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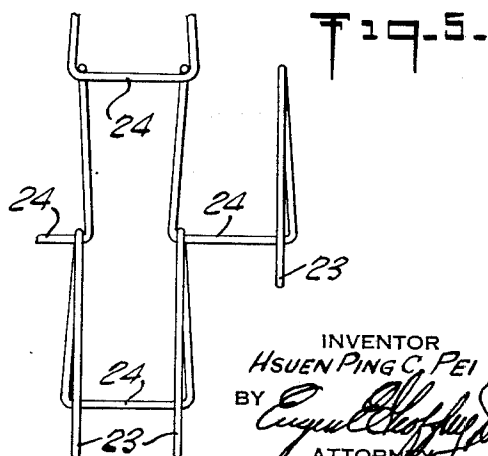
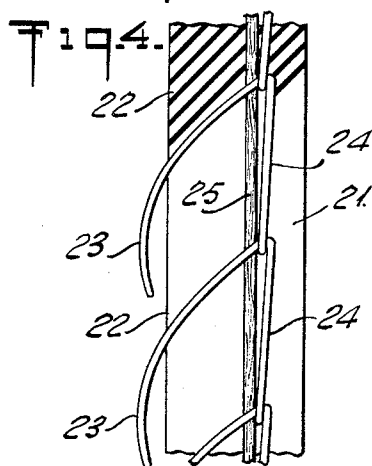
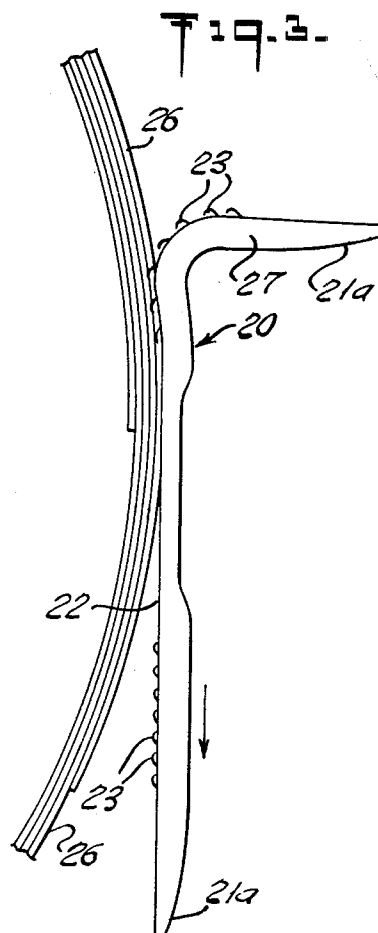
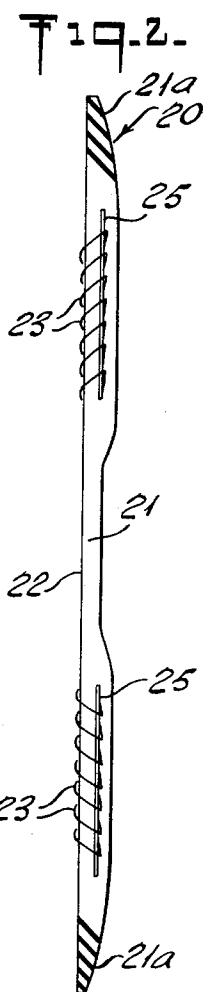
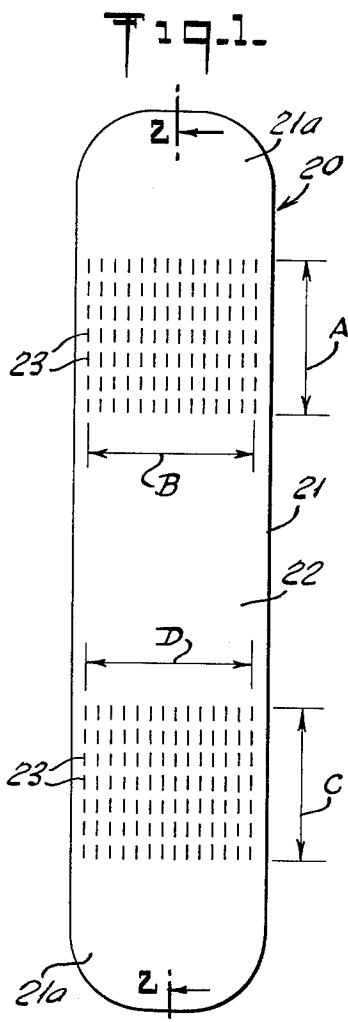
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3,134,152

