

Description

The present invention relates to a cord tightening device of synthetic resin for tightening cords or strings on various articles such as anoraks, rucksacks, shopping bags, life jackets, and other bags and pouches having openings to be closed with cords or strings.

Known cord tightening devices typically comprise a hollow body composed of face and back plates interconnected by side walls and defining narrower and wider openings therebetween, and a slider disposed in the body and movable along a guide groove in the face plate for reciprocating movement between the narrower and wider openings, the slider including a retainer for pressing portions of a cord against the side walls, and a knob integral with the retainer and projecting through the guide groove above the face plate. Examples of such conventional cord tightening devices are shown in Japanese Patent Publication No. 48-4511, published February 8, 1973 and Japanese Utility Model Publication No 52-648, published January 10, 1977. For assembling such cord tightening devices, the slider has to be forcibly pushed into the body along a groove defined in the body by elastically deforming the body in order to spread the face and back plates apart to an extent that permits such forced insertion of the slider.

Owing to the forcible insertion of the slider, the body is likely to be cracked or ruptured at the time of assembling of the cord tightening device. A similar problem also occurs when the slider is temporarily detached from the body to replace the cord with another cord having a relatively large diameter or thickness.

DE-C-808 924 discloses another example of a conventional cord tightening device comprising a hollow body and a separable retainer movably disposed in said hollow body. Said retainer is provided with an aperture and with a spring biased knob located within said aperture, said knob being resiliently movable into said aperture to such an extent that it is substantially fully received within said aperture. In this condition the retainer can be inserted into or removed from the hollow body. But this conventional cord tightening device has a complex structure and is expensive in production.

With the foregoing problems in view, the present invention seeks to provide a cord tightening device having simple structural features which enable smooth assembling and disassembling of a slider and a body without damaging the body.

According to the present invention, there is provided a cord tightening device comprising: a hollow body having a narrower opening at one of its opposite ends and a wider opening at the other end and composed of a pair of spaced face and back plates and a pair of spaced side walls interconnecting said face and back plates, one of said face and back plates having a guide groove defined therein and extending from a position

near the narrower opening toward a position near the wider opening; and a slider movably disposed in said body and slidable along said guide groove, said slider having a retainer for pressing cord portions against said side walls, and a knob integral with said retainer and projecting through said guide groove above said one plate, characterized in that said retainer has an aperture and that said knob is resiliently cantilevered to said retainer and extends in said aperture so that said knob is resiliently flexible into said aperture to such an extent that said knob is substantially fully received within said aperture.

The invention will now be described in more detail with reference to an exemplifying non-limiting embodiment thereof illustrated in the accompanying drawings, in which:

Figure 1 is a front elevational view of a cord tightening device according to the present invention;

Figure 2 is a cross-sectional view taken along line II-II of Figure 1;

Figure 3 is a cross-sectional view taken along line III-III of Figure 2;

Figure 4 is a front elevational view of a slider of the cord tightening device shown in Figure 1;

Figure 5 is a bottom end view of the slider of Figure 4;

Figure 6 is a cross-sectional view taken along line VI-VI of Figure 4;

Figures 7A and 7B are front elevational views, with parts omitted for clarity, of the cord tightening device, showing the manner in which the slider is assembled with a body of the cord tightening device; and

Figure 8 is a front elevational view of the cord tightening device, showing the manner in which it is operated with a cord extending therethrough.

As shown in Figures 1 through 3, a cord tightening device 10 embodying the present invention generally comprises a body 11 and a slider 12 slidably disposed in the body 11. The body 11 and the slider 12 are injection-molded of synthetic resin.

The body 11 is of a hollow structure composed of a pair of parallel face and back plates 13, 14 spaced from each other and integrally interconnected by a pair of side walls 15, 16 spaced from each other. The side walls 15, 16 converge toward each other upwardly (Figure 3) and terminate at a narrower opening 17 defined between the upper ends of the face and back plates 13, 14. The side walls 15, 16 diverge away from each other downwardly (Figure 3) and terminate at a wider opening 18 defined between the lower ends of the face and back plates 13, 14. Preferably, but not necessarily, the side walls 15, 16 have a series of step-like teeth or serrations 19 on inner surfaces thereof, the teeth 19 being disposed closer to the narrower opening 17 than to the wider opening 18.

