

Description

This invention relates to the fastening of objects, either together or one to another, and more particularly, to the secure, simplified fastening of objects.

Devices which are used to fasten objects typically make use of a strap connected to a locking head. The free end of the strap is threaded through or around the objects to be fastened and then inserted into the head.

In order to achieve secure fastening and prevent unauthorised tampering, the locking head generally is in the form of an enclosure that houses a locking tang and prevents unauthorised access to it.

One example of a fastener of this general construction is described in US-A-4106802 and comprises an elongated member having a free end with an aperture therein, said aperture extending along the axis of elongation of said member and being bounded by a wall of said free end, said free end having a plurality of projections on an outer surface of said wall; and a housing connected to the other end of said elongated member including an opening with a locking member within said opening for receiving and compressing said free end in order to lock said elongated member in said housing.

This construction is of a relatively massive configuration in order to achieve the desired locking effect. The massivity is undesirable as it might damage the merchandise or leave an unsightly hole. Moreover, a substantial effort will be required to insert the free end into locking engagement with the housing. Also, because of the massive proportions the locking members or barbs within the opening and the projections or barbs on the free end are constructed to be resilient to permit insertion of the free end in the aperture.

It is an object of the invention to improve on the said construction and, according to the present invention, the wall of the free end has single minimum thickness position or area intermediate the opposite ends of such aperture to facilitate compression of said free end and its entry into engagement with the locking member. In this way, on insertion, the walls bounding the aperture are able freely to move towards one another in a pivoting action, thus leading to easy insertion.

Various advantageous and additional features are set out in the sub-claims. According to one such feature, the fastener includes means associated with said elongated member for causing said free end to remain locked in said housing when said elongated member is thereafter separated from said free end in its locked position.

Brief Description of the Drawings

Other aspects of the invention will become apparent after considering several illustrative embodiments taken in conjunction with the drawings in which.

FIGURE 1A is a perspective view of an extended

fastener in accordance with the invention, before stretching of its connecting filament;

FIGURE 1B is a perspective view of the fastener of FIGURE 1A after stretching of its filament showing the tip end in position for being inserted into the head;

FIGURE 2A is an enlarged plan view of the tip portion of the fastener of FIGURES 1A and 1B;

FIGURE 2B is a cross sectional view of the tip of FIGURE 2A;

FIGURE 2C is a top view of the tip portion of FIGURE 2A;

FIGURE 3A is a cross-sectional view of the housing of the fastener shown in FIGURES 1A and 1B;

FIGURE 3B is an end view of the housing of FIGURE 3;

FIGURE 4A is an enlarged plan view of the tip portion of an alternative fastener in accordance with the invention;

FIGURE 4B is a partial cross sectional view illustrating the insertion of the alternative fastener of FIGURE 4A into the housing of FIGURE 3A and the additional safeguard against accidental removal provided by the alternative fastener;

FIGURE 5A is an enlarged plan view of the tip portion of a further alternative embodiment of the invention; and

FIGURE 5B is a partial sectional view illustrating the effect of an attempted withdrawal of the alternative fastener of FIGURE 5A once inserted into the housing of FIGURE 3A.

Detailed Description

With reference to the drawings, FIGURE 1 shows a fastener in accordance with the invention before elongation of its central filamentary portion 15. The fastener 10 additionally includes an apertured housing 11 in the form of a cylindrical locking head with longitudinally opposed circular openings C_1 and C_2 . The elongated member 15 is centrally attached to the housing 11 and has a free end or apertured tongue 16 that is inserted into one of the circular openings C_1 and C_2 , to become irremovably locked in the housing 11.

The fastener 10 is customarily produced by molding of a stretch reorientable plastic material, such as polypropylene, nylon and the like. After molding has been completed the fastener is in the form shown in FIGURE 1A with a thickened filamentary portion 15, and a connecting portion 17. After the fastener 10 is removed from its mold, the filamentary portion 15 is elongated by stretching, for example by gripping the locking head or housing 11 in a jaw (not shown) and simultaneously gripping the end of the filament 15 by a protuberance 17 p-1 and drawing the jaws apart.

