

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Gripping Devices and Uses thereof with Sanitary Devices.

I, ROBERT VINCENT MATHISON, a citizen of the United States of America, of 5 Woodcrest Road, Asheville, State of North Carolina, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to gripping devices of the buckle-type useful in releasably gripping or holding fabric or like material and uses thereof in supporting catamenial bandages or sanitary napkins by supporting belts or feminine undergarments such as conventional panties, bikini-type panties, panty briefs or sanitary panties.

Sanitary napkins or catamenial bandages are commonly supported and held in position against the body by means of sanitary belts, sanitary panties, or pad holders having suitable suspension tape arrangements, to which the napkin is attached by pins, buckles, or fasteners of various types.

In recent years, panties also have been designed which incorporate stretch yarn construction in a manner which enables sanitary napkins to be supported without the use of suspension tapes, pins, buckles, or similar attachment means. Such stretch yarn construction permits easy stretching of the garment in all directions; thus, when a sanitary napkin is used in conjunction therewith, the crotch area of the garment conforms to the shape of the napkin to closely engage the lower surface and outer edges of the napkin, and with gentle pressure hold the napkin snugly against the perineal area of the body. When these stretch panties are used for supporting napkins, the customary napkin tab ends usually employed for attachment purposes may be omitted.

The latter arrangement works satisfactorily while the panty is in normal position during use and when physical activity is moderate. However, when the wearer must displace the garment to perform necessary toilet functions, or for other reasons, the napkin is retained in the panty only with difficulty, and often falls out entirely even though it is not ready to be discarded. Many women will not use the above-described stretch panty for catamenial purposes because the sanitary napkins are not positively attached thereto. Unless some positive means of attachment is provided, the wearer lacks confidence in the ability of such supporters to retain the napkin securely in place.

The use of separate fastening elements such as safety pins and the like to attach sanitary napkins to supporting belts has a number of disadvantages. For this reason fastening or gripping means are fixed to most belts of this type. Although such fastening means represent a marked improvement over the use of separate fastening elements from a convenience standpoint, they have not fully met other requirements of a satisfactory product. It is essential, of course, that the device be capable of holding the sanitary napkin close to the body while insuring that the napkin will not slip out of place. It is also important that the gripping means be designed so that the napkin or catamenial bandage can be adjusted or removed without difficulty. The gripping means should also hold the pad or napkin in a flat and comfortable position.

This invention consists in a fastener comprising side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener,

[Price 4s. 6d.]



arranged

while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting a first or upper bar, the other end bar constituting a second or lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, characterized in that said intermediate bar has a substantially flat outer surface parallel to the plane of said fastener upon which are situated a plurality of synthetic polymer, small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, and a substantial portion of said outer surface of said intermediate bar being smooth and free of projections. The projections or teeth may be oblique cones, oblique triangular prisms, truncated, oblique triangular prisms, and related shapes wherein there is a taper in the direction outwardly from the base of the projections and the projections are slanted relative to the plane of the face of the cross bar on which they appear.

The projections may be arranged in a single row although at least two rows thereof are generally more satisfactory. They preferably all slant or slope in the same direction, but in some cases may be arranged in groups which slant in different directions, e.g., opposite directions.

Embodiments of the gripping devices and uses thereof in combination with sanitary devices are illustrated in the accompanying drawings wherein:

In the drawings:

FIGURE 1 is a front elevation of a bikini-type panty in the approximate shape the panty assumes on a wearer during use, and shows the relative location of attachment means in association with a sanitary napkin.

FIGURE 2 is an enlarged view taken of the interior of the front portion of the panty shown in Fig. 1, to illustrate the method of threading the short tab end of a sanitary napkin through the attachment means.

FIGURE 3 is a plan view of a preferred embodiment of the attachment means.

FIGURE 4 is a section taken through 4-4 of Fig. 3.

FIGURE 5 is a section taken through 5-5 of Fig. 3.

FIGURE 6 is another embodiment of the attachment means designed in a manner which permits the fastener to be easily removed from the garment at the wearer's option.

FIGURE 7 is another enlarged view taken of a portion of the interior of a panty to show in place the detachable embodiment

of the attachment means illustrated by Fig. 6.

FIGURE 8 is an enlarged view of a panty interior similar to Fig. 2 showing another embodiment of the attachment means as well as showing how a supplementary pad may be secured in place over a regular sanitary napkin.

FIGURE 9 is a fragmentary front view showing the subject gripping means and its relationship to the sanitary napkin and belt;

FIGURE 10 is a perspective view showing a sanitary napkin each each of which is attached to a gripping means of the subject invention;

FIGURE 11 is a sectional view through one of the gripping means of Figs. 9 and 10;

FIGURE 12 is a top plan view of another embodiment of a gripping device of the invention;

FIGURE 13 is a sectional view taken on section 13-13 of Figure 12, with a fabric tab or strip releasably held thereon and a loop of a fabric or strip mounted about a cross bar; and

FIGURES 14-18 are enlarged, perspective views of a fragment of the projection-bearing cross bar of the gripping devices of the invention, showing various embodiments of types of projections which may be used.