As illustrated in Figures 1 and 2, the face plate 13 has a vertically elongate guide groove 20 lying at equal distances from the side walls 15, 16 and extending from a position near the narrower

moving 17 downwardly toward a position near the wider opening 18. The face plate 13 further has a vertical guide slot 21 defined in an inner surface thereof and extending from the lower end of the guide groove 20 to the lower end of the face plate 13. The guide slot 21 having the same width as the guide groove 20. The slider 12 in the body 11 is slidable along the guide groove 20.

As shown in Figures 2 and 3, the slider 12 comprises a substantially annular retainer 22 for securely pressing portions of a cord C (Figure 7B) against the side walls 15, 16 and a knob 23 integral with the retainer 22 and projecting through the guide groove 20 above the outer surface of the face plate 13. The knob 23 is cantilevered to the retainer 22 and extending in a central oblong aperture or hole 24 in the annular retainer 22.

The annular retainer 22 is slidable in the body 11 and includes a pair of diametrically opposite locking portions 25, 25 facing the side walls 15, 16 of the body 11, an inverted U-shaped upper connecting portion 26 interconnecting one ends of the locking portions 25, 25 and facing toward the narrower opening 17 of the body 11, and an arcuate lower connecting portion 27 interconnecting the other ends of the locking portions 25, 25 and facing toward the wider opening 18 of the body 11. Each of the locking portions 25, 25 has a series of step-like teeth or serrations 28 on its outer peripheral surface which faces the corresponding side wall 15, 16. The teeth 28 serve to bite into the portions of the cord C to keep the cord C securely in position with respect to the body 11 against undesired slippage. The retainer 22 further includes a rectangular wing 29 projecting from the lower connecting portion 27 and extending in alignment with the guide groove 20 in the face plate 13. The wing 29 has the same width as the guide groove 20.

The cantilevered knob 23 is of a tongue-like shape and includes a thin rectangular base portion 30 joined with the upper connecting portion 26 and disposed in the aperture 24 in the retainer 22. As shown in Figure 2, the knob 23 has a thickness T which is smaller than the spacing or distance D between the face and back plates 13, 14. The cantilevered knob 23 thus constructed is resiliently flexible about the base portion 30 toward the back plate 14 to such an extent that the knob 23 is substantially fully received in the oblong aperture 24 in the retainer 22. The knob 23 further has a pair of horizontal upper and lower abutment walls 23a, 23b engageable respectively with a pair of confronting inner peripheral end edges 20a, 20b of the face plate 13 which define part of the guide groove 20. The upper abutment wall 23a is disposed adjacent to the base portion 30 and engageable with the peripheral end edge 20a to limit movement of the slider toward the narrower opening 17 of the body 11. The lower abutment wall 23b defines the lower end extremity of the knob 23 and is engageable with the peripheral end edge 20b to limit movement of the slider 12 toward the wider opening 18 of the body

11. The knob 23 has on its outer surface a plurality (three in the illustrated embodiment) of parallel ridges 23c for providing good frictional contact with the user's finger in moving the slider 12 along the guide groove 20. The endmost ridge 23c which is located near the base portion 30 has a bevelled surface 23d sloping downwardly toward the top abutment face 23a for facilitating smooth insertion of the slider 12 into the body 11, as described later.

As shown in Figure 3, the inverted U-shaped upper connecting portion 26 of the retainer 22 has a width substantially the same as the width of the knob 23 and projects upwardly from the upper ends of the locking portions 25, preferably to such an extent that the upper edge of the connecting portion 26 lies flush with the upper edges of the face and back plates 13, 14 when the upper abutment wall 23a is brought into abutment with the peripheral end edge 20a. The upper connecting portion 26 thus constructed is particularly suitable for applications wherein a portion of a cord C is looped around the retainer 22 of the cord tightening device 10, as shown in Figure 8. When the knob 23 is brought to an upper end of the guide groove 20, the looped cord portion is disposed outside the body 11 so that the user can grip the cord portion thus exposed and adjust the effective cord length while displacing the knob 23 toward the lower end of the guide groove 20.

