

[54] **AUTOMATED PRODUCTION OF MEN'S BOXER SHORTS**

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- [52] U.S. Cl.2/224 R, 2/243 R
- [51] Int. Cl.A41b 9/02
- [58] Field of Search.....2/224 R, 224 A, 225, 226, 238, 2/243 R

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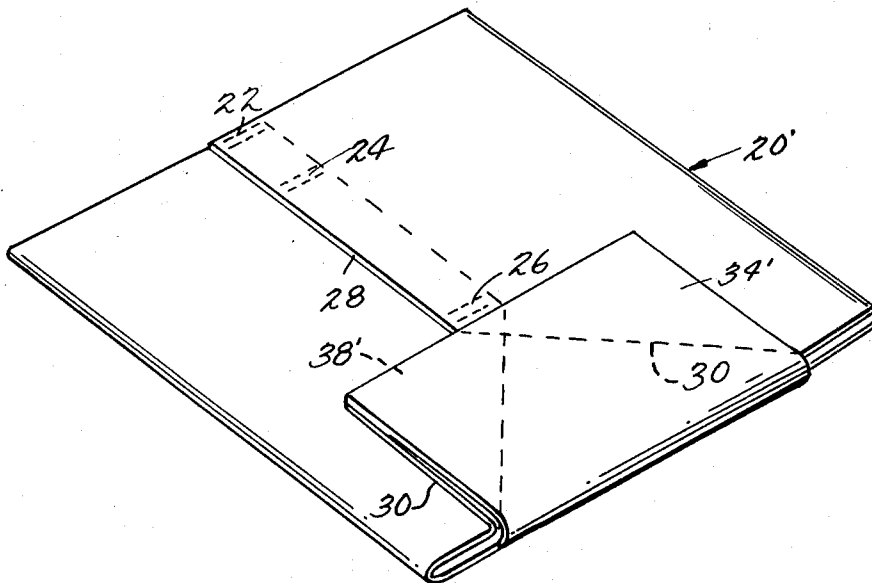
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[57] **ABSTRACT**

Simplified men's boxer shorts made by folding an elongated web of sheet material so that the side edges overlap to form a tube, severing a section from the tube, securing together portions of the overlapped section edges to define a fly front, folding back the overlapped edges below the fly to form flaps, securing a separate crotch patch to edge portions of the flaps and to the back end edge of the section between the flaps; and securing an elastic waist band to the section. In an alternative embodiment of one-piece construction the tube is cut so that the crotch patch is integral with the back end edge.

