Feb. 3, 1953

R. ELLIS

2,627,097

FLEXIBLE MAGNETIC CLOSURE

Filed May 25, 1951

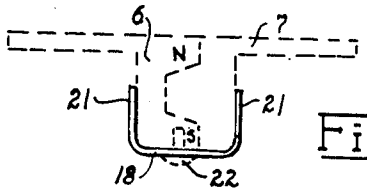


Fig. 3.

Fig. 1.

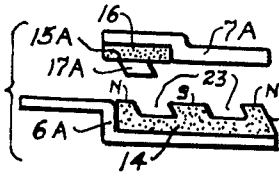
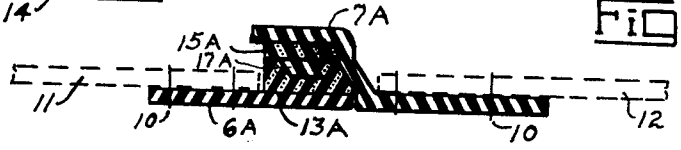


Fig. 5.

Fig. 4.



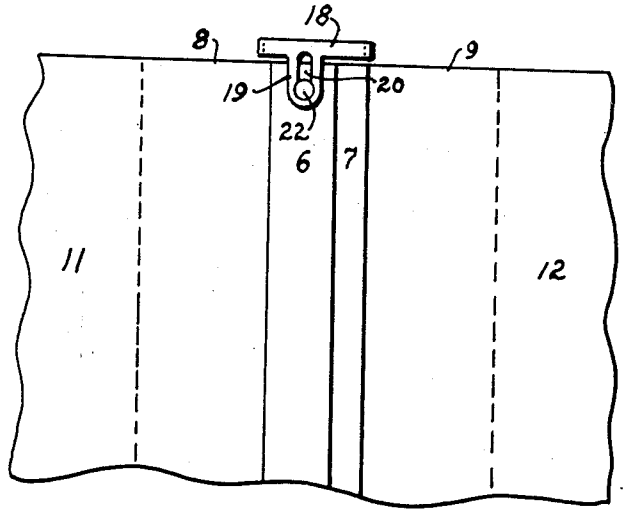


Fig. 2.

INVENTOR.

Robert Ellis

Patented Feb. 3, 1953

2,627,097

UNITED STATES PATENT OFFICE

2,627,097

FLEXIBLE MAGNETIC CLOSURE

Robert Ellis, Bronx, N. Y.

Application May 25, 1951, Serial No. 228,295

6 Claims. (Cl. 24—201)

1

This invention relates to flexible magnetic closures and one of the principal objects of the invention is the provision of means for more quickly and conveniently closing the margins of a flexible article of apparel or other device than other means in use at present.

A further object of the invention is the provision of means for increasing the magnetic tractive force of magnetic apparel closures to such a degree that the closure requires no additional mechanical or interlocking means to keep the margins of the flexible article effectively closed during regular use.

And a still further object of the invention is the provision of means for causing the margins of the flexible article to be self-closing as soon as any part or point of the magnetized margins are brought into contact.

And yet another object of the invention is the provision of a mechanical clasp or clamp at either end of the margins to be used only in cases where severe strain is applied to the extremities of the margins.

Other and further objects will appear in the specification and be specifically pointed out in the appended claims, reference being had to the accompanying drawings exemplifying the invention and in which;

Fig. 1 is a cross sectional isometric view of my magnetic apparel closure.

Fig. 2 is a front view of the closure showing a mechanical end fastener attached thereto.

Fig. 3 shows a top view of the mechanical end fastener.

Fig. 4 is a sectional view of a variation of the magnetic closure.

Fig. 5 illustrates diagrammatically the path of magnetic conductance through the apparel closure.

Referring to the drawings in which like characters and numerals of reference refer to similar parts throughout the several views, the numeral 6 denotes generally the longitudinal flexible channel part of my magnetic closure while 7 is the associated longitudinal flexible projecting part, which latter easily fits into the former longitudinally and is held thereto by magnetic attraction as will be progressively explained. These longitudinal flexible parts or strips are preferably made of rubber, pyroxylin or similar flexible material and can be easily and cheaply fabricated by extrusion or moulding. Each of the strips 6 and 7 are provided with laterally extending lips 8 and 9 respectively to which are attached, as by threads 10, the margins 11 and 12 respectively (shown in dotted lines in Fig. 1), of any article of apparel

2

such as garments, shoes, etc., or any flexible article requiring a closure means, such as brief cases, pocketbooks, etc.

Both the channel member 6 and the projection member 7 are composed of a composite number of longitudinal strips, the channel 6 having its outer part conform to a Z shape in cross section of which the lip 8 is a part, while to its inner surface is glued (glue not illustrated) the flexible magnetic channel 13, which is also preferably composed of the same material but having magnetizable particles 14 inherently mixed therewith. As will be noted, the channel member 13 has its cross section in the form of a V, thus conforming to the shape of a horse-shoe magnet throughout its length. The channel 13 is permanently magnetized with a north and south magnetic pole as indicated preferably after its rear and one side is glued to the Z-shaped part of the strip 6 as will be apparent from Fig. 1.