SAFETY FASTENER

Filed Oct. 13, 1961

2 Sheets-Sheet 1



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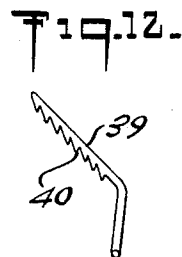
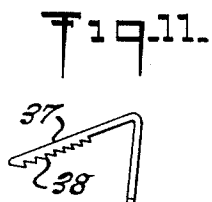
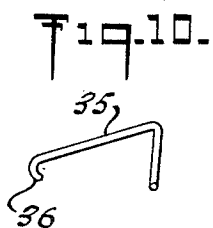
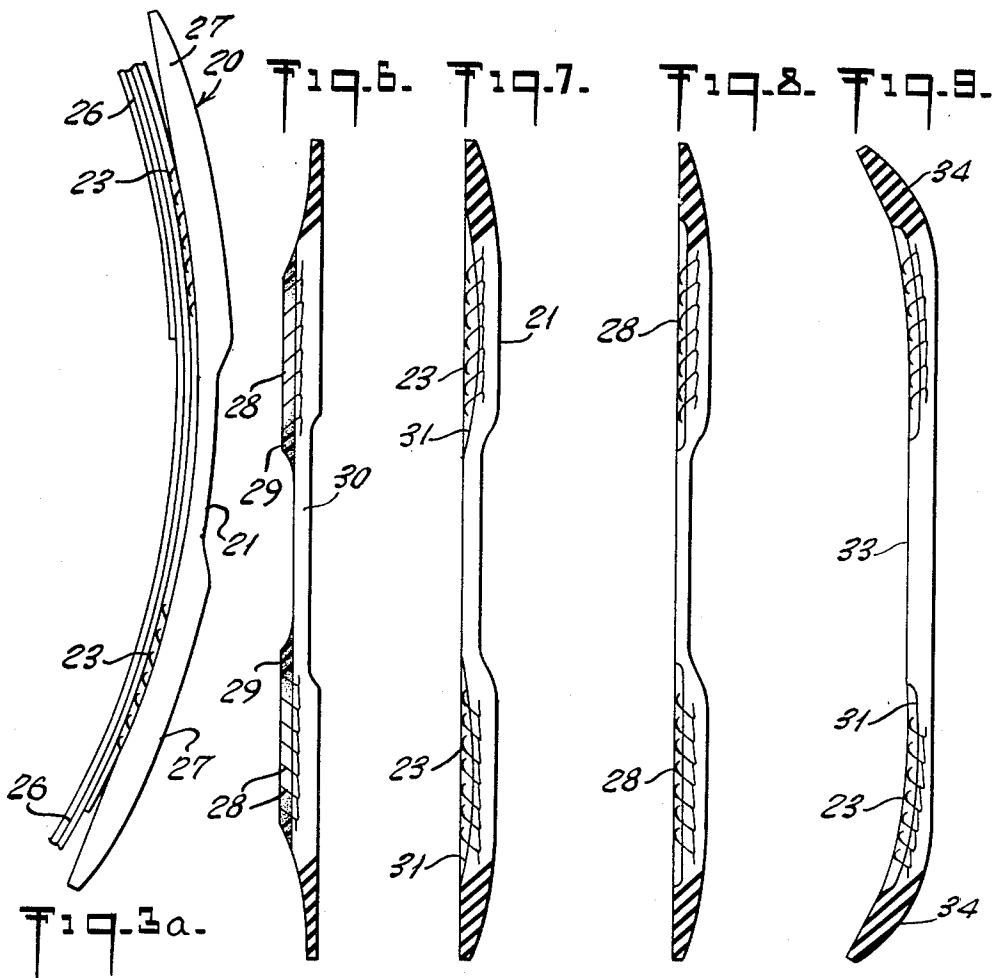
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2 Sheets-Sheet 2



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SAFETY FASTENER

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Jackson Heights, N.Y.Filed Oct. 13, 1961, Ser. No. 144,917
5 Claims. (Cl. 24-87)

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The present invention pertains to improvements in safety fasteners.

In the securing of fabric wrappings such as diapers, surgical bandages and the like, the use of ordinary safety pins often entails considerable inconvenience, as well as danger of injury which belies the term "safety." In view of this well-known fact, substitutes have been proposed in the form of opposed gripping or clamping devices. However, these attempts as hitherto practiced have also encountered various disadvantages such as difficulty of application, the necessity for sharpened prongs, and localized engagement with the fabric to be fastened, giving rise to danger of tearing and releasing the latter when the fastening is subjected to stress.

An object of the present invention is to provide a fastening device in the form of a tape or strip having attaching means adapted to engage the fabric wrapping throughout substantial areas thereof.

A further object is to provide a fastening strip including opposed gripping regions each equipped with a pattern of slender hooking bristles adapted to cooperatively engage a substantial area of the fabric to be secured.