6 Claims, 8 Drawing Figures



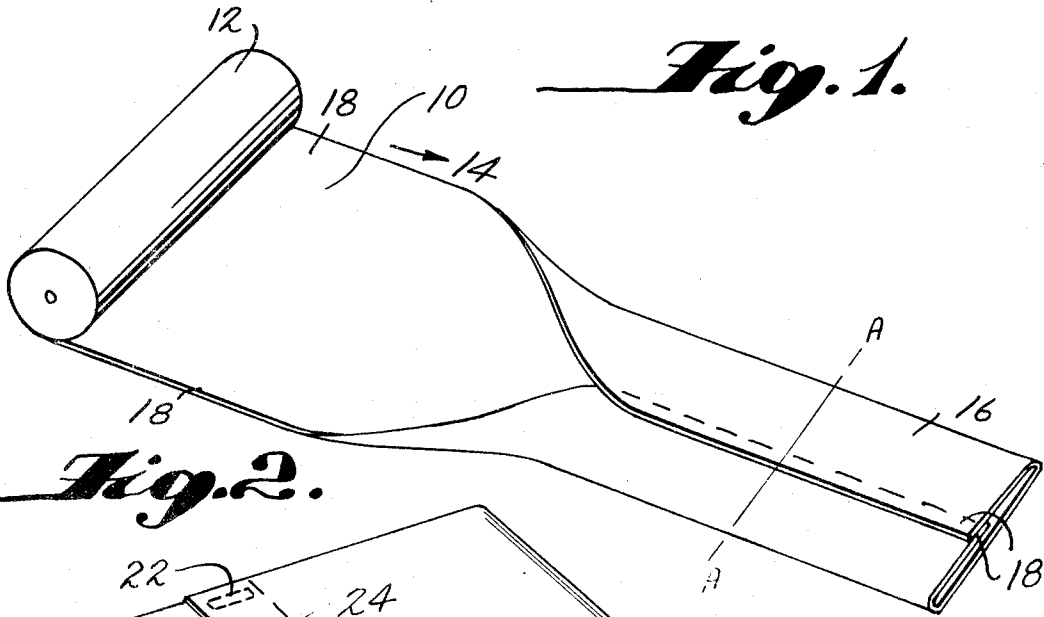


Fig. 2.

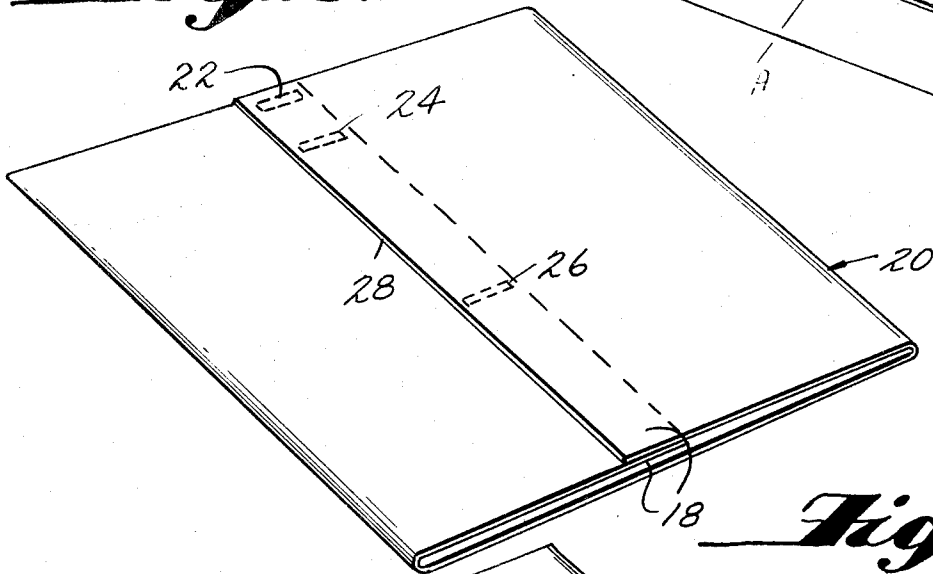
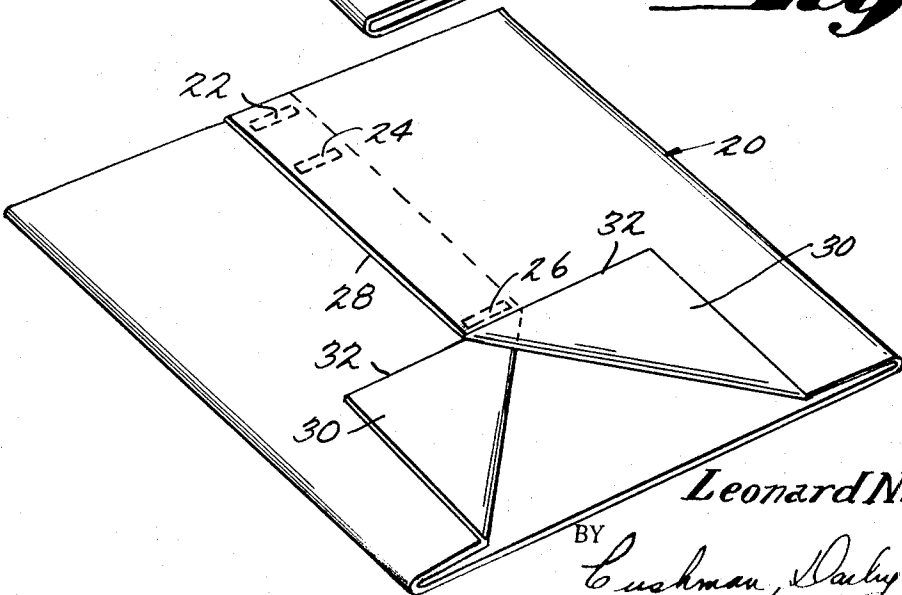


Fig. 3.



