Sept. 2, 1958 T. LOEW 2,849,719

ANTICURL DEVICES FOR GARMENT PARTS

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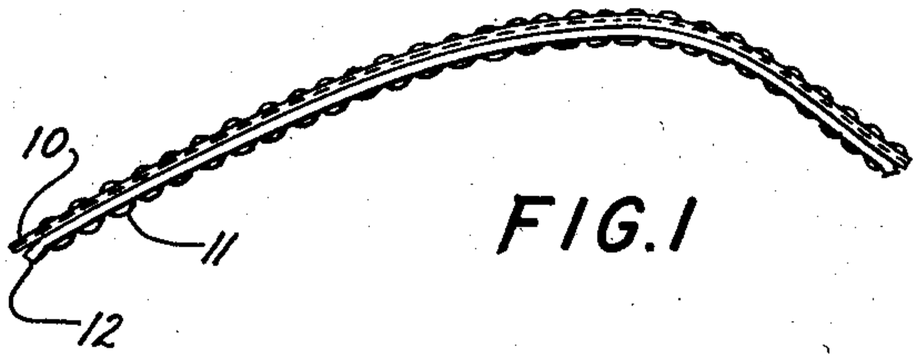
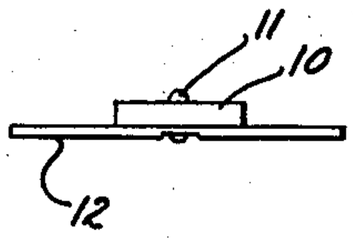


FIG. 1

FIG. 2

FIG. 3



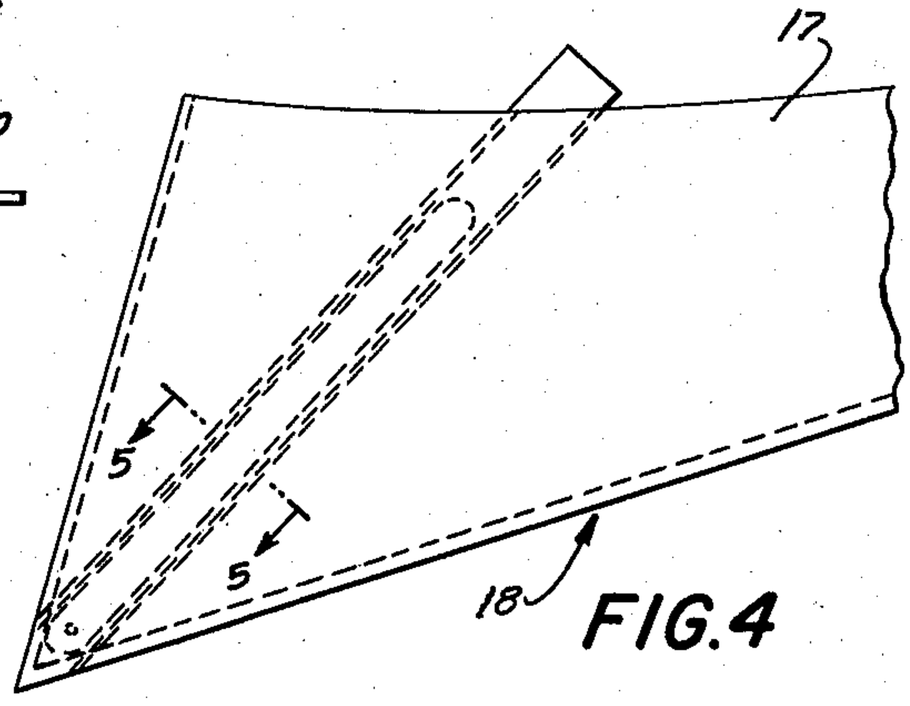
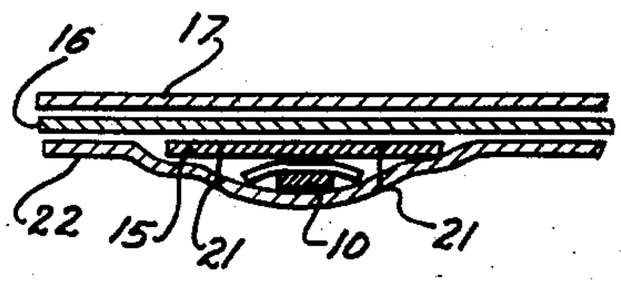


