



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 264 553 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

11.12.2002 Bulletin 2002/50

(51) Int Cl.7: **A41F 1/00, A45C 13/10**

(21) Application number: **01304193.4**

(22) Date of filing: **10.05.2001**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

Designated Extension States:

AL LT LV MK RO SI

(71) Applicant: **Hing Ngai Company Limited**

Cheung Sha Wan, Kowloon (HK)

(72) Inventor: **Wong, Sheung Chung,**

Hing Ngai Co.Ltd.

Cheung Sha Wan, Kowloon (CN)

(74) Representative: **Alexander, Thomas Bruce et al**

BOULT WADE TENNANT,

Verulam Gardens

70 Gray's Inn Road

London WC1X 8BT (GB)

(54) **Magnetic buttons**

(57) A fastening device including a magnet and a magnet enclosure, said device includes a magnetic coupling surface formed on said enclosure, said magnetic coupling surface being adapted to engage magnetically with another magnetic coupling surface of another fas-

tening device, characteristic in that said magnetic coupling surface is provided with a guide means to substantially restrict relative movement of said magnetic coupling surfaces when the surfaces are in physical contact.

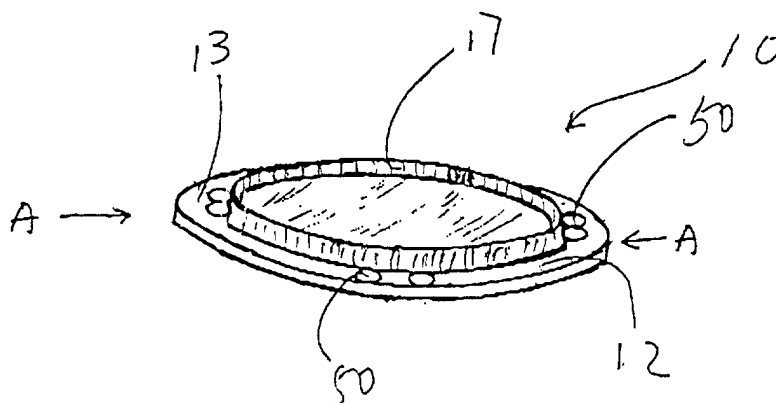


FIG 1

EP 1 264 553 A1

Description

Field of the Invention

[0001] The present invention relates to magnetic fasteners and, more particularly, to magnetic buttons which are usually used in detachable pairs and which are releasably fastened to each other by mutual magnetic attraction. More specifically, this invention relates to a pair of detachable magnetic buttons having magnetic coupling surfaces of opposite magnetic polarities.

Background of the Invention

[0002] Magnetic fasteners or buttons are very useful in many applications. Unlike conventional button assemblies in which a button is fastened and released by inserting into or removing from a button hole, magnetic buttons are fastened by mutual magnetic attraction between a pair of magnetic buttons having complementary or opposite magnetic properties. This means that magnetic buttons can be automatically fastened when a detachable pair is in proximity of each other and, at the same time, coupled magnetic buttons can be separated simply by pulling the buttons away from each other. Also, unlike conventional button assemblies which have to be fastened and released sequentially, an array of magnetic buttons can be simultaneously fastened or released. These unique characteristics find magnetic buttons in many useful applications.

[0003] For example, magnetic buttons are widely used in handbags, brief cases and other carriers to provide easy and convenient closure and opening without the tediousness of having to locate the exact engaging button holes every time.

[0004] Also, magnetic buttons are particularly useful in children clothing because children are known not to have the patience of doing and undoing conventional buttons and the almost automatic fastening and easy un-fastening of magnetic buttons are especially welcome by children. In places where winters are harsh, magnetic buttons are especially useful as gloves are always worn and people are extremely reluctant to remove their hands to do and un-do conventional buttons.

