Oct. 9, 1956 E. RIGHTOR, JR., ET AL 2,765,510

SANITARY BELT BUCKLE

Filed Feb. 12, 1953

Fig. 1

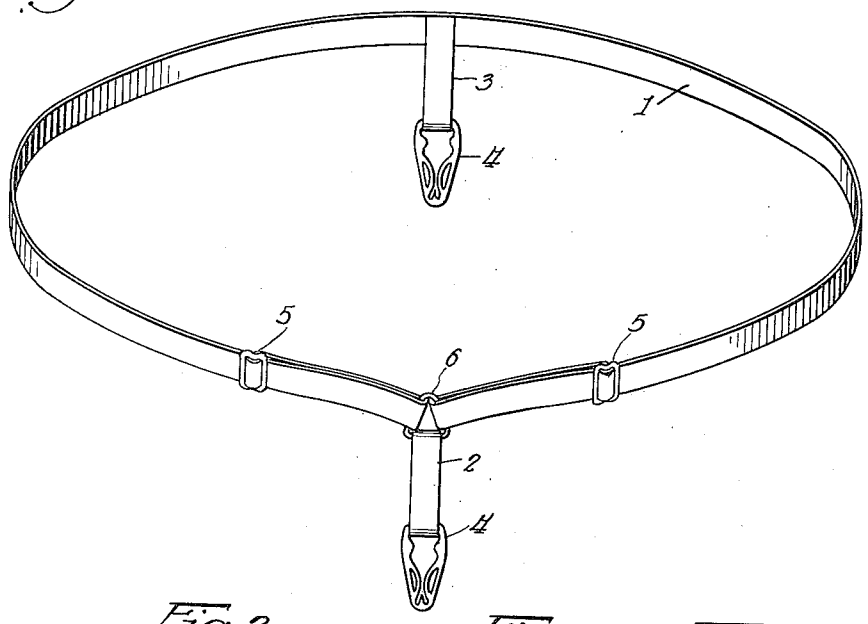


Fig. 2

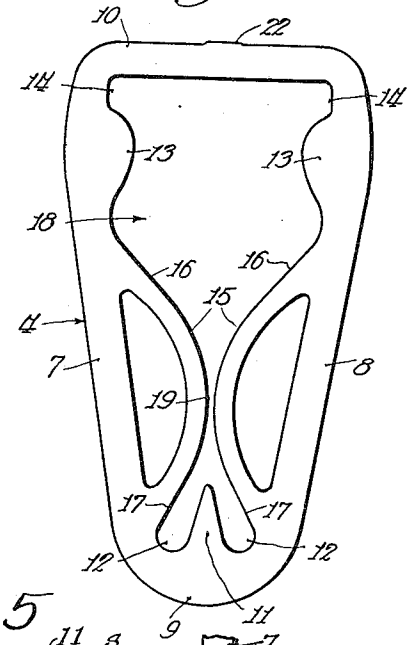


Fig. 3

Fig. 4

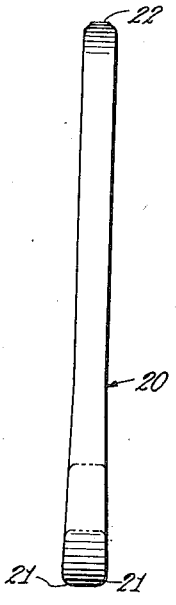
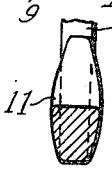


Fig. 5

Fig 6



Inventors:
Edward Rightor, Jr.
John C. Bletzinger.
By: Evans, Glaister & Anderson
Attys.

United States Patent Office 2,765,510 Patented Oct. 9, 1956

2,765,510

SANITARY BELT BUCKLE

Edward Rightor, Jr., and John C. Bletzinger, Neenah, Wis., assignors, by mesne assignments, to Kimberly-Clark Corporation, a corporation of Delaware

Application February 12, 1953, Serial No. 336,534

4 Claims. (Cl. 24—150)

This invention relates to improvements in sanitary belts, that is to say, belts used by women for supporting sanitary napkins. Such belts usually comprise a body encircling band and front and rear depending tabs, to which the front and rear attachment tabs of a sanitary napkin may be attached by pinning or by means of buckles carried by such tabs. The present invention is concerned with improvements in the construction of the buckles carried by such tabs.