FIG. 4

FIG. 5



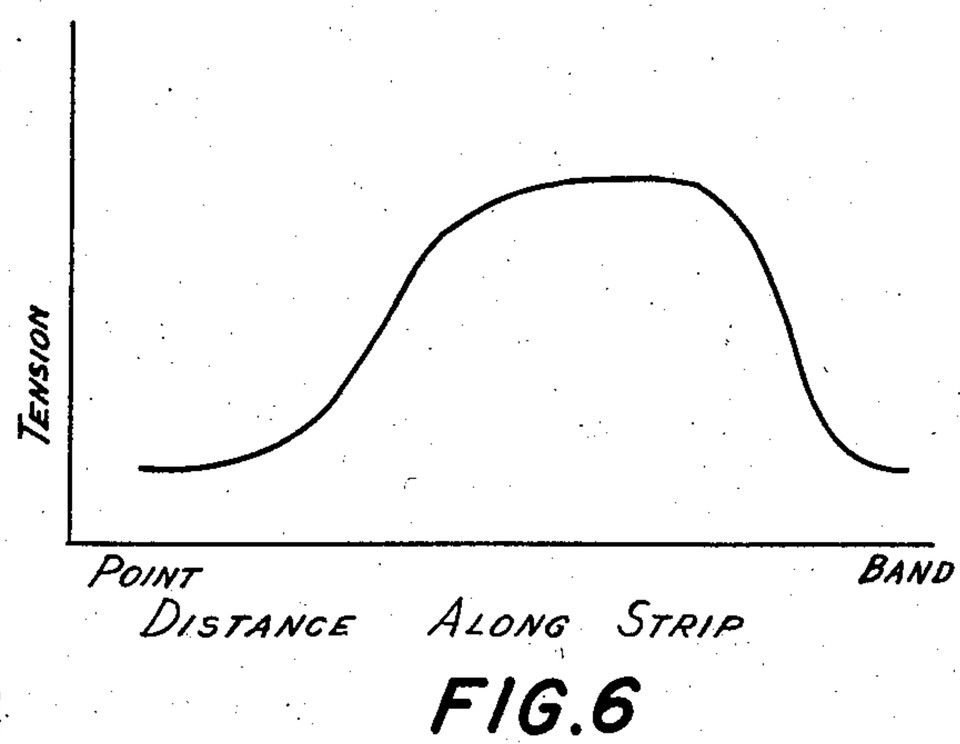


FIG. 5A

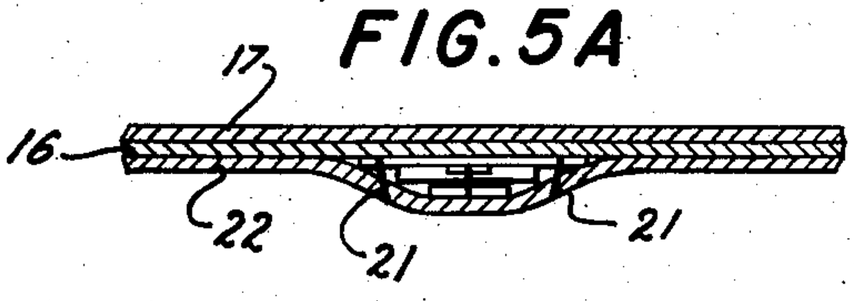


FIG. 6

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ANTICURL DEVICES FOR GARMENT PARTS

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13 Claims. (Cl. 2—132)

Anticurl devices have been described in United States Patents 2,601,035, 2,601,036, 2,601,037, 2,601,038, and Reissue 23,617. In these patents is disclosed a stretched elastic member which is attached to a thin flexible compression-resistant member in order to produce a curling tendency to oppose the curling tendency exerted on the garment part when worn. The object of the present invention is to provide certain improvements in such anticurl devices.

It was customary to make the thin flexible compression-resistant member disclosed in the above patents in practice out of nylon in strips having a width of approximately ⅛ inch and a thickness of 0.011–0.012 of an inch. These anticurl strips were produced for fused collars in the edge position, as indicated in the drawings of U. S. Patent No. 2,601,035. Under these circumstances the nylon strip functioned satisfactorily.

In the edge position of a fused collar it was found necessary to use relatively high stresses in the rubber, e. g. heat-resistant garment rubber having a thickness of approximately 0.030 inch and a width of approximately ⅛ inch. This rubber was given an average stretch of 75–100% and a maximum stretch near one end of the strip of approximately double this average. Such high stresses were desired in order to produce fully adequate anticurl power when the strip is in the edge position of the collar.

Satisfactory results were obtained in this way in fused collars, but it was found that the nylon strip did not have sufficient wet-strength under these circumstances when placed in the edge position of a soft collar. That is to say, the structure of a fused collar along its edges gives support to the anticurl strip when laundered, which made the use of nylon satisfactory, but in a soft collar this support is lacking.

