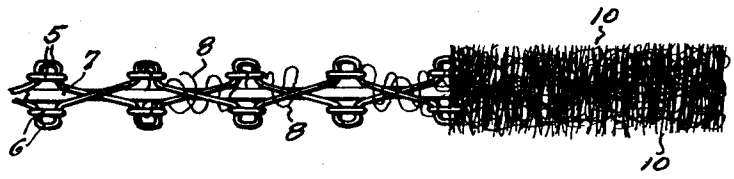
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KNITTED FABRIC AND METHOD OF MAKING THE SAME

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KNITTED FABRIC AND METHOD OF MAKING THE SAME

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This invention relates to the art of knitted fabrics, and for its principal object aims to provide a textile containing within the composition of its yarns a considerable quantity of kapok fibers, thus making available to the knitting industry a plentiful and, by present standards, an unusually low-cost material for use in the production of knitted fabrics.

The textile industry, while it has long recognized the many desirable qualities which are peculiar to kapok and has exerted considerable effort toward adapting fibers of the same to use in fabrics, has now largely abandoned experimentation with this material and the same consequently still finds commercial usage primarily only for packing purposes and as a fill ingredient for pillows and the like. One of the obstacles to usage in fabrics which, prior to the present invention, has been deemed insurmountable is the highly brittle nature of the raw fibers and the industry has arrived at the unwarranted conclusion that the fibers would necessarily break when subjected to flexure and furthermore, in their resistance to curling, would give to the produced fabric a rough and scratchy feeling. There has also been this further objection, and that is the constituent wax contained in the fibers of kapok, causing the fibers to slip and making it difficult to anchor the same within a woven body. All of these obstacles are effectively met and quite simply overcome in the instant process.

According to the present invention, and having reference to the accompanying drawing where I have illustrated a cross-section through a piece of double-faced knitting to schematically portray successively practiced steps of a suitable process, the procedure is to employ three yarns each of which contain staple fibers, as cotton, wool, rayon or the like, mixed in each instance with kapok fibers. In two of these yarns, the proportion is or may be 20% or thereabouts of kapok fibers. The third said yarn contains kapok fibers in the proportion, say, of one-half kapok to one-half basic materials. Using a knitting machine of the usual or suitable construction, yarns 5 and 6 from two spools, each containing 20% kapok, are knit into loops on both sides of the fabric to form, in the instance of each yarn, a ply that interengages with the ply formed by the other of the two yarns. The third yarn, denoted by 7, is incorporated unknit as an inlay yarn. When the knitting has been completed, the produced textile is then processed by subjecting the same to heat and moisture, accomplished either by subjecting the textile to a steam

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treatment or by dipping the same into boiling water. This treatment accomplishes two important ends, it extracts from the kapok fibers a part of the constituent wax and so softens the fibers as to permit the same to be easily bent.

The final step in the process, after this heat and moisture treatment, is to raise the fibers from the base of the knitting, and this operation, which in and of itself is common practice with ordinary yarns and may be performed by any one of a number of thread-picking machines expressly designed for the purpose, causes the kapok strands to be each drawn out from the knitting base at spaced intervals of their length. Insofar as each individual fiber is concerned, the same will be drawn out from the knitting base in a plurality of looping curls and with the fibers perforce piercing the knitting base between each said curl, each fiber usually piercing the base three times. A representation of individual raised fibers is shown at 8 and, by cumulation, there is produced in the finished product such an abundance of closely associated raised curls, denoted at 10, as to substantially pack the gaps of the knitting base and there results a textile having much the same appearance and the velvety feel of a "raised" virgin-wool blanket. Despite the abundant content of kapok fibers, the latter do not wear down easily nor do the portions thereof which pierce the knitting base tend to slip, hence substantially negating any sluffing of the fibers.

Kapok, when it is adapted to use in textiles through a knitting process such as I have here described, gives to the latter a number of highly desirable qualities. Kapok is unusually light in weight and, physically considered, is of a hollow cylindrical form. The air cavity within each fiber is largely responsible for the high heat-insulating characteristic of kapok, and the buoyancy of the material in water is also attributed to the hollow form of the fibers although the wax content, resisting absorption of water, is undoubtedly responsible in part therefor. In furtherance of this buoyancy, tests conducted with blankets produced in accordance with the present invention establish that the blankets will float in water for upwards of 48 hours and, when rolled, will serve as an efficient substitute for a life preserver. Aside from the low cost, light weight, and a superior ability to insulate against heat transfer, all of which features are highly desirable in substantially any fabric irrespective of the use to which the same is put, the buoyancy characteristic of a blanket knitted in accordance

with the teachings of the present invention makes the same almost a specific for use on ship-board.

It should perhaps be here stressed that knitting, as distinguished from weaving, is an essential part of the present process, and this is in consequence of the fact that, in weaving, the movements of the shuttle will cause kapok fibers within the warp to break and also to be pulled away from the base material. In a knitting procedure, however, the yarn is not subject to undue flexure and passes back and forth between both faces of the knitting to form loops upon both said faces, which loops are knitted together one with the next adjacent loop. The inlay yarn 7, which contains a large quantity of kapok fibers, pierces these loops. When the kapok fibers, later softened in the manner described, are raised into a multiplicity of surface curls, the fibers pierce the knitting base a plurality of times and are quite effectively locked against slippage. I find that the finished product has considerably less stretch than is usually found in a knitted product, and which has been considered perhaps the chief defect of an ordinary knitted textile.

The invention will, it is believed, have been clearly understood from the foregoing description. The proportion, as between kapok fibers and the base material, be it cotton, wool or other type of staple fiber, or combinations thereof, admits of considerable variation and the relative quantities which I have mentioned are not to be considered as implying any express limitation as to the amount of each which may be satisfactorily used.

What I claim is:

1. The process of producing a textile from staple yarns containing a large quantity of kapok fibers, which comprises knitting two yarns into loops on both sides of the fabric to form, in the instance of each such yarn, a ply that interengages with a similar ply formed by the other of the two yarns and incorporating, unknit therein, a third yarn as an inlay yarn, and upon completion of the knitting operation softening the kapok fibers and then thread-picking the textile to raise the softened fibers at several points within their length.

2. The process of producing a textile from staple yarns containing a large quantity of kapok fibers, which comprises knitting two yarns into loops on both sides of the fabric to form, in the instance of each such yarn, a ply that interengages with a similar ply formed by the other of the two yarns and incorporating, unknit therein, a third yarn as an inlay yarn, and upon completion of the knitting operation softening the kapok fibers by subjecting the knitted textile to the influence of heat and moisture and then thread-picking the textile to raise the softened fibers.

3. As a textile, a knit product of which all the contained yarns have an appreciable kapok content and with the kapok fibers raised into surface curls closely packed on both faces of the textile.

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