Oct. 4, 1966 P. J. GUBASH 3,276,083

SHOELACE HOLDER

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FIG. 1

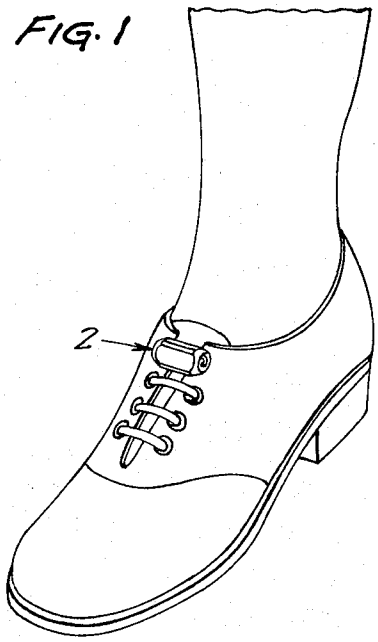


FIG. 2

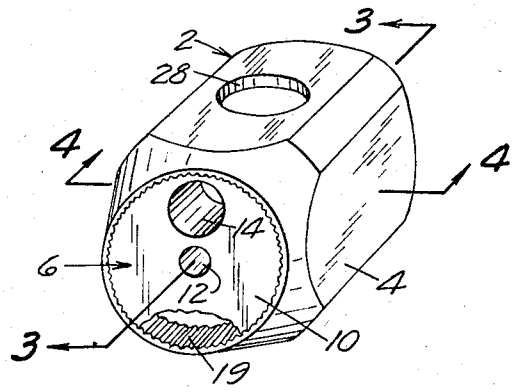


FIG. 3

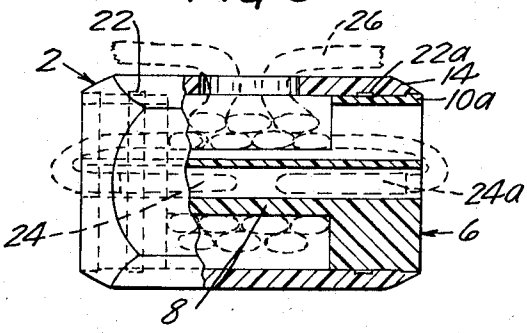


FIG. 4

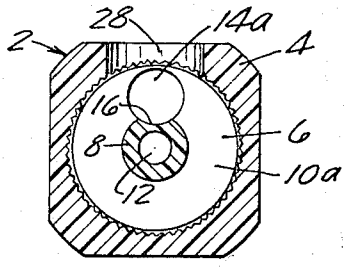


FIG. 5

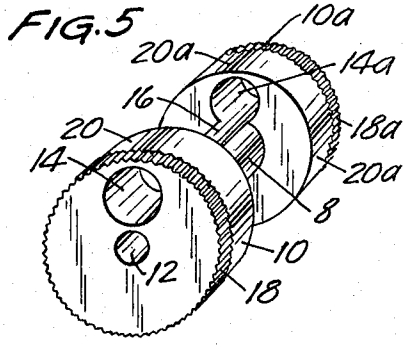
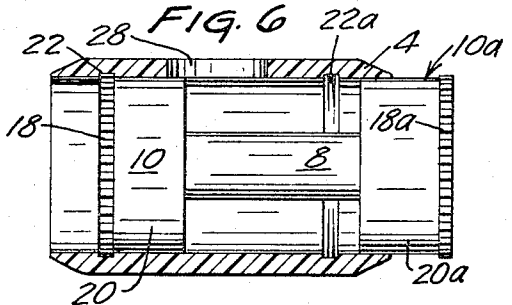


