No. 794,045. PATENTED JULY 4, 1905.

W. J. POPE & J. HÜBNER.

FABRIC AND METHOD OF ORNAMENTING SAME.

APPLICATION FILED OCT. 17, 1904.

2 SHEETS—SHEET 1.

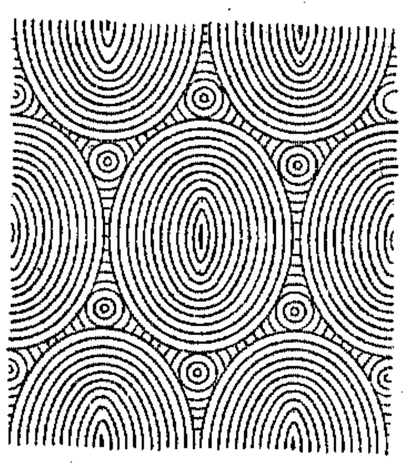

FIG. 5.

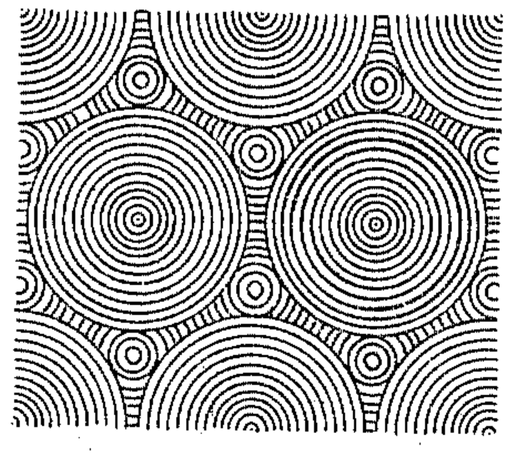

FIG. 3.

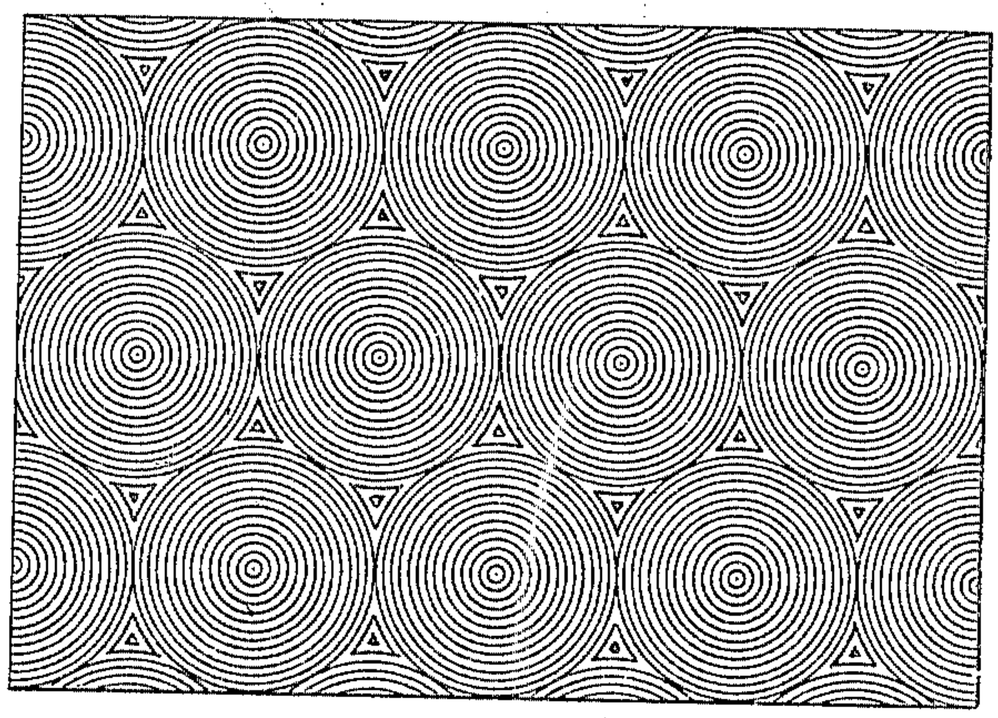

FIG. 2.

FIG. 1.