It has been found that if such anticurl strips are placed in a pocket in the diagonal position (see Fig. 7 of Patent No. 2,601,038), much lower forces in the rubber can be used successfully. Thus, it has been found that using rubber of approximately 0.017 inch in thickness and approximately ⅛ inch in width and having an average stretch of from 35–40% and a maximum stretch in the neighborhood of double this average, adequate forces are obtained for preventing curling of soft collars when used in this diagonal position. But there is an objection to the use of non-removable anticurl strips in the diagonal position in that they tend to show through on the outer face of the collar.

One of the objects of the present invention is to improve the thin flexible compression-resistant member of the above combination of rubber and plastic.

Another object of the present invention is to reduce the tendency of the anticurl strip to show through on the outer face of the collar when the strip is placed in the diagonal position.

The first objective is achieved by using a compression-resistant plastic material which has a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of

at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F. Such a material has a wet-strength which is far superior to that of nylon. Materials which meet these requirements are the plastic sold under the tradename "Mylar" and made by the DuPont Company, and also a plastic sold under the tradename "Cronar" and also sold by the DuPont Company. The material is used in strips having a thickness of 0.0075 inch and a width in the neighborhood of ¼ inch. The second of the above objectives is achieved by arranging the plastic compression-resistant strip so that it extends laterally at each of its free side edges beyond the rubber strip which is attached to the compression-resistant strip by a distance equal to at least three times the thickness of the rubber strip.

Reference may be made to the accompanying drawings in which:

Fig. 1 is a side elevation, Fig. 2 is a plan view, and Fig. 3 is an end view of an anticurl strip made according to the present invention and intended to be used in a diagonal position in a soft or fused collar.

Fig. 4 shows a collar having the anticurl strip of the present invention located therein in a diagonal position.

Fig. 5 is a cross sectional view taken along line 5—5 of Fig. 4 and showing the pocket sewn to the back or inner ply, this pocket being designed to contain the anticurl strip, Fig. 5 showing the shape taken when the collar is being pressed.

Fig. 5A shows the cross sectional shape of the collar when not being pressed.

Fig. 6 is a diagram showing a typical distribution of stress or stretch in the rubber member.

In the drawings, the heat-resistant rubber strip **10** is of the type used in garments, e. g., in the waist band of shorts and pajama trousers. In the embodiment shown, this strip in its unstretched condition is about ⅛ inch wide and about 0.017 inch thick. The length of the rubber strip is chosen so that when it is combined with the compression-resistant plastic strip by the stitches **11**, the rubber strip will have an average stretch of approximately 35–50%, depending upon the fabric of the collar and the design of the collar, as well as whether the collar is soft or fused. The stretch in the rubber strip is non-uniform, the pattern of stretch depending again on the particular use for which the anticurl device is designed, and Fig. 6 diagrammatically illustrates one possible variation in the stretch along the length of a rubber strip.

The flexible compression-resistant member consists of the plastic known as Mylar or Cronar, as was pointed out above, and this flexible compression-resistant strip has a width of approximately ¼ inch and a thickness of 0.0075 inch. As is clearly indicated in Fig. 3, the strip **12** is grooved to a depth of approximately 0.003 inch to receive portions of the stitches **11** in this groove, so that these stitches will not exend beyond the bottom face of the strip **12**, as viewed in Fig. 3. The rubber strip is preferably sewn centrally along one face of the compression-resistant strip **12**, as indicated in Fig. 2, so that the strip **12** will extend at its free side edges beyond each side edge of the rubber strip. In the illustrated example the strip **12** extends beyond the rubber strip **11** on each side by approximately 1/16 inch, where the stretch in the rubber is substantially zero, viz. at the ends in the particular example illustrated, as is indicated in Fig. 6. The stretch is greater than this in other portions of the rubber where the rubber strip is narrowed by the Poisson effect due to the stretch in the rubber. The thickness of the rubber may vary from approximately 17 mils to 19 mils. Thus, it will be seen that the extension of the plastic strip **12** beyond the rubber strip **11** on each side of the latter is greater than three times the thickness of the rubber. It