The body 11 and the slider 12 are separately injection-molded and then they are assembled into a cord tightening device in the manner as illustrated in Figures 7A and 7B.

As shown in Figure 7A, the end portions of a cord C are inserted through the body 11, one along the side wall 15 and the other along the side wall 16. Then the slider 12 is inserted through the wider opening 18 into the body 11 with the connecting portion 26 directed forward. During that time, the wing 29 of the slider 12 is gripped by the user's fingers. As the slider 12 moves toward the narrower opening 17, the bevelled surface 23d on the knob 23 is brought first into abutting engagement with the lower edge of the face plate 12 (Figure 2) and then into sliding engagement with the guide slot 21 (indicated by dotted lines) whereupon the knob 23 is resiliently flexed about the base portion 30 toward the back plate 14.

A further advancing movement of the slider 12 causes the knob 23 to fit in and slide along the guide slot 21, as shown in Figure 7B. When the knob 23 moves past the lower end edge 20b of the guide groove 20 (indicated by phantom lines), the knob 23 springs back to its original position. The knob 23 is now fitted in the guide groove 20 and the slider 12 is slidably disposed in the body 11. In use, when the slider 23 is the slidably displaced in the direction of the arrow with respect to the body 11, portions of the cord C are gripped between the inner surfaces of the side walls 15, 16 and the corresponding locking portions 25, 25 of the retainer 22. The teeth 19 on the side walls 15, 16 and the teeth 28 on the locking portions 25 are

preferable because they bite into the cord portion to retain the cord C firmly in position for greatest protection against unwanted slippage of the cord C in the body 11.

To disassemble the cord tightening device 10, the slider 12 is slidably displaced along the guide groove 20 toward the wider opening 18 of the body 11 until the knob 23 impinges on the lower end edge 20b of the guide groove 20. Then the knob 23 is lowered by the user's finger to flex toward the back plate 14. While keeping this condition, the slider 12 is further forced toward the wider opening 18 until it is detached from the body 11.

As described above, because of the cantilevered resilient knob 23, the slider 12 can smoothly be inserted into and removed from the body 11 without damaging the body 11.

Claims

1. A cord tightening device (10) comprising: a hollow body (11) having a narrower opening (17) at one of its opposite ends and a wider opening (18) at the other end and composed of a pair of spaced face and back plates (13, 14) and a pair of spaced side walls (15, 16) interconnecting said face and back plates (13, 14), one of said face and back plates (13, 14) having a guide groove (20) defined therein and extending from a position near the narrower opening (17) toward a position near the wider opening (18); and a slider (12) movably disposed in said body (11) and slidable along said guide groove (20), said slider (12) having a retainer (22) for pressing cord portions against said side walls (15, 16) and a knob (23) integral with said retainer (22) and projecting through said guide groove (2) above said one plate (13 or 14), characterized in that said retainer (22) has an aperture (24), and that said knob (23) is resiliently cantilevered to said retainer (22) and extends in said aperture (24), so that said knob (23) is resiliently flexible into said aperture (24) to such an extent that said knob (23) is substantially fully received within said aperture (24).

2. A cord tightening device according to claim 1, said knob (23) having a thickness (T) which is smaller than the distance (D) between said face and back plates (13, 14).

3. A cord tightening device according to claim 1 or 2 said one plate (13 or 14) having a guide slot (21) defined in an inner surface thereof and extending contiguously from said guide groove (20) to said other end of said body (11).

4. A cord tightening device according to one of the claims 1 to 3, said knob (23) including a bevelled surface (23d) facing toward said narrow opening (17) of said body (11).

5. A cord tightening device according to one of the preceding claims, said retainer (22) having an annular shape, said aperture (24) being defined centrally in said annular retainer (22).

6. A cord tightening device according to one of the preceding claims, said retainer (22) including a wing (29) projecting outwardly away

from said aperture (24) and extending in alignment with said guide groove (20).