The result of the stretching operation produces the modified fastener 10' of FIGURE 1B in which the central filamentary portion 15 of FIGURE 1A has become extended into an elongated and comparatively thinner filament 15' that extends between the housing or head 11 and the tip 16 by way of the connection portions 17. In addition, the connecting portion includes a neck 17n of reduced

cross section which provides a breakage point in case of an unauthorized tampering with the device 10'.

In particular FIGURE 1B shows the elongated filament 15' positioned in the form of a loop L with the tip 16 in position for being inserted into the locking head 11. The locking ring 11r can be provided with openings 11-o in order to permit some compression and facilitate entry of the tip 16 into the housing 11.

Details of the apertured tip 16 which bring about the desired locking engagement in the housing 11 are illustrated in FIGURE 2A.

The tip 16 of FIGURE 2A includes an end 16e in the form of an aperture cylinder 16c. The aperture is a double wedge opening 16w with a first opening having diverging upper and lower surfaces 16w-1 and 16w-2 that diverge from a radius of curvature 16c-1. The balance of the opening 16w is formed by oppositely diverging wedge surfaces 16w-3 and 16w-4 that diverge from an end radius of curvature 16c-2. The extremities of the wedge meet at the midsection of the cylindrical tip. Straddling the first portion of the wedge are oppositely positioned ramps 16r-1 and 16r-2. As indicated in FIGURES 2B and 2C the ramps 16r-1 and 16r-2 have planar outer surfaces and converge at the extreme tip 16t of the free member. They diverge outwardly to surfaces 16p-1 and 16p-2 with a curvature conforming to the underlying tip 16c.

The locking head 11 which receives the tip 16 is shown in section in FIGURE 3A. Upon insertion of the tip 16 into either open end C₁ or C₂ of the head 11 the ramps 16r-1 and 16r-2 engage the inner surface of an internal ring 11r. Further movement of the tip into the housing 11 compresses the ramps into the double wedge opening 16n. Complete movement of the tip into the housing results in clearance of the ring 11r by the trailing vertical extremities 16r-1 and 16r-2 of the ramps which hereupon spring back into their equilibrium position, locking the tip 16 against the opposite sides 11s-1 or 11s-2 of the locking ring 11r.

It is to be noted further that in addition to the protuberance 17p-1 there is a further protuberance 17p-2 at the end of the connector 17. This latter protuberance is designed to facilitate the insertion of the tip 16 into the locking head 11 by providing a convenient gripping point for the user. To that end the gripping protuberance 17p-2 is in the form of a partial sphere which is joined to a cylindrical embossment 16r. The further protuberance 17p-1 which is at the terminus of the reduced diameter neck 17n provides a convenient rupture point in the event of unauthorized tampering with the device, resulting in a fracture of the neck 17n at the protuberance 17p-1. Such tampering could result, for example, if a purchaser attempted to remove the locked fastener from an item of merchandise by pulling on the extended filament 15' because the tip 16 becomes locked in the housing 11 upon insertion to the point that the end of the cylindrical embossment 16r contacts one of the sides 11s-1 or 11s-2 of the

locking ring 11r. When the embossment is thus positioned, the vertical ends 16v-1 and 16v-2 of the ramps 16r-1 and 16r-2 engage the other side surface 11s-2 or 11s-1 of the locking ring 11r. Consequently, in this situation, if an attempt is made to pull the tip 16 from the housing 11, any failure of the fastener will take place at the reduced diameter neck 17n and the apertured tip that has become separated from the filament 15' remains in blocking position in the housing 11. This prevents any attempted reuse of the fastener and constitutes a security measure against unauthorized tampering and pilferage.

An alternative tip 56 is illustrated in FIGURE 4A. By contrast with the tip 16 of FIGURE 2A the tip 56 of FIGURE 7A includes a double wedge opening 56w which is asymmetric. In the case of FIGURE 2A the aperture 16w is formed by two wedge openings which are symmetrically disposed with respect to the ends 16 v-1 and 16 v-2 of the ramps 16 r-1 and 16 r-2. In the case of the tip 56 in FIGURE 4A the two wedge openings which form the aperture 56w are unequal and intersect before the inclined ends 56 v-1 and 56 v-2 of the ramps 56 r-1 and 56 r-2. At the intersection position along an axis I the walls 57 w-1 and 57 w-2 are of reduced thickness in order to promote flexure of the end 56e in accordance with FIGURE 4B.