has been found that these proportions tend to minimize the showing-through of the strip as a whole. The reason for this is evident from Fig. 5 which is a sectional view of the collar portion fragmentarily indicated in Fig. 4. In Fig. 4 the outer or face ply **17** of the collar **18** is visible, and the anticurl strip located within the collar is shown in dotted lines. Referring to Fig. 5, it will be seen that the increments by which the thickness of the collar increases and decreases are quite small. Thus, there is a slight increase in the thickness of the collar where the pocket material **15** is located. Then (neglecting the stitch for the time being) there is a further increase in thickness where the plastic **12** begins, and there is a final increase in thickness where the rubber **10** begins. It will be noted from Fig. 5 that these increases in thickness are very slight and furthermore are very gradual. Experiments have shown that if the width of the pocket is just large enough to receive the anticurl device, e. g., 9/32 inch between pocket stitches **21** for a strip ¼ inch wide, then this structure prevents pressure from being applied to the stitch which otherwise tends to show through, particularly if the collar is starched. Furthermore, the edges of the plastic strip **12** tend to flex under heavy ironing pressure so as to make the entire transition from normal collar thickness to maximum collar thickness at the center of the strip a gradual transition, thereby minimizing the highlights and showing-through of the entire strip-and-pocket structure on the face or outer ply of the collar. The shapes which the collar takes when being pressed and when not being pressed are indicated in Figs. 5 and 5A, respectively.

As is evident from Fig. 5, a lining ply **16** is located between the face ply **17** and the back ply **22** of the collar, and the pocket material **15** is stitched to the back ply **22** with the stitches **21**, the pocket for the anticurl strip **10**, **12** being located between the pocket material **15** and the back ply **22** and between the rows of stitches **21.** Fig. 4 clearly illustrates the diagonal position of the anticurl strip in the collar **18.**

At the time that the present invention was first made, the plastic Mylar was not available in thicknesses greater than 0.0075 inch and this thickness was not considered heavy enough for high tensions which were then used for anticurl strips in the edge positions of collars, although this thickness is heavy enough for the diagonal position, as described above. Recently, however, the DuPont Company has made available Mylar in a thickness of 0.010 inch. This heavier material can be used for anticurl strips in the edge position, where much greater forces due to the rubber are needed, and can also be used in wider form for anticurl strips in girdles, brassieres, etc. The present invention is not to be construed as limited to the specific quantitative or qualitative embodiments described above.

I claim:

1. In a collar consisting of one or more fabric plies, means for opposing the tendency of a collar point to curl away from the body of the wearer, said means comprising a flexible permanently compression-resistant element located in the neighborhood of said collar point in substantially fixed relation to said collar point, said element having a tensile strength of at least 17,000 lbs. per square inch and a tensile modulus of at least 450,000 lbs. per square inch, and said element having a moisture absorption of approximately 0.3% and a melting point of at least 480° F.; and an elastic strip-shaped element incorporated in said collar in permanently stretched tension-creating condition and secured in such condition to said flexible permanently compression-resistant element in the neighborhood of said collar point extending at least approximately toward the same and located between said flexible permanently compression-resistant element and the inner collar face.

2. In a collar including an outer collar ply, an inner collar ply and an interposed lining ply, means for opposing the tendency of a collar point to curl away from the body of the wearer, said means comprising a flexible permanently compression-resistant element incorporated in said collar located in the neighborhood of said collar point between said lining ply and said inner ply of said collar in substantially fixed relation to said collar point, said element having a tensile strength of at least 17,000 lbs. per square inch and a tensile modulus of at least 450,000 lbs. per square inch, and said element having a moisture absorption of approximately 0.3% and having a melting point of at least 480° F.; and an elastic strip-shaped element incorporated in said collar in permanently stretched tension-creating condition and secured in such condition to said flexible permanently compression-resistant element in the neighborhood of said collar point extending at least approximately toward the same and located between said compression-resistant element and the inner collar ply.

3. In an article of wearing apparel, means for opposing the tendency of said wearing apparel to curl away from the body of the wearer along an edge of said wearing apparel, said means comprising a flexible permanently compression-resistant element located in the neighborhood of said edge in substantially fixed relation to the same, said element having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F.; and an elastic strip-shaped element incorporated in said wearing apparel in permanently stretched tension-creating condition and secured in such condition to said flexible permanently compression-resistant element in the neighborhood of said edge extending at least approximately toward the same and located between said flexible permanently compression-resistant element and the inner face of said wearing apparel.

4. In an article of wearing apparel, means for opposing the tendency of said wearing apparel to curl away from the body of the wearer along an edge of said wearing apparel, said means comprising a flexible permanently compression-resistant element located in the neighborhood of said edge in substantially fixed relation to the same, said element having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F.; and an elastomer strip incorporated in said wearing apparel in permanently stretched tension-creating condition and secured in such condition to said flexible permanently compression-resistant element in the neighborhood of said edge extending at least approximately toward the same and located between said flexible compression-resistant element and the inner face of said wearing apparel.

