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PATTERNED FABRICS AND PROCESSES FOR
PRODUCING SAME

Georges Heberlein, deceased, late of Wattwil, Switzerland, by Georg Heberlein, Jr., legal heir and administrator, Wattwil, Wanne, Switzerland, and Ernst Weiss, Wattwil, Switzerland, assignors to Heberlein Patent Corporation, New York, N. Y., a corporation of New York

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This invention pertains to cellulosic fabrics, for example, cotton fabrics, embodying permanent and wash-resistant, fancy pattern effects, consisting of a combination of locally parch- mentized and locally shrunk pattern areas, to- gether with opaque, pigmented patterns, which may appear in whole or in part in either the parch- mentized or shrunk pattern areas or in otherwise untreated portions of the fabric. In addition desired pattern areas of the fabric may be left plain, i. e., neither parch- mentized, shrunk nor pigmented.

The invention pertains to the patterned fabrics aforesaid, as well as to various novel methods for producing the same, as described hereinafter.

This application is a continuation-in-part of applications Ser. No. 370,156, filed December 14, 1940, now patent 2,382,416, Ser. No. 187,027, filed January 26, 1938, now abandoned and Ser. No. 599,114, filed June 12, 1945.

In accordance with the basic concept of the processes above referred to, certain fabric areas according to a desired pattern, are given a parch- mentizing or transparentizing treatment and thus rendered more sheer than the original or start- ing material so treated, while other areas are locally shrunk and hence rendered more com- pact in appearance and of denser weave than the original material, in addition to which the fabric embodies opaque, locally pigmented areas, in which the pigment is made fast to the fabric and rendered wash-resistant by fixation with a water-insoluble resist or reserve, such as nitro- or other ester derivatives of cellulose, lacquer, chlorinated rubber, or the like.

In accordance with an important and novel feature of the invention, these pigmented pat- terns may, as above stated, be embodied in whole or in part in either the parch- mentized areas or in the shrunk areas or in otherwise untreated portions of the starting material, which is ordi- narily plain, mercerized cotton fabric. That is to say, the pigmented areas may of themselves be parch- mentized in whole or in part, or may be shrunk in whole or in part, or may be neither parch- mentized nor shrunk even though contig- uous to or entirely surrounded by parch- mentized or shrunk areas.

These results are brought about by the various methods described below for obtaining specific pattern effects desired, in conjunction with the use of pigment reserves which are permeable only to parch- mentizing agents, or permeable only to shrinkage agents, or permeable to either or to

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neither, depending on the particular effects de- sired in any given instance.

In this connection we have discovered, for ex- ample, that albuminous and casein reserves for the pigment, are substantially impermeable to, i. e., resistant against the action of parch- mentizing agents, such as sulfuric acid, but on the other hand are quite permeable to shrinkage agents, such as caustic soda. Likewise, nitro- cellulose pigment reserves can be made relative- ly impermeable to parch- mentizing agents, but are noticeably affected by shrinkage agents. On the other hand, chlorinated rubber reserves are impermeable both to parch- mentizing and shrink- age agents; while acetyl-cellulose reserves are appreciably affected by both parch- mentizing and shrinkage agents. Various other wash-resistant and water-insoluble reserves might be mentioned as falling within one or the other of the above categories, but those mentioned will suffice to il- lustrate the selective actions that may be ob- tained as between the pigment reserves on the one hand and the parch- mentizing and shrink- age agents on the other.

The processes employed for obtaining pattern effects as above noted will vary somewhat in ac- cordance with the specific pattern effects desired, and may be illustrated by the following:

Process (1).—A roll of plain mercerized cot- ton fabric is fed progressively through a first print roll for printing a water-insoluble and wash-resistant pigment reserve onto the fabric in a desired pattern, the fabric being fed thence, in the same printing operation, through a second print roll for applying a second pattern of a water-soluble reserve of gum, vegetable mucilage, or the like, in a desired registered or non-reg- istered relation to the pigment reserve pattern. A gum reserve consisting, for example, of equal parts by weight of water and gum arabic, is im- permeable both to parch- mentizing agents, such as sulfuric acid, and also to shrinkage agents, such as caustic soda. The entire fabric so printed is then subjected to a parch- mentizing treatment in a bath of sulfuric acid, thereby to parch- mentize the exposed or unprinted areas. The fabric is thereupon washed to remove the gum reserve, and the entire fabric is subjected to shrinkage treat- ment in an alkali bath, such as caustic soda, whereby the areas formerly protected by the gum reserve are shrunk. The shrinkage agent does not shrink the transparentized areas, but merely enhances their sheerness. The effect of the parch- mentizing and shrinkage treatments on the pigmented areas is discussed below.

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The finished fabric is thereby ornamented with pattern areas which are parchmented, other pattern areas which are shrunk, and pattern areas containing the wash-resistant pigment reserve. The pigmented areas may appear in whole or in part in either the parchmented or shrunk areas or in fabric areas which are neither parchmented nor shrunk, depending on the predetermined pattern desired and on the pigment reserves employed, i. e., whether they are permeable to acid, or only to alkali, or to neither.

It is to be noted in connection with the above process, that there are two ways of preventing the pigment printed areas from being affected by the parchmentizing treatment. One is to employ a pigment reserve, such as nitrocellulose, which is impermeable to the acid but permeable to caustic; the other is to overprint the pigment reserve with a water-soluble gum reserve, in which event the gum reserve protects the pigment reserve during the parchmentizing treatment, after which the gum reserve is removed by washing. In this case a pigment reserve is employed which is permeable to caustic if it is desired to shrink these areas; or with a pigment reserve impermeable to caustic if it is desired to have these areas unshrunk.

