Feb. 10, 1931. A. C. MOEBUS ET AL 1,791,599

EMBROIDERED TEXTILES AND METHOD OF MECHANICALLY PRODUCING THE SAME

Original Filed May 22, 1924 3 Sheets-Sheet 1

Fig. 1.

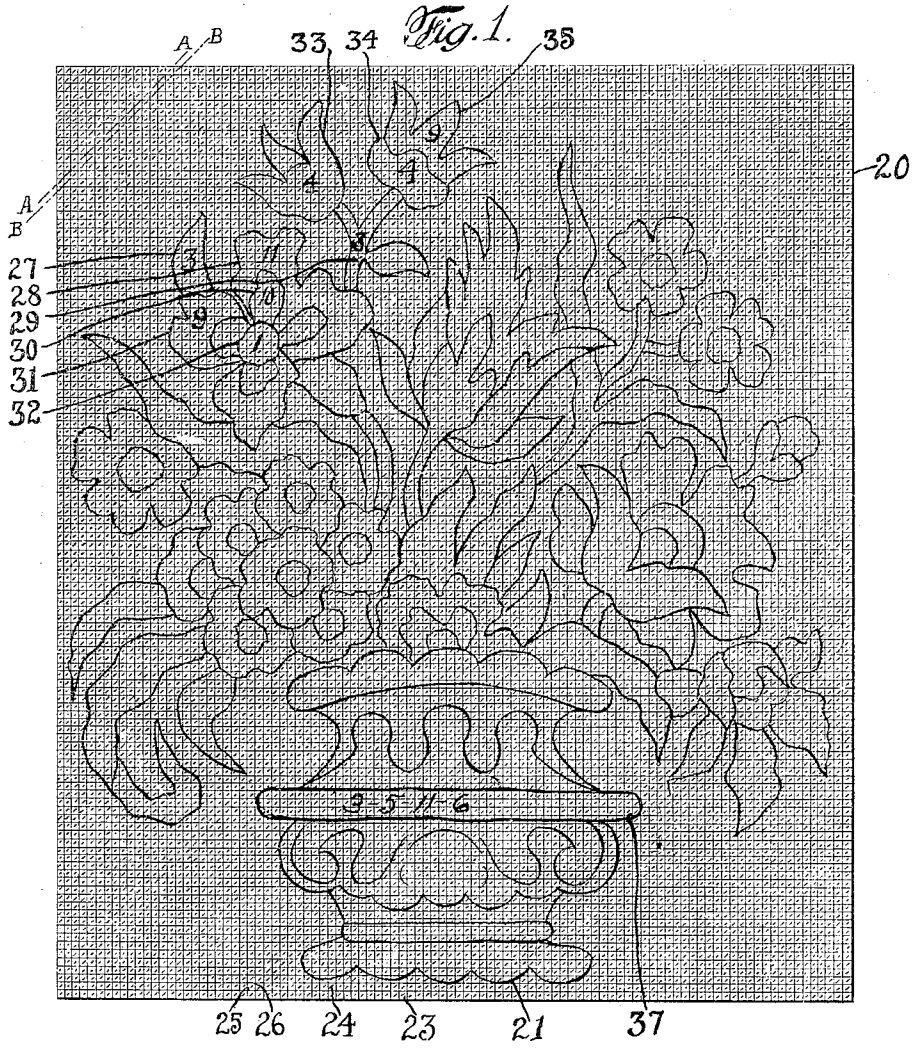


Fig. 2.

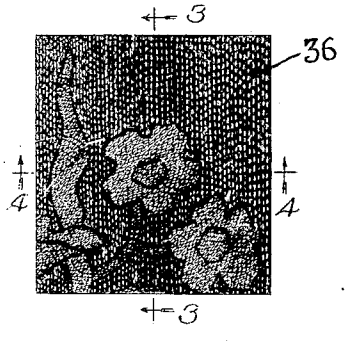


Fig. 3.

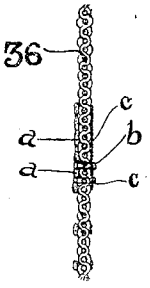
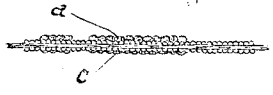


Fig. 4.