7. A cord tightening device according to one of the preceding claims said retainer (22) having a portion (26) lying flush with said one end of said body (11) when said knob (23) is located at an end of said guide groove (20) near said narrower opening (17).

Patentansprüche

1. Seilklemme (10), umfassend: einen hohlen Körper (11), der eine schmale Öffnung (17) an einem seiner gegenüberliegenden Enden und eine breite Öffnung (18) an dem anderen Ende aufweist und aus einem paar im Abstand voneinander angeordneter vorderer und hinterer Schilde (13, 14) und aus einem paar im Abstand voneinander angeordneter Seitenwände (15, 16) gebildet ist, die den vorderen und den hinteren Schild (13, 14) miteinander verbinden, wobei in einem der vorderen und hinteren Schilde (13, 14) eine Führungsnut (20) ausgebildet ist, die sich von einer Stelle nahe der schmalen Öffnung (17) zu einer Stelle nahe der breiten Öffnung (18) erstreckt; und einen Schieber (12), der in dem Körper (11) beweglich angeordnet und längs der besagten Führungsnut (20) verschiebbar ist, wobei der Schieber (12) ein Halteteil (22) zum Anpressen von Seilbereichen gegen die besagten Seitenwände (15, 16) und ein mit dem Halteteil (22) einstückig ausgebildetes Griffteil (23) aufweist, das durch die Führungsnut (20) hindurch über den besagten einen Schild (13. oder 14) hinausragt, dadurch gekennzeichnet, daß das besagte Halteteil (22) eine Öffnung (24) aufweist und daß das besagte Griffteil (23) mit dem Halteteil (22) elastisch freitragend verbunden ist und sich in diese Öffnung (24) hinein erstreckt, so daß das Griffteil (23) in einem solchen Maß elastisch in diese Öffnung (24) ausweichen kann, daß das Griffteil (23) im wesentlichen vollständig in dieser Öffnung (24) angeordnet ist.

2. Seilklemme nach Anspruch 1, wobei das besagte Griffteil (23) eine Dicke (T) hat, die kleiner ist als der Abstand (D) zwischen dem vorderen und dem hinteren Schild (13, 14).

3. Seilklemme nach Anspruch 1 oder 2, wobei der besagte eine Schild (13 oder 14) einen Führungsschlitz (21) hat, der in einer Innenfläche desselben ausgebildet ist und sich von der besagten Führungsnut (20) zu dem besagten anderen Ende des Körpers (11) erstreckt.

4. Seilklemme nach einem der Ansprüche 1 bis 3, wobei das besagte Griffteil (23) eine der schmalen Öffnung (17) des Körpers (11) zugekehrte abgeschrägte Fläche (23d) hat.

5. Seilklemme nach einem der vorhergehenden Ansprüche, wobei das besagte Halteteil (22) ringförmig ist und wobei die besagte Öffnung (24) mittig in dem ringförmigen Halteteil (22) ausgebildet ist.

6. Seilklemme nach einem der vorhergehenden Ansprüche, wobei das Halteteil (22) einen sich von der besagten Öffnung (24) nach außen



preferable because they bite into the cord portion to retain the cord C firmly in position for greater protection against unwanted slippage of the cord C in the body 11.

To disassemble the cord tightening device 10, the slider 12 is slidably displaced along the guide groove 20 toward the wider opening 18 of the body 11 until the knob 23 impinges on the lower end edge 20b of the guide groove 20. Then the knob 23 is lowered by the user's finger to flex toward the back plate 14. While keeping this condition, the slider 12 is further forced toward the wider opening 18 until it is detached from the body 11.

As described above, because of the cantilevered resilient knob 23, the slider 12 can smoothly be inserted into and removed from the body 11 without damaging the body 11.