[0005] Furthermore, magnetic buttons are particularly useful in circumstances in which buttons need to be done and undone with a single hand and within a short time. For example, magnetic buttons are useful in costumes for artists or performers who need to change frequently on stage. Magnetic buttons are especially useful for workers who wear work clothes and vests which may be caught by machinery or moving objects. Clothes or work vests with magnetic buttons provide easy escape to prevent the wearer from being caught and hurt when the clothes or vests are caught accidentally.

[0006] Magnetic buttons of the present describe include a pair of complementary parts which are releasably attachable to each other by magnetic attraction.

Each of the detachable parts usually includes a magnetic member in a slab or tablet form having a top and a bottom magnetic coupling surface. The magnetic coupling surfaces are usually interconnected by a continuous peripheral edge which is usually quite thin for aesthetic and styling consideration. These magnetic slabs or tablets are usually cylindrical in shape with substantially identical top and bottom surfaces. The magnetic slabs or tablets are generally enclosed in a magnetic permeable enclosure which can be made for example of rubber, Nylon, plastics (such as ABS or PVC) or synthetic resin. The enclosure provides decorative effects to the buttons by providing a cover to the magnetic material which usually has a monotonous and dull metallic appearance as well as providing weathering shield to the magnetic material to slow down undesirable rusting. In this regard, the enclosure is preferably water- or airtight so that even if the magnetic member has been oxidized, the enclosure provides a nice-looking cover to hide the rusted surfaces from the outside, thereby making magnetic buttons suitable for applications in which product presentation and appearance are important.

[0007] It is a unique characteristic of magnetic fasteners or buttons that they can come into automatic contact and engagement with each other even when they are physically separated prior to contact or engagement. The contact and subsequent engagement usually does not require external help because of the magnetic properties of the detachable parts. To further enhance the convenience of magnetic buttons, magnetic buttons are always made with complementary magnetic members having identical shapes and dimensions. As a result of the substantially identical dimensions of the complementary magnetic coupling surfaces on the detachable parts, the parts will come into automatic alignment once they come into contact.

[0008] However, magnetic buttons of this type usually require magnetic slabs or tablets having substantially identical shapes and the degree of freedom of button design is therefore severely limited. Furthermore, as magnetic buttons are usually engaged by mutual magnetic attraction of the coupling surfaces having opposite magnetic polarities, the coupling force is strongest in a direction which is substantially normal or perpendicular to the coupling surfaces. As a result, mutual lateral attraction is relatively weak and lateral dislocation of the buttons may occur relatively easily by lateral pulling of the buttons which may cause inadvertent or accidental disengagement of the buttons when lateral tension is applied. While it may be possible to retard undesirable lateral movement by providing matted or frictional coupling surfaces, this option would at the same time inevitably decrease the ease of self alignment between the coupling surfaces and less attractive. Hence, it will be desirable if improved magnetic buttons which can alleviate the known shortcomings of conventional magnetic buttons can be provided.

Objection of the Invention

[0009] It is therefore an object of the present invention to provide magnetic buttons which are substantially self-alignable and which are reasonably resistive to undesirable lateral dislocations. It is also an object of the present invention to provide magnetic buttons the shape of which are not totally dependent on the shape of the magnetic member and at the same time providing means to improve resistance of the magnetic buttons towards undesirable lateral disengagement. It is a further object of the present invention to provide at least of choices of alternative designs for magnetic buttons for public choice and use.

Summary of the Invention

[0010] According to the present invention, there is provided a fastening device including a magnet and a magnet enclosure, said device includes a magnetic coupling surface formed on said enclosure, said magnetic coupling surface being adapted to engage magnetically with another magnetic coupling surface of another fastening device, characterised in that said magnetic coupling surface is provided with a guide means to substantially restrict relative lateral movement of said magnetic coupling surfaces when the surfaces are in physical contact.

[0011] Preferably, the guide means includes a perimeter member.

[0012] Preferably, the perimeter member extends substantially perpendicular to and around at least a portion of an outer edge of said magnetic coupling surface.

[0013] Preferably, the guide means includes a continuous perimeter member extending substantially said magnetic coupling surface.

