

May 31, 1955

H. ROSENTHAL

2,709,290

PLASTIC CLOSURES

Filed June 26, 1951

FIG. 1.

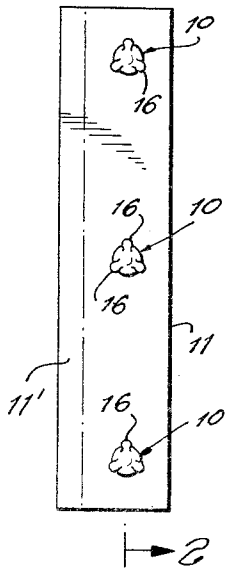


FIG. 2.

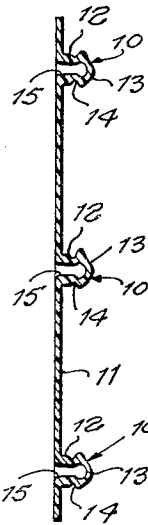


FIG. 4.

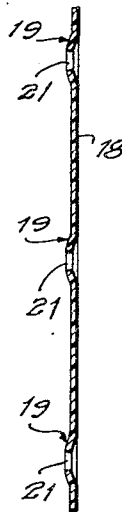


FIG. 3.

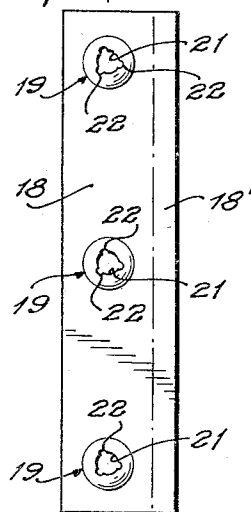


FIG. 6.

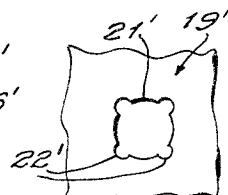
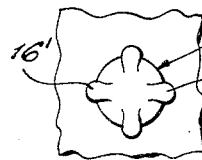
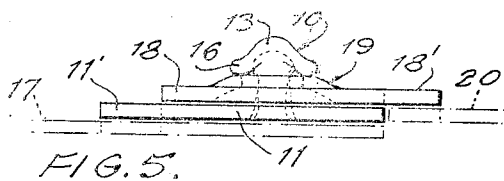
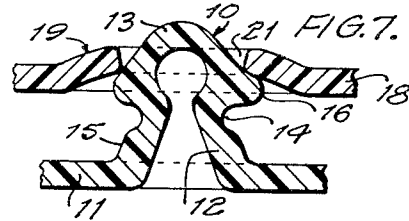
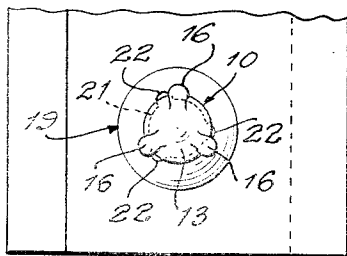


FIG. 9.

FIG. 10.

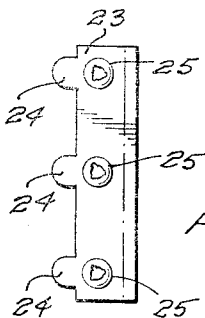
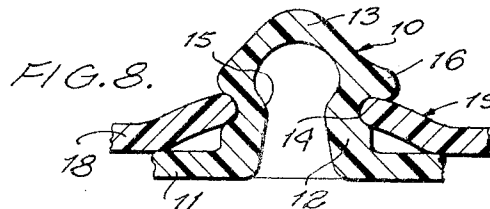


FIG. 11.

INVENTOR.
HARRY ROSENTHAL
BY *Raul Klein*
ATTORNEY

1

2,709,290

PLASTIC CLOSURES

Harry Rosenthal, Peekskill, N. Y.