As indicated in FIGURE 4B, once the tip 56 is inserted into the housing 11 the ramp walls 56 v-1 and 56 v-2 engage the inclined side surface 11' s-1 of the locking ring 11' r. If an attempt is made to remove the tip 56 by pushing on the end 56e is pushed inwardly and flexes about the axis I. This forces the side surfaces of the end against the corresponding inner walls of the housing 11. The result is to thwart attempts to make an unauthorized removal of the tip 56 from the housing 11.

In addition the nose portion of the end 56e is formed as a plug 56p with a concave end 56c so that unauthorized forces that are slightly displaced from the central axis of the housing 11 will also bring about the desired flexure of the depressed plug 56p against the internal side walls of the housing.

A further embodiment is shown in FIGURE 5A in which the axis I' of minimal wall thickness is displaced inwardly towards the ring 56' r with respect to the walls 56' v-1 and 56' v-2 of the tip 56' e. This has the effect, as illustrated in FIGURE 5B, of bringing about the rupture separation of the end 56' e from the remainder of the tip 56 when excessive pulling force is applied in the direction indicated by the arrow P'. In order to prevent further usage of the tip 56' once rupture has taken place as shown in FIGURE 5B, the ring 56' is reduced in diameter compared with FIGURE 4A so that severed portions 56' s cannot remain in the housing 11 once rupture has taken place as shown in FIGURE 5B.

Since the tip 56' includes the weakened regions 57' w-1 and 57' w-2, it is not necessary to include neck 17n of reduced cross section shown in FIGURE 1B.

While various aspects of the invention have been set forth by the drawings and specification, it is to be understood that the foregoing detailed description is for illustration only and that various changes, as well as the substitution of equivalent constituents shown and described may be made without departing from the scope of the invention as set forth in the appended claims.

Claims

1. A fastener comprising an elongated member (15) having a free end (16) with an aperture (16W, 56W) therein, said aperture extending along the axis of elongation of said member and being bounded by a wall of said free end, said free end having a plurality of projections (16p-1, 16p-2) on an outer surface of said wall; and a housing (11) connected to the other end of said elongated member including an opening (C₁, C₂) with a locking member (11r) within said opening for receiving and compressing said free end in order to lock said elongated member in said housing; characterised in that the wall of said free end has a single minimum thickness position or area (I) intermediate the opposite ends of such aperture to facilitate compression of said free end and its entry into engagement with the locking member.

2. A fastener according to claim 1 wherein said housing (11) is open (C₁, C₂) at opposed ends thereof to permit the bidirectional entry of said elongated member therein.

3. A fastener according to claim 1 or claim 2 wherein the locking member (11r) comprises a circumferential ring in said housing.

4. A fastener according to claim 3 wherein said ring forms a plurality of discrete segments.

5. A fastener according to any of claims 1 to 4 wherein said free end is circular in external configuration and the projections comprise planar ramps (16r-1, 16r-2) extending from the tip (16t) of said free end for locking said free end in said housing.

6. A fastener according to claim 5 wherein said tip includes ramps on opposite sides thereof.

7. A fastener according to claim 6 wherein said ramps each terminate in an arc surface (16v-1, 16v-2).

8. A fastener according to any of claims 1 to 7 wherein the minimum thickness is at a single point along said axis.

9. A fastener according to any of claims 1 to 8 wherein said elongated aperture has an interior profile defined by back-to-back wedges.

10. A fastener according to any of claims 1 to 9 wherein said aperture has its maximum width at midlength.

11. A fastener according to claim 9 wherein said wedge portions meet at a midposition.

12. A fastener according to any of claims 1 to 11 further including a partial sphere (17p-2) centered upon said elongated member before the tip portion thereof.

13. A fastener according to claim 12 wherein said partial sphere is joined to a cylindrical

embossment (16r) before the tip portion of said elongated member.

14. A fastener according to any of claims 1 to 13 further including means associated with said elongated member for causing said free end to remain locked in said housing when said elongated member is thereafter separated from said free end in its locked position.