[0014] According to a second aspect of the present invention, there is provided a fastening device including a first and a second detachable parts which are adapted to be releasably fastened by magnetic force, each said detachable parts include a permanent magnet and a magnetic permeable enclosure having a magnetic coupling surface for magnetic coupling with the other detachable part, characterising that a guide means is formed on at least one of the magnetic coupling surfaces.

Brief Description of the Drawings

[0015] The present invention will be explained in further detail by way of examples and with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view showing a first detachable part of a preferred embodiment of a magnetic button of the present invention.

Fig. 2 is a perspective view showing a second detachable part of a preferred embodiment of a mag-

netic button of the present invention.

Fig. 3 shows the cross-sectional views of the magnetic button of Figs 1 & 2.

Fig. 4 is a magnetic button of cross-sectional view along AA and BB of the Fig. 1.

Fig. 5 shows a perspective view of a first detachable part of a second preferred embodiment of a magnetic button of the present invention.

Fig. 6 is a cross-sectional view showing the first and second detachable parts of the button of Fig. 5 prior to engagement.

Detailed Description of the Preferred Embodiments

[0016] Referring to Figures 1 to 4, there are shown a pair of magnetic buttons which include a first (10) and a second (20) detachable parts. Each of the detachable parts includes a magnetic member (11, 21) which is preferably made into a slab or tablet shape. The magnetic slab is preferably embedded into a magnetic casing (not shown) so that the magnetic strength on the exposed surface is much stronger than the embedded surface. The magnetic member is enclosed within a magnetic permeable enclosure (12, 22). The enclosure is preferably water tight to prevent or slow down rusting of the magnetic member (11, 12) and to prolong the useful life of the magnetic button. Furthermore, the enclosure is preferably made of an opaque material such as plastic, rubber or resin so that the shape and appearance of the magnetic member can be substantially concealed from the outside and the buttons can be formed into various shapes and configuration with a variety of colours.

[0017] Referring to a first embodiment of the present invention as shown in Figs. 1 and 2 in which a first and a second detachable part of a magnetic button are shown, the enclosure (12, 22) is moulded with a protruding cavity which is surrounded by a substantially planer flange (13, 23). The cavity (14) is shaped to conform to the shape of a magnetic member and is elevated above the planer surface when viewed from one direction. When a magnetic member has been inserted into the cavity (14), the other side of the cavity is sealed with a piece of covering material (15, 25) to retain the magnetic slab. In this specific embodiment, the coupling surfaces (16, 26) of the magnetic member are directly underneath the elevated surface of the enclosure. A plurality of needling holes (50) are provided on the periphery of the magnetic button so that the button can be permanently attached to surfaces on clothes or hand bags or the like. Of course, such holes would not be necessary if the buttons are provided with other means for attaching.

[0018] Referring to Figures 1 and 3 in which the first detachable part is shown, a magnetic member (11) is enclosed within a magnetic permeable enclosure. On

the extreme periphery of the protruding cavity corresponding to the edge of the magnet member, there is formed a guide member (17) which is adapted to surround at least a portion of the periphery of the protruding cavity which encloses magnetic member of the other detachable part.

[0019] In the present preferred embodiment, the guide member includes a perimeter member which extends substantially perpendicular to and around at least a portion of an outer edge of the magnetic coupling surface. The periphery of the guide member is preferably slightly larger than the outline of the magnet member of the corresponding detachable part. Of course the guide member can be of other suitable shapes, whether continuous or intermittent. With such a guide member, the detachable parts can come into automatic alignment easily while the guide member substantially prevent desirable relative lateral movements between the first and second detachable parts.

[0020] When the magnetic surfaces of the first and the second detachable parts engage with each other, the protruding member on the second detachable part is received within the enclosure defined by the perimeter member, thereby substantially limiting relative movements between the detachable parts.

[0021] In a second preferred embodiment as shown in Figures 5 and 6, the magnet slab is placed underneath a planar surface (31, 41) and the periphery of the magnet member (11) is not apparent from the outside of the coupling surfaces (31, 41). To mitigate the likelihood of lateral movements between the first (30) and the second (40) detachable parts, corresponding or complementary guide means (32, 42) are formed on the magnetic coupling surfaces for limitation of mutual lateral movements.