Application June 26, 1951, Serial No. 233,570

2 Claims. (Cl. 24—204)

This invention relates generally to separable closures or fasteners, and particularly to a type of closure adapted for association with corresponding edges of openings in garments and especially in apparel made from thermoplastic material.

Closures and fasteners for separately uniting the edges of material forming either pockets, flaps or other parts of raiment are well known in the art, most of them being constructed either wholly of metal, such as the various types of snap fasteners, or are composed of metal and plastic elements or are made entirely of plastic material.

The present invention contemplates a novel departure from the presently known fastener structures in that both the male and female members of the closure structure are formed in one piece with and of the same material from which their supports or bases are made, and wherein such bases, preferably in strip form, are provided with marginal areas adapted for association with the edge portions of garment parts which are adapted to be separably united with one another, the attachment of the strip being such that their major areas adjacent their marginal attaching areas remain free, and wherein the male and female closure members are so constructed that both of them yield in respect to one another while being united, and both of them, when interlocked, rather effectively resist unintentional separation.

One of the objects of this invention is the provision of a plastic closure adapted to be associated by heat sealing with the edges of corresponding garment portions intended to be separably united by such closure, and wherein said closure comprises two thermoplastic strips having marginal attaching areas, and wherein from the material of one of the strips are integrally formed individual male closure members, while corresponding individual female closure members constitute integral parts of the other strip, and wherein both male and female closure members are provided with relatively offset interlockable means adapted to resist unintentional separation of the strips.

A further object of this invention is the provision of a plastic closure consisting of two thermoplastic strips, from one of which strips are integrally formed male closure members, while from the other strip are integrally formed female closure members, and wherein the male closure members comprise hollow, tubular projections extending beyond one surface of the strip, and which projections are composed of substantially cylindrical portions terminating in substantially conical heads, the latter being connected with the cylindrical portions by means of annular recesses, and wherein both the cylindrical and recessed portions as well as the heads are provided with continuous cavities rendering the male closure members sufficiently resilient for bodily compressibility in inward direction, and wherein the female closure members comprise preferably annular hollow spherical formations projecting above one surface of a thermoplastic strip, and wherein at the center of the spherical formations there

2

are provided apertures corresponding substantially in contour and peripheral dimension to that of the annular recesses of the male closure members, and wherein the heads of the male members have radially arranged, peripherally spaced projections extending beyond the head contours, said projections being arranged at certain predetermined points, and wherein the apertures provided in the female members have peripheral scallops extending outwardly, and corresponding in number to that of the head projections, but being disposed at an offset position relative to the latter so that when the apertures of the female closure members are forced over the heads of the male closure members the female members require a slight twist to bring their scallops in registry with the head projections, the apertures of the female members temporarily expanding while the heads of the male closure members are subjected to compression until the female closure members engage the recesses of the male members, the projections being offset relative to the scallops effectively preventing unintentional separation of the interlocked closure members, their interlocking engagement being emphasized as the spherical formations of the female closure members forcibly bear against the undersurfaces of the male heads.

The foregoing and numerous other objects and advantages of the present invention will become more fully apparent from the ensuing description in conjunction with the accompanying drawings, wherein:

Fig. 1 is a plan view of a thermoplastic closure strip provided with integral male closure members;

Fig. 2 is a section taken along line 2—2 of Fig. 1;

Fig. 3 is a plan view of another thermoplastic closure strip in which are integrally formed corresponding female closure members;

Fig. 4 is a section taken along line 4—4 of Fig. 3;

Fig. 5 is an enlarged end view of the plastic closure in interlocked position, and showing the relation of its marginal attaching areas to the edge of a closable garment portion;

Fig. 6 is a fragmental plan view of Fig. 5;

Fig. 7 is an enlarged vertical cross sectional view through male and female closure members in the process of being interlocked with one another;

Fig. 8 is a similar cross sectional view of the two members in interlocked position;

Fig. 9 is a plan view of a male closure member in a modified form;

Fig. 10 is a plan view of a modified female closure member corresponding to that in Fig. 9; and

Fig. 11 illustrates another embodiment of a female closure strip provided with attaching tabs.