A further object is to provide a positive safety fastening device wherein the necessity for sharpened prongs is eliminated.

A further object is to provide a safety fastening device which is applicable in minimum time and with minimum skill and effort.

A further object is to provide fastening means wherein possibility of accidental personal injury is prevented.

A further object is to provide a safety fastener which is relatively thin, flexible, and well adapted to production in sizes ranging from very small to large in accordance with best application to any specific type of requirement.

Other objects and advantages of the invention will become evident during the course of the following description in connection with the accompanying drawings, in which

FIGURE 1 is an enlarged face view of a preferred form of the invention;

FIGURE 2 is a longitudinal sectional view of the same;

FIGURE 3 illustrates a method of applying the fastener to a fabric wrapping;

FIGURE 3a similarly illustrates the completed fastening;

FIGURES 4 and 5 are greatly enlarged fragmental views showing a typical detail form and interrelation of the holding bristles;

FIGURE 6 illustrates an alternative form of the device employing straight bristles;

FIGURES 7, 8, and 9 are longitudinal sectional views illustrating modifications wherein the holding bristle assemblies are normally disposed in shallow depressed face areas of the strip bodies, and

FIGURES 10, 11, and 12 show optional detail modifications in the individual forms.

Referring to FIGS. 1 and 2, the numeral 20 generally denotes a fastening strip having a flexible body 21 of rubber or other suitable elastic material. Protruding from the inner face 22 of the body 21 are large numbers of inclined bristles 23 arranged in two arrays occupying substantial areas AB and CD spaced from each other and adjacent the two ends of the strip. The bristles of the two arrays are inclined inwardly toward each other as

shown in FIG. 2, and are secured in the body 21 in the manner best illustrated in the further enlarged FIGS. 4 and 5. Referring to the latter figures, it will be seen that the bristles 23, which are preferably of fine metal wire, are formed in unitary pairs connected by inner yokes 24 and are adapted to be linked with similar pairs in any number required to provide the desired gripping areas AB and CD. A reinforcing layer 25 of flexible fibrous material such as impregnated fabric, embraces the bristles 23 immediately above the junctions of the yokes 24 and is molded or otherwise embedded therewith in the body 21. The slenderness of the bristles 23 adapts them to penetration of fabric wrappings without any necessity for sharpening of the individual bristle points.

The bristles 23 are curved in an inwardly concave direction, so that in the normal condition illustrated in FIGS. 2 and 4 the outer ends of the protruding portions are inclined toward the body face 22. This provision, together with the close spacing of the bristles within the areas AB and CD, establishes in effect a normally smooth surface conformation throughout the two bristle arrays, preventing any tendency toward accidental gripping during storage or handling prior to a desired fastening operation.

A typical method of applying the fastening strip to a bandage or other wrapping 26 is illustrated in FIG. 3 and its companion FIG. 3a. For simplicity and clarity in these figures the strip 20 is shown in profile and the wrapping 26 in section, it being understood that conventional cross hatching is omitted in the latter to avoid possible obscurity in showing the engaging relationship of the very slender bristles 23 with the cloth. To start the operation, the end portion 27 of the body 21 which holds the array of bristles 23 in the area AB is bent outward, thus causing the bristles 23 to assume separated hooking positions. The strip 20 is then subjected to a stretching tension, and the portion 27 is applied to the wrapping 26 with an inward rolling motion which hooks the successive rows of bristles 23 into the outer layer or layers of the wrapping, until the entire array is securely anchored in the fabric. The other array of bristles occupying the area CD is applied in the same manner to the opposite side of the fabric terminal joint, completing the fastening as also shown in FIG. 3a. The hooking grip of the bristles 23, together with the tension supplied by the stretching of the body 21, ensures the stability of the fastening. The body 21 is preferably recessed or thinned from the outer side in its longitudinally middle portion as shown, so that the principal tensional pressure is brought to bear on the bristles 23 in the zone including and immediately underlying the inner surface 22, affording the best gripping leverage to the bristles.

From the foregoing description it will be evident that the retaining effect is not confined to any single or small number of hooking members, so that unduly localized stresses on the wrapping material are avoided. The individual bristles 23, as previously noted, are very slender and hence appreciably resilient, though the necessity for clear illustration has required their exaggeration both as to diameter and effective longitudinal extent, the same exaggeration of course applying to the thickness and other proportions of the strip body 21. Rather than localized engagement, the fastening effect is due to the cooperative action of the entire arrays of bristles which take even grip on the wrapping throughout substantial areas thereof without requiring sufficient depth of penetration as to involve any possible injury to underlying surfaces. While described as successive operations, obviously the applications of both gripping arrays may be readily and quickly carried out at the same time. End extensions of the body 21 form convenient manipulating tabs. Thus

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it will further be evident that the strip may be applied at least as easily as a short piece of adhesive tape, but with less pressure and without adhesive tape's well-known limitations as to feasible clinging surface and repeated use. When it is desired to release the fastening, the result may be accomplished by procedure which is substantially the reverse of that employed in the application, i.e., by simply stretching the body 21 and bending it outward progressively from its ends, thereby rolling the bristles 23 out of engagement with the wrapping 26. Such release involves no injury whatever to either wrapping or fastening strip, so that either or both may be used repeatedly if desired.