5. A device for inducing a curling tendency in a desired direction in a portion of an article of apparel with which said device is eventually assembled, said device comprising, in combination, a thin flexible compression-resistant element having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F.; and a stretched elastic element having a tension varying along its length and fastened in such stretched tension-creating condition to one face of said thin flexible compression-resistant element, thus inducing different curvatures in said thin flexible compression-resistant element along the length thereof and hence inducing a curving tendency in a portion of an article of wearing apparel with which the same is assembled, said curving tendency varying along the length of said thin flexible compression-resistant element and being in the direction of that face of said thin flexible compression-resistant element to which the said elastic element is fastened.

6. A device for inducing a curving tendency in a de-

sired direction in a portion of an article of apparel with which the device is eventually assembled, said device comprising, in combination, a thin flexible compression-resistant strip-shaped element having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisure absorption of approximately 0.3%, and a melting point of at least 480° F.; and a stretched elastic-strip-shaped element having a tension varying along its length and fastened in such stretched tension-creating condition to one face of said thin flexible compression-resistant strip-shaped element, thus inducing different curvatures in said thin flexible compression-resistant strip-shaped element along the length thereof and hence inducing a curving tendency in a portion of an article of wearing apparel with which the same is assembled, said curving tendency varying along the length of said thin flexible compression-resistant strip-shaped element and being in the direction of that face of said thin flexible compression-resistant strip-shaped element to which said strip-shaped element is fastened.

7. An anticurl device comprising, in combination, a flexible compression-resistant strip having a width of approximately ¼ inch and a thickness of 0.0075 inch; and a rubber strip fixed in stretched condition centrally to said compression-resistant strip and extending along one face thereof, said rubber strip having an average stretch of approximately 35–50% and having in its unstretched condition a width of approximately ⅛ inch and a thickness of approximately 0.0017 inch, so that said flexible compression-resistant strip has free side edge portions which extend beyond said rubber strip.

8. An anticurl device comprising, in combination, an elongated compression-resistant, flexible strip; a rubber strip fixed in stretched condition centrally along one face of said compression-resistant strip, said latter strip extending at each of its side edge portions beyond said rubber strip by a distance which is greater than three times the thickness of the rubber strip.

9. An anticurl device comprising, in combination, a flexible compression-resistant strip having a width of approximately ¼ inch; and an elongated rubber strip fixed centrally to said compression-resistant strip and extending along a face thereof, said rubber strip having in its unstretched condition a width of approximately ⅛ inch and being fixed in stretched condition to said compression-resistant strip.

10. An anticurl device comprising, in combination, a flexible compression-resistant strip having a width of approximately ¼ inch; and an elongated rubber strip fixed centrally to said compression-resistant strip and extending along a face thereof, said rubber strip having in its unstretched condition a width of approximately ⅛ inch and being fixed in stretched condition to said compression-resistant strip, said latter strip extending at each of its side edge portions beyond said rubber strip by a distance which is greater than three times the thickness of the rubber strip.

11. An anticurl device comprising, in combination, a flexible compression-resistant strip having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F.; and a rubber strip fixed in stretched condition centrally to said compression-resistant strip and extending along one face thereof, said compression-resistant strip extending at each of its side edge portions beyond said rubber strip by a distance which is greater than three times the thickness of said rubber strip.

12. An anticurl device comprising, in combination, a flexible compression-resistant strip having a width of approximately ¼ inch and a thickness of approximately 0.0075 inch, said strip having a tensile strength of at least 17,000 lbs. per square inch, a tensile modulus of at least 450,000 lbs. per square inch, a moisture absorption of approximately 0.3%, and a melting point of at least 480° F.; and an elongated rubber strip fixed centrally to said compression-resistant strip and extending along a face thereof, said rubber strip being fixed to said compression-resistant strip with an average stretch of approximately 35–50%, and said rubber strip having in its unstretched condition a width of approximately ⅛ inch and a thickness of approximately 0.0017 inch.

13. An elongated anticurl device comprising, in combination, a flexible, compression-resistant strip having a width of approximately ¼ inch and being formed in one of its faces with a substantially central longitudinal groove; and an elongated rubber strip stitched centrally to the other of said faces of said compression-resistant strip and extending along said other face thereof, said rubber strip having in its unstretched condition a width of approximately ⅛ inch and being stitched in stretched condition to said compression-resistant strip, the stitching which connects said strips together being located in part in said groove of said one face of said compression-resistant strip.

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