15. A fastener according to claim 14 wherein the causing means comprises a reduced diameter portion (17n) of said elongated member.

Patentansprüche

1. Befestigungselement, das einen verlängerten Teil (15) mit einem freien Ende (16) und einer Öffnung (16W, 56W) darin umfaßt, wobei die Öffnung sich entlang der Verlängerungsachse des Teils erstreckt und durch eine Wand des freien Endes begrenzt wird, wobei das freie Ende eine Vielzahl von vorspringenden Teilen (16p-1, 16p-2) an einer Außenfläche der Wand aufweist; sowie ein Gehäuse (11), welches mit dem anderen Ende des verlängerten Teils verbunden ist und eine Öffnung (C₁, C₂) enthält, mit einem Verschlussteil (11r) in dieser Öffnung für die Aufnahme und das Zusammendrücken des freien Endes zur Einrastung des verlängerten Teils in dem Gehäuse, dadurch gekennzeichnet, daß die Wand des freien Endes zum leichteren Zusammenpressen und leichteren Ineingriffbringen des freien Endes mit dem Verschlussteil eine einzige Stelle oder einen einzigen Bereich (I) mit geringster Dicke zwischen den gegenüberliegenden Enden der Öffnung aufweist.

2. Befestigungselement nach Anspruch 1, wobei das Gehäuse (11) an den gegenüberliegenden Enden (C₁, C₂) zur Schaffung eines beidseitigen Zugangs für das verlängerte Teil offen ist.

3. Befestigungselement nach Anspruch 1 oder 2, wobei der Verschlussteil (11r) einen am Umfang verlaufenden Ring in dem Gehäuse umfaßt.

4. Befestigungselement nach Anspruch 3, wobei der Ring eine Vielzahl einzelner Abschnitte bildet.

5. Befestigungselement nach einem der Ansprüche 1 bis 4, wobei das freie Ende in seiner äußeren Ausbildung kreisförmig ist und die vorspringenden Teile zum Einrasten des freien Endes in dem Gehäuse ebene Abschrägungen (16r-1, 16r-2) umfassen, die von der Spitze (16t) des freien Endes ausgehen.

6. Befestigungselement nach Anspruch 5, wobei die Spitze an den gegenüberliegenden Seiten Abschrägungen aufweist.

7. Befestigungselement nach Anspruch 6, wobei jede der Abschrägungen in eine bogenförmige Fläche (16v-1, 16v-2) mündet.

8. Befestigungselement nach einem der Ansprüche 1 bis 7, wobei die geringste Dicke an einem einzigen Punkt entlang der Achse liegt.

9. Befestigungselement nach einem der Ansprüche 1 bis 8, wobei die verlängerte Öffnung ein inneres Profil aufweist, das durch Rücken an Rücken angeordnete Keile bestimmt wird.



While various aspects of the invention have been set forth by the drawings and specification, it is to be understood that the foregoing detailed description is for illustration only and that various changes, as well as the substitution of equivalent constituents shown and described may be made without departing from the scope of the invention as set forth in the appended claims.

Claims

1. A fastener comprising an elongated member (15) having a free end (16) with an aperture (16W, 56W) therein, said aperture extending along the axis of elongation of said member and being bounded by a wall of said free end, said free end having a plurality of projections (16p-1, 16p-2) on an outer surface of said wall; and a housing (11) connected to the other end of said elongated member including an opening (C₁, C₂) with a locking member (11r) within said opening for receiving and compressing said free end in order to lock said elongated member in said housing; characterised in that the wall of said free end has a single minimum thickness position or area (I) intermediate the opposite ends of such aperture to facilitate compression of said free end and its entry into engagement with the locking member.

2. A fastener according to claim 1 wherein said housing (11) is open (C₁, C₂) at opposed ends thereof to permit the bidirectional entry of said elongated member therein.

3. A fastener according to claim 1 or claim 2 wherein the locking member (11r) comprises a circumferential ring in said housing.

4. A fastener according to claim 3 wherein said ring forms a plurality of discrete segments.

5. A fastener according to any of claims 1 to 4 wherein said free end is circular in external configuration and the projections comprise planar ramps (16r-1, 16r-2) extending from the tip (16t) of said free end for locking said free end in said housing.