FIG. 6



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SHOELACE HOLDER

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FIG. 7

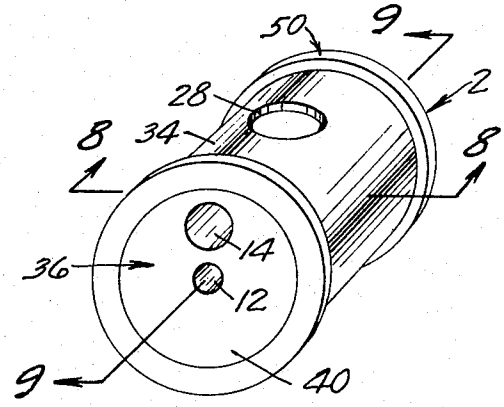


FIG. 8

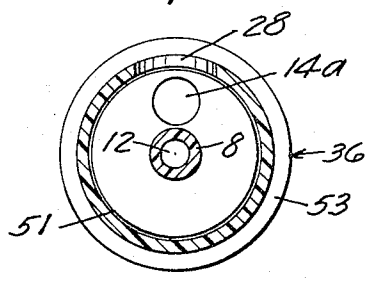


FIG. 9

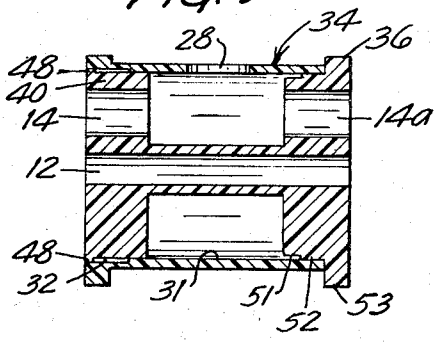


FIG. 10

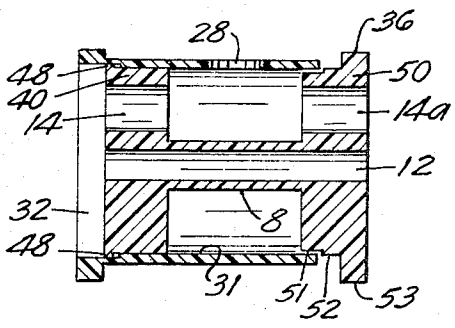


FIG. 11

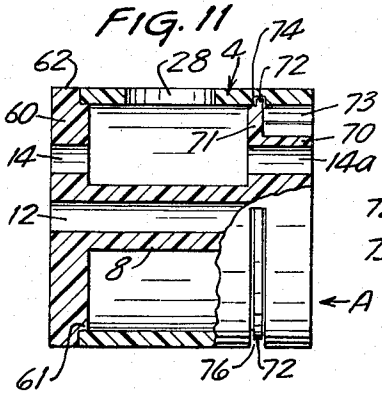


FIG. 12

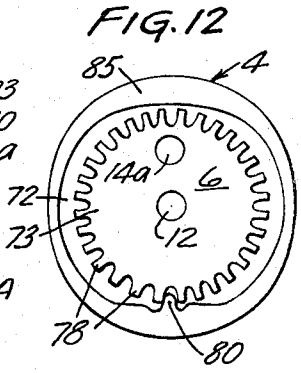
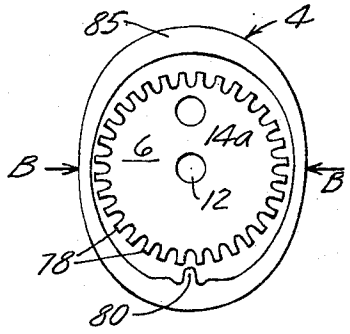


FIG. 13



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3,276,083

SHOELACE HOLDER

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5 Claims. (Cl. 24—117)

This invention relates to a device for fastening two adjacent ends of cords, laces, strings and the like. In particular, it relates to a device which may be used to retain the laces in shoes or boots in a fixed position in lieu of the usual practice of tying a knot in the same.

Others have addressed themselves to this problem over the years, see e.g. U.S. Patent Nos. 459,160; 1,126,399 and 2,911,697. Other fasteners are known in which an ordinary knot is tied in the shoelaces, the bow and knot then being placed inside a cylindrical tube with the laces running through a longitudinal slot in the sidewall, the bow being retained therein by the expedient of a threaded cap for closing the open end of the cylinder.

Some of the devices of the above mentioned character are complicated to manufacture, some difficult to operate. In the type with the end cap, such end cap is easily lost and this particularly becomes a problem on infants' or children's shoes when the child becomes old enough to manipulate and remove the end cap by himself.

It is therefore an object of the present invention to provide a simple, inexpensive and relatively "child proof" fastener which is simple to manufacture and which is simple to operate.