Claims

1. A cord tightening device (10) comprising: a hollow body (11) having a narrower opening (17) at one of its opposite ends and a wider opening (18) at the other end and composed of a pair of spaced face and back plates (13, 14) and a pair of spaced side walls (15, 16) interconnecting said face and back plates (13, 14), one of said face and back plates (13, 14) having a guide groove (20) defined therein and extending from a position near the narrower opening (17) toward a position near the wider opening (18); and a slider (12) movably disposed in said body (11) and slidable along said guide groove (20), said slider (12) having a retainer (22) for pressing cord portions against said side walls (15, 16) and a knob (23) integral with said retainer (22) and projecting through said guide groove (2) above said one plate (13 or 14), characterized in that said retainer (22) has an aperture (24), and that said knob (23) is resiliently cantilevered to said retainer (22) and extends in said aperture (24), so that said knob (23) is resiliently flexible into said aperture (24) to such an extent that said knob (23) is substantially fully received within said aperture (24).

2. A cord tightening device according to claim 1, said knob (23) having a thickness (T) which is smaller than the distance (D) between said face and back plates (13, 14).

3. A cord tightening device according to claim 1 or 2 said one plate (13 or 14) having a guide slot (21) defined in an inner surface thereof and extending contiguously from said guide groove (20) to said other end of said body (11).

4. A cord tightening device according to one of the claims 1 to 3, said knob (23) including a bevelled surface (23d) facing toward said narrow opening (17) of said body (11).

5. A cord tightening device according to one of the preceding claims, said retainer (22) having an annular shape, said aperture (24) being defined centrally in said annular retainer (22).

6. A cord tightening device according to one of the preceding claims, said retainer (22) including a wing (29) projecting outwardly away

from said aperture (24) and extending in alignment with said guide groove (20).

7. A cord tightening device according to one of the preceding claims said retainer (22) having a portion (26) lying flush with said one end of said body (11) when said knob (23) is located at an end of said guide groove (20) near said narrower opening (17).

Patentansprüche

1. Seilklemme (10), umfassend: einen hohlen Körper (11), der eine schmale Öffnung (17) an einem seiner gegenüberliegenden Enden und eine breite Öffnung (18) an dem anderen Ende aufweist und aus einem paar im Abstand voneinander angeordneter vorderer und hinterer Schilde (13, 14) und aus einem paar im Abstand voneinander angeordneter Seitenwände (15, 16) gebildet ist, die den vorderen und den hinteren Schild (13, 14) miteinander verbinden, wobei in einem der vorderen und hinteren Schilde (13, 14) eine Führungsnut (20) ausgebildet ist, die sich von einer Stelle nahe der schmalen Öffnung (17) zu einer Stelle nahe der breiten Öffnung (18) erstreckt; und einen Schieber (12), der in dem Körper (11) beweglich angeordnet und längs der besagten Führungsnut (20) verschiebbar ist, wobei der Schieber (12) ein Halteteil (22) zum Anpressen von Seilbereichen gegen die besagten Seitenwände (15, 16) und ein mit dem Halteteil (22) einstückig ausgebildetes Griffteil (23) aufweist, das durch die Führungsnut (20) hindurch über den besagten einen Schild (13. oder 14) hinausragt, dadurch gekennzeichnet, daß das besagte Halteteil (22) eine Öffnung (24) aufweist und daß das besagte Griffteil (23) mit dem Halteteil (22) elastisch freitragend verbunden ist und sich in diese Öffnung (24) hinein erstreckt, so daß das Griffteil (23) in einem solchen Maß elastisch in diese Öffnung (24) ausweichen kann, daß das Griffteil (23) im wesentlichen vollständig in dieser Öffnung (24) angeordnet ist.

2. Seilklemme nach Anspruch 1, wobei das besagte Griffteil (23) eine Dicke (T) hat, die kleiner ist als der Abstand (D) zwischen dem vorderen und dem hinteren Schild (13, 14).

3. Seilklemme nach Anspruch 1 oder 2, wobei der besagte eine Schild (13 oder 14) einen Führungsschlitz (21) hat, der in einer Innenfläche desselben ausgebildet ist und sich von der besagten Führungsnut (20) zu dem besagten anderen Ende des Körpers (11) erstreckt.