6. A fastener according to claim 5 wherein said tip includes ramps on opposite sides thereof.

7. A fastener according to claim 6 wherein said ramps each terminate in an arc surface (16v-1, 16v-2).

8. A fastener according to any of claims 1 to 7 wherein the minimum thickness is at a single point along said axis.

9. A fastener according to any of claims 1 to 8 wherein said elongated aperture has an interior profile defined by back-to-back wedges.

10. A fastener according to any of claims 1 to 9 wherein said aperture has its maximum width at midlength.

11. A fastener according to claim 9 wherein said wedge portions meet at a midposition.

12. A fastener according to any of claims 1 to 11 further including a partial sphere (17p-2) centered upon said elongated member before the tip portion thereof.

13. A fastener according to claim 12 wherein said partial sphere is joined to a cylindrical

embossment (16r) before the tip portion of said elongated member.

14. A fastener according to any of claims 1 to 13 further including means associated with said elongated member for causing said free end to remain locked in said housing when said elongated member is thereafter separated from said free end in its locked position.

15. A fastener according to claim 14 wherein the causing means comprises a reduced diameter portion (17n) of said elongated member.

Patentansprüche

1. Befestigungselement, das einen verlängerten Teil (15) mit einem freien Ende (16) und einer Öffnung (16W, 56W) darin umfaßt, wobei die Öffnung sich entlang der Verlängerungsachse des Teils erstreckt und durch eine Wand des freien Endes begrenzt wird, wobei das freie Ende eine Vielzahl von vorspringenden Teilen (16p-1, 16p-2) an einer Außenfläche der Wand aufweist; sowie ein Gehäuse (11), welches mit dem anderen Ende des verlängerten Teils verbunden ist und eine Öffnung (C₁, C₂) enthält, mit einem Verschlussteil (11r) in dieser Öffnung für die Aufnahme und das Zusammendrücken des freien Endes zur Einrastung des verlängerten Teils in dem Gehäuse, dadurch gekennzeichnet, daß die Wand des freien Endes zum leichteren Zusammenpressen und leichteren Ineingriffbringen des freien Endes mit dem Verschlussteil eine einzige Stelle oder einen einzigen Bereich (I) mit geringster Dicke zwischen den gegenüberliegenden Enden der Öffnung aufweist.

2. Befestigungselement nach Anspruch 1, wobei das Gehäuse (11) an den gegenüberliegenden Enden (C₁, C₂) zur Schaffung eines beidseitigen Zugangs für das verlängerte Teil offen ist.

3. Befestigungselement nach Anspruch 1 oder 2, wobei der Verschlussteil (11r) einen am Umfang verlaufenden Ring in dem Gehäuse umfaßt.

4. Befestigungselement nach Anspruch 3, wobei der Ring eine Vielzahl einzelner Abschnitte bildet.

5. Befestigungselement nach einem der Ansprüche 1 bis 4, wobei das freie Ende in seiner äußeren Ausbildung kreisförmig ist und die vorspringenden Teile zum Einrasten des freien Endes in dem Gehäuse ebene Abschrägungen (16r-1, 16r-2) umfassen, die von der Spitze (16t) des freien Endes ausgehen.

6. Befestigungselement nach Anspruch 5, wobei die Spitze an den gegenüberliegenden Seiten Abschrägungen aufweist.

7. Befestigungselement nach Anspruch 6, wobei jede der Abschrägungen in eine bogenförmige Fläche (16v-1, 16v-2) mündet.

8. Befestigungselement nach einem der Ansprüche 1 bis 7, wobei die geringste Dicke an einem einzigen Punkt entlang der Achse liegt.

9. Befestigungselement nach einem der Ansprüche 1 bis 8, wobei die verlängerte Öffnung ein inneres Profil aufweist, das durch Rücken an Rücken angeordnete Keile bestimmt wird.

10. Befestigungselement nach einem Ansprüche 1 bis 9, wobei die Öffnung ihre maximale Ausdehnung in der Längsmittle aufweist.

11. Befestigungselement nach Anspruch 9, wobei die Keilteile in einer mittleren Position aufeinandertreffen.

12. Befestigungselement nach einem der Ansprüche 1 bis 11, das weiters eine Teilkugel (17p-2) umfaßt, die auf dem verlängerten Teil vor dessen Spitze zentriert angebracht ist.