It is a further object of this invention to provide a fastener which once locked in place is difficult to unlock by a very young child, but rather readily mastered by pre-school and primary school children.

It is a further object to provide a fastener which when once placed on the shoelaces will remain associated therewith so that the shoelaces may be "tied" and "untied" without separating the device from the shoe, i.e. it is semipermanently attached thereto.

The manner in which these and other objects of the invention are attained will become apparent from the following description.

The invention will be described further in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view of one form of the device in the "tied" position on a laced shoe;

FIGURE 2 is a perspective view from one end of a device;

FIGURE 3 is a side elevation, partially broken away, showing a cross-section of the device taken along the lines 3—3 of FIGURE 2;

FIGURE 4 is a cross-sectional taken along the lines 4—4 of FIGURE 2;

FIGURE 5 is a perspective view of the axial member of the device of FIGURE 2 removed therefrom;

FIGURE 6 is a side elevation of the device of FIGURE 2 with the outer housing member in cross-section along the lines 3—3 of FIGURE 2;

FIGURE 7 is a perspective view of a presently preferred form of the device;

FIGURE 8 is a cross-sectional view of the device along the lines 8—8 of FIGURE 7;

FIGURE 9 is a cross-sectional along the lines 9—9 of FIGURE 7;

FIGURE 10 is the same as FIGURE 9 but with the inner axial member moved to the right to a freely rotatable position,

FIGURE 11 is a partially broken away cross-section of an alternate form of the device.

FIGURE 12 is an end elevation of the device of FIGURE 11 from the end indicated by the letter A; and

FIGURE 13 is an end elevation of the device of FIGURE 11 from the end A when external forces in the direction indicated by the letters B–B′ are applied thereto.

Referring now to FIGURES 1–6 of the drawing, (in which like numbers refer to like parts) the device **2** comprises an outer housing member **4** and an inner axial member **6**, the latter having a central axle **8** terminating at each end in knurled flange members **10** and **10***a*. A shoelace tip-accepting bore **12** is formed into or through the central axle from each end of the axial member, e.g. by drilling or by molding two appropriately shaped halves and joining them together. Each flange member **10** has an aperture **14** and **14***a* therethrough positioned between the circumference of the flange and the lacetip-accepting bore. These apertures are directly opposite one another and preferably so arranged that a medially directed extension of a portion of the inner circumference thereof is in a line substantially tangential to the circumference of the central axle. In fact, if the apertures **14** and **14***a* are formed by drilling from one side of the inner axial member through the other so that slight tangential contact between the drill bit and the side of the central axle **8** is made, a guidance groove **16** is formed in the latter, the benefit of which will be more fully explained hereinafter.

The terminal portions **18** and **18***a* of the flange members **10** and **10***a* are knurled and have an outside diameter that is slightly greater than the unknurled portions **20** and **20***a* of the flange members. In the device illustrated the outside diameter (O.D.) of the knurled portion is about 0.725 inch and the smooth portion about 0.700 inch, while the axle **8** has an O.D. of about 0.25 inch. The I.D. of the housing member **4** is about 0.710 inch except for the portion defining internal grooves **22** and **22***a* at which portions the I.D. is about 0.735 inch. Thus when the axial member **6** is in the locked position illustrated in FIGURE 3 the knurled ends frictionally fit against the inner surface of the ends of the housing member **4** and this prevents rotation of the axial member, but when the axial member is partially moved through the bore of the housing member to the unlocked position illustrated in FIGURE 6, so that one knurled terminal portion (**18***a*) projects beyond an end of the housing member and the other knurled terminal portion (**18**) lies within the internal groove **22**, the axial member may be freely rotated.

As can be seen in FIGURE 2, the outer housing member **4** may be provided with a plurality of ridges or knurls **19** on its inner surface at one or both ends of the bore therethrough, it being preferred that these knurls correspond in number and cooperatively fit the knurls on the flange members **10** and **10***a* of the inner axial member **6**.