As indicated in Figs. 2, 7 and 8, the male closure members 10 are made from the material of thermoplastic strip base 11 and extend from one face thereof. They form hollow elements having a lower substantially cylindrical portion 12, a head 13 which terminates in a cone structure and which is connected with cylindrical portion 12 by means of an annular recess 14. As stated, male closure members 10 are hollow, the cavity or passage 15 therewithin extending throughout their entire height towards their conical apex of the head, whereby the male closure members are rendered compressible to lesser or greater extent along their entire length, depending upon the wall thickness.

When observing Figs. 1, 5 and 6 it will be noted that from the conical surface of the heads extend radial projections 16 disposed at predetermined position relative to each other and relative to the center axis passing through the male closure members. It will be also noted from these figures that strip 11 has a marginal area 11' designed for so attaching the strip to a closable garment portion, indicated in broken lines at 17 in Fig. 5, that the entire

strip area beyond its attaching margin 11' is entirely free.

In Figs. 3 and 4 another thermoplastic base strip 18 is illustrated, from which are integrally formed female closure members 19. Also strip 18 is provided with a marginal attaching area 18' for attachment to the edge of a garment portion indicated at 20 in broken lines in Fig. 5. The attachment of strip 18 is such that its area adjacent margin 18' is entirely free. Female closure elements 19 comprise relatively thin-walled spherical formations provided with apertures 21, at the periphery of which latter are provided indentations or scallops 22 extending in radial outward direction beyond the apertures and are positioned in a manner similar to that of projections 16 of the male closure members 10 but are offset relative to these projections, as will be clearly observed by consulting Figs. 1 and 3, and which relative offset condition of the projections and of the scallops can be readily seen in Fig. 6. Apertures 21 substantially correspond in contour and periphery to those of recesses 14 in the male closure members but are preferably slightly smaller so that when these recesses become engaged by the edges of apertures 21, such engagement will be relatively forceful.

Interlocking of the closure members

When the male and female closure members are to be interlocked with one another, apertures 21 are brought in registry with the conical ends of heads 13 of the male closure members, are twisted slightly so that projections 16 will approximately register with scallops 22, whereupon the female closure members are forced over the heads. Due to the pressure exerted by the female members against the heads, apertures 21 will slightly expand while at the same time compressing heads 13. When the edges of the apertures 21 have passed over the heads, they enter recesses 14 and the apertures will contract while the male closure members will expand and revert to their original position. The interlocking procedure may be readily followed by first observing Fig. 7 which indicates the initial stage of placing the female closure member over the male closure member, and following it up by consulting Fig. 8 which shows the female member forcibly engaging recess 14 as the male member has expanded to its original shape. The interlocking engagement between the female and male members is effected by the female member bearing against the undersurface of head 13, and projections 16 of the male member assuming an offset position in respect to scallops 22 of the female member. Due to the spherical formation of female closure member 19, the edge of opening 21 produces an upward thrust against head 13, and the interengagement between these two members will effectively resist their unintentional separation.

Modifications

While in Figs. 1 to 5 the heads of the male members are shown to have but three projections and likewise the female members having but three scallops extending from the periphery of apertures 21, Fig. 9 illustrates a male member 10' provided with four projections 16', and corresponding female member 19' in Fig. 10 is shown with aperture 21' having four scallops 22', the disposition of the scallops in respect to the projections being such that they are offset relative to one another. These modified forms of the closure members are intended to indicate that this invention is not restricted to any set number of interlockable instrumentalities.

Another modified form of the female member is illustrated in Fig. 11, wherein the thermoplastic strip or base 23 is shown equipped with gripping tabs 24 which are aligned with female closure members 25. These tabs assist the operation of either attaching or detaching the female members in respect to the male members and also facilitate imparting a twisting movement to the female members as they are being forced over the conical heads of the male members.

