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R. HINCHLIFF
COMPOSITE TEXTILE ARTICLE
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2,484,293

Fig. 1

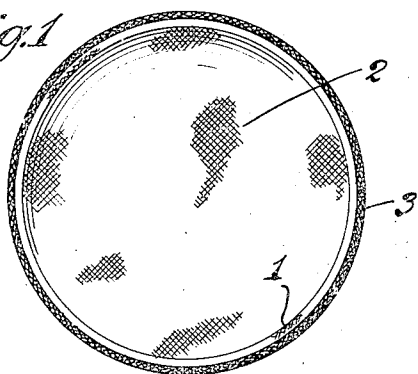


Fig. 2

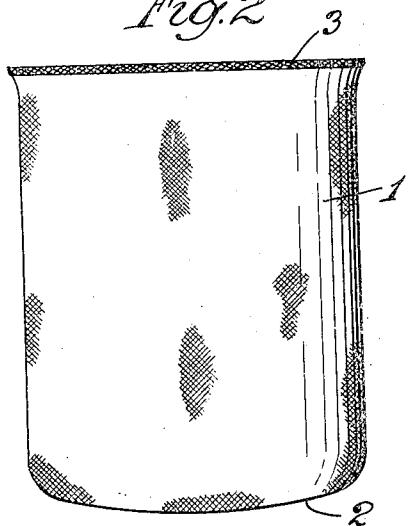


Fig. 4

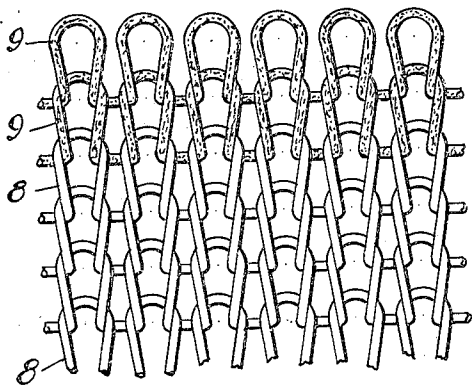


Fig. 3

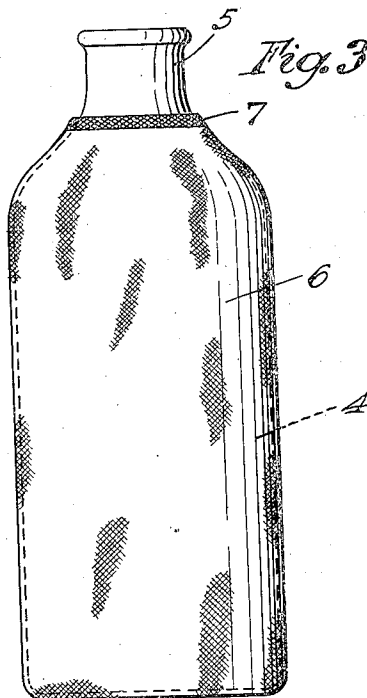
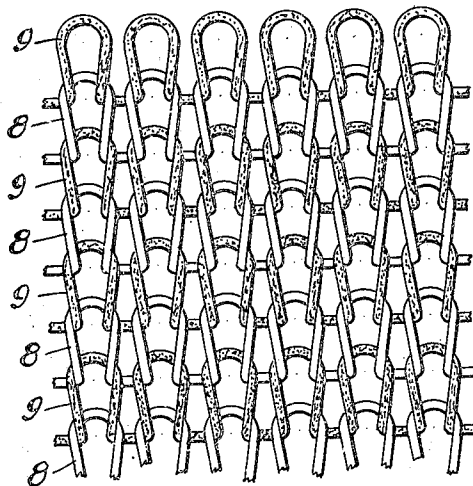


Fig. 5



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UNITED STATES PATENT OFFICE

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COMPOSITE TEXTILE ARTICLE

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2 Claims. (Cl. 66—170)

1

This invention relates to a composite textile article in which the body of the article is formed generally of yarn or thread which is not appreciably changed by the application of heat and in which portions of the articles are formed of a yarn or thread which although initially soft and flexible, becomes hard upon the application of heat. Such yarn or thread may also shrink upon the application of heat. One such yarn or thread is now available on the market under the trade name of Vinyon. Vinyon is spun from a resin composed of approximately ninety percent vinylchloride and ten percent vinyl acetate, copolymerized to an average macro-molecular weight of about 20,000 as measured by Staudinger's viscosity method. The fiber is produced by dissolving the resin in acetone to form a viscous spinning dope containing about twenty-five percent solids, which is then filtered, deaerated and spun through multiholed stainless steel jets as in acetate rayon spinning. The acetone evaporates and is recovered, and the yarn is collected on suitable bobbins. This yarn or thread in its initial manufactured state is soft and flexible and appears very much like natural and other synthetic yarns and threads. When subjected to heat, however, it tends to shrink and to become stiff. For some purposes this shrinking is controlled by putting the article in which the yarn is included about a form so that the shrinking is limited by the size and shape of the form. Once the shrinking has taken place and the article has been cooled the Vinyon or other yarn having comparable properties takes up a set. Should the yarn or article in which the yarn or thread having the property of shrinking is included be subsequently subjected to heat it may shrink further. It is to be understood that the degree of heat necessary to cause shrinking need not be very high. In some cases the shrinking will occur when the article is used in the presence of rather a moderate temperature. Thus washing in reasonably hot water or even warm water may cause the shrinking and hardening and similarly exposure to weathering which may include the sunlight may cause this hardening. Some of the synthetic yarns now available have similar properties of shrinking and hardening upon exposure to cold and this invention contemplates the use of any such yarn, thread or fiber however arranged so long as these yarns, threads or fibers have the property of shrinking or hardening to a degree substantially greater than that possessed by normal, natural or synthetic fibers. Such yarn or thread after being