[0022] Preferably, the guide means or the perimeter member is provided in a manner which substantially restricts the relative lateral movements of the magnetic coupling surfaces while still allowing relatively easy separation of the surface by slight relative tilting of the surfaces or by separation of the surfaces in an direction which is substantially normal to the direction of the magnetic attraction.

[0023] While the present invention has been explained with reference to the above specific embodiments, it should be understood that the scope and the spirit of the present invention should not be limited to the above specific embodiments and the invention can be realized in other forms by making trivial modification of the embodiments without loss of generality. In particular, it will be appreciated that all the embodiments above disclose a pair of magnetic buttons having magnetic coupling surfaces on which complementary guide means adapted to limit mutual lateral movements of the detachable parts have been provided.

Claims

1. A fastening device including a magnet and a magnet enclosure, said device includes a magnetic coupling surface formed on said enclosure, said magnetic coupling surface being adapted to engage magnetically with another magnetic coupling surface of another fastening device, **characterised in that** said magnetic coupling surface is provided with a guide means to substantially restrict relative lateral movement of said magnetic coupling surfaces when the surfaces are in physical contact
2. A fastening device according to Claim 1, wherein the guide means includes a perimeter member.
3. A fastening device according to Claim 2, wherein said perimeter member extends substantially perpendicular to and around at least a portion of an outer edge of said magnetic coupling surface.
4. A fastening device according to Claim 1, wherein said guide means includes a continuous perimeter member extending substantially said magnetic coupling surface.
5. A fastening device including a first and a second detachable parts which are adapted to be releasably fastened by magnetic force, each said detachable parts include a permanent magnet and a magnetic permeable enclosure having a magnetic coupling surface for magnetic coupling with the other detachable part, characterizing that a guide means is formed on at least one of the magnetic coupling surfaces.
6. A fastening device according to Claim 5, wherein complementary guide means are formed on the magnetic surfaces of said detachable parts.