13. Befestigungselement nach Anspruch 12, wobei die Teilkugel vor der Spitze des verlängerten Teils mit einer zylindrischen Erhebung (16r) verbunden ist.

14. Befestigungselement nach einem der Ansprüche 1 bis 13, das weiters Mittel umfaßt, die mit dem verlängerten Teil verbunden sind, um das freie Ende in dem Gehäuse in einem Einrastzustand zu halten, wenn der verlängerte Teil anschließend von dem freien Ende in seiner eingerasteten Stellung getrennt wird.

15. Befestigungselement nach Anspruch 14, wobei das Mittel zur Halterung einen Teil mit vermindertem Durchmesser (17n) des verlängerten Teils umfaßt.

Revendications

1. Attache comprenant un élément oblong (15) présentant une extrémité libre (16) dans laquelle est ménagée une boutonnière (16W, 56W), cette boutonnière s'étendant suivant l'axe longitudinal dudit élément et étant délimitée par une paroi de l'extrémité libre, cette extrémité libre présentant une pluralité de saillies (16p-1, 16p-2) sur une surface extérieure de ladite paroi; et un étui (11) relié à l'autre extrémité de l'élément oblong comprenant une lumière (C₁, C₂) dans laquelle un organe de verrouillage (11r) est prévu pour recevoir et comprimer l'extrémité libre de manière à verrouiller l'élément oblong dans l'étui; caractérisée en ce que la paroi de l'extrémité libre présente une unique partie ou zone (I) d'épaisseur minimale entre les extrémités opposées de la boutonnière de manière à faciliter la compression de l'extrémité libre et son entrée puis son engagement dans l'organe de verrouillage.

2. Attache suivant la revendication 1, dans laquelle l'étui (11) est ouvert (C₁, C₂) à ses extrémités opposées de manière à y permettre une introduction bidirectionnelle de l'élément oblong.

3. Attache suivant l'une quelconque des revendications 1 ou 2, dans laquelle l'organe de verrouillage (11r) comprend un anneau circonferentiel dans l'étui.

4. Attache suivant la revendication 3, dans laquelle ledit anneau forme plusieurs segments distincts.

5. Attache suivant l'une quelconque des revendications 1 à 4, dans laquelle l'extrémité libre présente une configuration extérieure circulaire et les saillies comprennent des rampes planes (16r-1, 16r-2) partant de la pointe (16t) de l'extrémité libre et destinées à verrouiller l'extrémité libre dans l'étui.

6. Attache suivant la revendication 5, dans laquelle la pointe comprend des rampes sur ses côtés opposés.

7. Attache suivant la revendication 6, dans laquelle les rampes se terminent chacune en une surface en arc de cercle (16v-1, 16v-2).

8. Attache suivant l'une quelconque des revendications 1 à 7, dans laquelle l'épaisseur minimale est située en un point unique le long de l'axe.

9. Attache suivant l'une quelconque des revendications 1 à 8, dans laquelle la longue boutonnière présente un profil intérieur défini par des coins disposés dos à dos.

10. Attache suivant l'une quelconque des revendications 1 à 9, dans laquelle la boutonnière présente sa largeur maximale à mi-longueur.

11. Attache suivant la revendication 9, dans laquelle les parties en coin se rejoignent en un endroit situé au milieu.

12. Attache suivant l'une quelconque des revendications 1 à 11, comprenant, en outre, une sphère partielle (17p-2) centrée sur l'élément oblong devant sa partie d'extrémité.

13. Attache suivant la revendication 12, dans laquelle la sphère partielle est reliée à un bossage cylindrique (16r) devant la partie d'extrémité de l'élément oblong.

14. Attache suivant l'une quelconque des revendications 1 à 13, comprenant, en outre, un moyen associé à l'élément oblong pour amener l'extrémité libre à rester verrouillée dans l'étui lorsque l'élément oblong est séparé ultérieurement de l'extrémité libre dans sa position verrouillée.

15. Attache suivant la revendication 14, dans laquelle ledit moyen comprend une partie (17n) de diamètre réduit de l'élément oblong.



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