June 7, 1966 C. J. GREINER ETAL 3,254,648

SANITARY NAPKIN WITH IMPROVED PLEATED TAB ENDS

Original Filed April 18, 1960

Fig. 1

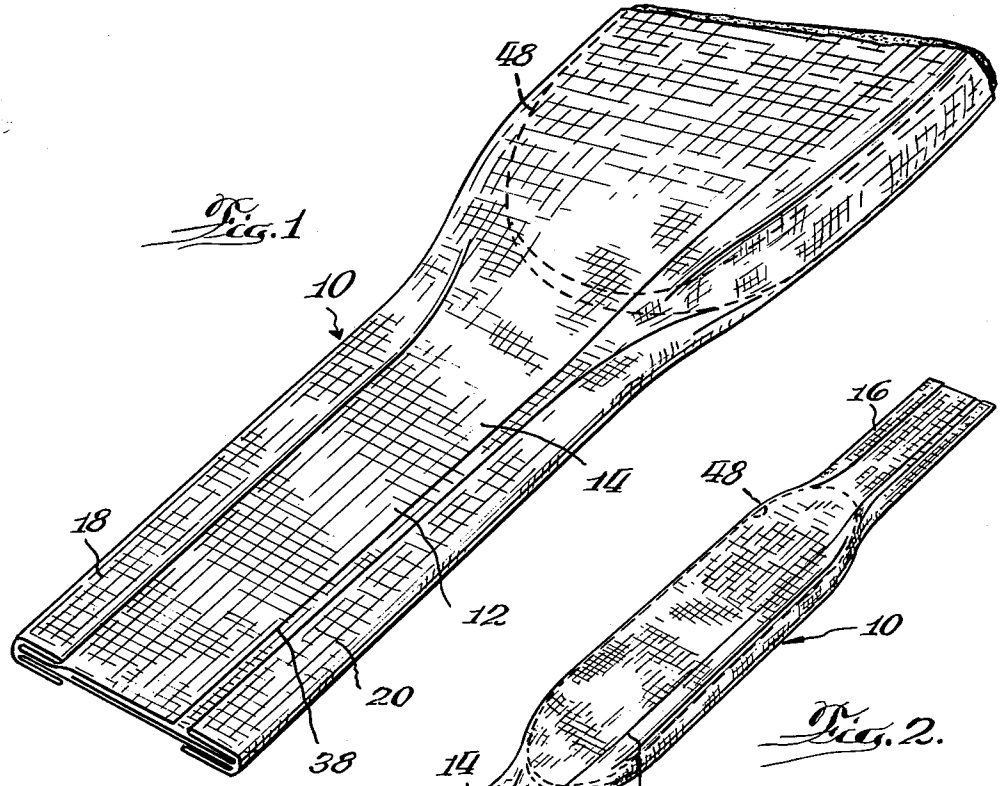
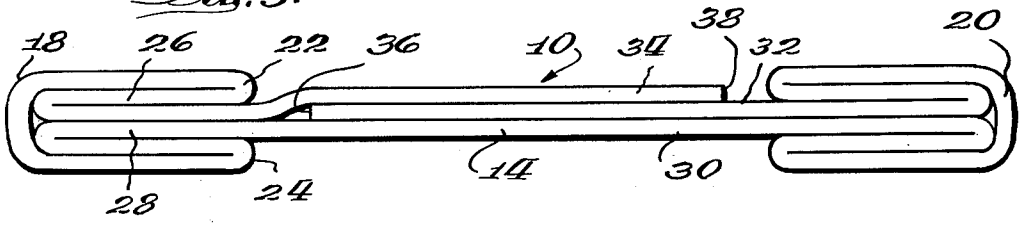


Fig. 2.

Fig. 3.



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SANITARY NAPKIN WITH IMPROVED PLEATED TAB ENDS

Charles J. Greiner, Menasha, and Henry R. Cloots and Harold V. Ruthus, Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis., a corporation of Delaware

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5 Claims. (Cl. 128—290)

This application is a division of copending application Serial No. 22,875, filed April 18, 1960.

This invention relates generally to an improved sanitary napkin. The invention is particularly applicable to the pleating of the tab portions of a sanitary napkin wrapper extending beyond opposite ends of the enclosed absorbent pad for attachment to belts or undergarments during use.

An object of the invention is to provide an improved sanitary napkin with outwardly tapering and marginally pleated tab end portions symmetrically reduced to narrow the width of the tab ends in respect to the pad width in a manner to increase pin strength while facilitating attachment to belts and the like.

A further object is to provide an improved sanitary napkin the tab ends of the wrapper of which are marginally pleated in a configuration utilizing the inherent tensile strength of the wrapper material to an optimum degree during use.

Other objects and advantages will become readily apparent to persons skilled in the art upon examination of the description and drawings, as will various modifications of the structure without departure from the inventive concepts as defined in the appended claims.