2

subjected to heat becomes in effect self sustaining or self supporting and because of this property gives a shaping effect to the article in which it is embodied. It has a spring-like stiffness and although it may yield from the position in which it was at the time the heat was applied it tends to return to that position.

It is one object of the invention therefore to embody within a manufactured article portions or areas of yarn, thread or fiber which upon being subjected to heat or cold will stiffen and shrink and will, therefore, tend, when free to do so, to shape the article at one or more points and to cause the article to retain that shape. Because of the flexibility of such yarn the article may be deformed, bent, crushed or otherwise manipulated but it will, when free to do so, tend to return to its original position. In this sense the Vinyon or comparable thread or yarn has a spring-like effect on the article of which it forms a part.

Another object of the invention is to form a knitted or woven or felted article of a plurality of materials all of which at the time of forming are flexible and freely suitable for knitting, weaving, sewing or felting, one or more of which upon the application of heat, cold or pressure changes its form and takes a set.

The invention is not limited to the use of such yarns or threads in knitted articles. They may be embodied in woven articles, felted articles or articles formed by sewing or made by any of the methods by which fibrous material is shaped to form a composite article. Obviously the final article may be formed by the use of several different methods. Thus portions of material which have been woven may be sewn together or portions of material which have been knitted may be sewn on or otherwise attached to each other and felted portions may be fastened by something to otherwise woven or knitted portions. The invention is therefore not limited to any specific form of construction or method of construction so long as the final article includes portions of the thread or yarn of fiber which has the property of being affected by heat and/or cold to cause shrinking and hardening together with portions of material which is substantially unaffected by heat and cold. Where yarns, threads and fibers such as Vinyon or having similar properties are used they need not be used to form a complete section. Thus in one form of an article the main article is made of other yarns or threads and a solid band or area of Vinyon or similar yarn is used. However, the

Vinyon or similar yarn may be run parallel with yarns of different natures so that in effect they run side by side and there is no separate area formed wholly of Vinyon or formed wholly of other types of yarns, threads or fibers. Also Vinyon yarn may be plated over or under yarns of other sorts. The word "plating" in this connection means feeding yarns to the needles of a knitting machine so that one yarn is always on the outer surface and the other is on the inner surface. The net result is, of course, that the two yarns or threads are together knitted into a composite structure and this form of knitting or a comparable form of weaving, felting and the like may be adopted in the use of this invention. A further modification of the formation of articles according to this invention includes the step of forming the threads, yarns or fibers compositely so that the threads, yarns or group of fibers might be so formed that they include some parts or members made of Vinyon or comparable materials and other parts of relatively non shrinkable materials. Where this is done the shrinking of the Vinyon or comparable yarns is somewhat limited by the effect and presence of the non shrinkable fibers but the shrinking effect is present and is effective to some degree.

A specific object of the articles shown and described herewith is to form a knitted container which is made generally of textile yarns or threads and to form in that article a portion or area which includes or is wholly made up of Vinyon or thread or yarn which upon the application of heat will change its form and become in effect self sustaining and which may also shrink and wholly or partially become rigid.

In general the material such as Vinyon above mentioned which is affected by heat and is caused thereby to shrink and harden will be controlled in its shrinking by being associated with form. In the article mentioned just above after the article has been formed by knitting or otherwise it may be put about a form of a given size and shape and then subjected to heat and it will shrink tightly upon the form and will conform to it in shape. After cooling it may be removed and then can be readily placed upon a similar shaped and formed article. One such use is in connection with a holder for beverage glasses and the article itself is by the heat treatment given a size and shape corresponding accurately to the glass upon which it is to be placed in use. Once it has been given this shape it will retain it unless it is subjected to additional heat which causes further shrinking unless restrained.

Another such use is in connection with babies' bottles as illustrated and disclosed below. In that case the article is positioned about the bottle so that it embraces not only the major but a smaller diameter of the bottle. It is then subjected to heat and it shrinks about the bottle so that it is not readily removable therefrom. Further heat treatment of the bottle and the cover will merely retain the cover on the bottle because the bottle itself limits further shrinking. This however has the advantage that when the bottles are boiled the cover is also boiled and therefore sterilized.

