est sensiblement dans l'intervalle de 30° à 90°.

15. Ensemble de laçage selon les revendications 9 ou 10, dans lequel chaque partie (152) formant plaque comporte des faces avant et arrière ayant chacune une partie (158) épaissie disposée au voisinage de l'ouverture (154) et de la fente (160), les faces avant et arrière étant disposées de façon à former une image dans un miroir l'une de l'autre.

16. Ensemble de laçage selon les revendications 8 ou 10, dans lequel l'ensemble de laçage présente un axe longitudinal et l'angle d'inclinaison desdites fentes (160) est sensiblement de cinquante degrés (50°) par rapport audit axe longitudinal.

17. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel chaque fente des parties formant plaques est produite par des parties (258;259) formant plaques souples se chevauchant.

18. Ensemble de laçage selon l'une quelconque des revendications précédentes, dans lequel lesdites fentes (160) ont des côtés sensiblement parallèles.

19. Ensemble de laçage selon l'une quelconque des revendications 1 à 4, cet ensemble ayant un axe longitudinal, les fentes (160) ayant des côtés parallèles et ayant une longueur sensiblement supérieure à la taille de l'ouverture (154) de communication et s'étendant vers l'intérieur en formant un angle d'inclinaison compris entre trente et quatre-vingt dix degrés (30°-90°) par rapport audit axe longitudinal.

20. Ensemble de laçage selon la revendication 19, dans lequel chaque partie (150) formant plaque comporte une partie (158) de renforcement épaissie disposée au voisinage de ladite fente.

21. Ensemble de laçage selon la revendication 20, dans lequel ladite partie épaissie est disposée au voisinage de ladite ouverture (154).

**22.** Ensemble de laçage selon l'une quelconque des revendications 19 à 21, dans lequel chaque partie (150) formant plaque comporte une partie (151) de marge sensiblement rectiligne et une partie (153) de marge incurvée reliant les extrémités de ladite partie (151) rectiligne, ladite ouverture (154) étant disposée plus près d'une extrémité de ladite marge (151) rectiligne que l'autre extrémité, et lesdites fentes (160) s'étendant vers le haut en formant un angle par rapport à la marge rectiligne.

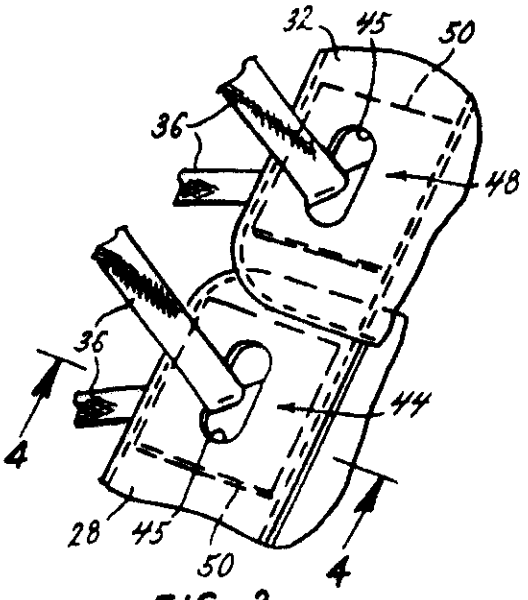



FIG. 2.

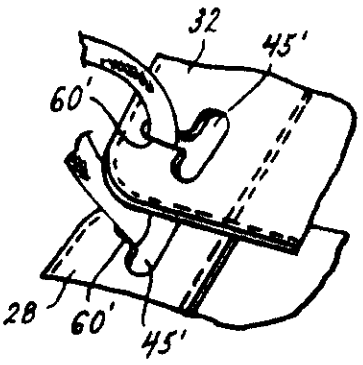



FIG. 6.