To use the device, the tipped ends **24** and **24***a* of the shoelace **26** are introduced into the housing member through the perpendicular orifice **28** in the longitudinal surface of the housing member, and each tip of the shoelace is then threaded laterally to the outside of the device through the aperture **14** or **14***a* respectively. This operation is facilitated if the guidance groove **16** on the central axle **8** is positioned directly opposite and facing the perpendicular opening **28** so that the shoelace tips **24** and **24***a* which normally have a metal or plastic covering will be guided directly to and through the apertures **14** and **14***a*. Once the tips are outside the ends of the device they are then reversed in direction and introduced into the tip-accepting bore **12** from each respective end. The portion of the laces immediately outside the perpendicular opening **28** are then grasped and pulled away from the opening to take up any slack in the laces. With the device in the unlocked position illustrated in FIGURE 6 the axial member **6** is then rotated in one direction to

wind up the laces around the central axle 8 until the device is snug against the instep portion of the shoes, at which time the axial member is pushed back into the locked position as illustrated in FIGURE 3.

Referring now to FIGURES 7 through 10 of the drawings (which illustrate the presently preferred form of the invention), an outer housing member 34 and an inner axial member 36 are both utilized.

As in the device of FIGURES 1–6, this device has a perpendicular orifice 28 in the longitudinal surface of the housing member, and a tip-accepting bore 12 and aperture 14 and 14*a* in flange portions 40 and 50 (respectively), of the inner axial member 36. The latter also has a central axle 8 around which the excess shoelace is convolutely wound. In this embodiment however the internal diameter (I.D.) of the bore of the housing member is uniform from one end to a point about ⅛ of an inch from the other end, at which point the I.D. increases about 0.005 inch and is uniform to the end of the device, thus forming a terminal grove 32. (Alternately, this area may be in the form of a groove similar to the internal groove 22 of FIGURE 6, but the latter generally is more difficult to manufacture, particularly where the outer housing member is made from, or molded as, a single piece.)

One flange member 40 has an inner stop member or terminal portion 48 having an O.D. just slightly less than the I.D. of the terminal groove 32 but greater than the I.D. of the non-grooved portion 31 of the housing bore and a medial portion with an O.D. just slightly less than the I.D. of the non-grooved inner surface of the bore of the housing member 36. At the opposite end of the central axle 8 the second flange member 50 has a 3-step longitudinal cross sectional configuration, the innermost step 51 having an O.D. less than the I.D. of the non-grooved portion 31 of the housing member bore; the medial step 52 has an O.D. at least equal to the I.D. of the non-grooved portion 31 of the outer housing member whereby these two portions may be brought into and out of frictional engagement, and the outermost step or outer stop member 53 has an O.D. substantially in excess of the I.D. of the non-grooved portion whereby the second flange member is prevented from passing in toto into the bore of the housing member.

In use, the operation of the device is substantially the same as the operation of the device of FIGURES 2–7 discussed hereinbefore.

A specific embodiment of the device of FIGURES 7–10 was made out of a polyamide plastic obtained under the tradename nylon, and had approximately the following dimensions; width, 1 inch, thickness (O.D.), ¾ inch. The terminal groove in the outer housing member had an I.D. of 0.715 inch and the non-grooved remainder 0.692 inch. The inner axial member had a central axle of about 0.25 inch O.D., the flange member 40 had a terminal portion of 0.694 inch O.D. and the O.D. of the medial portion thereof was 0.672 inch. The second flange member from the innermost step to the outer stop member had O.D.'s of 0.672, 0.694 and 0.875 respectively. When the device was in the open position illustrated in FIGURE 10 the inner axial member was freely rotatable and a shoelace (when connected to the device in the manner illustrated and described in connection with FIGURE 3) easily wound around the central axle. Pushing the inner axial member into frictional engagement with the housing member as illustrated in FIGURE 9 keeps the shoelace "tied."

A further embodiment of the invention is illustrated in FIGURES 11–13 where like numerals again refer to like parts. In this device, as in the two embodiments discussed supra, an outer housing member 4 is provided with a perpendicular orifice 28 and the cooperating inner axial member 6 has a central axle 8 with a tip-accepting bore 12 therethrough and flanges 60 and 70 at the ends of the central axle, both flanges having an aperture 14

and 14*a* respectively whereby a shoelace may be attached to the devices and a laced shoe "tied" and "untied" in substantially the same manner described hereinabove.