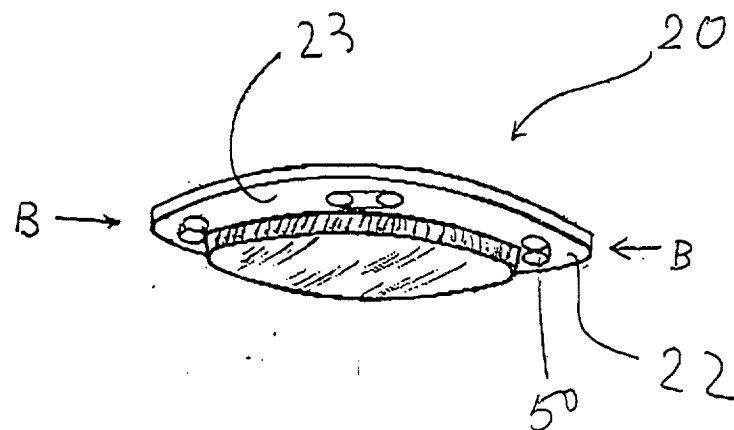


FIG 2

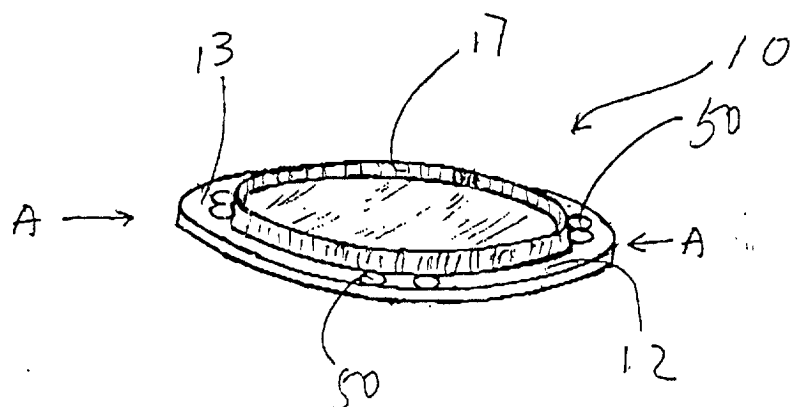


FIG 1

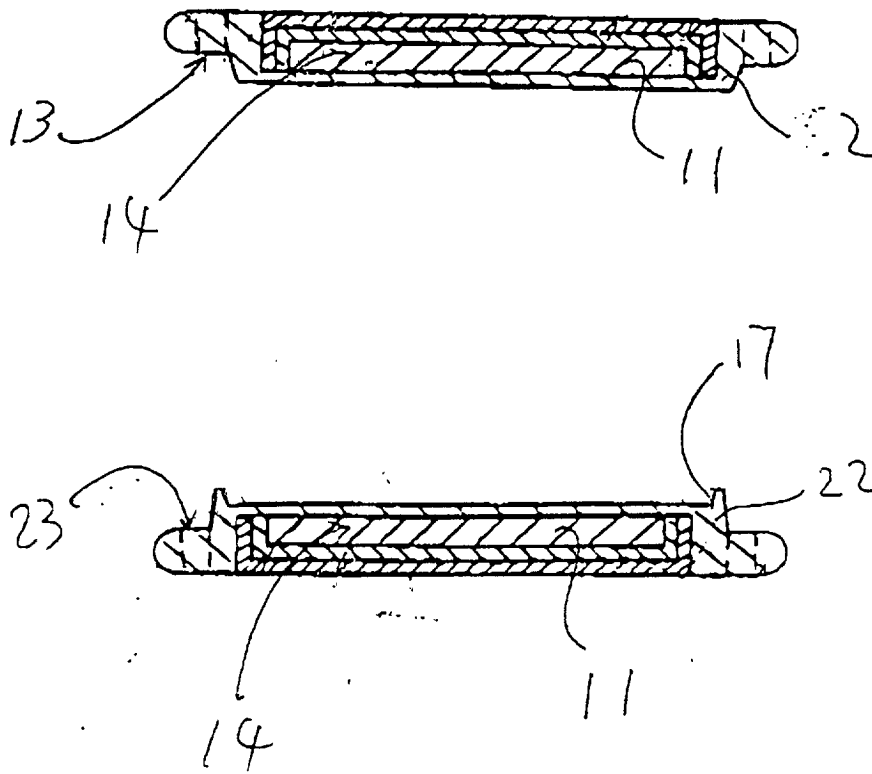


FIG 3

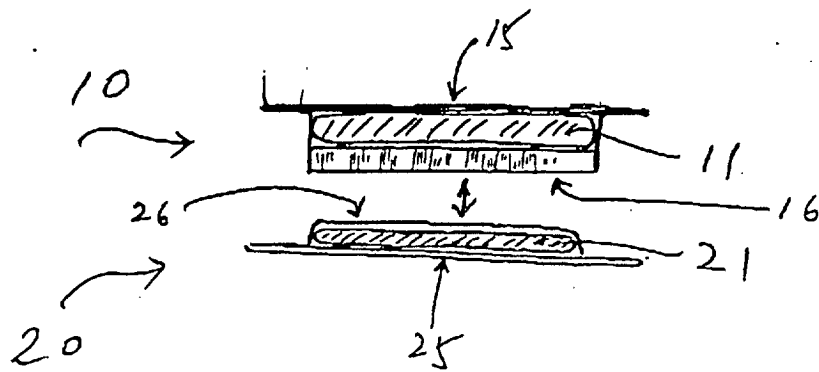


FIG 4

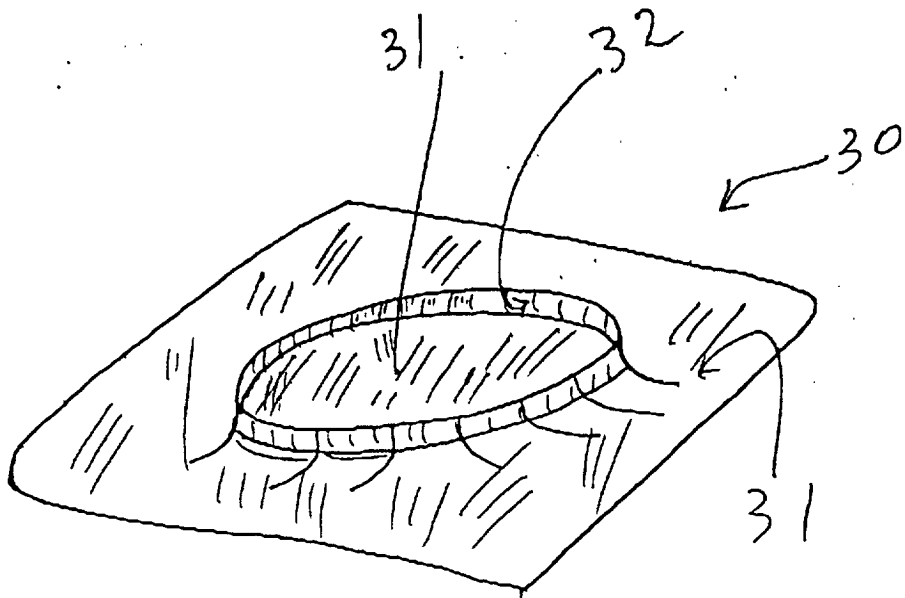


FIG 5

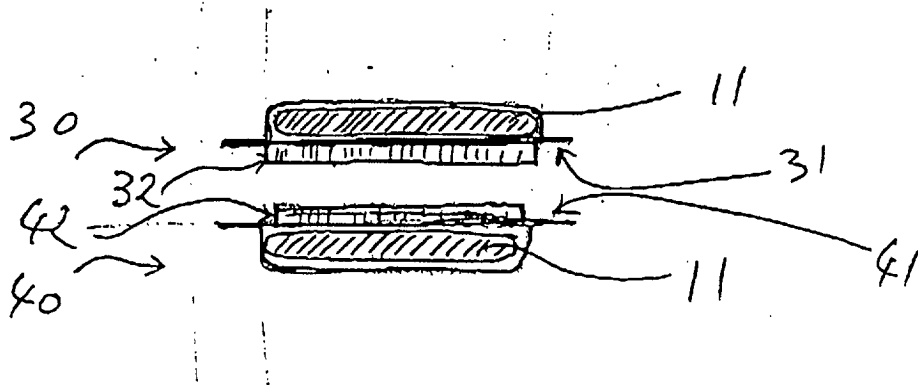


Fig 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 4193

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.7)
X	US 4 480 361 A (MORITA TAMA0) 6 November 1984 (1984-11-06) * column 2, line 26-55; figures *	1-6	A41F1/00 A45C13/10
X	US 5 865 482 A (AOKI YOSHIHIRO) 2 February 1999 (1999-02-02) * abstract; figure 1 *	1,2,4-6	
X	US 5 983 464 A (BAUER IRVING) 16 November 1999 (1999-11-16) * abstract; figure 8 *	1-6	
A	US 6 226 842 B1 (WONG SHEUNG CHUNG) 8 May 2001 (2001-05-08) * the whole document *	1-6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A41F A45C
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 16 October 2001	Examiner Kock, S
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 4193

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-10-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4480361 A	06-11-1984	JP 1379068 C	28-05-1987
		JP 58105524 A	23-06-1983
		JP 61024807 B	12-06-1986
		CA 1206519 A1	24-06-1986
		GB 2114208 A ,B	17-08-1983
		HK 69086 A	18-09-1986
		KR 8701531 B1	22-08-1987
		MY 56586 A	31-12-1986
		NL 8204766 A	18-07-1983
US 5865482 A	02-02-1999	NONE	
US 5983464 A	16-11-1999	NONE	
US 6226842 B1	08-05-2001	CN 1260151 A	19-07-2000