INVENTORS:
August C. Moebus and Charles A. Moebus,
BY
Otto W. Holmgren
their ATTORNEY.

Feb. 10, 1931. A. C. MOEBUS ET AL 1,791,599

EMBROIDERED TEXTILES AND METHOD OF MECHANICALLY PRODUCING THE SAME

Original Filed May 22, 1924 3 Sheets-Sheet 2

Fig. 10.

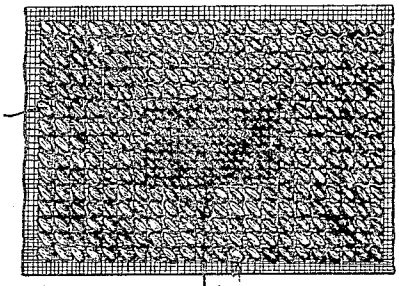


Fig. 11.

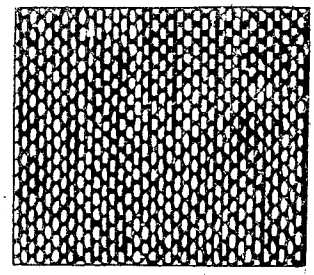


Fig. 6.

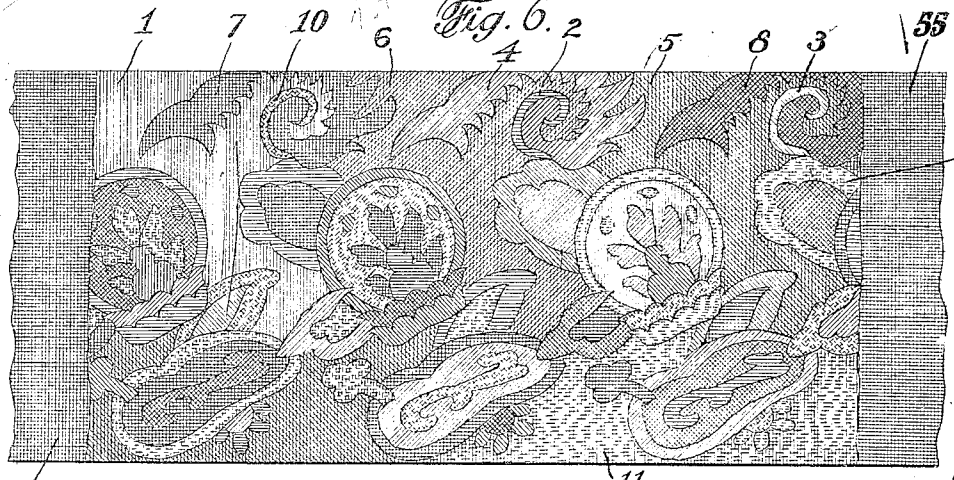


Fig. 5.

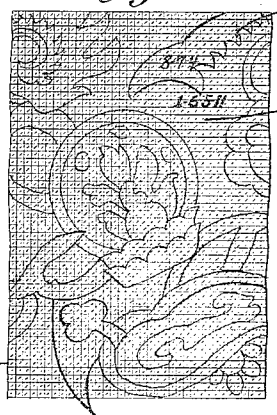


Fig. 8.

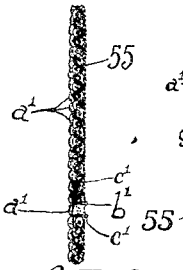


Fig. 9.

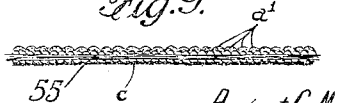
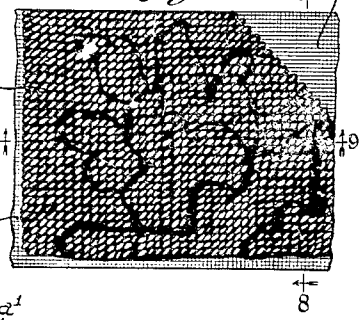


Fig. 7.



INVENTORS:
August C. Moebus & Charles A. Moebus,
BY
Otis M. Holmgren
their ATTORNEY.