The panty 12 as shown in Fig. 1 is of bikini-type construction, having a rear panel 11, a front panel 17, side seams 21, a crotch piece 23, a waistband 13 and leg openings 15. The garment preferably, but not necessarily, is made of stretch yarn and has a reinforced construction in the crotch area 23, such as double-plices of material, starting at seam 14 and extending a similar distance to a seam at the rear of the garment.

At seam 14, where there is adequate strength of fabric, there is secured a special attachment means or fastener 16, as shown in more detail in Figs. 2 and 3, through which the short tab end 18 of sanitary napkin 20 is threaded.

The fastener 16 is of flat, generally oblong, configuration and comprises a pair of side bars 22, 24 interconnected at their lower ends by a first transverse bar 26 and intermediate their ends by transverse bar 28 to form aperture 38. The opposite or upper end of said side bars is provided with a second transverse split top bar in the form of end bars 30, 32 extending toward each other to form an access slot 34 above aperture 40 which slot provides an easy access passage for tab ends 18 to aperture 40.

It is understood that first transverse bar 26 may also be provided with a central slot to facilitate threading and removal of tab

ends 18. The fastener may also be designed without slots in either the first or second bar, but in that case is more difficult to thread and not as convenient in use.

5 Center bar 28 is provided with a plurality of spaced pointed protuberances 36 arranged in parallel rows and extending obliquely outward therefrom. While two parallel rows are shown, it is understood that a single row or more than two rows may also be employed. It is preferred that the protuberances 36 be located near the upper edge of center bar 28.

10 For the purpose of securing the fastener to the panty, small thread holes 42 are provided in side bars 22 and 24 on either end of center bar 28. The fastener is secured to the panty by sewing or stitching a thread 25 through holes 42 and through the reinforced portion of the panty which comprises forward crotch seam 14 while the panty is held under tension for proper spacing.

20 While the fastener in Figs. 2 and 3 is shown as having thread holes 42 for securement to the panty, the fastener may also be secured by double stitches 27, 29 located on both sides of the center bar 28, as shown in Fig. 8. An alternative removable arrangement for securement of the fastener is shown in Figs. 6 and 7 and described hereinafter.

25 When the gauze-like fabric tab end 18 of sanitary napkin 20 is threaded under first bar 26, through aperture 38, over center bar 28, through slot 34 into aperture 40 and under second bars 30 and 32, the upwardly angled protuberances 36 penetrate the gauze or covering sufficiently to hold the tab end 18 and pad 20 securely in place. The position of pad 20 may be adjusted upwardly by pulling on tab 18. The protuberances 36 hold the gauze securely, so that the pad cannot be displaced, pulled downward, or removed unless tab end 18 is subsequently pulled back up through slot 34, and away from protuberances 36.

30 It is important that the protuberances be of sufficient length to hold onto the fabric of the tab ends. While they must not be sharp, such as needles are, they should have a somewhat pointed edge so that the fabric is easily caught. In one specific embodiment, as shown in Figs. 3 to 5, the fastener is made of durable plastic, and is about 0.078" thick, the horizontal dimension is about 1.125" and the vertical dimension is about 0.86". The protuberances 36 are located at the upper side of center bar 28 as shown in Fig. 5, i.e. the side of the center bar nearest the second bar 30, and have the shape of truncated oblique triangular prisms, the upper side 35 angles away from center bar 28 at an angle of about 45° while, the lower side 37 is at an angle of 30°. The

height of the flat top is about 0.021" from the surface of center bar 28. The width of each protuberance is about 0.020", and they are spaced from each other about 0.040". The dimensions can, of course, be varied in a reasonable range from those given in this specific embodiment. The flat truncated top 39 is important to eliminate the possibility of irritating or scratching the wearer's body.

70 When the above described fastener was first contemplated for use with panties, it was tried with a suspension strap as is customary in panty usage, in the same manner as with the sanitary belt arrangement hereinafter described. For example, when the fastener is used on the suspension straps of such a sanitary belt arrangement, the fastener would be inverted and turned upside down when viewed in relation to the drawings shown herein. First bar 26 thus becomes an upper suspension bar for hanging the fastener from the belt suspension strap and the protuberances 36 face outward at a downward angle, pointing away from the body when worn. The upper tab ends of a sanitary napkin, which now must be of the usual long tab length, are threaded underneath bar 28, up through aperture 38, over bar 28 and angled protuberances 36, and then back through slot 34 into aperture 40. Pulling down on the tab end presses the gauze into engagement with the protuberances across the full width of center bar 28, and when the forces are reversed, which happens when worn, the obliquely angled protuberances hold the napkin securely in place. The lower or rear tab end of the napkin is fastened to the rear of the belt by a similar fastener or by other more conventional fasteners.