The main objects of the invention are to provide an improved buckle construction which will effectively grip the attachment tabs of a sanitary napkin; to provide an improved buckle which will be flexible and thereby more or less comfortable to body curvatures under forces applied to the buckle under normal service conditions; to provide a buckle which will permit easy attachment and detachment of a sanitary napkin tab to and from the buckle while at the same time, securely holding such attachment tabs under normal service conditions; to provide a buckle of the character indicated which will not only be highly effective for its purpose but which will also afford certain advantageous comfort characteristics; and in general, it is the object of the prseent invention to provide an improved sanitary napkin buckle of the character indicated.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing wherein there are illustrated two selected embodiments of the invention.

In the drawing:

Fig. 1 is a perspective illustration of the general arrangement of a sanitary belt of the character herein contemplated;

Fig. 2 is a face view of the improved buckle on a greatly enlarged scale (about four times normal size);

Fig. 3 is an edge view of one form of the buckle;

Fig. 4 is an edge view of a second form of the buckle, and

Figs. 5 and 6 are fragmentary front and edge views respectively of another modification.

A sanitary belt normally comprises, as shown in Fig. 1 of the drawing, a waistband portion 1, front and rear tabs 2 and 3, which depend from said waistband, and buckles 4 secured to said front and rear tabs 2 and 3.

The buckles 4 on the front and rear tabs 2 and 3 may be of like construction. The waistband 1 may be provided with buckle arrangements indicated at 5, whereby the waistband may be adjusted as to size. In one form, the front tab 3 is connected to portions of the waistband through the agency of a more or less triangular loop 6 of metal or plastic material.

Sanitary belt buckles have usually been made of metal although there have been some such buckles made of various kinds of plastic material as a substitute for metal. The plastic material buckles heretofore used, have generally proven unsatisfactory for various reasons. The metal buckles heretofore used, and also the plastic material buckles heretofore used, have been of such thickness that the buckles are quite stiff and rigid and such buckles, or at least the buckle on the rear attachment tab 2, have a tendency to poke into the body of the wearer due to forces exerted under normal service conditions. The stiffness or rigidity of the buckles heretofore used, has contributed to this undesirable characteristic of conventional sanitary belts.

According to the present invention, the buckles 4 are made of plastic material which has a suitable degree of resiliency to permit the buckles to flex into at least partial conformity with body curvatures under forces imparted to the buckle under normal service conditions. Such flexibility avoids, to a considerable extent, the very uncomfortable poking which has been a common complaint against conventional construction. In addition to being resilient, the material of which the buckle is made, must have adequate strength to resist breakage and also the abrasive action to which the buckle is subjected, for example, by the threads or fibers in the attachment tabs of a gauze or other sanitary napkin wrapper.

There are perhaps many plastic materials now available or being developed or which may later become available, which may be useful for the purpose of the present invention, but at the present time, nylon is preferred. Du Pont's standard injection molding nylon #10001 is particularly satisfactory.

Resilient sheet metal may be employed for constructing the buckles but at the present time, metal is considered less desirable than resilient plastic material of the character indicated for several reasons, among which is the fact that in order to obtain the desired flexibility the metal would have to be quite thin, and the thinness results in relatively sharp edges which are objectionable. To avoid such sharp edges, costly special treatments would be required, or thicker metal could be used but would result in loss of resiliency and flexibility. Furthermore, to be satisfactory, metal buckles should be made of non-corrosive and stain resistant metal which is objectionably expensive, or they should be covered with a protective coating of plastic or other material which also objectionably increases the cost while at the same time being objectionable because of its tendency to chip and wear off as a result of the abrasive action of the threads or fibers of the wrapper tabs. There are also other matters which make the use of plastic more advantageous than the use of metal for the indicated purpose.

A buckle made of said nylon #10001 comprises a pair of side arms 7 and 8 interconnected at their lower ends by an end bar 9, and at their upper ends by an end bar 10. A pointed tooth 11 projects upwardly from the lower end bar 9 in spaced relation to said side bars 7 and 8 so as to provide spaces 12 at the sides of the tooth for receiving material which will be impaled on the tooth 11 in the normal use of the buckle.