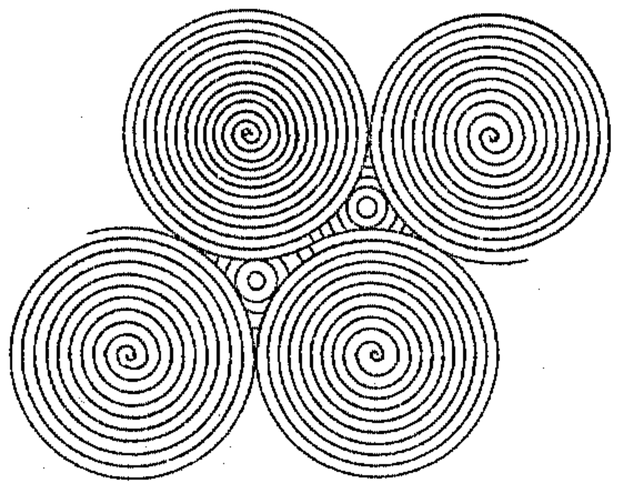

FIG. 4.

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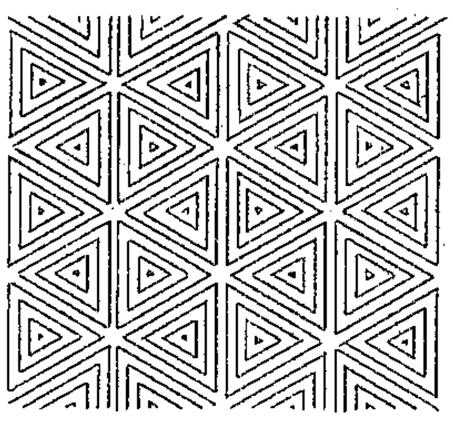

FIG. 7.

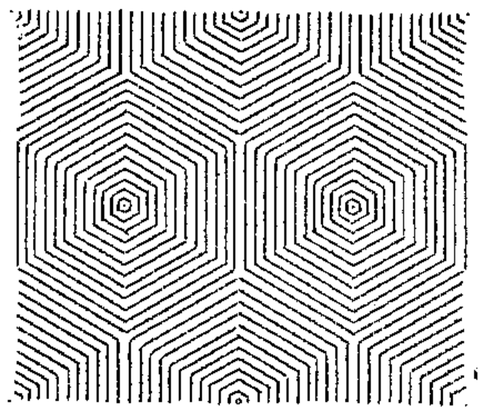

FIG. 6.

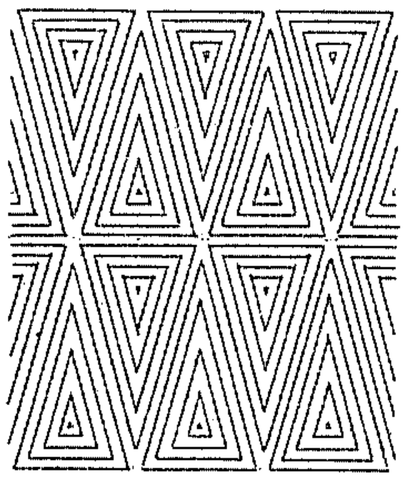

FIG. 8.

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No. 794,045. Patented July 4, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM J. POPE AND JULIUS HÜBNER, OF MANCHESTER, ENGLAND.

FABRIC AND METHOD OF ORNAMENTING SAME.

SPECIFICATION forming part of Letters Patent No. 794,045, dated July 4, 1905.

Application filed October 17, 1904. Serial No. 228,815.

To all whom it may concern:

Be it known that we, WILLIAM JACKSON POPE and JULIUS HÜBNER, British subjects, and residents of Manchester, county of Lancaster, England, have invented certain new and useful Improvements in Fabrics and Methods of Ornamenting the Same, of which the following is a specification.

The method hitherto practiced for obtaining an engraved finish on textiles consists in impressing on the fabric under certain well-known conditions the pattern from a metal cylinder or bowl, upon the surface of which some hundreds of lines (usually straight and parallel) to the linear inch have been engraved. The impression produced upon the fabric under suitable conditions by this cylinder, hereinafter called the "engraved bowl," gives the fabric a peculiar finish or luster, hereinafter called the "engraved" finish.