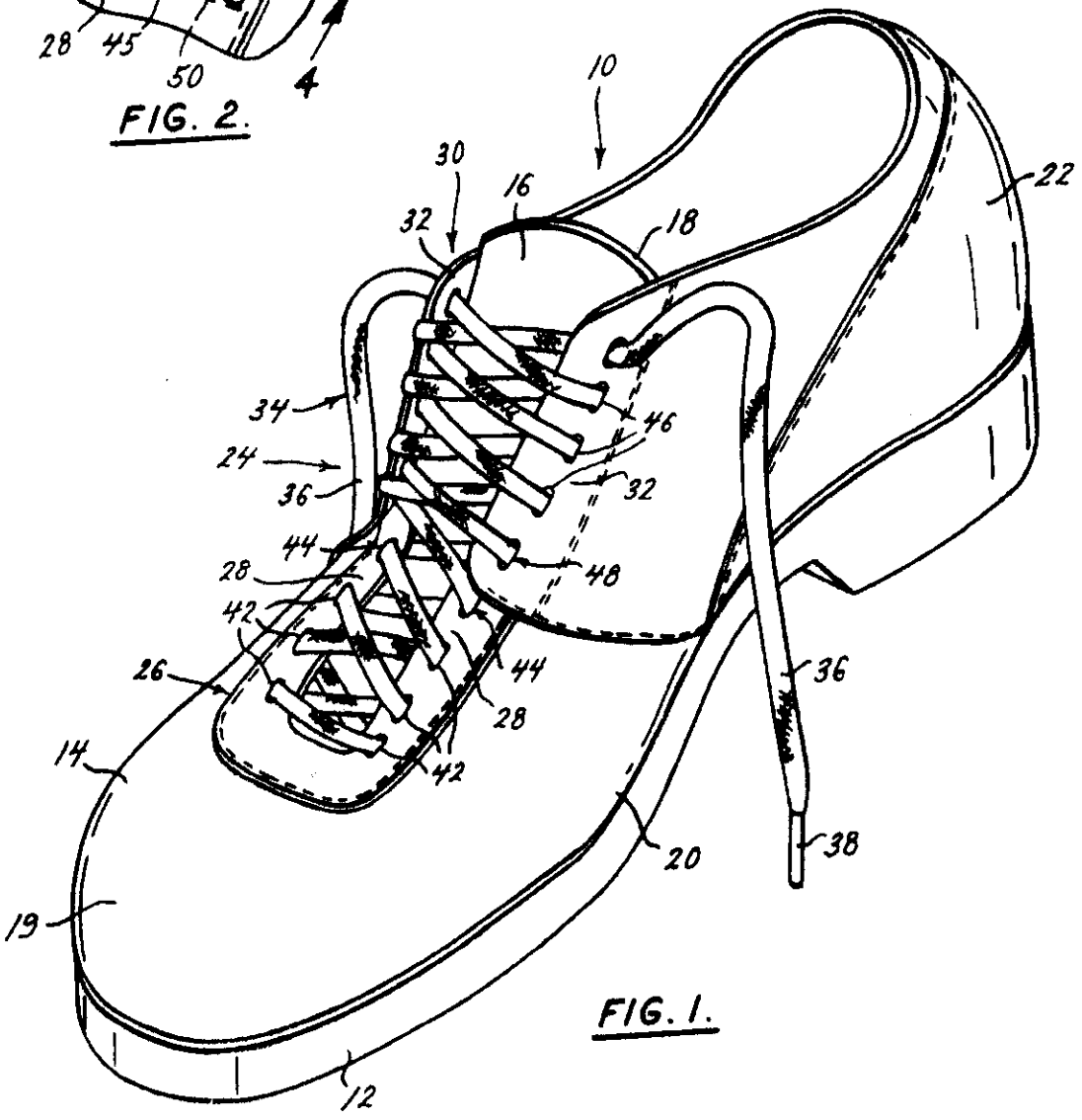



FIG. 1.

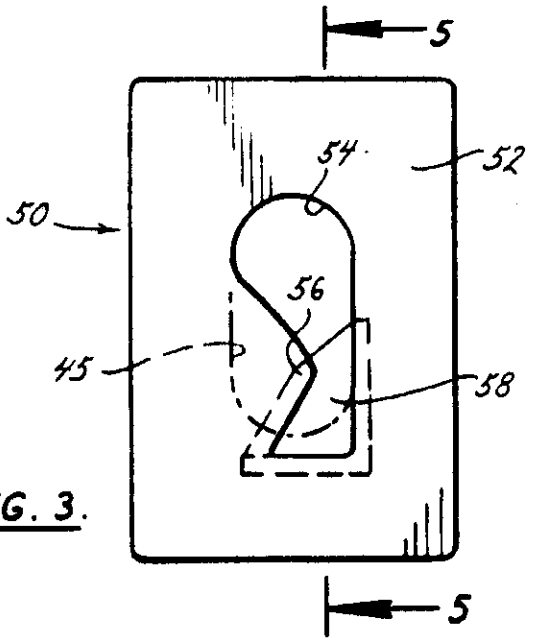



FIG. 3.

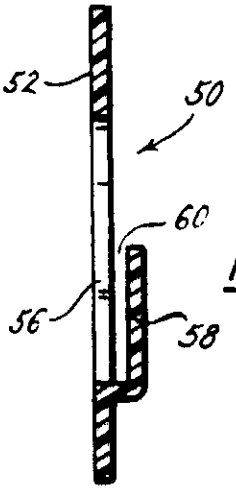



FIG. 5.