80 While this arrangement of the fastener works very well with a sanitary belt, it was found generally unsatisfactory in combination with panties or similar garments because threading the tab end through the fastened required awkward manipulation between the fastener and the front or crotch area of the panty. Sufficient space is not available in that limited area to adjust the napkin tightly against the body.

85 Reversing the fastener so that the protuberances face inwardly while still pointing generally downward does not solve the problem either, since, while threading is facilitated, the front tab end drapes down over the upper surface of the napkin and becomes soiled and interferes with absorption of discharged body fluids by the main element of the napkin itself.

90 The problem of providing a suitable arrangement for use with panties was solved only when the fastener was reversed and turned over, as illustrated in the drawings, with the protuberances pointing upward and



facing toward the body. At the same time securing means were provided at each end adjacent the central bar for pivotable securement of the fastener to the panty by sewing through thread holes 42, by thread loops 52 in a removable manner, or by sewing on either side of the center bar as shown in Fig. 8 by double stitches 27, 29. By positioning the securing means adjacent the centre bar 28, the fastener is easily pivoted up or down by the user with the attachment thread acting as a fulcrum or pivot point, to facilitate threading of the sanitary napkin tap end.

The tab end is threaded as shown in Fig. 2 and may be adjusted in place by pulling upwardly on the tab. Additionally, because the fastener holds the napkin securely and prevents sideways displacement, no rear tab or fastening means is required as with the belt arrangement. The napkin can be pulled up firmly against the fastener as shown with the leading edge of the pad positioned near the crotch seam and cannot be displaced sideways when in position. At the same time, the end of the napkin is flattened as it comes into firm contact with the lower bar 26 and remains flat during use, thus minimizing any tendency for unsightly bulging.

When additional protection is desired by the wearer, as during periods of heavy flow, a small supplementary pad 44, as shown in Fig. 8, also having a short tab end 46, may be positioned above regular napkin 20, with the tab end 46 also threaded through the fastener to be held securely in place thereby in much the same manner as the large pad.

When a second or auxiliary pad is employed, it is not necessary for the protuberances to penetrate deeply into the tab of the second pad, if at all, since close frictional engagement of the two pads assists in holding the top pad in place.

In some cases it is desirable to have the fastener made easily detachable when not in use, so that the garment may be employed as conventional lingerie when catamenial protection is not necessary. For such purposes, a fastener as shown in Fig. 6 may be used. Instead of having thread holes 42 (Fig. 3) for permanent securement to the garment by stitching therethrough, this embodiment of the fastener has interior hooks 48 provided on the interior portion of side bars with matching notches 50 on the exterior of the side bars immediately adjacent the upper side of center bar 28. The panty then is provided with permanent thread loops 52, as shown in Fig. 7, which hold this type fastener in place by said hooks and notches while the fastener is inserted therein.

Preferably these loops 52 are sewed to

the front crotch seam 14 and are so spaced that the garment must be stretched to hold the fastener in place. Thus, when the panty is worn, the material intermediate the loops will not bunch up and will lie flat. Additionally, by having the loops under stress, any tendency for the fastener to sag below the seam is minimized.

If a split lower bar is employed for easier threading of the tab ends, the hooks and notches for thread loop attachment may be located immediately below center bar 28. In either case, it is important that the hooks and notches be positioned as near as possible to center bar 28 to provide the necessary pivot points.

The arrangements herein defined provide a sanitary undergarment which for the first time is equipped with a positive fastening means for a sanitary napkin without having need for cumbersome auxiliary straps and suspension devices. The sanitary napkin used in combination therewith requires only a short tab at its forward end and is held snugly in place without danger of displacement during use. The fastener is secured to the garment in such a manner that it may be easily pivoted up or down around its center bar to permit convenient threading. The removable features of one embodiment of the arrangement also provides additional advantages in that the garment may be used as conventional lingerie when the fastener is removed.

Figs. 9 to 11 illustrate the gripping devices of the character heretofore described on sanitary napkin belts instead of undergarment apparel. Where applicable, like numerals designate like parts.

As shown in Fig. 9, sanitary napkin 20 is held in position by fastener or gripping means 16 which in turn is attached to front tab 53 of elastic support belt 54. In a further embodiment of the invention, gripping means 16 can be sewn or otherwise attached directly to the belt 54.