Referring now to FIGURE 11, the flange 60 has medial step 61 that has an O.D. slightly less than the I.D. of the outer housing member and which fits within the latter; and a terminal portion 62 having an O.D. greater than the I.D. of the housing member. At the opposite end of the central axle the flange 70 has an innermost step 71 with an O.D. the same as that of the medial step 61, a medial step 72 having an O.D. greater than the I.D. of the housing member, but less than the O.D. of the housing member; and an outermost step 73 that has an O.D. less than the I.D. of the housing member. In constructing the axial member 6, the distance between the inner face of the terminal portion 62 of flange 60 and the exterior face of step 73 on flange 70 is selected so that flange 70 lies wholly within the confines of the outer housing member. The portion of the outer housing member overlying medial step 72 of flange 70 is provided with a semicircular groove 74, and as an extension of said groove, a semicircular slot 76 which forms a raceway for receiving the medial step 72.

Referring now to FIGURE 12, at least an exterior portion of outermost step 73 is provided with a plurality of cogs 78 and a co-acting stop pin 80 is formed in the inner surface of the outer housing. By applying external pressure or force (as shown by the lines B, B′ in FIGURE 12) to the end of an appropriately elastic outer housing member on the portions 90° away from the pin 80, the shape of the outer housing is changed from circular to ellipsoidal and the stop pin 80 is withdrawn from engagement with the cogs 78. When connected to the shoelace in the same fashion as previously described, rotation of the axial member will wind or unwind the shoelace around the axle 8. Upon release of the pressure B, B′ the housing member returns to its original shape and the axial member is locked in position and no longer rotates due to the engagement of the stop pin with a cog.

If the outer housing member of the device of FIGURES 10–12 is made of some plastic material which is relatively easy to force into the ellipsoidal cross-sectional configuration shown in FIGURE 12, then on some occasions when the device is worn on the shoes, sufficient force is transmitted through the shoelace and the axial member to distort the shape of the outer housing and allow undesired rotation of the axial member. To overcome this difficulty the thickness of the pin end of the outer housing member may be increased slightly at the area 85 lying in the same plane as the perpendicular orifice 28 and also on the side directly opposite thereto wherein the pin 80 is located.

A specific embodiment of this device had approximately the following dimensions: width, 1 inch; diameter, 1 inch. The flange 60 had a 1 inch O.D. on the terminal portion 62 and 0.845 inch O.D. on the medial step 61. The axle 8 was 0.25 inch O.D. and the flange 70 had an O.D. on 0.845 inch at the innermost step 71, 0.865 at the medial step 72 and 0.755 at the cog-bearing outermost step 73. The I.D. of the outer housing 4 was approximately 0.850 inch except for the 0.020 inch deep semicircular groove 74 (and the continuation thereof as slot 76), and the pin end which had an I.D. of about 0.900 inch in the plane perpendicular to the direction of the perpendicular orifice 28 and an I.D. of 0.735 inch in the plane parallel to said direction, the increased thickness of the area 85 being 0.120 inch and there being 0.145 inch from the outside of the housing member to the tip of the pin 80.

It will of course be understood that the dimensions used herein are illustrative and may be modified for a given use as desired, and that except for the need for an elastic outer housing member in the device of FIGURES 11–13, various other materials may be substituted for nylon in constructing the devices described. However, it should be understood that such modifications or substi-

tutions are within the spirit and scope of this invention, and that the particular forms illustrated place no limitation thereon except as defined in the appended claims.

What I claim is:

1. A device suitable for tying a shoelace on a shoe comprising an outer housing member having an axial bore and accommodating therein an inner axial member having a central axle for accepting a convolutely wound shoelace thereabout, said inner spool member from at least one end thereof having an outside diameter which is at least equal to but substantially no greater than the minimum inside diameter of said bore of said outer member; the axial member having flanges at each end thereof and the said housing member having at least one groove circumscribing said bore and medial the ends thereof, the inside diameter and width of said groove being of a size sufficient to accept the portion of said flange which has a diameter at least equal to the inside diameter of said bore whereby said inner axial member is freely rotatable while said flange is in said groove and essentially non-rotatable while moved out of said groove and in frictional contact with said outer housing member; said outer housing member having a perpendicular orifice therethrough, said flanges having apertures therethrough and said axle having a tip-accepting bore therein whereby said device may be semi-permanently attached to the lace of a shoe.