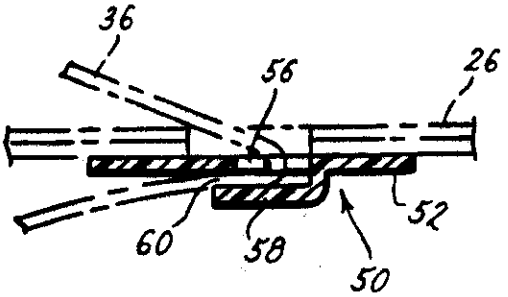



FIG. 4.

FIG. 7.

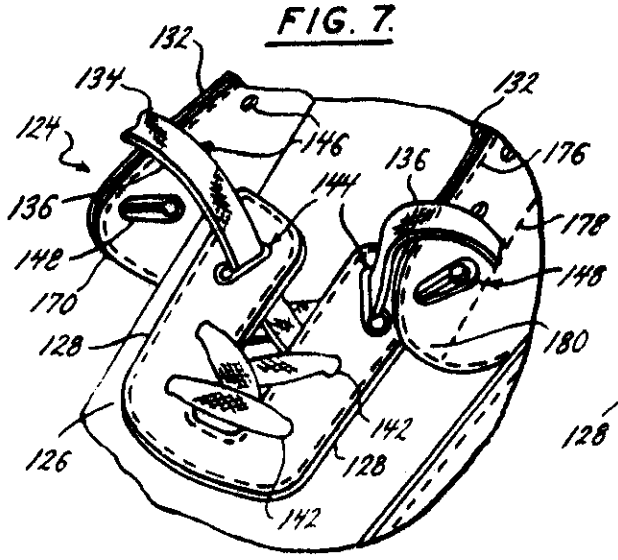
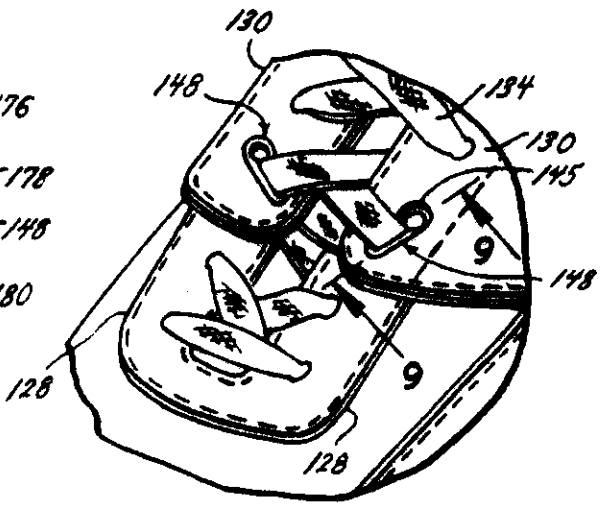



FIG. 8.



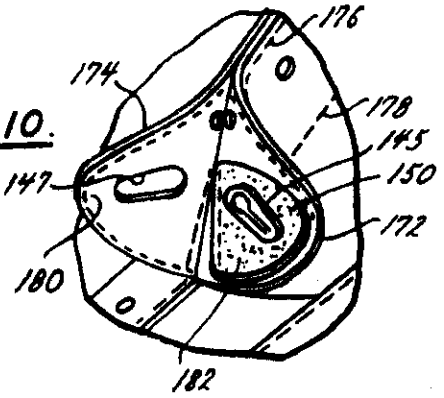




FIG. 10.

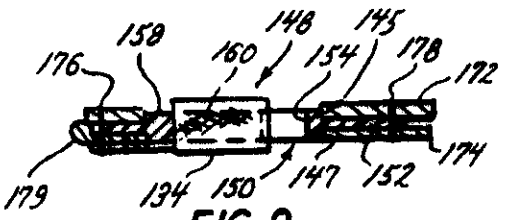



FIG. 9.

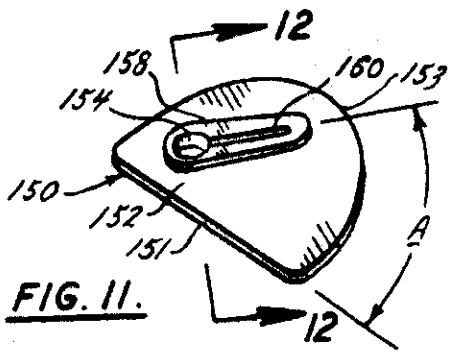



FIG. 11.

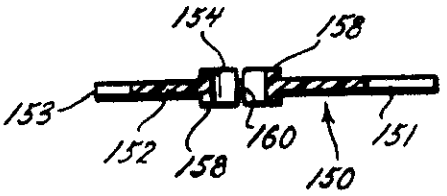



FIG. 12.