In the drawings, in which like parts are identified by the same reference numeral,

FIG. 1 illustrates in perspective a portion of a sanitary napkin a tab end of which incorporates the invention,

FIG. 2 illustrates in perspective a sanitary napkin having both tab ends pleated in accordance with the invention,

FIG. 3 is an end view showing the doubly pleated tab end of FIG. 2 greatly enlarged.

While it is known to taper outwardly as well as to marginally pleat sanitary napkin wrapper tab ends, substantial problems are involved in the operation of high speed apparatus designed to introduce both the desired degree of taper and to effect consistently uniform known types of marginal pleats. Simple over-pleating such as a diagonal fold-over of the tab end portions from a position adjacent the absorbent pad along an oblique line of taper outwardly of the pad does not utilize the full potential of available pin strength. Serious production difficulties are presented in obtaining such folded over pleats in the tubular tensioned wrapper material between similarly spaced pads without slitting the material, a step which has proved impractical at high mass production speeds. Marginal infolds of moderate depth symmetrically formed between the outer plies of tab ends and accompanied by some transverse tapering of the tab ends are rather widely employed, although manufacturing difficulties encountered at high production speeds such as maintaining proper alignment and configuration of the wrapper material commonly result in non-uniformity of folds, hence either a high rejection rate or a lowering of tolerance standards.

While wrapper materials exhibiting certain physical characteristics have been found suitable for inpleating, many materials are difficult to process in that manner due to the stresses exerted thereon during tab end formation.

Materials suitable for sanitary napkin wrappers may consist of a web-like structure of fluid or air laid fibers which may or may not be reinforced with woven or non-woven gauze or scrim formed of either natural or synthetic fibers. Manufacturers seek constantly to improve their wrapper materials in respect to appearance and softness, tensile strength, fluid permeability and pin strength, while maintaining manufacturing costs at acceptable competitive levels. Since improved wrapper materials often vary as to physical, hence processing, characteristics it is of major importance that production equipment be capable of satisfactorily processing a wide range of wrapper materials without requiring modification or re-design thereof. The present invention permits satisfactory processing of a wide range of such material by avoiding the necessity of subjecting the material to high stresses during pleat formation. The required web displacement, meaning the extent to which any discrete area of the wrapper must be moved during formation of pleated tab ends is substantially lowered, as compared to inpleating, by the method herein taught. The term "web" is used alternately herein with "wrapper" and "wrapper material" to mean any of the above mentioned materials or modifications thereof.

Satisfactory inpleating such as by the apparatus taught in co-pending Pukis and Rutkus U.S. application 725,108, filed March 31, 1958, now Patent No. 3,020,599, and assigned to applicants' assignee, requires accurate alignment of the web in the machine and rather exacting continuous maintenance of all machine adjustments. Improperly pleated tab ends, such as those with the web margin extending laterally of a pleated margin frequently result from improper machine maintenance. The web must be sufficiently stressed to maintain a transverse configuration between pads roughly that of the corresponding pad configuration. Also, the inpleating blades have a tendency to pass either over or under a lightly stressed web instead of forming a pleat. Such initially required wrapper tension is substantially increased as the blades employed in inpleating force the side-wall wrapper material inwardly between the tab forming outer plies to an extent much greater, as above mentioned, than is required by the overpleating method of the present invention. Inpleated portions of the wrapper material, thus necessarily placed under high stresses during formation, are therefor substantially biased toward lateral expansion as they leave the folding blades and prior to passage through closely positioned ironing rolls which fix the pleats.

While it is conventional practice to iron infolded pleats after forming, structural limitations dictate the necessity of spacing the ironing rolls at least a short distance from the pleating blades. The type of pleating herein taught is easily effected without the necessity of subjecting the wrapper material to the above mentioned stresses, hence there is no appreciable change in web configuration between the final forming steps and ironing. For the above reasons, many materials which do not take an acceptable inpleat either because they do not keep in proper machine alignment or because they will not hold their pleats prior to ironing are easily over-pleated in accordance with this invention.

FIGS. 1 and 2 illustrate a sanitary napkin **10** comprising a pad portion **48** enclosed in a fluid pervious wrapper **12** having portions extending beyond the opposite ends of pad **48** to form tab ends **14** and **16** which may be of equal or unequal length. Tab end **14** is shown marginally overpleated at **18** and **20** in accordance with the invention. As shown in the enlarged end view of FIG. 3, a portion of the wrapper material is marginally folded over the upper overlapping ply **34** of tab end **14** with a like portion folded over the lower ply **30** of the central portion of **14**. The marginal folds **18** and **20** preferably start at a position slightly outwardly of the ends of pad **48** and increase in

depth along convergent fold lines extending toward the end of each tab portion until the desired tab end width is obtained. The fold lines may be linear or slightly arcuate to provide the neatly tapered tab end configuration illustrated. Such a taper may extend continuously to the end of the tab end or may lead to portions of uniform width as shown.