The perspective view of Fig. 10 shows a sanitary napkin 20 which is attached at both ends to a fastener of the subject invention. The gauze like fabric tab ends 18 and 18a of the napkin are threaded through apertures 38, over center bars 28, through the other apertures 40, and beneath divided lower bars 30 and 32 of the fasteners 16 and 16a. The position of the napkin can be tightened by pulling downwardly on either tab end 18 or 18a. Obliquely angled protuberances or teeth on center bars 28 hold the napkin securely in place in a manner to be described more fully below. Although Fig. 10 shows an adjustable fastener at both ends of the napkin, ordinarily only one such fastener is required, preferably at the front or forward end of the napkin. The other end of the napkin can be attached to



the belt by a nonadjustable gripping means of a suitable design.

5 The protuberances 36, in this case downwardly angled, have been placed in two rows near lower edges of center bar 28 in this embodiment. The protuberances should have a somewhat pointed or sharp edge so that the tab end fabric of the sanitary napkin is easily caught. They preferably are not needle-shaped, however, in order to avoid the possibility of catching on underclothing or causing other discomfort to the wearer. As can be seen in the drawings, the protuberances can have the shape of truncated, oblique, triangular prisms. In this embodiment, the width of each protuberance is about 0.020 inch and the protuberances are spaced from each other from base to base in the same row a distance of about 0.045 inch. The base to base spacing of the protuberances between rows is about 0.015 inch. The vertical height of each protuberance from the face is about 0.023 inch. The dimensions, of course, can be varied in a reasonable range from those given in this embodiment. The width of the protuberances, for example, can vary from about 0.010 inch to about 0.050 inch and they can be spaced from each other in the same row at a distance of from about 0.020 inch to about 0.100 inch or more.

35 The vertical height of each protuberance is normally within the range of 0.02 to 0.15 inch. The tip of each protuberance is preferably flattened parallel to its base with a length in the direction of slant of about 0.01 inch. The angularity is preferably 20° to 80°.

40 In the embodiment shown, the second bar is split into sections 30 and 32 forming a slot 34. It is also contemplated that the second bar can be split in such a manner that the section ends extend toward each other to form a diagonal slot as in Fig. 6. The second bar can also be designed without slots. The second bar may also have inner squared corners rather than inner rounded corners shown. First bar 26 can also include a vertical or diagonal slot if such be desired. In one specific embodiment, the fastener 16 is made of durable plastic and is about 0.078 inch thick, the width of the fastener is about 1.125 inch and the length of the fastener from the outer edge of lower bar 10 to the outer edge of first bar 26 is about 0.86 inch. The fastener may be made of any suitable material including metal but it is preferred that somewhat flexible materials such as polypropylene, nylon, acetal resins, and the like be used for this purpose. It is also possible to have the fastener made all of metal except for a plastic center bar, or to have 65 any other similar combination of materials.

The protuberances themselves, preferably should be made of a durable material such as a suitable plastic.

As shown in Figure 4, sections 30 and 32 can be somewhat tapered. This makes the sections more flexible and simplifies the insertion of the ends of the sanitary napkin as well as the removal of the napkin.

70 The sanitary napkin is adjusted in place by pulling downwardly on the end of tab 18. Protuberances 36 engage the fabric tab end and prevent the napkin from becoming dislodged while in use. In the embodiment shown in Fig. 11 the upper sides 56 of protuberances 36 angle away from center bar 28 at an angle of about 45° while the lower sides 55 are at an angle of about 30°. The angle, of course, can be varied. It is important, however, that there be a sufficient angle to prevent the protuberances or teeth from becoming disengaged from the tab end of the sanitary napkin.

80 45°
85 It is also important that aperture 40 between center bar 28 and second bars 30 and 32 be relatively small to ensure positive engagement of the fabric with the teeth when the usual forces are exerted on the napkin during use. The height of the flat tops 57 of protuberances 36 is about 0.021 inch from the surface of center bar. This dimension likewise can be varied within a reasonable range depending on the thickness of the tab material. At least one row of protuberances preferably is located near the lower edge of center bar to make certain the fabric will be readily engaged thereby.

90 As is apparent from Fig. 11, first bar 26 of the fastener constitutes a suspension bar for suspending the fastener from the strap of a sanitary belt. The front tab of the sanitary napkin is threaded under middle bar 28, through aperture 38, back over middle bar 28, then through aperture 40 and beneath the second split or continuous bar assembly 30 and 32. The napkin is positioned by pulling downwardly on the tab end of the napkin after threading, causing the napkin to move upward into snug association with the fastener. The tab of the napkin, which is made of gauze-like material, engages the protuberances across the full width of the center bar to hold the napkin securely in place during use. Center bar 28 is relatively wide which tends to equalize the tension by spreading the forces across a substantial portion of the napkin tab. Spacing the protuberances substantially across the width on the lower portion of center bar 28 as shown in Fig. 11, i.e. the portion nearest to the second bar 30, likewise tends to equalize the tension on the tab and also makes it easier to disengage the napkin tab from the protuberances. In the embodiment of the invention wherein the second bar is split, the 130



tab can be passed in a simple manner through slit opening 34. The sections of the split crossbar are flexible and assist in holding the pad in its proper position while flattening the leading edge of the pad to minimize any tendency for the pad to bulge.