The upper end bar 10 is adapted to be received within a loop of the depending tab 2 or 3 or a sanitary belt for securing the buckle to such tab. A pair of humps 13 respectively project inwardly from the opposite side arms 7 and 8 to provide recesses 14 thereabove for receiving edge portions of said depending tabs to thereby more effectively position the buckles relative to said tabs.

For resisting displacement or disengagement of the attachment tab of a sanitary napkin from the tooth 11, structure is provided to form a restricted and preferably a resiliently enlargeable passageway in overlying relation to the tooth and through which passageway the attachment tab is to be passed to and from engagement with or impalement on said tooth. Such structure may embody an element which projects from one side arm of the buckle towards the other and into such close

proximity to the other as to provide the desired restricted passageway between the element and side arm. The projecting element or the side arm, or both, should be made sufficiently resilient to permit a desired amount of displacement of the resilient part or parts as an incident to the forcing of a more or less gathered attachment tab between such parts. Such a restricted passageway may advantageously be formed by means of a pair of arcuate retaining members or bridge strips **15** which project toward each other from the opposite side arms of the buckle, these strips being preferably made more flexible than said side arms and end bars, for example, by being made of somewhat smaller width or thickness, or both, than said other parts so that said bridges **15** are more flexible than the outer frame structure of the buckle. As shown, these bridge strips **15** are integrally connected at their ends of the respective side arms, and their convex edges are disposed in such proximity to each other that they will normally resist upward displacement of sanitary napkin tabs from impalement on said tooth **11**.

In one practical embodiment, the space between said flexible and resilient strips **15**, at their points of closest approach to each other, is about 1/64 of an inch or just slightly greater. In said embodiment, the proximate edges of said arcuate bridge strips are formed on a radius of about 19/64 of an inch, the centers of the arches being disposed outside of the side arms **7** and **8**.

Extended upper portions **16** of said tab retaining bridges or members **15** are disposed at angles of about 45° relative to a vertical center of the buckle. Similarly, lower extended edges **17** of said retaining members **15**, are disposed at angles of about 30° relative to such vertical center line. The tooth **11** extends upwardly between said extended edge portions **17** and the sides of said tooth are disposed at angles of about 15° relative to the vertical center of the buckle.

The indicated angularity of the sides of the tooth and of the lower extended edge portion **17**, of the retaining members **15** results in gradual widening of the spaces **12** from adjacent the upper end of the tooth to the lower end thereof so as to form downwardly widened pockets which provide sufficient room to receive most, if not all, of the material of the sanitary napkin attachment tab which is impaled on the tooth **11**. Also, the narrowed upper portions of these pockets constitute restricted outlets from said pockets whereby upward displacement of material impaled on said tooth is additionally resisted.

For attaching a sanitary napkin tab to the buckle, the tab of the napkin is first extended or threaded through the relatively large upper opening or space **18** above the retaining members **15**. Thereafter, the tab material is forced downwardly between the retaining members **15** which, because of their resilient flexibility, may be flexed either out of the plane of the buckle or towards the respective side arms within the plane of the buckle to enlarge the space **19** between said retaining members, thereby to permit passage of the tab material into the space below said retaining members and into impalement on said tooth **11**. By making the retaining members **15** in such a way that they, rather than the surrounding frame or the side members **7** and **8**, flex to open or enlarge the space or passageway **19**, manufacture of the buckle with predetermined tab retaining characteristics is substantially facilitated in that any desired degree of resiliency and flexibility of said retaining members may be readily built thereinto by the simple expedient of making such members of appropriate cross-sectional size and length. As shown, the width of said retaining members **15** is made smaller than that of said side arms **7** and **8**, the thickness being the same, so that said retaining strips are of smaller cross-sectional area than said side arms and hence more flexible. Accordingly, flexing in the buckle incident to the forcing of material between said retaining strips to and from impalement on said tooth, occurs mainly in said retaining strips.