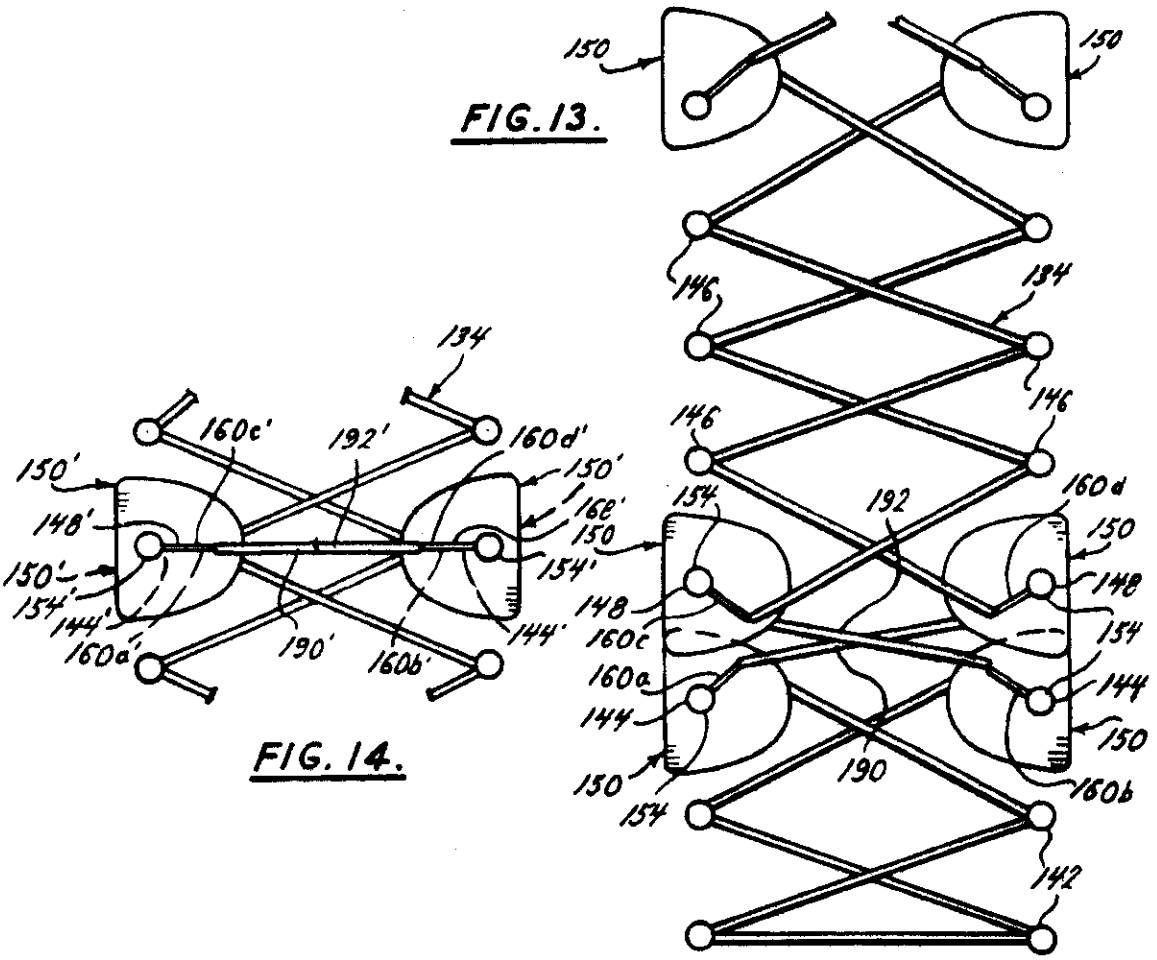



FIG. 13.

FIG. 14.

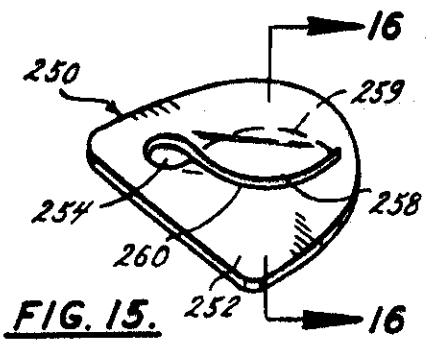



FIG. 15.

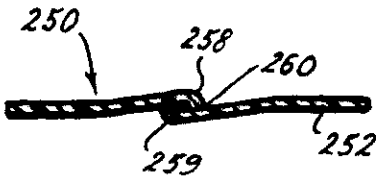



FIG. 16.

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European Application No EP87907192.6 filing date 08.10.1987

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PCT EUROPEAN PHASE
PCT Application PCT/US87/02624 Publication No WO89/00387 on 26.01.1989

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Title FOOTWEAR LACE LOCKING ASSEMBLY.

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Entry Type 8.11 Staff ID. DD1 Auth ID. AA

**** END OF REGISTER ENTRY ****

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