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EMBROIDERED TEXTILES AND METHOD OF MECHANICALLY PRODUCING THE SAME

Original Filed May 22, 1924 3 Sheets-Sheet 3

Fig. 12.

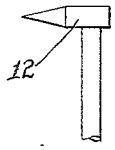


Fig. 13.

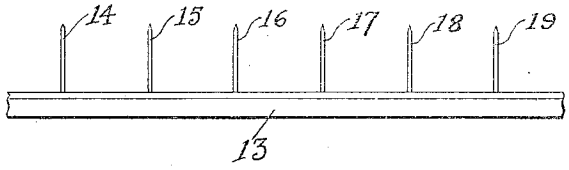


Fig. 14.

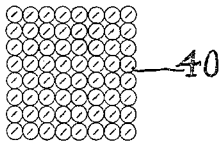


Fig. 15.

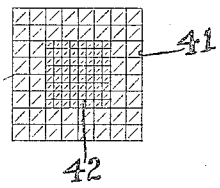


Fig. 16.

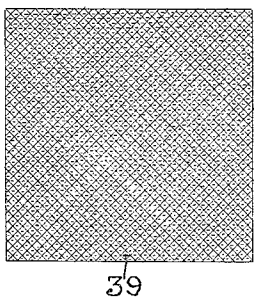


Fig. 17.

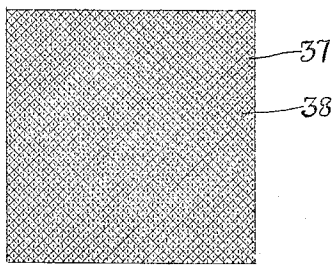


Fig. 18.

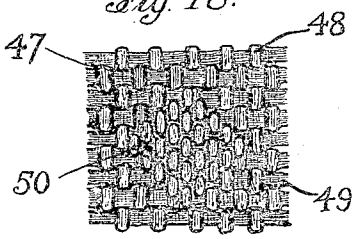


Fig. 20.

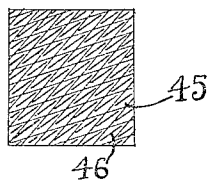
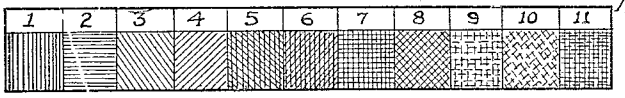


Fig. 19.



INVENTORS:
August C. Moebus & Charles A. Moebus,
BY
Otto W. Holmgren
their ATTORNEY.

Patented Feb. 10, 1931 1,791,599

UNITED STATES PATENT OFFICE

AUGUST C. MOEBUS, OF NEW YORK, AND CHARLES A. MOEBUS, OF NEW ROCHELLE, NEW YORK; HAZEL B. MOEBUS ADMINISTRATRIX OF SAID AUGUST C. MOEBUS, DECEASED

EMBROIDERED TEXTILES AND METHOD OF MECHANICALLY PRODUCING THE SAME

Application filed May 22, 1924, Serial No. 715,087. Renewed June 21, 1930.

This invention relates to the art of embroidering and particularly to embroidered textiles including those of the tapestry type and the improved production of the same by mechanical means entirely, in contradistinction to those produced entirely by hand or partly by mechanical means and partly by hand.

Hand made tapestries and like embroidered ornamental textiles as heretofore produced are readily distinguished by their individual characteristics and original effect and appearance, and are in popular demand because of their richness and beauty. The production of such hand made embroideries involves a considerable expenditure of time and skilled labor, making them expensive in cost, for which reason their use is to a certain extent limited to those who can afford the same. Attempts heretofore made to imitate hand made tapestries by mechanical means have been crude and have amounted to practical failure from an artistic as well as commercial point of view because of the apparent impossibility to successfully duplicate the effect of original hand work. Still other attempts have been made to produce tapestry effects in imitation of hand made tapestries by utilizing a mechanically made background material having certain tapestry weave characteristics and stitching the designs or figures on such background by hand in such manner that the hand stitched designs or figures may appear to some to form part of the background, but such attempts have likewise resulted in unsatisfactory imitations of original all hand work, and their production is furthermore accompanied by a substantial expenditure of labor and time because of the considerable amount of hand work necessary.

