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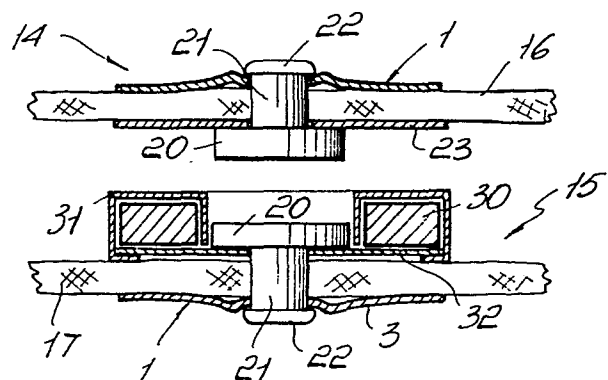
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54 **Magnetic button for articles of clothing, leather goods, and the like.**

57 The magnetic button comprises magnetically cooperating male and female elements (14, 15) each having a rivet element for attachment to a respective flap (16, 17) of an article and at least one holed plate (1, 3) wherethrough the rivet element (20-22) is passed and clamped between one face of the respective flap (16, 17) and an upsettable end (22) of the rivet (20-22). The plate (1, 3) has a substantially crowned shape with peripheral radial cutouts defining peripheral tabs (3) on said plate (1, 3) so as to enable an elastic deformation thereof.



MAGNETIC BUTTON FOR ARTICLES OF CLOTHING, LEATHER
GOODS, AND THE LIKE

This invention relates to a magnetic button for articles of clothing, leather goods, and the like.

As is known, there are commercially available magnetic buttons which can secure together two flaps of
5 an article of clothing by virtue of the magnetic attraction established between two elements, usually male and female ones of cylindrical shape. Magnetic buttons of this kind are available in a variety of shapes, and various methods are used for attaching them to the
10 article flaps. In particular the published Italian Utility Model application N. 23266 B/82 by the same Applicant illustrates in Figure 7 a magnetic button wherein the male element comprises a rivet shank which is passed through the article flap and upturned at one
15 of its ends for fixing purposes, whilst the female element has, in addition to a similar upturned end, a magnetic core which generates the magnetic field attracting the male shank.

This prior embodiment has proved to be advantageous in that it affords the possibility of greatly
20 decreasing the overall bulk of the magnetic button, and because it can be applied even where limited thicknesses are required.

It is a primary object of this invention to improve
25 the magnetic button of the cited prior application so as to combine the reduced thickness and wide applicability features with constructional features

which afford a simple and quick assembling to the article flaps.

Another object of this invention is to provide such an improved magnetic button which can be installed
5 automatically using specially provided equipment, and no longer require the costly and time-consuming manual procedure used heretofore for the same purpose.

A further object of this invention is to provide such a magnetic button which is simple and extremely
10 inexpensive and involves no costly procedures for its assembling.

A not least object of this invention is to provide such an improved magnetic button which has an appealing outward appearance.

15 These and other objects, such as will be apparent hereinafter, are achieved by a magnetic button for articles of clothing, leather goods, and the like, comprising magnetically cooperating male and female elements each having a rivet element for attachment to
20 a respective flap of an article and at least one holed plate wherethrough said rivet element is passed and being clamped between one face of the respective flap and an upsettable end of said rivet, characterized in that said plate has a substantially crowned shape with
25 peripheral radial cutouts defining peripheral tabs on said plate so as to enable an elastic deformation thereof.

According to another aspect of the invention, the cited objects are achieved by a magnetic button,
30 particularly for clothing and leather articles,

comprising male and female elements cooperating with each other magnetically and each having a rivet element for attachment to a respective flap of an article and a drilled disk wherethrough the shank of said rivet element is passed and being arranged between the head of said rivet and one side of the respective flap of one side, characterized in that said rivet element and said disk are made fast with each other.'

Further features and advantages will become apparent from the following detailed description of a preferred embodiment of the invention, with reference to the accompanying illustrative drawings, where:

Figure 1 is a cross-section taken through the magnetic button incorporating the plate according to the invention;

Figure 2 is a top plan view of the inventive plate;

Figure 3 is a cross-section taken through the plate of Figure 2;

Figures 4-7 show fragmentary cross-sectional views across changed embodiments of the button's male element according to the invention; and

Figure 8 is a corss-sectional view through a changed embodiment of the female member of the button according to the invention.