For the purpose of imparting an engraved finish of a uniform character to textiles the engraved bowls hitherto used have always been engraved with straight parallel lines. As one result of the parallel arrangement of these lines the full luster of the engraved finish is only to be seen when the source of illumination occupies a certain kind of position with respect to the fabric and to the eye of the observer. The finish is therefore only to a very limited extent uniform in character, because the surface of the finished material does not present the same appearance in whichever direction it is viewed. Another kind of engraved finish which has been previously applied to textiles is obtained by the application of an engraved bowl, upon the surface of which a pattern made up of fine lines to the number of some hundreds to the linear inch has been engraved, which lines are not all straight and parallel; but some, if not all, are curved, or, if straight, are not all parallel. This kind of engraved finish has hitherto been applied exclusively for the production of a finish which is visible to the eye as a perfectly definite design or pattern and has not been applied for the production of a finish which is uniform in character or which gives to the eye of the casual observer the impression of being a finish of a uniform character.

We have discovered that an entirely new effect and a much more effective engraved finish than has hitherto been obtained may be produced by the application of an engraved bowl, upon the surface of which is engraved a pattern consisting of lines lying very close together, as in the ordinary engraved bowls, but which pattern consists in the repetition over the surface of the bowl of an engraved design made up of closed curves or figures, the design which is repeated being so small as not to be distinguishable as a definite and distinct design by the eye of the casual observer who examines the fabric upon which the pattern has been impressed without the aid of a magnifying apparatus. In other words, the lines of the curves or figures are microscopic, and the same statement applies to the intervening spaces between said lines.

Such a finish as that now described differs from the finish obtained by impressing with a bowl engraved with the ordinary parallel straight-line engraving in that it does not reflect light only when the source of illumination, the surface of the fabric or lamellar material upon which the finish is impressed, and the eye of the observer occupy one definite series of relative positions; but it reflects light uniformly and shows a uniform finish or appearance in whatever relative position it may be placed.

The engraved finish now described differs from all that have previously been obtained in that it is truly a uniform or homogeneous finish, the surface upon which the finish is impressed exhibiting the same appearance in whichever direction it is observed with the eye, unaided by magnifying apparatus.

The invention will be fully described with reference to the accompanying drawings, in which as examples several diagrams of the patterns or figures to be engraved upon the bowls or rollers are illustrated, all of which are drawn to a very greatly enlarged or magnified scale.

Figure 1 is an engraving of a number of small circles; Fig. 2, an engraving of sets of concentric circles; Fig. 3, an engraving of sets of concentric circles in modified form; Fig. 4, an engraving of sets of spirals resembling sets of concentric circles; Fig. 5, an engraving of sets of ovals or ellipses; Fig. 6, an engraving of sets of hexagons; Fig. 7, an engraving of sets of triangles; Fig. 8, an engraving of sets of triangles.

The uniform or homogeneous engraved finish which we have described above is obtained by the countless repetition upon the surface of the engraved bowl of a design which is too small or too minute to be distinguishable by the eye unaided by magnifying apparatus or of a design with uniform repetition which is of a size quite readily appreciable by the unaided eye, but which produce a somewhat similar optical effect, owing to the fact that the eye does not immediately analyze such patterns when so impressed upon a lamellar surface, especially when such a surface is folded or is made up into articles of dress or the like. The simplest form of engraving, which gives this new technical effect in the finishing of fabrics hereinbefore described, is illustrated in Fig. 1. This pattern or engraved finish is obtained by covering the surface of the engraved bowl with a pattern consisting in the repetition of minute circles having a diameter of one one-hundred and fiftieth part of a linear inch, the centers of adjacent circles being one one-hundredth of a linear inch apart.

Instead of a repetition of single circles each circle may be made up of two, three, or more concentric circles with a minute distance between each. A design or pattern thus formed which gives a very good effect is illustrated in Figs. 2 and 3. These patterns comprise sets of concentric circles engraved so close together that the surface of the engraved bowl is wholly filled in with lines lying very close together. The pattern is obtained by describing sets of equal circles packed closely together, but each approaching the adjacent circle within a distance of one one-hundredth of a linear inch. From the centers of these circles other sets of concentric circles are described with radii which increase in arithmetic progression from the one three-hundredth of a linear inch by a constant increment of one three-hundredth of a linear inch until the radius of the largest original circles is attained. The interstices between the larger original circles are filled in with sets of concentric arcs of circles drawn from the centers of the original circles, (see Fig. 2,) or they may be filled in with sets of circles and arcs drawn from the centers of the interstices, the increment of radius and the diameters of the smallest circles being the same as before. (See Fig. 3.)