The primary object of this invention is the improved novel production of ornamental embroidered textiles of the tapestry type by mechanical means entirely, as for instance on a standard embroidering machine, preferably of the pantograph type.

A further object is to produce ornamental embroideries and tapestries which are substantially perfect duplications or reproductions of hand stitched or woven articles and practically undistinguishable therefrom even to those skilled in the art.

A still further object is to produce mechanically made ornamental embroidered textiles of tapestry type in repeating patterns of variegated color and design.

Another object is to produce an embroidered textile in repeated variegated color effects upon a background which is itself reproduced in variegated colors to correspond or contrast with the repeated variegated color effects of the design, as may be desired.

Still another object is to mechanically produce an embroidered textile in which the stitches are substantially exactly like those produced in hand needle point tapestry embroidery.

Still another object is to enable the needle point stitching to be produced mechanically in close simulation of hand-needle effects of hand made tapestries in both the background and pattern design, producing an embroidered surface which is undistinguishable from hand work and very pleasing to the eye.

Still another object is to enable needle point embroidery to be produced mechanically in different effects and combinations of effects.

With the above and other objects in view, which will hereinafter appear, certain specific embodiments of the invention are illustrated in the accompanying drawings, forming part hereof, wherein

Figure 1 is a reproduction on a reduced scale of a pattern chart as prepared for the pattern board of an embroidery machine in connection with one preferred embodiment of the invention.

Figure 2 is a detail view of a piece of ordinary loom woven textile with a portion of the design mechanically embroidered thereon, illustrating one effect produced according to the present invention.

Figure 3 is a sectional view through the warp of the textile, substantially on the line 3—3 of Figure 2.

Figure 4 is a sectional view through the woof of the textile, substantially on the line 4—4 of Figure 2.

Figure 5 is a partial reproduction on a reduced scale of a pattern chart as used on

the embroidery machine pattern board in connection with another embodiment of the invention in which both the design and the background are adapted to be superimposed in an all-over effect upon a mechanically woven background material in repeating patterns and variegated color effects.

Figure 6 is a diagrammatic view showing the variegated effect obtained as a result of the operation referred to in Figure 5.

Figure 7 is a face view of a portion of the mechanically produced embroidered textile as shown in Figure 6 illustrating the mechanical stitching superimposed upon the mechanically woven background material, in which the stitches constituting the boundaries of the figures of the pattern and hence the color divisions have been blocked out to distinguish the outlines of the figures.

Figure 8 is a sectional view through the warp of the mechanically woven background material with mechanically produced embroidery thereon, taken substantially on the line 8—8 of Figure 7.

Figure 9 is a sectional view through the woof of the background material, taken substantially on the line 9—9 of Figure 7.

Figure 10 is a face view of a piece of the mechanically embroidered textile produced according to the present invention illustrating certain modifications of the stitching within the capacity of the invention.

Figure 11 is a diagrammatic view illustrating the stitched effect produced through another modification of the herein described method.

Figure 12 is a representation of the tracing point of a pantograph type embroidery machine adapted to be used in the mechanical production of the herein described textiles.

Figure 13 is a top plan view of the needle rail of the embroidery machine as used in producing repeating designs or color effects or both upon the same background.

Figure 14 is an illustration of a modified layout of stitch indicia utilizable in accordance with this invention in which the geometrical figure employed is a circle.

Figure 15 is an illustration of a further modification of the stitch indicia including like geometrical figures of different sizes.

Figure 16 is an illustration of still another modification of the stitch indicia.

Figure 17 is a view similar to Figure 16 showing still another modification of the stitch indicia.

Figure 18 is a face view of a relatively coarse woven background material with unidirectional stitching mechanically superimposed thereon, in which the stitches are in close simulation of the upstanding portions of the weave of the background material.

Figure 19 is a representation of a color card used as a guide in effecting production of variegated color effects according to the present method.

Figure 20 is a partial representation of a modified form of stitch indicia in which the geometrical figure employed is a rhombus.