With reference to Figure 1, the improved magnetic button of this invention comprises, in a conventional fashion, a male element 14 attached to a flap 16 of an article and a female element 15 attached to another

flap 17 of the article. This improved magnetic button has a similar overall configuration to that of the button shown in Figure 7 of the cited prior Application by the same Applicant. In detail, the male element 14
5 comprises essentially a rivet having a head 20, shank 21, and upsetting zone 22. Between the head 20 and fabric or hide flap of the article 16, there is interposed a small disk 23. Likewise, the female element 15 includes a rivet having a head 20, shank 21,
10 and upsetting end 22 whereto a magnetic core 30 is affixed which is accommodated within a cap 31, adapted to be clinched on a small disk 32. The button of this invention further comprises small plates, designated with the reference numeral 1, located on the sides of
15 the flaps 16 and 17 facing away from each other and clamped by the upset heads 22 of the rivets against such surfaces.

Said plates, which form the peculiar aspect of this invention, are shown more detailedly in Figures 2
20 and 3.

With reference to Figures 2 and 3, the plate of this invention comprises a circular disk of substantially crowned shape, as shown in the sectional view of Figure 3. The plate 1 is divided into plural
25 concentric areas having individual characteristics for performing a well-defined function and obtaining particular advantages. In detail, the plate 1 has an outermost annular zone whereat cutouts 2 are formed to define a plurality of fins or tabs 3 effective to
30 confer on the plate -- formed from hardened steel and,

hence, inelastic -- compliance characteristics necessitated to lock the button on the flap. The tabs 3 extend preferably over a frusto-conical surface coaxial with the plate. Advantageously, the outermost portion
5 of the tabs 3 defines a substantially flat zone 12 extending approximately parallel to the flap of the article on which the button is to be installed, prior to its installation. This prevents the outer edge of the plate, during the fastening thereof, from digging
10 into the fabric or hide and causing laceration thereof. Proceeding concentrically, toward the inside with respect to the zone of the tabs 3, a conical portion 4 is defined, which has an opposite taper angle and which, together with the next annular zone 8, also
15 conical and extending more or less in the same direction as the tabs 3, defines a seat 5 for the upsetting head 22 of the rivet, as shown in Figure 1, and as explained more fully hereinafter. The inner conical zone 8, delimiting a hole 7 for accommodating
20 the shank 21 of the rivet, further defines (at the bottom in Figure 3) a conical lead-in zone 10 to facilitate insertion and centering of the rivet during assembly and also to permit assembling of an automatic type.

25 Figures 4-8 show modifications of the male and female elements to which the plate shown in Figures 1-3 may be attached. Such elements are characterized in that the rivet and disk are made fast to each other.

In detail, with reference to Figure 4, the male
30 element shown comprises essentially a small disk 101

and a rivet element 102 made fast to each other. In particular, the rivet element 102 comprises an enlarged head 103 and a shank portion 104. The shank 104 has an undersize zone 106 adjacent the head 103 and an
5 oversize zone on the inside whereof there is a cavity 105, thereby a step 107 is formed between the undersize zone 106 and the remainder of the shank. That male element is obtained in this way. Initially, the rivet shank 104 has a uniform cross-section throughout its
10 longitudinal extension, then, after being inserted into the drilled disk 101, a chamfering operation is carried out on the rivet by means of a punch penetrating the hole 105 in the shank 104 of the rivet and causing its expansion and the formation of the step 107. Upon
15 completion of the chamfering operation, therefore, the rivet has an expanded shank zone the diameter whereof is greater than that of the hole in the disk 101 and prevents, therefore, the rivet from coming out and accordingly the permanent attachment of the rivet to
20 the disk 101.

The male element according to Figure 5 comprises a drilled disk 110 and a rivet element 111. Also in this case, the rivet 111 has a head 112 and shank 113 on the interior whereof there extend (at least part-way) a
25 cavity 114 to allow outwards expansion of the rivet shank end. In this case, the upper portion of the shank 113, adjacent the head 112, has a knurled formation 115 which, upon force fitting the rivet shank into the hole in the disk 110, engages with the cylindrical wall of
30 the hole in the disk 110 and prevents the rivet from

coming off the disk 110. Of course, the knurled formation, instead of being provided on the rivet shank, could be provided on the wall delimiting the hole in the disk 110, to achieve the same effect.