The flexible member 7 is also composed of a plurality of strips, the lip part 9 being also of substantially Z-shaped formation in cross section and to which is glued the magnetically attractive flexible bar 15 which has inherently mixed therewith soft iron particles 16, and which bar therefor acts as a "keeper" for the horse-shoe magnet 13. In order to properly guide and align the projection member 7 into the channel member 6, I provide a flexible projection strip 17, which is not magnetically attractive as otherwise it would magnetically short circuit the horse-shoe magnet 13 and render its tractive force almost negligible. It will thus be apparent that I have designed a flexible closure means which will have great tractive force, it being also apparent that it would be practically impossible to make the strips 6 and 7 each in one piece and insert magnetizable particles 14 and 16 only in the particular locations illustrated. By gluing the strips of magnetizing material to the other strips with rubber cement or vulcanizing them together, I inexpensively provide the structure shown which will resist any ordinary stress. However, should any special strain be applied to the margins of a garment, such as might occur at the neck or waist of a wearer, I provide a mechanical U-shaped fastener 18 as illustrated in Figs. 2 and 3. This fastener is provided with a lip 19 having a slot 20 which permits the fastener to slip onto or off of the opposite sides of the already magnetically attached strips 6 and 7, the arms 21 of the fastener gripping the outer sides of the strips against tensional stress as will be apparent from Fig. 3. A rivet 22 is secured to the strip 6 which confines the movement of the fastener within

the bounds of the slot 20. The V-shape of channel 13 permits easy insertion of part 17.

For greater tensional strains applied to the margins 11 and 12, I provide an arrangement illustrated in Figs. 4 and 5 in which a complete magnetic circuit is also provided. The strip 6A has glued to it the U-shaped permanently magnetized channel strip 13A into the channel 23 of which fits the unmagnetized projection strip 17A. It will thus be apparent that the magnetically attractive bar strip 15A completes the magnetic circuit. The bar strip 15A is glued to the strip 7A and also to the projection strip 17A.

In Fig. 5 is illustrated how the garment or other article may be adjusted as to size by merely inserting the projection strip 17A into any of the plural channels 23. It is not necessary to provide any additional end clips 18 with this construction. It will be noted that every alternate pole piece on the magnetic strip 13A is a north magnetic pole and of course the intermediate pole pieces are south poles, signified by the letters N and S respectively. The inclined edges of both the parts 17A and channels 23 of strip 13A cause mechanical interlocking of the parts against lateral tension while the strong magnetic tractive force secured by the arrangement illustrated will prevent dislodgement of the strips from each other when such tensional strain is removed or if the wearing apparent buckles through looseness or during the various postures required while wearing. To open the margins, all that is necessary is to pass a finger between the strips 6A and 7A.

As will be apparent from Fig. 1, the strips 6 and 7 will automatically close the margins through magnetic attraction as soon as either end or part thereof are brought sufficiently close together to cause magnetic attraction to move them, thus saving time and effort.

From the foregoing description it will be apparent that I have evolved a magnetic apparel closure which will be very effective in positively keeping the margins of a garment in closed position, permit quick and convenient application thereof in either the closing or opening operation and permit economical manufacture as well as easy and convenient attachment to the articles of wearing apparel or other device to be closed.

Various changes may be made in the embodiment of the invention hereinabove specifically described without departing from or sacrificing the advantages of the invention as defined in the appended claims.

I claim:

1. A flexible magnetic closure comprising two flexible strips each attached to oppositely disposed margins of a closable article, said strips forming a longitudinal closed magnetic circuit in cross-section when in closed relation, one of said strips forming a permanently magnetized substantially V-shaped horse-shoe magnet in cross-section while the associated strip consists of a magnetically attractive bar-shaped keeper in cross-section and adapted to contact the poles of said horse-shoe magnet, and a substantially V-shaped non-magnetic guide strip permanently attached to said bar-shaped keeper and adapted to fit between the poles of said V-shaped horse-shoe magnet.

2. A flexible magnetic closure comprising a longitudinal channel member of flexible material provided with permanently magnetizable material inherent therewith, an associated longitudinal projection member of flexible non-magnetic material adapted to fit into the channel of said channel member, and another longitudinal member of flexible material provided with magnetically attractive material inherent therewith and attached to said projection member and adapted to form a closed magnetic circuit with said channel member when said members are in closed position.

3. A flexible magnetic closure as in claim 2, and means for attaching the longitudinal channel member and the composite projection member to opposite flaps of a closure article.

4. A flexible magnetic closure comprising two flexible strips each attached to oppositely disposed margins of a closable article, said strips being partly composed of material having permanent magnetic attraction for each other and forming a closed magnetic circuit when in closed relation, the said magnetically attractive strips extending the full length of the opening of said closure article, and a rigid mechanical clasp irremovably attached to either end of one of said strips and adapted to secure the ends of said strips to each other.

5. A flexible magnetic closure comprising a longitudinal channel member of flexible material provided with permanent magnetizable material inherent therewith, the legs of said channel member comprising the opposite poles of a permanent magnet, an associated longitudinal projection member of flexible non-magnetic material adapted to fit into the channel of said channel member, and another longitudinal member of flexible material provided with magnetically attractive material inherent therewith attached to said non-magnetic projection member and adapted to form a closed magnetic circuit with the magnetic poles of said channel member when said members are in closed position, the said legs of said channel member and the said projection member being inclined so as to interlock when in closed position.

6. A flexible magnetic closure as in claim 5, the said channel member being provided with a plurality of parallel channels so as to permit said projection member to seat in either channel.

ROBERT ELLIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,355,816	Morner	Aug. 15, 1944
2,389,298	Ellis	Nov. 20, 1945