4. Seilklemme nach einem der Ansprüche 1 bis 3, wobei das besagte Griffteil (23) eine der schmalen Öffnung (17) des Körpers (11) zugekehrte abgeschrägte Fläche (23d) hat.

5. Seilklemme nach einem der vorhergehenden Ansprüche, wobei das besagte Halteteil (22) ringförmig ist und wobei die besagte Öffnung (24) mittig in dem ringförmigen Halteteil (22) ausgebildet ist.

6. Seilklemme nach einem der vorhergehenden Ansprüche, wobei das Halteteil (22) einen sich von der besagten Öffnung (24) nach außen



erstreckenden und mit der Führungsnut (20) fluchtenden Lappen (29) aufweist.

7. Seilklemme nach einem der vorhergehenden Ansprüche, wobei das besagte Halteteil (22) einen Bereich (26) hat, der mit dem besagten einen Ende des Körpers (11) fluchtet, wenn das Griffteil (23) an einem Ende der Führungsnut (20) nahe der schmalen Öffnung (17) angeordnet ist.

Revendications

1. Dispositif (10) de serrage de corde comportant: un corps creux (11) ayant une ouverture plus étroite (17) à une de ses extrémités opposées et une ouverture plus large (18) à l'autre extrémité et composé d'une paire de plaques (13, 14) avant et arrière espacées et d'une paire de parois latérales espacées (15, 16) interconnectant lesdites plaques avant et arrière (13, 14), l'une desdites plaques avant et arrière (13, 14) ayant une rainure de guidage (20) définie à l'intérieur de celle-ci et s'étendant depuis une position proche de l'ouverture la plus étroite (17) et vers une position proche de l'ouverture la plus large (18); et une glissière (12) disposée de façon à pouvoir se déplacer dans ledit corps (11) et pouvant glisser le long de ladite rainure de guidage (20), ladite glissière (12) ayant un dispositif de maintien (22) pour appuyer des parties de la corde contre lesdites parois latérales (15, 16) et un bouton (23) faisant partie intégrale dudit dispositif de maintien (22) et s'étendant à travers ladite rainure de guidage (20) au-dessus de ladite première plaque (13 ou 14), caractérisé en ce que ledit dispositif de maintien (22) a une ouverture (24), et en ce que ledit bouton (23) est appuyé par un levier élastique sur ledit dispositif de maintien (22) et s'étend dans ladite ouverture

(24), de telle sorte que ledit bouton (23) soit flexible de façon élastique dans ladite ouverture (24) à un point tel que ledit bouton (23) soit substantiellement totalement reçu à l'intérieur de ladite ouverture (24).

2. Dispositif de serrage de corde selon la revendication 1, ledit bouton (23) ayant une épaisseur (T) qui est inférieure à la distance (D) entre lesdites plaques avant et arrière (13, 14).

3. Dispositif de serrage de corde selon la revendication 1 ou 2, ladite première plaque (13 ou 14) ayant une rainure de guidage (21) définie dans une surface intérieure de celle-ci et s'étendant de façon contiguë à ladite rainure de guidage (20) vers ladite autre extrémité dudit corps (11).

4. Dispositif de serrage de corde selon l'une des revendications 1 à 3, ledit bouton (23) comportant une surface (23d) à niveau faisant face à ladite ouverture étroite (17) dudit corps (11).

5. Dispositif de serrage de corde selon l'une des revendications précédentes, ledit dispositif de maintien (22) ayant une forme annulaire, ladite ouverture (24) étant définie de façon centrale dans ledit dispositif de maintien annulaire (22).

6. Dispositif de serrage de corde selon l'une des revendications précédentes, ledit dispositif de maintien (22) comportant aile (29) s'étendant vers l'extérieur depuis ladite ouverture (24) et s'étendant en alignement avec ladite rainure de guidage (20).

7. Dispositif de serrage de corde selon l'une des revendications précédentes, ledit dispositif de maintien (22) ayant une partie (26) s'étendant au même niveau que ladite première extrémité dudit corps (11) lorsque ledit bouton (23) est situé à une extrémité de ladite rainure de guidage (20) au voisinage de ladite ouverture la plus étroite (17).