5 In the embodiment of Figure 6, the disk and rivet form a single monolithic element, generally designated with the reference numeral 120. In particular, that unitary element 120 comprises a disk-like element 121 on one face whereof there extends a preferably frusto-
10 conical projection 122 having a greater width dimension than its height, whilst the other face has a cylindrical projection portion 123 provided with a longitudinal bore 124. Both the projection 122 and cylindrical portion 123 on the other side of the disk-
15 like element 121 are arranged centrally with respect to that disk-like element.

 In the embodiment of Figure 7, the rivet element 31 is of traditional shape, having a head 132, shank 133, and longitudinal cavity 134. The disk 130 has,
20 however, a chamfered portion 135 provided with a lip 136 extending toward the shank 133 of the rivet and force-fitted adjacently the latter to retain it and prevent the rivet 131 from coming out. That element is formed from a disk of an ordinary type which is
25 chamfered by means of a suitable punch acting on the annular dimpled zone of the disk to cause displacement of material and the formation of the retining lip 136 for the rivet shank.

 Figure 8 shows the female element obtained from
30 the male element fabricated as in Figure 4. That female

element has, accordingly, a disk 101 and a rivet 102 provided with a head 103 and a chamfered shank 104 having an undersize portion through the disk and an oversize portion which prevents the rivet from coming
5 out. The female element 140 is then completed by a magnetic core 141 and a clenching cap 142, of a traditional type. However, it would also be possible to form a female element from the embodiments of Figures 2-4.

10 During assembly, after placing the plate 1 against the flap whereto the button is to be attached and after centering the plate, the rivet is inserted into the disk, thereafter the rivet and disk are passed through the related flap, 16 or 17 (which may be previously
15 holed at the more or less precise location), then rivetting is performed by upsetting its end 32. Thereupon, the plate 1 is pressed against its respective flap and deformed to widen and adapt to the form and consistency of the flap fabric or hide. During
20 this operation, the upset, widened head 22 of the rivet is positioned at the groove 5, thereby the rivet as a whole will barely protrude beyond the thickness of the plate 1 or may even be flush therewith.

Assembling is even simpler in the instance where
25 the male and female elements are embodied as shown in Figures 4-8. In this instance, in fact, it is only required that the rivet-disk combination be passed through the related attachment flap, thus saving one operation in the attachment step. This advantage is
30 much more significant in the instance of the female

element, where problems could be encountered due to the magnetic interaction of the rivet and magnetic core at the time of inserting the rivet.

As may be appreciated from the above description,
5 the invention fully achieves its objects. In fact, a magnetic button has been provided which, by virtue of the elasticity and compressibility of the plate has very little bulk, especially if compared to the magnetic buttons which include tabs attached to either
10 the male or female element and passed through the attachment flap to be folded over during assembly. The elasticity and compliance of the plate of this invention allow the latter to flatten itself against the flap and fit so as to accommodate unavoidable
15 variations in thickness and consistency of the application material. Furthermore, as already explained, the provision of the flat zone 12 at the edges ensures perfect spreading of the plate and adaptation to the fabric without digging into the
20 fabric in any circumstances, even if the plate is not positioned exactly parallel to the flap to which it is to be attached.

The fact, moreover, that the plate has a conical lead-in or invitation zone 10 ensures perfect centering
25 of the rivet and plate, thus enabling the use of automatic machinery for assembling.

Finally, the presence of the groove 5 in the face not adjacent to the flap forming a seat for the rivet upsetting zone enables the overall thickness of the
30 button to be decreased.

Further, the button so constructed is aesthetically pleasing, as well as being inexpensive by virtue of its extreme simplicity.

The materials used, as well as the dimensions, may
5 be any ones contingent on requirements.

CLAIMS

1 1. A magnetic button for articles of clothing,
2 leather goods, and the like, comprising magnetically
3 cooperating male and female elements (14,15) each
4 having a rivet element for attachment to a respective
5 flap (16,17) of an article and at least one holed plate
6 (1-5,7,8,10,12) wherethrough said rivet element (20-
7 22,102-107,111-115,122-124,131-134) is passed and being
8 clamped between one face of the respective flap (16,17)
9 and an upsettable end (22) of said rivet (20-22,102-
10 107,111-115,122-124,131-134), characterized in that
11 said plate (1-5,7,8,10,12) has a substantially crowned
12 shape with peripheral radial cutouts (2) defining
13 peripheral tabs (3,12) on said plate (1-5,7,8,10,12) so
14 as to enable an elastic deformation thereof.