In all of the illustrations showing the male closure

members, one foremost feature is patent, to wit, that the male member is hollow and that the cavity therein extends throughout its entire height or length and has for its purpose to render the male member compressible in radially inward direction. That compressibility is of particular advantage at the recessed area and the head structure, and facilitates the attachment of the female member to the male member.

It is to be noted that the interior recess in the male member terminates within its head in a spherical enlargement, as can be readily observed from Figs. 7 and 8. That enlargement facilitates first the compression and subsequent expansion of the head as it passes through and is then released by the aperture of the female member.

The resiliency of the head portion serves reciprocally to securely hold the interconnected members against casual or unintentional disengagement from one another. That feature is effected by the cooperation of the male head with the spherically bowed female closure member, which latter forcibly bears with the edge of its central aperture against the undersurface of the head and becomes so-to-speak anchored in its tendency to push the head upward and away from the cylindrical portion of the male member. Therefore, irrespective of the added interlocking feature produced by the cooperation of head projections 16 and scallops 22 in the female closure member, the present male and female structures effect a unique and dependable interconnection between one another.

While only a single structure of the closure is illustrated wherein relatively thin thermoplastic sheet strips are employed to serve as bases for and from which are formed both male and female closure elements, the same results may be achieved by the use of bases of different thicknesses and by slightly modifying or changing the structure of the closure members, for which reason such changes and modifications are deemed to reside within the scope of the present invention as defined in the present claims.

What is claimed as new is:

1. In a plastic closure including two complementary thermoplastic strips, a male closure member forming an integral part of one strip, a corresponding female closure member forming an integral element of the other strip, said male member comprising a bodily compressible structure ending in a conical, highly resilient, hollow head and having an annular recess just beneath the head, said female closure member comprising a spherical formation having a central aperture, the interior edge of the latter being adapted to forcibly engage the recess of the male member, the spherical formation of the female member tensionally bearing against the head of the male member when the two members are in interlocking position, the hollow head of the male member being adapted, when forced through the central aperture of the female member, to become materially compressed, thus facilitating its passage through said aperture, and to immediately expand to its normal size after its passage through the aperture, the sphericity of the female member serving to facilitate the interengagement of the two members, said male member having a lower substantially cylindrical portion beneath its annular recess and being hollow throughout its body so that its head is rendered substantially compressible as it passes through the aperture of the female member, and wherein radially disposed extensions project from the periphery of the head, and wherein the aperture of the female member is smaller than the diameter of the recess provided beneath the head of the male member; radially disposed outwardly directed scallops extending beyond the periphery of the aperture of the female member and being offset relative to the head extensions of the male member.

2. In a plastic closure composed of interlockable and separable male and female members, both forming integral parts of complementary thermoplastic strips, said

5

male member comprising a substantially cylindrical body terminating in a cone-shaped head, an annular recess provided beneath said head, a longitudinal recess extending substantially throughout the entire length of the male member and terminating in a spherical enlargement within the head to render the male member, and especially its head and the area of the annular recess, substantially compressible; said female member constituting a spherical formation and having a central aperture smaller in diameter than that of the annular recessed area of the male member, thereby causing, when the closure members are being interlocked, to first compress and then release the conical head of the male member, and to tensionally engage and interlock with the annular recess of the male member, the spherical

6

shape of the female member then exerting an upward thrust against the head, and wherein from the periphery of the head extend radial projections, and wherein corresponding scallops extend from the periphery of the aperture of the female member and are offset relative said head projections.

References Cited in the file of this patent

UNITED STATES PATENTS

1,310,119	Harper	July 15, 1919
2,095,931	Kraft	Oct. 12, 1937
2,164,382	Burke	July 4, 1939
2,397,801	Mitchell	Apr. 2, 1946