In the Fig. 11 the fastener is shown as including two rows of protuberances or teeth. This is a preferred embodiment of the invention. While it is possible to have but a single straight or staggered row of protuberances, improved tension distribution and holding power is obtained with a two-row arrangement. The use of more than two rows of protuberances does not add significantly to the effectiveness of the device. For reasons of economy, therefore, it is preferred that not more than two rows of protuberances be included. The center bar should be sufficiently broad in dimension from its upper edge to its lower edge so that both rows of the protuberances can be at the lower portion of the bar allowing a substantial flat portion of the bar to be exposed above the protuberances. In a specific embodiment the dimension of the center bar from upper edge to lower edge is about 0.22 inch and both rows of protuberances are located in the lower half of the bar with the upper flat portion of the bar having a dimension of about 0.12 inch. The dimensions can be varied, of course, within reasonable limits. In all cases, however, it is preferred that at least the upper one-third of the bar be smooth and free of protuberances to facilitate the removal of the tab.

Referring now to the embodiments of Figs. 12—18, the gripping device comprises a unit made up of a pair of parallel, spaced side bars 61, 62 connected at their respective, opposite ends by crossbars 63, 64. The side bars are further connected intermediate their ends by a third crossbar 65. The side bars and crossbars form an open, essentially rectangular framework with two openings 66, 67 therein, which openings may be essentially rectangular if desired.

The edges 69, 70 of crossbar 65 may be straight and parallel or may be, as shown in Fig. 12, V-shaped. The outer edges of bars 61, 62, 63 and 64 may be bevelled edges 71, 72 or any other suitable configuration. Similarly, the inner edges 73, 74 of bars 61, 62 and longitudinal edges 75, 76 of bar 65 may be bevelled or any other suitable shape. The inner edge of bar 64 may be similarly bevelled edges 77, 78.

The bar 63 may have beveled edges 79, 80 and may further have a notched or recessed portion 81 along its inner edge. The latter forms a seat section having side shoulders 82, 83. A loop 84 or the like of a fabric strip, belt, etc., 85 may be attached to the buckle-type fastener. The bar 63 is

useful only as a means for attaching the buckle-type fastener to the article with which it is used. Should other fastening means be used, the bar 63 may be omitted.

Another strip 86 of fabric or the like is removably held in the fastener by looping it over center bar 65 and placing the free end between bar 64 and the underside of strip 86 (Fig. 13).

The strip 86 is securely held by the projections 87 on the face 68 of center bar 65. The projections 87 are of the aforescribed character, i.e., tapered projections which slope obliquely with reference to face 68. These projections penetrate the interstices of a woven fabric or the like and securely grip the fabric. In the illustration as oriented in Fig. 11, the projections slant outwardly and downwardly, the latter being opposite to the direction of pull of the free end 88 of strip 86 when a pulling force is exerted on strips 86. By virtue of the slanting relationship of the projections 87 against the direction of pull, the fabric strip becomes more embedded on or impaled by projections 86 under the pulling force to tightly seat the strip on the projections.

The face 68 may be substantially covered with said projections as shown in Fig. 12. They are preferably closely spaced in rows. There is at least one row of projections 87 on the face 68 in any case, but two or more closely spaced rows are preferred for better gripping function. The grip is released by raising segment 88 off the projections 87.

The projections heretofore described are oblique, triangular prisms. Illustrations of alternative shapes suitable for use in the invention are shown in Figs. 14—18, i.e., truncated, oblique, triangular prism projections 36a; oblique, conical projections 36b; oblique, frusto-conical projections 36c; oblique, pyramidal projections 36d; and oblique, frusto-pyramidal projections 36e. These projections have two common factors. They are tapered in an outward direction, and the underside of the slanting projections form an acute angle with the surface so that the fabric or other penetrable material seated thereon is drawn by virtue of the sloping undersides of the projections more tightly toward face when the fabric or other material is pulled under tension in a direction opposite the direction of slant of the projections.

The entire buckle-type fasteners of the invention may be manufactured as a single molding of synthetic resin or polymer (including projections 87 or 36—36e) or the projections may be molded separately as a part of a thin sheet or bar of synthetic resin or polymer and attached as bar to an open, substantially rectangular frame. The latter may be molded synthetic resin or

omitted



polymer, metal or any other suitable or desired material.

5 The centre lines of the tapered projections form an angle with the face of about 20° to 80°. The rows of projections are spaced closely enough, for the best gripping results, so that their tips or outer edges overlap or come close to overlapping the bases of projections of the adjacent row. Center-to-center spacing of the projections in the respective rows is in the order of 0.03 to 0.25 inch. The vertical distance between face 8 and the tips or outer ends of the projections is in the order of 0.02 to 0.15 inch.