In carrying out the present invention our improved embroidered textiles are produced by the use of a mechanical embroidery machine, preferably of the shuttle pantograph type, of which standard types are available. The construction of such a machine forms no part of the invention and is well understood, for which reason the showing thereof is confined to the pantograph tracing point 12 and needle rail 13 having a series of needles of any desired number, in the present instance six, designated 14, 15, 16, 17, 18 and 19.

Referring particularly to Figures 1, 2, 3, 4, 12, 13 and 19, we have illustrated one embodiment of the invention in which the embroidered design is adapted to be mechanically superimposed upon any desired fabric material in simulation of hand work. In accordance with this method, the design or pattern is first prepared by the designer in the customary manner and is then laid out on an enlarged scale, preferably at least six times the size desired on the finished product, upon a pattern chart 20, as seen at 21, so far substantially in accordance with standard practice. In this instance, however, the chart 20 is, in accordance with our invention, divided into equally spaced, uniform, aligned subdivisions, preferably on the plan of a geometrical figure, which may be a parallelogram or other figure, in this modification squared subdivisions 23 being employed. The squared subdivisions 23 are laid out throughout the chart to encompass the entire design 21; or, the chart may be on specially prepared material already ruled out into the desired subdivisions. The design itself is delineated upon the chart without regard to the geometrical significance of the geometrical figures or subdivisions.

In accordance with this invention separate stitch indicia are placed upon the chart by suitable marks 24, such marks in this instance being by straight lines located in the squares 23 substantially on the line of the largest dimension thereof, from the point 25 to the point 26, which is the hypotenuse of the two equilateral triangles into which the square is thus divided. The stitch indicia 24 are thus located uniformly in the course of the aligned hypotenuses of meeting squares as indicated by the line A—A of Figure 1. In the succeeding course, designated B—B, which is parallel with the course A—A, the stitch indicia 24 are located between the termini of the stitch indicia in the course A—A. The chart is thus laid out or plaited in parallel stitch courses with the stitch indicia of alternating courses aligned as well as parallel with each other, so that

the stitch indicia of succeeding courses are arranged in uniform staggered or overlapping relationship. The system of squares in this instance has not been employed for the purpose of effecting enlargement or reduction, which expedient is well known, but has been devised in connection with our invention solely as a means for definitely and uniformly locating the stitch indicia in the desired relationship. The method of locating the individual stitch indicia as described herein constitutes an important feature of our invention by which we are enabled to successfully produce needle point embroidery of the type used in embroidered tapestries and like textiles by mechanical means entirely. The stitch indicia 24 located as above described may be placed upon prepared paper or like material and the squares themselves may in such case be dispensed with, but in practice their use is desirable for the guidance of the operator.

After the figures of the design and the stitch indicia have been thus charted, the figures or portions of the pattern or design may be suitably marked with indicia to designate the colors to be employed on the completed textile. In this instance a color card as shown in Figure 19 is employed in which the different colors are indicated by numerals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11, any desired number of colors being employed. Numerals or marks corresponding to the several colors are preferably placed directly upon the chart 20 as seen on the pattern figures or portions 27, 28, 29, 30, 31, 32, 33, 34 and 35 for illustration. The color indicia is followed in threading the needles of the needle rail 13 when a particular portion of the pattern is to be worked, as will be readily understood.

The chart 20 completed with the pattern, stitch indicia and color indicia is then placed upon the pattern board of the embroidery machine, and the needle or needles corresponding to the first figure to be worked properly threaded with threads of the desired color or colors. The operator then proceeds to follow the stitch indicia 24 with the tracing point 12, operating the machine to produce a stitch corresponding to each of the indicia marks 24. As shown in somewhat exaggerated form for illustartion at *b* in Figure 3 the threads of the stitches *a* extend through the fabric material 36 and are secured by the rearwardly crossing threads *c* of the shuttle in accordance with mechanical embroidery practice.

The fabric material 36, it will be understood, has previously been placed in the working frame of the embroidery machine. The operator may retrace each indicia mark 24 as many times as may be desired to cause the embroidered design to be built up on the fabric or textile 36 to any desired height. When one stitch has been thus completed a succeeding stitch, which may be either in the same or in an adjoining course, is treated in like manner. The operator keeps within the limits of the particular pattern portion worked upon and one figure or pattern portion is preferably finished before a succeeding one is taken up.