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Fig. 5.

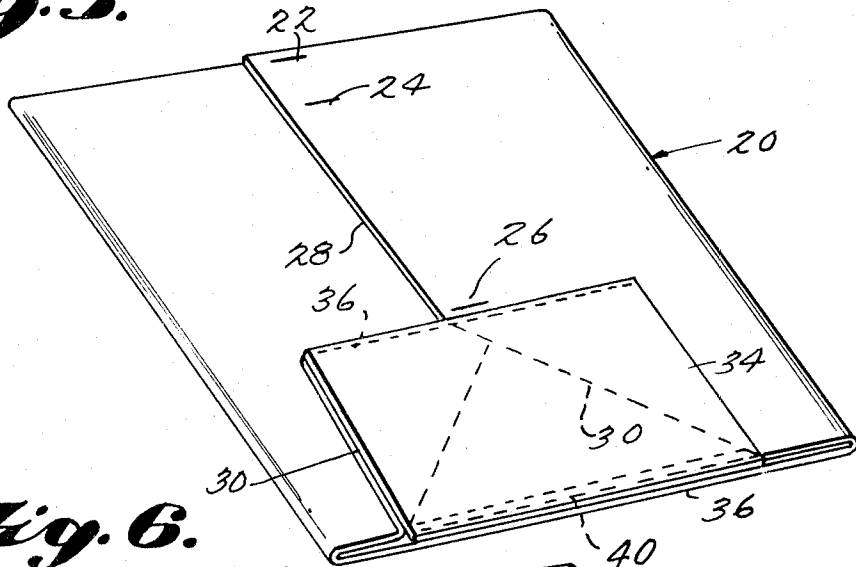


Fig. 6.

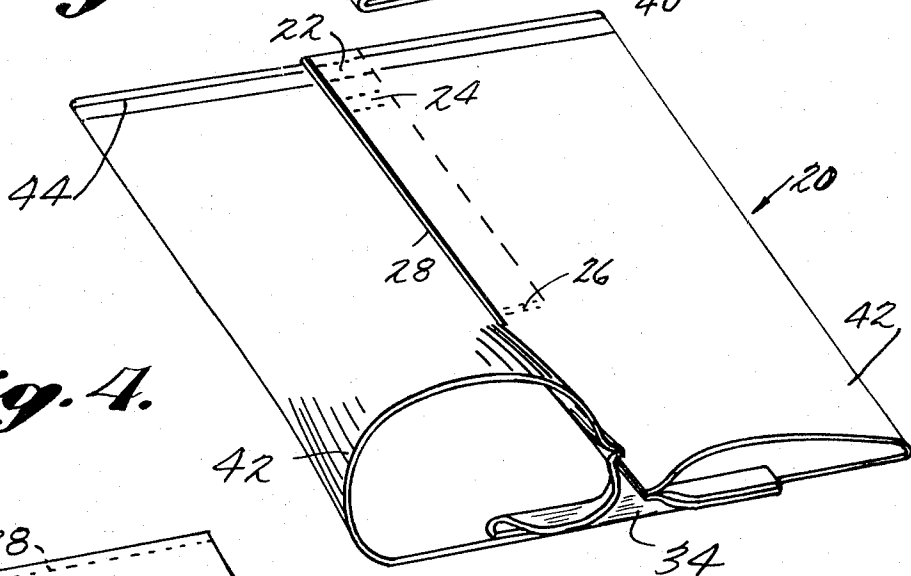
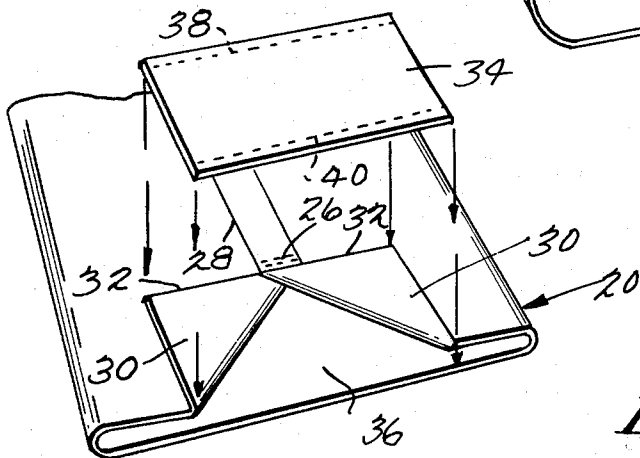