We at present prefer to place the circles one three-hundredth of an inch apart; but in practice the lines may be engraved at any distance apart from one one-hundredth to one five-hundredth of an inch. The pleasing character of the luster is materially enhanced by the fact that this particular kind of patterns give rise to an optical delusion, from which the observer derives the visual impression that the pattern changes as the material upon which it is impressed is moved.

The sets of circles described in Figs. 2 and 3 may be replaced by other kinds of figures, such as helices or spirals, Fig. 4, sets of ovals or ellipses, Fig. 5, sets of hexagons, Fig. 6, and sets of triangles with either straight or curved sides, Figs. 7 and 8. Further, the figures used in the design may be filled in with engraving consisting of straight or curved lines, which lie in different directions in the various parts of the design. It is, however, to be understood that in place of circles we may use other curves or figures and that interstices in the pattern may be filled up by engraving consisting of lines in so far as the use of these lines does not interfere with the homogeneity of the finish, as the finish is apparent to the eye unaided by the aid of magnifying apparatus.

Although the main object of the present invention consists in obtaining an engraved finish which exhibits a uniform luster which is quite different in kind from any hitherto obtained, the invention may also be applied for the purpose of bringing into relief floral and other patterns which may be engraved upon the bowl or impressed or woven into the lamellar material. Thus pleasing effects may be obtained by the use of designs of different sizes in the different parts of a floral or other pattern. Although the size of the design in the engraved finish may be so small as to be indistinguishable as a definite design by the unaided eye, several different types or sizes of design of the above-described kinds may be so applied to the various parts of one pattern as to give different kinds of luster, and so to cause the floral or other pattern to stand out in greater relief. The invention may also be applied to fabrics or other lamellar materials on which a moire, crêpe, goffered, or other impressed or calendered finish has been or is to be produced. It is further stated and is to be understood that the size of the pattern as also the degree of fineness of the engraving may be altered to suit the requirements of any particular case.

We wish it to be clearly understood that engraved bowls engraved with finely-engraved straight parallel lines, curved lines, and dots have been previously employed, and

we do not claim for the use of these, because they do not give the effect now described as new, this effect being due to the use of an entirely new type of design or pattern.

What we claim as our invention, and desire to protect by Letters Patent, is—

1. A method of ornamenting textile fabric, which consists in impressing thereupon a plurality of closely-arranged inclosed figures the lines of which and the spaces between said lines are microscopic.

2. A method of ornamenting textile fabric, which consists in impressing thereon a plurality of curvilinear, grouped figures, the groups being closely arranged and the lines and the spaces between said lines being microscopic.

3. A method of ornamenting fabric which consists in impressing thereupon closed figures arranged in groups, each of the latter comprising several figures surrounding one another and the lines of the figures and the spaces between said lines being microscopic.

4. As an article of manufacture a textile fabric having one of its faces provided with a plurality of concentric curvilinear microscopic lines closely arranged thereon to form a changeable lustrous surface and the spaces between said lines being also microscopic.

5. As an article of manufacture, a textile fabric having a face provided with a plurality of closed figures concentric and arranged within one another to form a changeable lustrous surface the lines of the figures and the spaces between said lines being microscopic.

6. As an article of manufacture, textile fabric having on its surface a plurality of impressed grouped figures, the groups being closely arranged and the lines of the figures and the spaces between said lines being microscopic.

7. A method of ornamenting fabric, which consists in embossing thereupon a plurality of grouped figures, the lines of the figures being microscopic and the spaces between said lines being also microscopic.

8. A method of ornamenting fabric which consists in embossing thereupon a plurality of closely-arranged groups of closed figures, the lines of the figures and the spaces between said lines being microscopic.

9. A method of ornamenting fabric which consists in embossing thereupon a plurality of closely-arranged groups of closed figures, the lines of the figures being curvilinear and microscopic and the spaces between said lines being also microscopic.

10. As an article of manufacture, fabric having thereupon embossed grouped figures, the lines of the figures and the spaces between the lines being microscopic.

11. As an article of manufacture, fabric having thereupon closely-arranged groups of embossed closed figures, the lines of and the spaces between which are microscopic.

12. As an article of manufacture, fabric having thereupon closely-arranged groups of embossed closed figures, the lines of and the spaces between which are microscopic and curvilinear.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

W. J. POPE.
JUS. HÜBNER.

Witnesses:
I. OWDEN O'BRIEN,
B. NATHAN WOODHEAD.