When one portion of the pattern has been completed in the desired color the needle is rethreaded with the color desired for a succeeding pattern portion and this procedure is observed until the entire design 21 has been reproduced upon the fabric or material. In actual practice the design is preferably repeated on the same piece of textile fabric a plurality of times by utilizing a plurality of needles 14, 15, 16, 17, 18 and 19, suitably spaced, so that the same figure traced out on the pattern chart will be reproduced in multiple. The repeated designs or figures may be exactly alike as to coloring, or the coloring may be varied in succeeding repeated figures by proper threading of the needles with thread of the desired colors in accordance with the predetermined color indicia, which in such case is indicated by a plurality of color marks as seen for illustration on the pattern portion 37 of Figure 1. In this case the first needle may be threaded with color 3 the next with color 5, the next with color 11, the next with color 6, succeeding needles being threaded in the same order. The order may be otherwise varied, as will be evident.

The finished piece of embroidered textile, produced singly or in multiple repeats, will consist of the background or fabric 36 with the design embroidered thereon with stitches which closely simulate hand needle point embroidery, in which the stitches will be located in closely spaced staggered relationship in a uni-directional oblique plane, and superimposed upon the background material to a height depending upon the extent to which each stitch has been built up. Every stitch is of substantially the same length and width, and can only be detached from hand work by viewing the reverse side of the fabric which as will be understood contains the rearwardly crossing threads as evidence of the mechanical construction. The finished piece is shown in Figures 2, 3 and 4, the background material in this instance being of contrasting character to illustrate the effect of the stitching. The stitches per se are better seen in Figure 10 and are exactly like the large stitches 43 of this figure, but located in an opposite oblique plane, which would be clearly indicated if the sheet containing this figure were read with the signatures toward the left hand.

The geometrical figure employed in laying out the stitch indicia is capable of effecting production of the same staggered relationship of stitches but in different planes as

indicated in Figures 16 and 17, so that the stitches may be produced in a horizontal or vertical plane instead of an angular or oblique plane as already described. In the case of production of the stitches in a vertical plane as indicated in Figure 17, the squares 37 are laid out in an angular plane and the stitches are indicated by vertical marks 38, the procedure being in all other respects like that already described. The result in this case will be as indicated diagrammatically in Figure 11. In the case of production of stitches in a horizontal plane as indicated in Figure 16, the squares are laid out in the same manner as in Figure 17 and the stitches indicated by horizontal lines 39. The result in this case is one in which the stitches would be located in a plane at right angles to that indicated in Figure 11 and as would be seen if this figure were read with the signatures of the sheet toward the left.

In using a square as the geometrical figure for locating the stitch indicia, it will be obvious that the indicia may be located in an angular plane opposite to that shown in Figure 1. Stitches 43 and 44 located in such direction are shown for illustration in Figure 10. Succeeding rows of stitches may also alternate as to their direction, thus producing further effects within the scope of the invention.

As already stated, the geometrical figure employed in laying out the stitch indicia may be other than a square. As seen in Figure 14 a circle is employed, the chart being laid out with a plurality of equally spaced aligned circles 40 as seen in this figure. The result is exactly the same. The use of a circle, however, permits the stitches to be laid out in any desired plane, the stitch indicia extending diametrically through the circles at any desired point in accordance with the direction in which it is desired to have the stitches run.

As a further illustration of the employment of different geometrical figures, Figure 20 illustrates the employment of a rhombus 45, which tends to produce longer stitch indicia 46, as will be obvious, all being in the same direction and in proper staggered relationship in succeeding courses.

The present method is also utilized to mechanically produce both large and small stitches on the same piece of fabric or textile, in which different parts of the embroidered textile may have stitches of different sizes. One way in which this is done is illustrated in Figure 15 in which the large squares 41 and small squares 42 are used, whereby four small sized stitches will be produced within the space occupied by substantially one large stitch. Very artistic embroidered results are producible mechanically by this modification. For the purpose of illustrating this result in combination with the result produced by locating the stitch indicia in an angular plane opposite to that shown in Figure 1, Figure 10 is here again referred to. The large sized stitches are in this case designated 43 and the small sized stitches 44.

