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HALF-SOLUBLE SPECIAL FABRIC AND A METHOD OF  
MANUFACTURING EMBROIDERY LACE THEREON  
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FIG. 1



FIG. 2

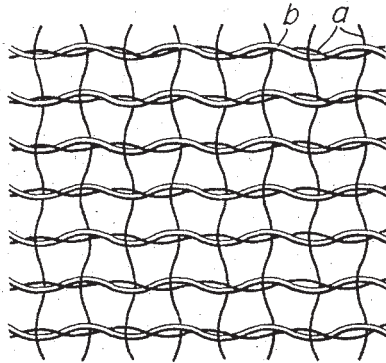
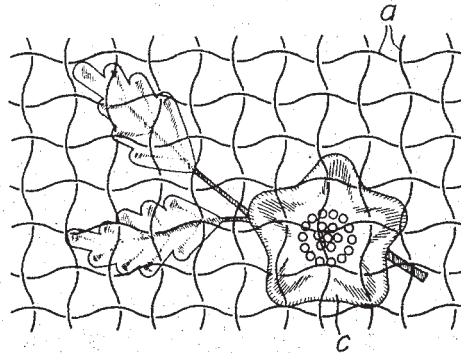


FIG. 3



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**HALF-SOLUBLE SPECIAL FABRIC AND A  
METHOD OF MANUFACTURING EM-  
BROIDERY LACE THEREON****Toshihiko Moriya, Tokyo, Japan, assignor to Nihon  
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**ABSTRACT OF THE DISCLOSURE**

A method for manufacturing a special embroidery lace by preparing a fabric from a combination of crimped yarn, hard-twisted, or non-twisted yarn of hot water-insoluble fibers having low denier and polyvinyl alcohol or alginic acid yarn of hot water-soluble fibers, embroidering the thus prepared fabric as an embroidery foundation cloth with hot water-insoluble yarn, and dissolving and removing only the hot water-soluble fibers from the foundation cloth.

This invention relates to a special fabric manufactured with a fine size of insoluble yarn, either of crimped, hard-twisted or non-twisted type, mix-used with a soluble yarn; and further relates to a method of manufacturing commercially valuable embroidery lace using said fabric as a foundation cloth.

Generally speaking, when embroidery is attempted on a foundation cloth, such foundation must be strong enough to withstand the burden of heavy and repetitious stitchings. It is therefore required that the foundation cloth be constructed with as many warps and wefts as permissible, preferably with a coarse size of yarn. The fabric of such construction is bound to be heavy and thick, and accordingly, even if it may withstand the burden of heavy stitchings, distinct noticeability of the foundation itself adversely affects delicacy and elegance of the embroidery lace made thereon. Such embroidery lace has little commercial value.

In order to avoid the demerit of distinct noticeability, the foundation cloth must be fine and light. The only known way of making such a fabric is to construct a loose weave using a fine size of yarn both for warp and weft. A fabric so woven, however, is too weak as a foundation to withstand the burden of heavy stitchings, and accordingly, slippings, or partial or even total break of the cloth occurs in the process of stitchings. Such embroidery lace has no commercial value.

There exists a conventional guipure embroidery, whereby a foundation cloth is totally dissolved with the help of chemicals, leaving the embroidery work alone intact. In the case of guipure, however, since the foundation is completely dissolved, each and every pattern or figure must be connected one way or another by the connection lines stitched all over open spaces. Otherwise, the patterns will not hold by themselves after the foundation has been dissolved. Guipure again has its drawbacks, such as:

(a) Acceptable patterns or figures are limited only to those which are connected. Separate or unconnected patterns are technically impossible for use in guipure.

(b) Incomplete stitchings or connection lines are frequently discovered only after the foundation has been dissolved, thus tedious mendings are often required.

(c) Due to a lengthy time required in precise and heavy stitchings all over the patterns and the frequent necessity of later mendings, etc., costs are bound to be high.

This invention has not only solved the technical difficulties as explained in the case of embroidering on a fine

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foundation, but also created at much reduced costs a variety of new embroidery lace which is extremely similar to the costly guipure, and moreover made it possible to choose patterns more freely than in the case of guipure.

The foundation cloth in this invention is woven, mixing a special soluble yarn and a fine size of insoluble yarn. The fabric so composed of is, with the support of soluble yarn therein, strong enough as a foundation and safely withstand the burden of heavy stitchings. After the embroidery is finished using an insoluble thread, then the soluble part in the foundation is dissolved. Because of disappearance of the soluble part, spaces in-between warps and wefts of the insoluble part of foundation are widened, giving far less noticeability, and yet the patterns had already been stitched on and held there neatly by the insoluble foundation. The embroidery thus obtained is unique in the point that while retaining almost guipure like elegance and appearance, a variety of new patterns, connected or unconnected, inclusive, are freely worked on. The insoluble foundation cloth, with its widened spaces, creates a fine texture and adds delicate touch to the embroidery lace. It also holds the stitched threads neatly, thereby greatly reducing the trouble of later mendings.

This invention relates to a special fabric mix-woven with either crimped, hard-twisted or non-twisted yarn of a fine size which is insoluble in lukewarm or hot water, such as nylon, polyester and other synthetics, as well as silk, cotton, etc. having a size of 10-40 deniers, and a yarn which is soluble in lukewarm or hot water, having a size of 50-150 deniers, a water-softening point of 30-80° C., such as polyvinyl alcohol or alginic acid fibers. The water softening point referred to above means the temperature at which the fiber sealed together with water in a glass tube is heated to shrink by 1/3 of the original length of the fiber.