Fig. 4.



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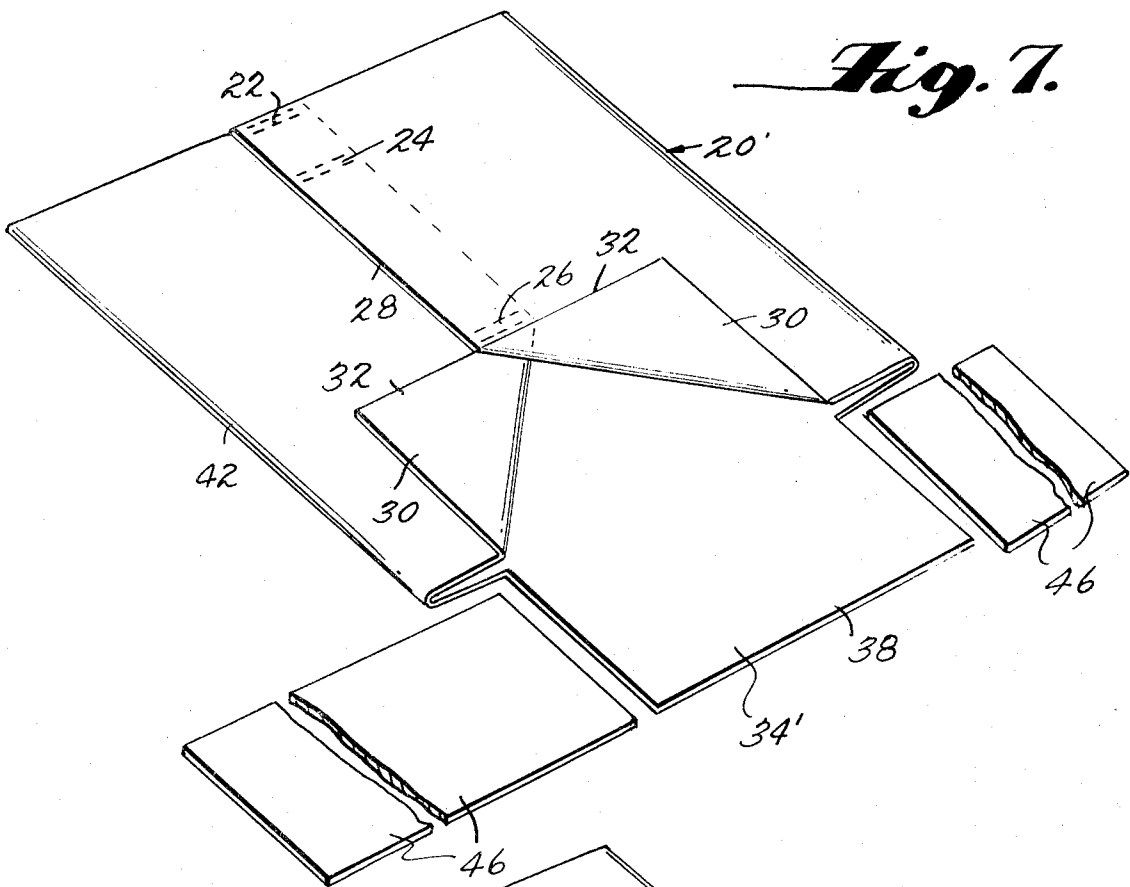


Fig. 7.