1 2. A button according to Claim 1, characterized in
2 that said plate (1-5,7,8,10,12) is formed from hardened
3 steel.

1 3. A button according to either Claim 1 or 2,
2 characterized in that said plate (1-5,7,8,10,12) has an
3 annular groove (5) concentrical with the hole (7) for
4 the passage of said rivet element (20-22,102-107,111-
5 115,122-124,131-134) and facing toward the upsettable
6 end (22) of said rivet element so as to define a seat
7 for said end after upsetting the same.

1 4. A button according to one or more of the
2 preceding claims, characterized in that an inner
3 portion (4) of said plate (1-5,7,8,10,12) adjacent and
4 concentrical with the passage hole (7) for the rivet
5 element (20-22,102-107,111-115,122-124,131-134) defines

6 a conical lead-in and centering mouth (4) for said
7 rivet element (20-22,102-107,111-115,122-124,131-134).

1 5. A button according to one or more of the
2 preceding claims, characterized in that said peripheral
3 tabs (3) define, at the peripheral portion (4) of said
4 plate (1-5,7,8,10,12), a flat zone (12) extending
5 substantially parallel to said respective flap (16,17).

1 6. A magnetic button, particularly for clothing
2 and leather articles, comprising male and female
3 elements (14,15) cooperating with each other
4 magnetically and each having a rivet element (20-
5 22,102-107,111-115,122-124,131-134) for attachment to a
6 respective flap (16,17) of an article and a drilled
7 disk (101,110,121,130,135,136) wherethrough the shank
8 (21,104,113,123) of said rivet element (20-22,102-
9 107,111-115,122-124,131-134) is passed and being
10 arranged between the head (103,112,122) of said rivet
11 and one side of the respective flap (16,17) of one
12 side, characterized in that said rivet element (20-
13 22,102-107,111-115,122-124,131-134) and said disk
14 (101,110,121,130,135,136) are made fast with each
15 other.

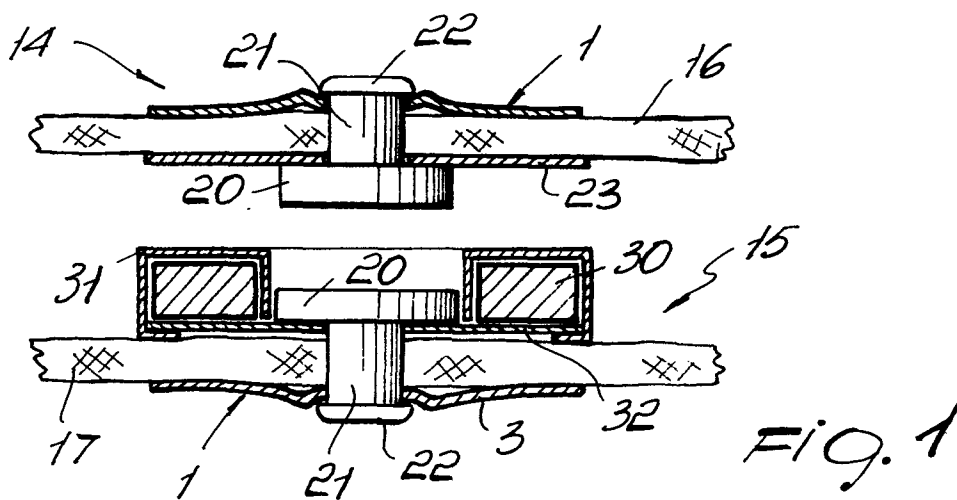
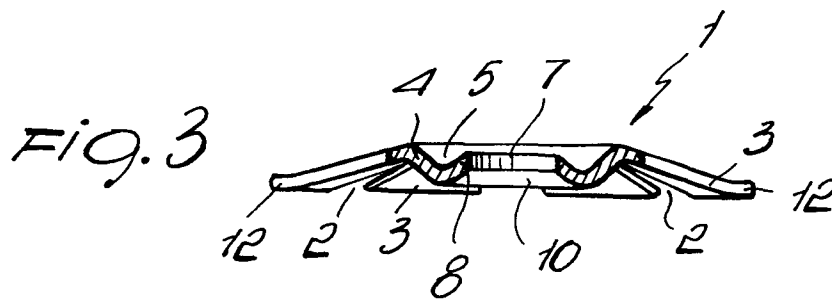
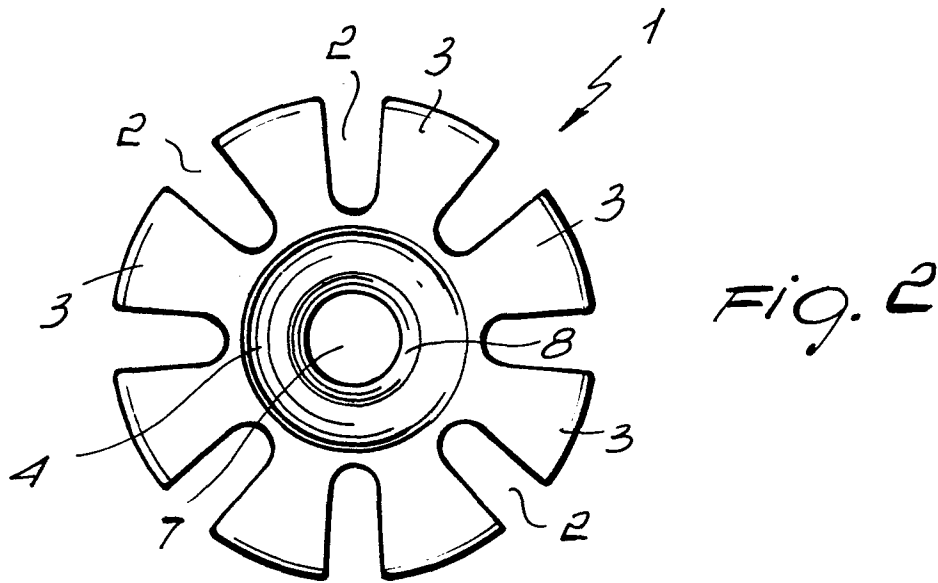
1 7. A magnetic button according to Claim 6,
2 characterized in that said shank (104) of the rivet
3 element (102-107) has a narrower shank portion (106) at
4 said disk (101) and at least one expanded portion (107)
5 at the free end of said shank (104), said expanded
6 portion (107) having a greater diameter than the hole
7 in said disk (101).