10 0.15
15 As a typical example, the projections can be made 0.050 inch in length and slanted at an angle of 45° with the supporting structure. The bases of these projections can be 0.030 inch in diameter and taper to a tip having a diameter of 0.010 inch. The supporting structure can be 0.014 inch in thickness at places where there are no projections and the overall thickness from the tips of the projections through the supporting structure can be 0.049 inch. There can be a projection tip every 0.050 inch or about 400 points per square inch.

20 As another example, the thickness of the supporting structure can be $\frac{1}{32}$ inch. The projections can be slanted at an angle of 55°. The projections are disposed in rows in two directions, the rows being $\frac{1}{16}$ inch apart and the projections being $\frac{1}{16}$ inch apart center-to-center in each row. The vertical height from the tips of the projections to the top of the supporting structure can be $\frac{1}{16}$ inch. Considering each projection as a cone, the base can be $\frac{1}{32}$ inch. The projections can overlap each other to the extent that a vertical line drawn from the tip of one projection will substantially intersect the mid point of the base of the preceding projection. Thus, a fastener of this type containing eight projections in each row longitudinally and seven rows laterally will occupy a space of approximately $\frac{1}{2}$ inch on each side allowing some room for margins.

30 The size and arrangement of the projections will vary to some extent depending upon the intended use but in most cases it is preferable that the projections be integrally formed or molded on a supporting sheet at an angle of 45 to 60°, that the adjacent projections be separated from each other center-to-center by a distance of from 0.060 to 0.150 inch, and that the vertical height from the tips of the projections to the surface of the supporting sheet be from 0.020 to 0.150 inch.

35 The synthetic polymer from which the fastener is formed can be a homo-polymer, such as a polymer of formaldehyde (e.g., Delrin) (Registered Trade Mark), or a polymer of tetrafluoroethylene (e.g., Teflon)

(Registered Trade Mark), or polyethylene or polypropylene, or a copolymer (e.g., nylon). These polymers can also be described as synthetic resins.

In the most preferred forms of the invention, there are 100 to 500 projections per square inch of the areas on the face 8 covered by the projections. The bases of the projections are at least 0.015 inch in one dimension. They are spaced apart center-to-center in the range of 0.03 to 0.250 inch, preferably 0.06 to 0.15 inch, and the vertical height of the outer edges or tips from the face is 0.015 to 0.15 inch, preferably 0.02 to 0.15 inch. For best results, the center lines of the projections intersect the plane of face at 45—60°.

It will be recognized that the invention is subject to variation and that a number of modifications can be made without departing from the scope of the invention. It is not absolutely essential that the projections all run in the same direction. This is usually desirable, however, because it facilitates detaching the fastening device without destroying the surface of the material to which it is fastened. In fact, one of the advantages of the present invention in the form herein described is the ease with which the fastener can be applied to a looped fabric or an open weave material or another porous material and withdrawn therefrom without damage.

WHAT I CLAIM IS:—

1. A fastener comprising side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting a first or upper bar, the other end bar constituting a second or lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, characterized in that said outer surface parallel to the plane of said fastener upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, and a substantial portion of said outer surface of said intermediate bar being smooth and free of projections.

2. A fastener of claim 1 wherein the lower bar is split to define a centrally disposed slot therein.

3. A fastener of generally oblong configuration made of durable plastic and comprising side bars, two end bars, and an



intermediate bar has a substantially flat



polymer, metal or any other suitable or desired material.

5 The centre lines of the tapered projections form an angle with the face of about 20° to 80°. The rows of projections are spaced closely enough, for the best gripping results, so that their tips or outer edges overlap or come close to overlapping the bases of projections of the adjacent row. Center-to-center spacing of the projections in the respective rows is in the order of 0.03 to 0.25 inch. The vertical distance between face 8 and the tips or outer ends of the projections is in the order of 0.02 to 0.15 inch.

15 As a typical example, the projections can be made 0.050 inch in length and slanted at an angle of 45° with the supporting structure. The bases of these projections can be 0.030 inch in diameter and taper to a tip having a diameter of 0.010 inch. The supporting structure can be 0.014 inch in thickness at places where there are no projections and the overall thickness from the tips of the projections through the supporting structure can be 0.049 inch. There can be a projection tip every 0.050 inch or about 400 points per square inch.

20 As another example, the thickness of the supporting structure can be $\frac{1}{32}$ inch. The projections can be slanted at an angle of 55°. The projections are disposed in rows in two directions, the rows being $\frac{1}{16}$ inch apart and the projections being $\frac{1}{16}$ inch apart center-to-center in each row. The vertical height from the tips of the projections to the top of the supporting structure can be $\frac{1}{16}$ inch. Considering each projection as a cone, the base can be $\frac{1}{32}$ inch. The projections can overlap each other to the extent that a vertical line drawn from the tip of one projection will substantially intersect the mid point of the base of the preceding projection. Thus, a fastener of this type containing eight projections in each row longitudinally and seven rows laterally will occupy a space of approximately $\frac{1}{2}$ inch on each side allowing some room for margins.