If a napkin tab is moved either up or down between the retaining members **15**, the resulting flexing of said members is mainly an action of spreading said members apart within the plane of the buckle structure rather than displacement or bending of said members **15** out of the plane of the buckle. However, in the event that the attachment tab, during its manipulation, is pulled endwise, said retaining members **15** may be flexed out of the plane of the buckle. The structure when made of the nylon material mentioned, is well able to stand these various distortions or displacements. However, it should be understood that the use of other materials as already mentioned, is not excluded by the foregoing reference to nylon.

The resiliency of the members **15** serves, of course, to restore the same to normal position in which the space or passageway **19** is so restricted as to effectively prevent free displacement or disengagement of the napkin tab from the tooth **11**. Nevertheless, displacement may be intentionally effected by lifting the tab and forcing it upwardly between the retaining members **15**, the latter being again displaced in the manner already indicated to permit the tab to be removed from the tooth **11** and returned to the large upper opening **18** from which the tab may readily be withdrawn.

It will be observed that the convex edges of the retaining member **15** together with the angular extensions **16** and **17** thereof form flaring mouths or entrances to the restricted passageway **19**, thereby facilitating the movement of the tab material into and through said passageway.

The thickness of the plate-like buckle structure is dependent somewhat upon the degree of flexibility and resiliency desired in the buckle.

In one practical embodiment made of nylon as above-mentioned, the buckle tapers in thickness from its upper end to its lower end, the upper end being between 3/64 and 1/16 of an inch in thickness, and the lower end being between 1/16 and 5/64 of an inch in thickness. Such a gradually tapered construction is represented in Fig. 3. This construction, whereby the lower end portion of the buckle is made thicker than the upper end portion, stiffens the lower end portion so that the tooth **11** cannot readily be twisted or turned out of the plane of the buckle incident to forces applied thereto under normal service conditions.

The thinner upper portion of the buckle retains more flexibility and permits the buckle to be flexed or bent into more or less conformity to the curvature of the adjacent portion of the body, thereby attaining a desirable degree of comfort and, to a considerable extent, avoiding the very common objection of poking.

In the modified arrangement illustrated in Fig. 4, a major portion of the buckle is of uniform thickness which, in one practical embodiment, is about 1/16 of an inch, and a lower portion is gradually thickened from a point indicated at **20** to the lower end of the buckle, the lower end thickness being about 5/64 of an inch. This modified arrangement retains an adequate degree of flexibility in about the upper two-thirds of the buckle while imparting to the lower portion thereof adequate stiffness to prevent flexing of said tooth **11** out of the plane of the buckle.

A buckle of the character described, may conveniently be made by molding in a two part die, each part having a mold cavity representing one-half the thickness of the buckle. In forming such mold cavities, it is quite practicable to provide for the formation of rounded corners, such as indicated at **21**, on all edges of the buckle. This is a highly desirable detail in that it results in smooth, non-cutting and non-abrading edges which help to facilitate free movement of the napkin attachment tab material through the buckle, while also preventing or avoiding any

tendency of the buckle to cut or scratch the body of the wearer.

The gate in the molding dies through which the plastic material is injected into the mold cavity may conveniently be located so as to communicate with the cavity portion for the upper end bar **10** of the buckle so that when the buckle is removed from the cavity, the sprue extending from the bar **10** may be cut off very close to the bar as indicated at **22**. Since this bar **10** is received within the loop of one of the depending tabs **2** or **3** of the belt, a slight roughness remaining where such sprue is cut off, will not be objectionable. Hence, special finishing operations are not required in connection with the production of the described buckle. Upon removal from the die and removal of any excess sprue, the buckle is ready for assembly with the other parts of the belt structure.

The buckle structure described is not only advantageous because of its efficient grip on the napkin attachment tab and because of its flexibility for body conforming purposes, but also because the plastic structure is not cold to the feel as is a metal structure.

The described nylon material is very tough and will not readily break out, if made in thin enough sections, will twist considerably before breaking. The dimensions above indicated as typifying a practical construction are such that the various parts of the buckle, if called upon to flex, will do so with sufficient freedom for the purpose, but will not be displaced or twisted to such an extent as to be permanently objectionably displaced.