In Figure 18 we illustrate the result produced by using vertical stitch indicia as shown in Figure 17, and embroidering the design upon fabric, designated 47, having a tapestry weave, warp portions of which upstand above woof portions. The needle point stitches 50 in this instance are shown as unidirectional with the weave and when mechanically embroidered upon the fabric 47 appear to be like hand work without actually being so. The stitches 50 may be located in either a vertical, horizontal or angular plane, in accordance with any of the previously described modifications of indicia location, and a wide variety of effects is possible, but the stitches will all bear the same relatively closely-spaced staggered relationship to each other, which is characteristic of hand made tapestries.

Our method as described enables us to produce on a shuttle pantograph machine an embroidered textile in which the stitches are substantially like hand produced needle point tapestry embroidery and practically undistinguishable therefrom even to experts, except by viewing the reverse side of the fabric in which the mechanical production will be evidenced by the crossing shuttle threads. Attempts to produce needle point embroidery mechanically have not heretofore been successful when using an embroidery machine of the shuttle type in which the threads of the stitches extend into the fabric, are looped at the reverse side and secured by the rearwardly crossing threads interposed by the traversing shuttle. By our improved method, however, such needle point stitches are producible, resulting in an all mechanically embroidered textile equaling hand made tapestries in richness, design, color, effect and appearance, at a greatly reduced cost over hand work, or part hand work and part mechanical work.

This textile has a surface which is in fact real tapestry, but produced mechanically instead of by hand. The stitches, instead of being woven, are mechanically constructed, and differ in construction from hand made stitches.

It has been found that very good results are obtained by using relatively fine thread for the stitches and building up the stitches to the desired height as hereinbefore described; thus, the needles in their traverse from the point of completion of one finished stitch to the point of commencement of another stitch, whether in the same course or in an adjoining course, will produce a small cross over stitch comprising but a single thread, but this thread is not visible to the

eye because it is located in close proximity to the fabric and within the interstices between the individual completed stitches. The completed stitches are thus actually interconnected, but are seen as individual stitches just as in a hand woven tapestry.

The present invention applies to embroidery machines of the shuttle type, and includes known types of pantograph machines and so-called automatic machines. In the case of the latter the invention is utilized in projecting the stitch indicia for the perforated records usually employed in connection with such automatic machines.

Mechanical all-over tapestry

Referring now to the modification of our invention illustrated in Figures 5 to 9, inclusive, there is illustrated an advanced development of our method by which ornamental tapestries are producible in exact simulation of hand made tapestries, except for evidence of the mechanical production on the reverse side. In this instance the entire piece is embroidered mechanically, including both design and background, in repeating designs and repeating color effects in both design and background. Hand made tapestries of this type are used for the finest decorations and are very expensive. Our mechanically made all-over tapestry equals the hand made article in elaborateness and is obtainable at a great reduction in cost.

In producing our all mechanically made tapestry, a pattern chart 51 is prepared in the same manner as the chart 20 already described, except that in this case a long continuous strip or piece is to be produced in repeating designs interlaced in uniform continuity, so that the chart 51 need only contain a complete figure, designated 52 which is to be reproduced in multiple to make up both design and background.

The repeating colors, desired for the design and background, are indicated on the chart 51 as seen on the pattern portion 53 and background portion 54, the color indicia referring to the selected colors according to the color card designed for the piece to be produced, which color card may be as indicated in Figure 19, and may contain any desired number of colors. In this instance each portion of the design and background may be reproduced in multiple in any number of different colors. One portion may be repeated any desired number of times using, say, three colors in successive repetition; another portion may be repeated any desired number of times using four colors successively; another portion may be repeated as many times as may be desired using six colors; or a particular portion may be repeated any desired number of times using one and the same color, which may be changed to another color for any desired number of repeats. In this manner a very elaborate color combination is obtained in the finished piece, the variegated effect tending to remove the impression that one design figure has been used in repetition and creating the impression that the entire piece is a complete figure or design, and imparting an elaborate individual effect to the finished product.