In any form of article the amount of shrinking is always controlled to a substantial degree by the proportion of the shrinkable yarn to the unshrinkable yarn and this proportion is determined to control or vary the degree of shrinking. Obviously if the proportion of shrinkable yarn

is very large then the ultimate article has a very pronounced shrinking tendency. If the proportion of the shrinkable yarn is small however in respect to the unshrinkable yarn the ultimate article has a very slight or limited shrinking tendency. Such yarns, threads or fibers in Vinyon may in their manufacture be given a pre-stretching. Thus they are stretched before use and the degree of this prestretching controls and to some degree determines the amount of subsequent shrinking which will result when they are subjected to heat.

Other objects will appear throughout the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a plan or end view of one device which can be made according to the invention; Fig. 2 is a side illustration of the device shown in Fig. 1;

Fig. 3 is a side elevation of a modified form of the invention as applied to a different device;

Fig. 4 is a diagrammatic showing of the piece of knitting in which the invention is embodied, the Vinyon or comparable yarn being arranged in one complete zone; and

Fig. 5 is a view similar to Fig. 4 but showing a modified form in which the Vinyon or comparable yarn is woven or knitted throughout the article the kind of yarn being alternated.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings 1 indicates a generally rounded or cylindrical article having a bottom 2. Adjacent its upper edge there is provided a zone 3 of Vinyon or other yarn, thread or fiber which responds to heat, cold or pressure so as to shrink and become relatively stiff or spring like. It is understood that most yarns or fibers will shrink some under certain conditions and where in the present specification and claims reference is made to yarns, threads or fibers which shrink or rigidify under heat, cold, pressure or other influences, this language is to be taken as meaning a material which does so substantially and greatly in excess of the other materials with which it is associated.

As shown in Figures 1 and 2 the zone or area 3 of Vinyon or the like is at the top of the article or at the open upper edge and because of its nature after having been subjected to treatment it tends to hold its round shape and thus holds the top of the article open so that something may be readily inserted therein. The article itself is formed of material which is soft and flimsy and would tend to lie flat or to occupy an irregular position, so that articles, glasses, bottles and the like could not readily be inserted into it. The effect of the material shown in zone 3 is therefore to hold the end open and in substantially round shape.

In the modified form of Fig. 3 a bottle 4 is shown which has a neck 5 of reduced diameter. The covering therefore is generally similar to the article shown in Figures 1 and 2 and comprises a main portion 6 and a zone 7 formed adjacent or at its upper open end and this zone is formed of Vinyon or comparable yarns or fibers. After the article has been formed it is placed about the bottle and is subjected to heat, cold or other treatment which causes the material in the zone 7 to shrink and to take what is in effect a permanent set around the bottle thus making it difficult or impossible to remove the covering.

5

It is to be understood that subsequent heat treatment will further shrink or will tend further to shrink the material in the zone 7 but the bottle about which the cover is positioned obviously limits the ultimate shrinking of the device.

As shown in Fig. 4 the main body of the article is formed of threads, yarns or fibers 8 of almost any desired material while a portion or zone is formed of threads, yarns or fibers 9. It will be noticed that the fibers 9 are at one end or edge of the article.

As shown in Fig. 5 a composite article appears in which yarns or threads or fibers 8 alternate with yarns or threads or fibers 9. These are of the same nature as the members 8 and 9 shown in Fig. 4 and thus an article formed as shown in Fig. 5 will have the Vinyon or other comparable material interspersed throughout the body of the article and the physical action and effect of the yarns, threads or fibers 9 will be modified and to some degree limited by their intimate mixture with the yarns, threads or fibers 8. However, the shrinkability and hardenability of the members 9 is not totally eliminated or prevented by the interspacing and an article formed according to Fig. 5 would shrink and would perform otherwise as described above in connection with the other figures, but the shrinking would be substantially an overall effect.

I claim:

1. A shaped knitted protective jacket for liquid containers and the like, having a self-sustaining peripheral wall and an end wall, the jacket comprising a series of side-by-side rings formed from

6

yarns comprising fibers which exhibit different shrinkage properties at a given temperature, the rings comprising the yarns formed from the more readily shrinkable fibers alternating regularly with the rings comprising the yarns formed from the less readily shrinkable fibers, and the more readily shrinkable fibers being heat-shrunk and stiffened.

2. A shaped fibrous protective jacket for liquid containers and the like having a self-sustaining peripheral wall and an end wall, the jacket comprising a series of side-by-side rings formed from fibers which exhibit different shrinkage properties at a given temperature, the rings formed from the more readily shrinkable fibers alternating regularly with the rings formed from the less readily shrinkable fibers, and the more readily shrinkable fibers being heat-shrunk and stiffened.

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