35 The size and arrangement of the projections will vary to some extent depending upon the intended use but in most cases it is preferable that the projections be integrally formed or molded on a supporting sheet at an angle of 45 to 60°, that the adjacent projections be separated from each other center-to-center by a distance of from 0.060 to 0.150 inch, and that the vertical height from the tips of the projections to the surface of the supporting sheet be from 0.020 to 0.150 inch.

40 The synthetic polymer from which the fastener is formed can be a homo-polymer, such as a polymer of formaldehyde (e.g., Delrin) (Registered Trade Mark), or a polymer of tetrafluoroethylene (e.g., Teflon)

(Registered Trade Mark), or polyethylene or polypropylene, or a copolymer (e.g., nylon). These polymers can also be described as synthetic resins.

70 In the most preferred forms of the invention, there are 100 to 500 projections per square inch of the areas on the face 8 covered by the projections. The bases of the projections are at least 0.015 inch in one dimension. They are spaced apart center-to-center in the range of 0.03 to 0.250 inch, preferably 0.06 to 0.15 inch, and the vertical height of the outer edges or tips from the face is 0.015 to 0.15 inch, preferably 0.02 to 0.15 inch. For best results, the center lines of the projections intersect the plane of face at 45—60°.

80 It will be recognized that the invention is subject to variation and that a number of modifications can be made without departing from the scope of the invention. It is not absolutely essential that the projections all run in the same direction. This is usually desirable, however, because it facilitates detaching the fastening device without destroying the surface of the material to which it is fastened. In fact, one of the advantages of the present invention in the form herein described is the ease which which the fastener can be applied to a looped fabric or an open weave material or another porous material and withdrawn therefrom without damage.

WHAT I CLAIM IS:—

100 1. A fastener comprising side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting a first or upper bar, the other end bar constituting a second or lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, characterized in that said outer surface parallel to the plane of said fastener upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, and a substantial portion of said outer surface of said intermediate bar being smooth and free of projections.

115 2. A fastener of claim 1 wherein the lower bar is split to define a centrally disposed slot therein.

120 3. A fastener of generally oblong configuration made of durable plastic and comprising side bars, two end bars, and an

intermediate bar has a substantially flat



intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting an upper bar, the other end bar constituting a lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, said intermediate bar having two parallel rows of said spaced projections aligned transversely across said face of said bar, said rows being positioned on two-thirds of said face, each of said projections comprising a truncated, oblique, triangular prism extending from said face, the remaining one-third of said intermediate bar being smooth and free of projections.

4. The fastener of claim 3 wherein the lower bar is split to define a centrally disposed slot therein.

5. A buckle-type fastening device comprising a pair of spaced side bars, a first cross bar extending between said side bars, a second cross bar spaced from said first cross bar and extending between said side bars, and a plurality of closely spaced, outwardly tapered, slanting projections made of a synthetic resin extending outwardly from a face of one of said cross bars, there being 100-500 of said slanting projections per square inch on the area of said one of said faces covered by said projections, said projections having a size at their bases of at least 0.015 inch in one dimension, said projections being spaced apart center-to-center from 0.030 inch to 0.250 inch, and the vertical height of the tips of said projections from said face being 0.015 inch to 0.150 inch.

6. A device as claimed in claim 5 wherein the center lines of said projections intersect said face at an angle of 45° to 60°, adjacent projections are separated from each other center-to-center from 0.060 inch to 0.150 inch, and the vertical height from the tips of the projections to said face are 0.020 inch to 0.150 inch.

7. A device for supporting sanitary napkins comprising in combination a belt and fastening means mounted on said belt, said fastening means comprising a fastener of generally oblong configuration having paired side bars, two end bars, and an in-

intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting an upper bar, the other end bar constituting a lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said belt being attached to said upper bar, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar.

8. A device for supporting sanitary napkins comprising in combination a belt and fastening means mounted on said belt, said fastening means comprising a fastener of generally oblong configuration having paired side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting an upper bar, the other end bar constituting a lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said belt being attached to said upper bar, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross-bar, said projections being arranged in at least one row positioned near one edge of said intermediate bar.

9. The device of claim 8 wherein said lower bar is split to define a centrally disposed slot.

10. A device as claimed in claim 8 wherein said projections are tapered in their outwardly extending direction and have blunted tips.