In the form of the device shown in FIG. 6 the inwardly inclined bristles 28 are straight instead of curved, and are normally guarded by thin pads 29 of highly compressible foam material. When the strip is applied in the manner previously described, the initial outward bending and a light applying pressure compress the pads 29 sufficiently to cause the bristles 28 to protrude therefrom and hook into the fabric being secured; as the application is completed the longitudinal tension of the stretched strip body 20 on the inwardly inclined bristles 28 holds the pads 29 compressed and the bristles in effective gripping engagement with the wrapping.

FIG. 7 shows a modification of the structure in FIG. 2, the arrays of bristles 23 being set in shallow recesses 31 so that normally their inner surfaces are flush with the inner body surface 22. In application, the bending procedure and light inward pressure flatten out the recesses, the bristles engaging the wrapping to achieve substantially the same fastening relation as that shown in FIG. 3a. Similarly, the straight bristles 28 of FIG. 6 may be set in shallow recesses 32 as shown in FIG. 8. With this arrangement the foam pads 29 may be omitted, the edges of the bristle arrays being normally guarded by the rims of the recesses, while the exposed faces of the arrays may be handled with impunity due to the large number and close spacing of the bristles; a classic illustration of the latter principle is the safety with which oriental "magicians" walk barefoot over arrays of closely spaced spikes.

FIG. 9 shows an embodiment of the invention generally of the type illustrated in FIG. 7 but particularly adapted to applications calling for high strength of fastening with minimum stretch. For this purpose the elastic body 33 may be formed with a relatively thick middle portion and with the end portions 34, which hold the bristles 23, curved inward as shown. When the device is applied, the inward elastic urge of the curved portions 34 augments the gripping effect of the bristles 23.

FIGS. 10, 11 and 12 illustrate the fact that the bristles employed in the invention, while operative in substantially the same manner throughout, may be formed with various detail modifications rendering them best suited to particular types of service. Thus in FIG. 10 the otherwise straight bristle 35 terminates in a small end hooking bend 36. For relatively large fasteners which warrant the use of bristles 37 of larger diameter, FIG. 11, the forward hooking faces of the bristles may be serrated to form barbs 38 which increase their holding power. Similarly, for particular requirements wherein it may be advantageous to apply the gripping arrays with an outward motion, the bristles 39 may be inclined rearwardly as shown in FIG. 12, the main retaining grip in this case being furnished by the barbs 40.

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From the foregoing, it will be evident that the device described is a simple, easily applied, and safe fastening means which is readily adaptable to production in various sizes and detail forms to conform most conveniently to particular or general requirements. With respect to details, while the gripping bristles have been described as composed of thin metal wire, in some forms that may alternatively be made of other materials such as nylon or the like. Similarly, the gripping areas defined by the bristle arrays are not necessarily confined to rectangular shapes illustrated by AB and CD, but may be of circular or any other suitable area pattern. Thus, while the device has been set forth in preferred form, it is not limited to the particular embodiments illustrated, as various modifications may be made without departing from the spirit of the invention within the scope of the appended claims.

What is claimed is:

1. A safety fastening device comprising an elongated elastic body member having inner and outer faces adapted to be applied to a wrapping and recessed areas in said inner face adjoining each end thereof, a plurality of closely spaced bristles having hook-like portions and disposed within each of said recessed areas, said bristles protruding from the inner surfaces of said recesses, each of said bristles having a root portion anchored in said body member between an inner surface and the outer face of said body and a shank extending outwardly from the root and inclined toward the center of said body, said body member upon elongation and engagement of said bristle areas with said wrapping exerting stress on the shanks of said bristles to maintain them in secure engagement with said wrapping.

2. A safety fastener according to claim 1 wherein said body member has a central portion of reduced cross-sectional area.

3. A safety fastener according to claim 1 wherein the root portions of the bristles in each of said recesses are interlocked with the root portions of other bristles in said recess.

4. A safety fastener according to claim 3 wherein said body member has a central portion of reduced cross-sectional area.

5. A safety fastener according to claim 1 wherein said hook-like portions of the bristles of each recess are in collective guarding relationship.

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