The special fabric in this invention is manufactured by using for warp the above mentioned insoluble yarn, and for weft said yarn doubled or twisted with the above mentioned soluble yarn. Another construction of special fabric in this invention is manufactured by using both for warp and weft said insoluble yarn doubled or twisted with said soluble yarn. This invention further relates to a method of manufacturing embroidery lace, by means of using said construction of fabric as a foundation cloth and embroider thereon any desired pattern or figure, using such thread as nylon, polyester or other synthetics, as well as cotton, rayon, silk, wool, etc., which is insoluble in lukewarm or hot water, and after the embroidery is finished, immersing the cloth in water of 40-95° C. temperature for 30-90 minutes, thereby dissolving the soluble part in foundation but leaving the embroidery, as well as the insoluble part in foundation intact.

In the accompanying drawing which illustrates the invention diagrammatically:

FIGURE 1 shows an enlarged view of a double yarn consisting of hot water-insoluble fibers *a* of 10-40 deniers and hot water-soluble fibers *b* of 50-150 deniers, which is used as part of warp or weft for the foundation cloth of special embroidery lace;

FIGURE 2 shows an enlarged view of an embodiment of the foundation cloth for special embroidery lace prepared by using the hot water-insoluble fibers *a* of 10-40 deniers as warps, and the doubled yarns as shown in FIGURE 1 as wefts; and

FIGURE 3 shows an enlarged view of the special embroidery lace consisting of embroidery thread *c* of hot water-insoluble fibers, and hot water-insoluble fibers *e* used as warps and wefts for the foundation cloth, which remain after hot water treatment at 40°-95° C. for 30-90 minutes.

The following examples will illustrate the invention:

(1) A fabric was woven using for warp nylon crimped yarn of 15 deniers, and for weft said nylon yarn twisted at 100 t./m. with polyvinyl alcohol fiber yarn of 120 deniers having a water-softening point of 75° C. Using said fabric as a foundation, desired patterns were embroidered with rayon thread of 100 deniers. Subsequently, the cloth was immersed in water of 95° C. temperature for 60 minutes. Thus obtained was an embroidery lace beautifully stitched on a fine crimp foundation.

(2) A fabric was woven using for warp nylon none-twisted yarn of 15 deniers, and for weft said nylon yarn twisted at 100 t./m. with polyvinyl alcohol fiber yarn of 110 deniers having a water-softening point of 40° C. Desired patterns were embroidered thereon with wool thread of 30 count. Subsequently the cloth was immersed in water of 65° C. temperature for 45 minutes. A woolen embroidery lace nicely arranged on a fine plain foundation was obtained.

(3) A fabric was woven using both for warp and weft hard-twisted silk yarn of 21 deniers doubled at 100 t./m. with polyvinyl alcohol fiber yarn of 100 deniers, having a water-softening point of 70° C. Desired patterns were embroidered thereon with cotton thread of 80 count. Subsequently, the cloth was immersed in water of 90° C. temperature for 50 minutes. Thus obtained was an elegant cotton embroidery lace stitched beautifully on a fine silk crimp foundation.

(4) A fabric was woven using both for warp and weft crimped nylon 15 denier twisted with alginic acid fiber yarn of 100 deniers having a water-softening point of 50° C. Desired patterns were embroidered thereon with polyester yarn of 100 deniers. Subsequently, the cloth was immersed in water of 80° C. temperature for 60 minutes. Thus obtained was an attractive polyester embroidery lace made on a fine nylon crimp foundation.

What I claim is:

1. A method for manufacturing a special embroidery lace, which comprises preparing a foundation cloth by weaving first yarns having 10 to 40 deniers and consisting of hot water-insoluble fibers as warps and doubled yarns consisting of said first yarns and hot water-soluble fibers having 50 to 150 deniers and having a water-softening point of 30-80° C. as wefts, embroidering the thus prepared foundation cloth with embroidery threads consist-

ing of hot water-insoluble fibers, and dipping the embroidered foundation cloth in hot water at a temperature of 40-95° C. for 30 to 90 minutes thereby to dissolve and remove only hot water-soluble fibers woven into the foundation cloth, and retain the embroidery threads and the hot water-insoluble fibers woven into the foundation cloth between the embroidery patterns.

2. A method according to claim 1, in which said first yarns are crimped yarns of synthetic fibers.

3. A method according to claim 1, in which the hot water-insoluble fibers for the embroidery thread are selected from the group consisting of synthetic fibers, silk and cotton.

4. A method according to claim 1, in which the hot water-soluble fibers are selected from the group consisting of polyvinyl alcohol and alginic acid fibers.

5. A method according to claim 1, in which the doubled yarns are used as both warps and wefts for the foundation cloth.

6. A method according to claim 1, in which said first yarns are hard-twisted yarns consisting of at least one fiber selected from the group consisting of synthetic fibers, silk and cotton.

7. A method according to claim 6, in which the doubled yarns are used as both warps and wefts for the foundation cloth.

8. A method according to claim 1, in which said first yarns are non-twisted yarns consisting of at least one fiber selected from the group consisting of synthetic fiber, silk and cotton.

9. A method according to claim 8, in which the doubled yarns are used as both warps and wefts for the foundation cloth.

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