11. A catamenial bandage and body support therefor which comprises in combination a belt adapted to be worn about the human lower abdominal area, a strap depending from said belt at each of the front portion and the rear portion thereof, a releasable clasp means depending from



each of said straps, and an absorbent, catamenial bandage having front and rear fabric tabs removably attached to said straps by releasable clasp means, the releasable clasp means on at least said front strap comprising a fastener of generally rectangular configuration having paired side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting an upper bar, the other end bar constituting a lower bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said strap being attached to said upper bar, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, said projections being positioned on two-thirds of the face of said intermediate bar, said front tab of said bandage being looped about said intermediate bar and extending through the space between said intermediate bar and lower bar with said projections penetrating said fabric tab to hold said tab against displacement from said clasp means.

12. A device for supporting sanitary napkins comprising a panty and sanitary napkin attachment means in combination therewith, said panty having the usual waistband, leg openings, and crotch area defined by front and back seams extending transversely of the garment, said attachment means comprising a fastener of flat, generally oblong configuration having a pair of side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting a first bar, the other end bar constituting a second bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting

projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, said fastener being pivotally secured at points adjacent the ends of said intermediate bar to the inside front portion of said panty intermediate the leg openings at the forward edge of the crotch area of said panty with the projections facing inward.

13. The device of claim 12 wherein each of said projections is in the form of a truncated, oblique, triangular prism.

14. The device of claim 12 wherein said projections comprise a plurality of spaced parallel rows.

15. A device for supporting sanitary napkins comprising a panty and a removably sanitary napkin attachment means in combination therewith, said panty having the usual waistband, leg openings, and crotch area defined by front and back seams extending transversely of the garment, said attachment means comprising a fastener of flat, generally oblong configuration having a pair of side bars, two end bars, and an intermediate bar situated between said two end bars, said side bars being parallel to the direction of pull upon the fastener, while said end bars and said intermediate bar are transverse and normal to the direction of pull upon said fastener, the respective ends of said end bars and said intermediate bar being connected to said side bars, one end bar constituting a first bar, the other end bar constituting a second bar, the connected arrangement of said bars defining a pair of apertures on opposite sides of said intermediate bar, said first bar being split, said intermediate bar having a substantially flat outer surface or face which is parallel to the plane of said fastener and upon which are situated a plurality of synthetic polymer small tapered slanting projections, said projections being molded integrally with and emanating from said outer surface of said cross bar, the outer surface of said intermediate bar having at least one row of said spaced pointed projections extending obliquely therefrom, said panty having means for pivotally securing said fastener to the inside front portion of said panty intermediate the leg openings, and at the forward edge of the crotch area thereof with the projections facing inward, said securement means comprising a pair of thread loops attached near the mid-point of the crotch seam, said fastener having interior hooks on each of the side bars immediately adjacent said intermediate bar and exterior notches on said side bars immediately opposite said hooks, said fastener being capable of removable insertion in said thread loops whereby said fastener is held in place by said hooks and notches.



16. The device of claim 15 wherein each of the projections is in the form of a truncated, oblique, triangular prism.

17. The combination of the supporting device of claim 12 and a sanitary napkin, said sanitary napkin having a short front attachment tab, said tab being threaded under the second bar, over said intermediate bar, and under the first bar of said fastener.

18. The combination of the supporting device of claim 15, a sanitary napkin, said sanitary napkin having a short front attachment tab, said tab being threaded under the second bar, over the intermediate bar, and under the first bar of said fastener.

19. A buckle-type fastener device for use in releasably holding a fabric strip having projection-penetrable interstices between its threads, said device comprising a molded, synthetic polymer, open bar frame including a pair of spaced side bars, a main cross-bar joined at opposite ends thereof with a respective side bar, said main cross-bar having a substantially flat outer face, first bar means extending alongside, but spaced from one longitudinal edge of, said main cross-bar and joined at the respective ends thereof with a respective side bar, said first bar means adapted to be attached to a buckle-support member, second bar means joined at the respective ends thereof to said side bars and extending alongside, but spaced from the opposite longitudinal edge of, said main cross-bar; a plurality of synthetic polymer, small, tapered, blunted, slanting projections molded integrally with

and emanating from said face of said main cross-bar, said projections being closely spaced and arranged in at least one row extending longitudinally along said face of said main cross-bar, all of said projections slanting in the same general direction outwardly from said face and transversely to said rows, the longitudinal axes and the shortest sides of said projections being disposed at acute angles relative to said face, and said projections being prisms, each with essentially parallel, opposite sides in the form of oblique, truncated triangles and each with a planar, blunt outer surface essentially parallel with said face, said projections being sufficiently small so that they penetrate the interstices between the threads of said fabric when said strip is in contact with said projections and under pulling tension across said face in a direction opposite to the direction of slope of said projections.

20. A fastener substantially as hereinbefore described, having reference to the accompanying drawings.

21. A catamenial bandage and body support therefor, substantially as hereinbefore described having reference to the accompanying drawings.

22. A device for supporting sanitary napkins, substantially as hereinbefore described, having reference to the accompanying drawings.

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