This all-over tapestry is composed of an all stitched surface superimposed on a relatively thin, fine weave but tough fabric, such as linen canvas, substantially of the type used in hand made tapestries. A piece of such fabric, designated 55, is secured in the working frame of the embroidery machine. This fabric may be in a single piece of any desired size within the capacity of the machine.

The needles on the needle rail are then spaced predetermined graduated distances apart so that each is adapted to embrace the range of one repeat of the figure, and threaded with the proper color thread as indicated by the color indicia for the pattern portion worked upon. The operator then follows the design as laid out on the chart, taking up one portion of the design at a time, just as in the modification already described, except that in this instance the stitch indicia are laid out throughout the background as well as the design itself, so that the background is an integral part of the design. The ornamental design and background as traced out on the chart by the operator will be reproduced on the fabric 55 throughout the extent thereof, the repeats interlacing with each other and making up a unitary surface.

As seen in Figures 7, 8 and 9, the stitches a' are all uniform in both design and background and are all in the same plane, so that there is no evidence of mechanical production upon the surface of the finished embroidered textile, which presents an appearance of hand embroidery throughout and can not in fact be detected therefrom when in use. All the stitches a' extend through the fabric 55 and as indicated at b' are secured by the separate threads c' interposed between the looped portions b' and fabric 55 at the reverse side of the textile.

The varied order of repetition of the colors used results in a very elaborate color scheme on the finished textile and greatly enhances its æsthetic appearance.

In practice we have produced very large pieces of such ornamental tapestry by mounting the fabric 55 on rolls in the embroidery machine so that when the embroidering of one strip embracing the capacity of the working frame of the machine has been completed the fabric is shifted to present an adjoining unworked surface, upon which the same figure is repeated as before, being interwoven with the preceding finished strip. By this means an embroidered piece of textile is pro-

duced of a size scarcely obtainable in hand work.

Any of the variations in the stitched effects produced as heretofore described, and illustrated in one instance in Figure 10, are utilizable in effecting production of the mechanically made all-over tapestry, greatly enhancing the artistic appearance of the finished piece.

It is to be understood that while the present showing and description discloses certain modifications of the invention, other forms and modifications are included within the spirit and scope thereof, as expressed in the appended claims.

What we claim is:

1. A machine-made embroidered imitation tapestry textile comprising a woven background fabric and ornamental needlepoint embroidery superimposed thereon to form both pattern and background and including substantially uniform, unidirectional stitches arranged in staggered close relationship, each stitch including a plurality of threads, the threads of said stitches extending through the background fabric to the reverse side thereof, and separate shuttle threads interposed within loops of the stitch threads projected through said background fabric, whereby said ornamental needlepoint embroidery covers substantially the entire obverse side of said fabric in simulation of a hand woven tapestry.

2. An embroidery chart for use with a shuttle embroidery machine having a pantograph device, said chart having a pattern outline delineated thereon, and separate individual stitch indicia for said pattern, said chart including a plurality of uniformly disposed geometrical figures and said separate individual stitch indicia comprising visible lines of division of said geometrical figures, said lines of division arranged in parallel courses with lines of division in each course in longitudinal alignment and lines of division in succeeding courses in staggered relationship, and said pattern outline delineated on said chart independently of the geometrical significance of said figures.

3. An embroidery chart as set forth in claim 2, in which the geometrical figure is a straight-sided angular figure.

4. An embroidery chart as set forth in claim 2, in which the geometrical figure is a square.

5. An embroidery chart for use with a shuttle embroidery machine having a pantograph device, said chart having a continuous interlaced pattern and background design delineated thereon, and separate individual stitch indicia for said pattern and background design, said chart including a plurality of uniform geometrical figures throughout said pattern and background design and said separate individual stitch indicia comprising visible lines of division of said geometrical figures, said lines of division arranged in parallel courses with lines of division in succeeding courses in staggered relationship continuously throughout interlaced pattern and background design, portions, said pattern and background design delineated on said chart independently of the geometrical significance of said figures.

In testimony whereof, we have signed this specification.

AUGUST C. MOEBUS.
CHARLES A. MOEBUS.