The dimensions given are not critical but may be varied considerably. Also, other thickening arrangements than those described may be employed for strengthening the tooth **11** against displacement from the plane of the buckle. For example, if the buckle is made of material which is strong enough to enable the lower end bar to resist twisting, the tooth alone may be made thicker and/or wider at its base as shown in Figs. 5 and 6.

Various other modifications in the construction of the buckle may be made while retaining the principles of the invention as represented by the illustrated embodiments.

We claim:

1. A sanitary napkin belt buckle of thin, flat form having an upper end bar, a pair of spaced side bars, and a bottom bar, said upper, side and bottom bars forming an outer frame and being of a width which, in respect of normal-use forces, makes each of said bars and the frame in its entirety highly resistant to bending in directions which extend edgewise of the buckle, said buckle also having impaling means projecting upwardly from said bottom bar, and a pair of resilient arcuate members respectively connected at their ends to said side bars and having the major portions of their lengths intermediate said ends spaced inwardly from said side bars, lower terminal portions of said arcuate members being spaced sidewise from the respectively adjacent sides of said impaling means so as to form pockets between said sides and said lower terminal portions, said arcuate members having convex sides projecting into proximity to each other intermediate said side bars in overlying relation to said tooth so as to provide a restricted passageway in communication with said pockets, and being individually deformable in the plane of the buckle and displaceable from their normal positions in said plane by the bulk of a sanitary napkin tab portion manually moved downwardly or upwardly of the buckle between said members into and out of said pockets and to and from engagement with said impaling means, the resiliency of said arcuate members serving to restore the same to their normal positions for retaining a tab in engagement with said impaling means and in said pockets, the rigidity of said side bars to which said arcuate members are connected and of said frame, serving to resist substantial edgewise separation of said arcuate members without preliminary, substantial, individual deformation thereof as aforesaid, whereby said arcuate members are caused to effectively resist displacement of a sanitary napkin tab from said pockets and from impalement on said tooth by said normal-use forces while also readily permitting manual movement of such a tab between said members to and from said pockets and impalement on said tooth.

2. A molded, one-piece tough and resilient plastic material sanitary napkin belt buckle of thin, flat form, having an upper end bar, a pair of spaced side bars, and a bottom bar, said upper, side, and bottom bars forming an outer frame and being of a width which, in respect of normal-use forces, makes each of said bars and the frame in its entirety highly resistant to bending in directions which extend edgewise of the buckle, said buckle also having means projecting upwardly from said bottom bar, and a pair of resilient arcuate members respectively connected at their ends to said side bars and having the major portions of their lengths intermediate said ends spaced inwardly from said side bars, lower terminal portions of said arcuate members being spaced sidewise from the respectively adjacent sides of said impaling means so as to form pockets between said sides and said lower terminal portions, said arcuate members having convex sides projecting into proximity to each other intermediate said side bars in overlying relation to said tooth so as to provide a restricted passageway in communication with said pockets, and being individually deformable in the plane of the buckle and displaceable from their normal positions in said plane by the bulk of a sanitary napkin tab portion manually moved downwardly or upwardly of the buckle between said members into and out of said pockets and to and from engagement with said impaling means, the resiliency of said arcuate members serving to restore the same to their normal positions for retaining a tab in engagement with said impaling means and in said pockets, the rigidity of said side bars to which arcuate members are connected and of said frame, serving to resist substantial edgewise separation of said arcuate members without preliminary, substantial, individual deformation thereof as aforesaid, whereby said arcuate members are caused to effectively resist displacement of a sanitary napkin tab from said pockets and from impalement on said tooth by said normal-use forces while also readily permitting manual movement of such a tab between said members to and from said pockets and impalement on said tooth, all of said parts of the buckle being molded with smooth, round edges and corners so as to be of non-cutting and non-chafing character.