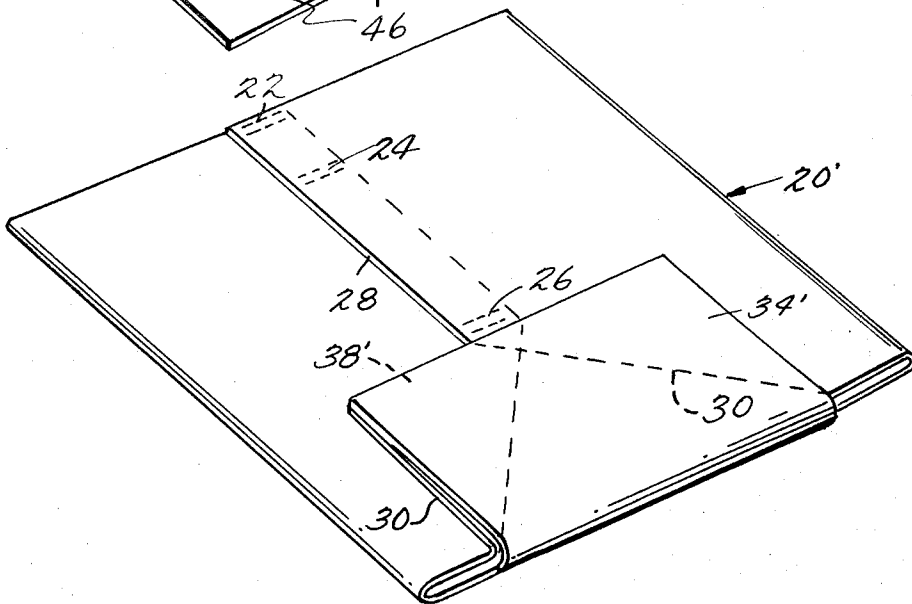


Fig. 8.

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AUTOMATED PRODUCTION OF MEN'S BOXER SHORTS

BACKGROUND OF THE INVENTION

It has long been desirable to automatically and inexpensively manufacture finished garments of relatively simple construction directly from elongated webs of sheet material to reduce the labor costs in cutting, fitting and sewing together pieces of material by hand to make a garment. Garments which have been so produced heretofore, however, have suffered from the disadvantages of being rather baggy, not well fitting, and unattractive in appearance. These disadvantages become material in garments such as boxer shorts which must conform to the torso of the human body. Boxer shorts which do not conform to the torso of the human body are not commercially acceptable due to the reluctance of consumers of discriminating taste to purchase and wear such garments.

Consequently, there is an immediate need for a method of automatically manufacturing boxer shorts, which are form fitting, from elongated sheets of material without the use of expensive hand labor. Such a method becomes practical, however, only with a construction of such a garment that is extremely simple.

SUMMARY OF THE INVENTION

The principal object of the present invention is to provide boxer shorts of form fitting but simple construction and to achieve continuous automatic low cost production of such shorts with substantially no waste of material. To accomplish this result, the edges of sheet material are overlapped to form a tube which corresponds to the size of a boxer short; the tube is then cut into sections according to the desired length of the boxer shorts; a seam is then formed along a portion of the overlapping edges to define a fly front; portions of the overlapping edges below the fly are then folded back to form flaps having aligned edges substantially parallel to the ends of the section; and crotch and a is attached to the aligned edges of the flaps and to the inner side of the end edge of the section between the flaps. The section is then advanced to a station where elastic is applied to form the waist band of the garment.

A BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a diagrammatic perspective view showing sheet material being unwound from a roll and having its side edges overlapped to form a tube;

FIG. 2 is a diagrammatic perspective view of a section cut from the tube and with portions of the overlapping edges being secured together;

FIG. 3 is a diagrammatic fragmentary perspective view corresponding to FIG. 2 but illustrating another step in the process embodying this invention;

FIG. 4 is a fragmentary diagrammatic perspective view corresponding to FIG. 3 but showing a crotch patch preliminarily positioned for attachment to the section;

FIG. 5 is a diagrammatic perspective view corresponding to FIG. 4 but showing the crotch patch attached to the section;

FIG. 6 is a diagrammatic perspective view of a completed boxer short embodying this invention;

FIG. 7 is a diagrammatic perspective view corresponding to FIG. 3 but showing a one-piece construction of boxer shorts embodying this invention;

FIG. 8 is a view corresponding to FIG. 5 but showing the one-piece construction of boxer shorts.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Boxer shorts embodying this invention which can be produced automatically and substantially continuously from an elongated web of sheet material with no waste are of essentially two-piece construction. One piece, cut from the elongated web, forms the waist, body, and most of the leg portions. Another separate piece forms the crotch area and part of the

leg portions of the garment. The method of producing such shorts is shown in FIGS. 1 to 6 of the drawings.

Referring now to FIG. 1, there is shown an elongated web 10 of sheet material being unwound from a roll 12, in the direction of the arrow 14, and being progressively formed into a flattened tube 16 by overlapping the marginal edge portions 18 of the sides of the web 10.

The width of the web 10 is adjusted so that the circumference of the flattened tube 16 corresponds to the size desired for the boxer shorts being produced, while the extent of overlap of the marginal edge portions 18 is adjusted to correspond to the required overlap for the fly front of the shorts being produced. A section 20 is then severed from the flattened tube, i.e., along the severance line A—A, with the length of the section corresponding to the desired length of the boxer shorts being produced.

Certain portions of the overlapping edge portions 18 of the section 20 are then secured together to form a fly front as shown in FIG. 2. For example, the overlapping marginal edge portions 18 are secured together in a small area 22 adjacent that end of the section 20 which will form the top or waist of the shorts being produced. The overlapping marginal edge portions 18 are also secured together in an area 24 about 2 inches down from the area 22, and also in an area 26 about 8½ inches down from the area 22. The unsecured marginal edge portions 18 between the areas of securement 24 and 26 define a fly 28.

The securement of the overlapping marginal edge portions 18 in the several areas 22, 24 and 26 may be effected by any suitable adhesive which may be applied to the appropriate areas on either or both of the opposed faces of the overlapping marginal edge portions 18, preferably while the web 10 is in its flattened form before being formed into a tube 16. Such adhesive may be of a pressure sensitive type or of a heat sealable type.

The free portions of the overlapping marginal edge portions 18 below the fly 28 are then folded back up to the securement area 26, as shown in FIG. 3, to form flaps 30 having generally aligned edges 32 preferably extending generally parallel to the end edges of the section 20.

The next step in the manufacturing process is to secure a generally rectangular crotch patch 34 to the section 20, as is illustrated in FIGS. 4 and 5. The patch 34 is generally coextensive with the area of the flattened section 20 defined by the free edges of the flaps 30 and that portion 36 of the lower back edge of the section between the flaps. One marginal edge portion 38 of the crotch patch 34 is secured to the marginal edge portions of the flaps 30 along their edges 32, while the opposite marginal edge portion 40 of the crotch patch is secured to the inner side of the marginal edge portion of the back of the section 20 between the flaps 30. In a preferred arrangement, the appropriate sides of the marginal edge portions 38 and 40 of the crotch patch 34 are precoated with a suitable adhesive, so that when the patch is placed in position it can be secured in place by pressure, or by the application of heat in the event the adhesive is of a heat sealable type.

As shown in FIG. 6 it will be seen that the crotch patch 34 provides not only the crotch area of the boxer shorts but also the inner sides of the leg portions 42, and that by use of the patch the leg portions 42 are of a circumference sufficiently enlarged to comfortably fit the legs of the wearer.

The next step in the process is to apply an elastic waist band 44 to the garment at its upper or waist end, as is also shown in FIG. 6. Such a waist band 44 may be applied by any known means, such as by adhesive, sewing, or the like. In lieu of separate elastic webbing, an elastic waist band can be formed by the application of a shrinkable plastic film to the waist band area of the garment. After application, by appropriate activation, the film can be shrunk to some extent and thereby provide appropriate elasticity to the waist band area of the shorts.