1 8. A magnetic button according to Claim 6,

2 characterized in that said shank (113) of said rivet
3 element (111-115) has a knurled zone (115) proximate to
4 said head (112) of the rivet element (111-115) for
5 forcibly engaging said rivet (111-115) with the hole in
6 said disk (110).

1 9. A magnetic button according to one or more of
2 the preceding claims, characterized in that said rivet
3 element and said disk are fabricated as a unitary
4 construction piece (120-124).

1 10. A magnetic button according to one or more of
2 the preceding claims, characterized in that said disk
3 (130) has a chamfered portion (135) clamped on the
4 shank (133) of said rivet element (131-134).



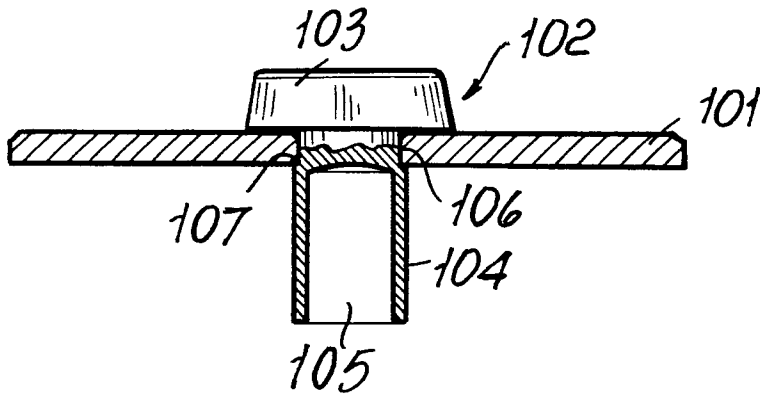


Fig. 4

Fig. 5

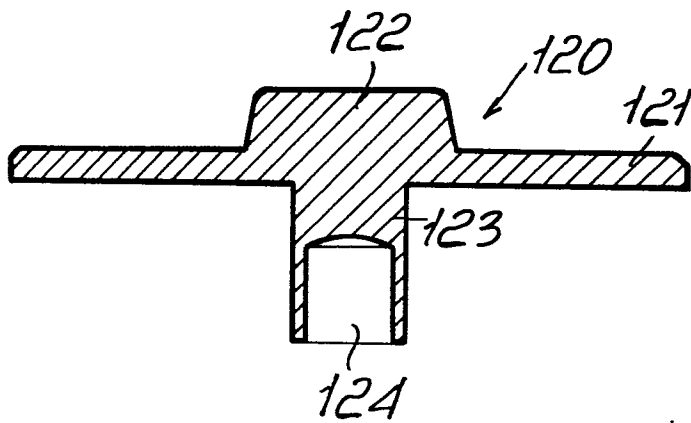
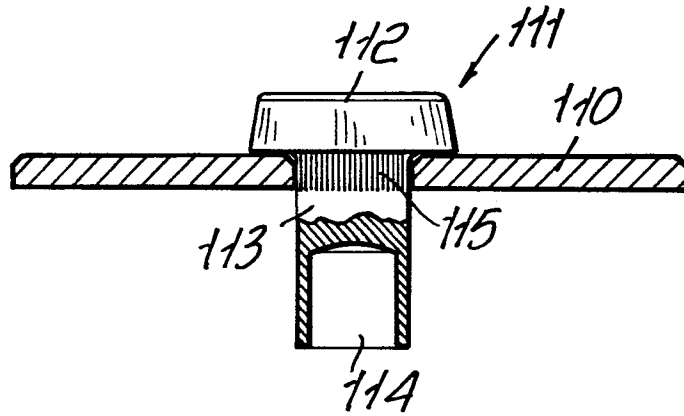


Fig. 6

Fig. 7

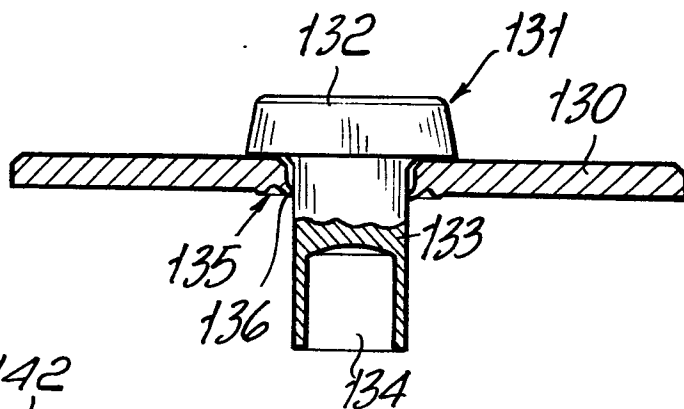
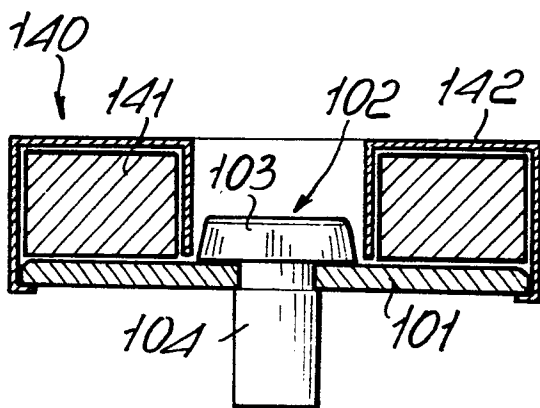


Fig. 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	FR-A-2 044 965 (P. ROUGE PULLON) * Page 2, lines 20-40; page 3, lines 1-15 *	1,6,9	A 41 F 1/00 A 45 C 13/10
A	FR-A-1 586 926 (P. TEILLARD) * Page 3, lines 25-28; claim 1; figures 1-3,7 *	1,6,9	
A	US-A-3 259 383 (ASS. SPRING CORP.) * Column 2, lines 21-71; figures 3-5 *	1	
A	US-A-4 102 239 (CH. M. DALLAS) * Column 1, last paragraph; column 2, lines 1-21; figures *	1-3,5	
A	GB-A- 589 304 (CAMLOC FASTENER CORP.) * Page 3, lines 2-20; figures 11,12 *	10	
A	DE-A-1 040 322 (J. SCHWARZ) * Column 3, last paragraph; column 4, paragraph 1; figures 8,9 *	9	
A	GB-A- 982 259 (H.P. SCHOFIELD) * Page 2, lines 22-52; figure 1 *	7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30-10-1985	Examiner GARNIER F.M.A.C.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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EUROPEAN SEARCH REPORT

0170852
Application Number

EP 85 10 7796

DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	US-A-4 157 725 (TEXTRON) * Column 4, lines 40-62; figure 2 * -----	4	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30-10-1985	Examiner GARNIER F.M.A.C.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	