As shown in the enlarged end view of FIG. 3, the present method converts the generally rectangular configuration which the wrapper defines tranversely of each pad into tab end configurations defining double pleats 18 and 20 formed by overfolding rather than infolding marginal portions of the wrapper material. The production difficulties mentioned as inherent in the accordion-type infolding method are thus avoided. Both the inner and outer plies of the double pleats 18 and 20 are of inwardly open and outwardly closed U-configuration as distinguished from the inwardly closed and outwardly open pleats of V-configuration obtained by the inpleating method. Double marginal pleat 18 comprises a marginally closed outer ply portion forming the exposed portions of the upper and lower double pleats, the inner margins of which are reversed at 22 and 24 to form within the area of the exposed pleat portions two additionally outwardly closed U-configurations as the outwardly extending inner ply portions 26 are reversed to form the closed end of the inwardly defined U's, the inner leg portions 28 of which are integral extensions of the bottom ply 30 and the overlapped upper tab end ply 34, respectively. While the marginal pleats shown in FIG. 3 are formed in a manner to position one side margin 36 of the wrapper material inwardly of double pleat 18 and to position the other side margin 38 thereof inwardly of the opposite double ply 20, the formation of somewhat wider over-folded marginal pleats, as below described, may result in the positioning of wrapper margins 36 and 38, respectively, well inside the double pleats 18 and 20, but still positioned between the lower tab pleat 30 and the upper overlapped tab pleat 34. In some instances, however, with very wide and substantially abutting marginal pleats thus formed, the wrapper margins 36 and 38 may extend completely through the double pleats 18 and 20 partially around either of the two innermost portions of U-configuration to terminate, for example, between one of the pleat portions 26 and the outermost pleat portion contiguous thereto. The constructional advantages of the improved tab ends are later explained.

Sanitary napkins currently produced by applicants' assignee and sold under the trademark Kotex are of a pad size defining a web perimeter during fabrication of about 6¾". Factors inherent in the bellows type inpleating method such as the required displacement of the web while substantially tensioned and the resulting stresses limit tab ends formed from a similar tube to a width of about 1⅞". However, with the present over-pleating method, the pleats may, as above mentioned, be formed wider than shown in FIGS. 1 and 2. For example, pleats may be formed of sufficient width to bring the inner margins of the pleats substantially into abutment. The provision of such pleats reduces the width of the tab ends formed from a tubular web of 6¾" permieter to about 1⅛". The resulting narrowed tab ends are more easily looped through belts, hence may be preferred by some users.

Referring particularly to FIG. 3, it is evident that proper pinning of the tab ends shown results in a pin strength greater than is obtained by pinning a tab end having either C-folded pleats or a tab end provided marginally with pleats of inwardly directed V configuration.

The fastening pin normally pierces only four web thicknesses in the area of each pleated margin, whether C-folded or inpleated in outwardly open V configuration, while piercing six web thicknesses in the area of each tab end margin pleated in the manner herein taught.

It is thus seen that the invention offers a very wide degree of flexibility in respect to the formation of outwardly closed over-folded and symmetrically paired marginal tab end pleats. Sanitary napkins may be so pleated with relative ease at high production speed and offer many advantages during use.

We claim:

1. A sanitary napkin comprising an absorbent pad and a wrapper of foldable material enclosing said pad and extending in opposite directions beyond the pad in pressed contiguous engagement outwardly of the pad to provide multiple ply tab ends, at least one tab end thus formed being provided along the margins thereof with two integrally formed pleats having an inwardly open and outwardly closed "U-shaped" configuration over opposite surfaces of the tab end margins.

2. A sanitary napkin comprising an absorbent pad and an elongate wrapper of foldable material enclosing said pad and extending in opposite directions beyond the pad to provide tab ends, said tab ends comprising a central portion of contiguously engaged plies of the wrapper material with at least one of said tab ends marginally provided on each side of said multi-ply portion thereof with an overpleat integrally formed from said material with overpleats, said overpleats comprising a symmetrically disposed pair of U-shaped configurations which are inwardly open and outwardly closed and which extend along major portions of said margins.

3. The sanitary napkin of claim 2 wherein the marginally disposed tab end pleats are maintained in bonded engagement with the multi-ply central tab portions.

4. The sanitary napkin of claim 2 wherein the marginal pleats of said tab ends extend from substantially the ends of the enclosed pad along the entire length of each tab end.

5. A sanitary napkin comprising an elongate absorbent pad and a wrapper of fluid pervious foldable material enclosing the pad and extending beyond opposite ends thereof with the extending portions flattened into multi-ply tab ends, the side margins of at least one of said tab ends tapering outwardly to a width less than the pad width with the material of the outer plies formed into integral overpleats extending along each margin of the tab on each face of the tab, the two pleats on opposite faces of each tab margin being in substantial registry and in close proximity to the integral portions of the face ply which they overlie.

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RICHARD A. GAUDET, *Primary Examiner.*

C. F. ROSENBAUM, *Assistant Examiner.*