Boxer shorts embodying this invention which can be produced automatically and substantially continuously from an elongated web of sheet material, but with some waste of the

material are of essentially a one-piece construction. This method of manufacture is illustrated in FIGS. 6 and 7. The method is essentially that illustrated in FIGS. 1 to 3, save that the crotch patch 34' is formed as an integral portion of the section 20' by suitably cutting the same from the web 10 of sheet material. In this arrangement the flattened tube 16, instead of being severed along transverse lines to form a section 20 of a length equal to that of the shorts to be produced, is severed along transverse lines to form a section 20' of a length equal to that of the shorts to be produced plus an additional length equal to the length of a crotch patch 34'. Thereafter, either before or after the section 20' is severed from the flattened tube 16, or even before the web 10 of sheet material is folded into a tubular shape, notch-like sections 46 are cut out from opposite sides of the web to leave an intermediate section corresponding in width and length to those of the crotch patch 34'. These cut-out sections 46 will, of course, constitute waste material.

When the section 20' has been thus formed and severed from the tube 16 of sheet material, as illustrated in FIG. 7, it will be seen that the crotch patch 34' is formed by an integral extension of the back side of the flattened tubular section 20'. After the overlapping marginal edge portions 18 have been secured together, as described with reference to FIG. 2, the unsecured overlapping marginal edge portions are then folded back to form flaps 30, the same as illustrated in FIG. 3, and then the crotch patch portion 34' is folded up and over the flaps 30, into the position shown in FIG. 8, and the marginal edge portion 38' of the crotch patch and the upper marginal edges of the flaps are secured together, as by a pressure sensitive or heat sealable adhesive.

The remaining steps of forming this modified form of the invention into a complete boxer short are the same as those illustrated with reference to FIG. 6.

Although the type of material used is unimportant to this invention, and likewise the manner of securing the various edge portions together is unimportant, it is contemplated that this invention could be used to produce inexpensive disposable garments from non-woven material.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. The method of making boxer shorts from a generally rectangular web of sheet material, the steps comprising: folding opposite marginal edge portions of the web into overlapping relation to form a flattened tube;

securing together portions of the overlapping marginal edge portions adjacent one end to form a waist and intermediate the length of the tube to form a fly front for the shorts between the secured portions;

folding back the unsecured portions of the overlapping marginal edge portions below the fly front to form flaps and to expose a portion of the inner side of the tube adjacent the other end thereof; and

securing a marginal edge portion of a crotch piece to the upper marginal edge portions of the flaps, the opposite marginal edge portion of the crotch piece being attached to the back edge portion of the tube between the flaps, to form the crotch and inner portions of the legs of the shorts.

2. The method defined in claim 1 including the additional step of securing an elastic waist band to the tube about the one end thereof.

3. The method defined in claim 1 in which the crotch piece is separate from the web and including the additional step of securing the opposite marginal edge portion of the crotch piece to the inner side of the back edge marginal portion of the tube between the flaps.

4. The method defined in claim 3 in which the waist, body, and portions of the legs of the shorts are made from an elongated web of the material wound on a roll and including the additional steps of:

- unwinding the web from the roll;
- progressively folding the side edges of the web into overlapping relation to form a flattened tube; and
- severing sections from the tube each of a length corresponding to the length of the shorts to be made.

5. The method defined in claim 1 in which the crotch piece is integral with the web.

6. The method defined in claim 5 in which the shorts are made from an elongated web of the material wound on a roll and including the additional steps of:

- unwinding the web from the roll;
- cutting pairs of generally rectangular notches in opposite sides and spaced along the length of the web with the distance between notch pairs corresponding to the length of the shorts being made, the width of the notches corresponding to the length of the crotch piece, and the distance between the notches of each pair corresponding to the width of the crotch piece;
- progressively folding the unnotched side edges of the web into overlapping relation; and
- transversely severing the web into sections at one end of each notch.

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