3. A molded one-piece, tough and resilient plastic material sanitary napkin belt buckle of thin, flat form, and which is resiliently bendable in a facewise direction toward body conforming curvatures by normal-use forces, said buckle having an upper end bar, a pair of spaced side bars, and a bottom bar, said upper, side, and bottom bars forming an outer frame and being of a width which, in respect of normal-use forces, makes each of said bars and the frame in its entirety highly resistant to bending in directions which extend edgewise of the buckle, said buckle also having an impaling means projecting upwardly from said bottom bar, and a pair of resilient arcuate members respectively connected at their ends to said side bars and having the major portions of their lengths intermediate said ends spaced inwardly from said side bars, lower terminal portions of said arcuate members being spaced sidewise from the respectively adjacent sides of impaling means so as to form pockets between said sides and said lower terminal portions, said arcuate members having convex sides projecting into proximity to each other intermediate said side bars in overlying relation to said tooth so as to provide a restricted passageway in communication with said pockets, and being individually deformable in the plane of the buckle and displaceable from their normal positions in said plane by the bulk of sanitary napkin tab portion manually moved downwardly or upwardly of the buckle between

said members into and out of said pockets and to and from engagement with said impaling means, the resiliency of said arcuate members serving to restore the same to their normal positions for retaining a tab in engagement with said impaling means and in said pockets, the rigidity of said side bars to which said arcuate members are connected and of said frame, serving to resist substantial edgewise separation of said arcuate members without preliminary, substantial, individual deformation thereof as aforesaid, whereby said arcuate members are caused to effectively resist displacement of a sanitary napkin tab from said pockets and from impalement on said tooth by said normal-use forces while also readily permitting manual movement of such a tab between said members to and from said pockets and impalement on said tooth, said bottom bar and the adjacent lower portions of said side bars being of a thickness to provide sufficient strength to resist significant twisting and bending of said bottom bar and tooth out of the plane of the buckle by said normal-use forces, and the upper portion of the buckle being made thinner than said lower portion so as to permit resilient facewise bending thereof toward body conforming curvature as aforesaid.

4. A molded, one-piece, tough and resilient plastic material sanitary napkin belt buckle of thin, flat form, and which is resiliently bendable in a facewise direction toward body conforming curvatures by normal-use forces, said buckle having an upper end bar, a pair of spaced side bars, and a bottom bar, said upper, side, and bottom bars forming an outer frame and being of a width which, in respect of normal-use forces, makes each of said bars and the frame in its entirety highly resistant to bending in directions which extend edgewise of the buckle, said buckle also having impaling means projecting upwardly from said bottom bar, and a pair of resilient arcuate members respectively connected at their ends to said side bars and having the major portions of their lengths intermediate said ends spaced inwardly from said side bars, lower terminal portions of said arcuate members being spaced sidewise from the respectively adjacent sides of said impaling means so as to form pockets between the said sides and said lower terminal portions, said arcuate members having convex sides projecting into proximity to each other intermediate said side bars in overlying relation to said tooth so as to provide a restricted passageway in communication with said pockets, and being individually deformable in the plane of the buckle and displaceable from their normal positions in said plane by the bulk of a sanitary napkin tab portion manually moved downwardly or upwardly of the buckle between said members into and out of said pockets and to and from engagement with said impaling means, the resiliency of said arcuate members serving to restore the same to their normal positions for retaining a tab in engagement with said impaling means and in said pockets, the rigidity of said side bars to which said arcuate members are connected and of said frame, serving to resist substantial edgewise separation of said arcuate members without preliminary, substantial, individual deformation thereof as aforesaid, whereby said arcuate members are caused to effectively resist displacement of a sanitary napkin tab from said pockets and from impalement on said tooth by said normal-use forces while also readily permitting manual movement of such a tab between said members to and from said pockets and impalement on said tooth, said bottom bar and the adjacent lower portions of said side bars being of a thickness to provide sufficient strength to resist significant twisting and bending of said bottom bar and tooth out of the plane of the buckle by said normal-use forces, and the upper portion of the buckle being made thinner than said lower portion so as to permit resilient facewise bending thereof toward body conforming curvature as aforesaid, and said tooth being thickened so as to project beyond the planes of the opposite faces of the buckle to thereby further strengthen said tooth.

References Cited in the file of this patent

UNITED STATES PATENTS

D. 165,621	West	Nov. 1, 1952
249,659	Moore	Nov. 15, 1881
1,345,713	Stevens	July 6, 1920
2,002,999	Jones	May 28, 1935
2,017,551	Statter	Oct. 15, 1935

FOREIGN PATENTS

53,368	Norway	Nov. 12, 1933
968,898	France	of 1950