2. A device according to claim 1 in which said inner axial member has knurled flanges at each end thereof and said outer housing member has a said groove about ⅛ inch medial each end thereof.

3. A device suitable for tying a shoelace on a shoe comprising an outer housing member having an axial bore and accommodating therein an inner axial member having a central axle and flanges at each end thereof, the major non-grooved inside diameter of said housing member being uniform from the first end thereof to a point near the second end, at which point the inside diameter increases whereby a terminal groove is formed; the flange of said axial member positioned at the terminal groove end of said housing member having a terminal portion having an outside diameter slightly less than the inside diameter of said terminal groove and greater than the inside diameter of said non-grooved portion, and having a medial portion with an outside diameter smaller than the inside diameter of said non-grooved portion of said housing member; the flange at the said first end of said housing member having a three-step longitudinal cross sectional configuration, the innermost step having an outside diameter less than the inside diameter of said non-grooved portion, a medial step having an outside diameter at least equal to the inside diameter of said non-grooved portion, said medial step and non-grooved portion having a size relationship whereby they may be brought in and out of frictional engagement with each other, and having an outermost step having an outside diameter substantially in excess of the inside diameter of said non-grooved portion whereby said first end flange member is prevented from passing in toto into said axial bore of said housing member; said outer housing member having a perpendicular orifice therethrough, said flanges having apertures therethrough and said axle having a tip-accepting bore therein whereby said device may be semi-permanently attached to the lace of a shoe and said lace may be convolutely wound around said axle; movement of said inner axial member into and out of said frictional engagement with said housing member, respectively allowing and preventing rotation of said axial member.

4. A device suitable for tying a shoelace on a shoe comprising an elastic outer housing member having an axial bore and accommodating therein an inner axial member having a central axle and flanges at each end thereof, the first flange at one end of said housing member having a medial step with an outside diameter slightly less than the inside diameter of the bore of said housing member and positioned therein, the terminal step portion of said flange being located outside said housing member and having an outside diameter greater than the inside diameter of said housing member; the second flange at the second end of said housing member having an innermost step with an outside diameter slightly less than the inside diameter of said housing member, a medial step with an outside diameter greater than the inside diameter of said housing member but less than the outside diameter of said housing member, and an outermost step lying within the confines of said housing member and having an outside diameter that is less than the inside diameter of said housing member, said outermost step having a plurality of cogs formed along the circumference thereof and said housing member having a stop pin located at said second end and normally projecting into said axial bore for a distance sufficient to lie between two of said cogs whereby said inner axial member is prevented from rotating; the portion of said housing member overlying said medial step of said second flange having formed therein a semicircular groove circumscribing a portion of axial bore, and as an extension of said groove, a semicircular slot, said groove and said slot forming a raceway receiving said medial step of said flange and the portion of said outer housing between said slot and said second end being resilient and bearing said pin whereby external pressure on said portion moves said pin in and out of co-acting relationship with said cogs, said outer housing having a perpendicular orifice therethrough, said flanges having apertures therethrough and said axle having a tip-accepting bore therein whereby said device may be semi-permanently attached to the lace of a shoe and said lace may be convolutely wound around said axle.

5. A device suitable for tying a shoelace on a shoe, said device comprising an outer housing member having an axial bore, and accommodated therein, an inner axial member having a central axle and flanges at each end thereof, said outer housing member having a perpendicular orifice therethrough, said flanges having apertures therethrough and said axle having a tip-accepting bore therein whereby the lace on a shoe may be threaded through said orifice, said apertures and said bore thus semi-permanently attaching said device to said shoe, said inner axial member being freely rotatable within said axial bore whereby said shoelace may be convolutely wound around said axle; said housing member and said axial member being moveable in relationship to one another whereby at least one of said flanges may be moved into frictional engagement with said housing member to prevent rotation of said axial member.

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