Specific examples illustrative of the above process are the following:

Example I

A mercerized mousseline fabric is fed progressively through a first print roll which prints thereon according to a desired pattern, a water-insoluble and wash-resistant pigment reserve consisting of:

230	grams	titanium white
45	do	acetyl cellulose
370	do	ethylene chlorhydrin
355	do	water

In the same machine, the fabric is then fed through a second print roll which prints in registry with the pigment pattern, a different pattern with a water-soluble or gum resist impervious to parchmentizing treatment as aforesaid, namely, a resist consisting of vegetable mucilage or of equal parts by weight of water and gum arabic. After drying, the fabric is passed through a parchmentizing or transparentizing bath of sulfuric acid of 54° Bé. for 8 seconds at 15° C., whereupon it is immediately washed to remove the acid and gum reserve, and dried. Thereupon the fabric is given a shrinkage treatment with a caustic soda solution of mercerizing strength, for instance 38° Bé., on steeping for instance during 10 seconds without tension. The material is then pressed out, left to itself for several minutes and allowed to shrink, and is then rinsed hot. After the usual acidifying to neutralize the alkali, followed by water rinsing, the fabric is dried under the least possible tension.

As a result of the above treatments the pattern areas initially exposed to the parchmentizing agent, i. e., the areas initially unprotected by the gum reserve, are parchmented; while the areas initially protected by the gum reserve, are shrunk, due to removal of this reserve prior to shrinkage treatment.

Since the acetyl cellulose pigment reserve is permeable both to parchmentizing and shrinkage agents, the effect of the above treatments on the pigmented areas will depend on the extent to which the gum printed areas overlap the pig-

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ment printed areas. If the gum resist wholly overlaps the pigment printed areas, these areas will be protected against the parchmentizing treatment and hence will be shrunk, due to subsequent exposure to the shrinkage treatment on removal of the gum reserve. Conversely, if the gum printed areas do not encroach upon the pigment printed areas, these areas will be parchmented due to exposure to the parchmentizing treatment. Finally if the gum printed areas only partially overlap the pigment printed areas, the initially exposed portions will be parchmented and the remaining portions subsequently shrunk.

The pigmented areas which are parchmented are merely stiffened, but remain opaque due to the presence of the pigment. The remaining parchmented areas are, however, transparentized, and the subsequent shrinkage treatment produces no shrinkage of these portions but merely imparts a different or more enhanced sheerness thereto. On the other hand the shrinkage treatment shrinks and thus increases the density of weave of the unparchmented areas, the two effects above noted thus enhancing the optical contrast between the transparentized and shrunk portions.

Also the shrinkage of the unparchmented areas produces undulations or puckered effects in the fabric due to the shrinkage of these areas in contrast to the non-shrinkage of the parchmented areas.

Example II

The fabric is pattern printed with a pigment resist made up as follows:

50	grams	chlorinated rubber
175	do	toluol
30	do	American pine oil
80	do	titanium white

and in registry therewith, in the same printing operation, is printed with a gum reserve as aforesaid. Thereupon the fabric is subjected to the above mentioned parchmentizing treatment, washed and dried, and subjected to shrinkage treatment as aforesaid.

Since the chlorinated rubber resist is impermeable both to parchmentizing and shrinkage agents, the pigment reserved areas are neither parchmented nor shrunk. The gum printed, non-pigmented areas are shrunk, while the non-pigmented initially exposed areas are transparentized.

Process (2).—The ornamental effects above discussed may be obtained by an alternative procedure of directly printing the fabric with a pigment resist and with a parchmentizing paste, rather than by printing with a water-soluble gum reserve followed by treatment in a parchmentizing bath. In accordance with this alternative, the original fabric is fed through successive print rolls, the first of which applies the wash-resistant pigment reserve in a desired pattern, which is dried on the way to the second print roll; while the second print roll applies the parchmentizing paste (such as zinc chloride or calcium thiocyanate solution, thickened with cellulose) in a desired relation to the pigmented pattern. After drying and heating to develop the parchmented pattern, and washing, the fabric is subjected to shrinkage treatment in an alkali bath.

Here again the fabric will contain locally parchmented pattern areas, locally shrunk areas, and wash resistant pigmented areas, which

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may appear in whole or in part in the parch-
mentized areas, in the shrunk areas, depend-
ing on the relative pattern arrangement and on
the type of reserve employed for the pigment.

A specific example of this procedure is the
following:

Example III

The fabric is pattern printed on a first print
roll with an acetyl cellulose pigment resist as in
Example I, and dried on the way to a second print
roll where it is printed in a different pattern
with a parchmmentizing paste consisting of:

69.5 grams zinc chloride
30.5 do water
1.8 do viscose

or with a parchmmentizing paste consisting of:

710 grams crystallized calcium thio-
cyanate
106 grams water
22 do viscose waste

The fabric is thereupon dried and heated at
about 80° to 100° C. to develop the parchm-
mentizing effect, and preferably washed and again
dried, following which it is subjected to shrinkage
treatment as in Example I.

The pattern areas printed with the parch-
mentizing paste will be parchmmentized, including
such pigment reserved areas as may be over-
printed with the parchmmentizing agent; while the
remaining areas will be shrunk, including such
pigmented areas as are not parchmmentized in the
manner aforesaid. In this connection it is to
be borne in mind that the pigment reserved areas
may be wholly or only partially parchmmentized
or completely unparchmmentized; or wholly or
only partially shrunk, depending on the extent
to which the pigment reserve is overprinted with
the parchmmentizing paste.

Substitution of a chlorinated rubber for the
acetyl-cellulose pigment reserve would result in
pigmented areas which are neither parchmment-
ized nor shrunk, against a background of locally
transparentized and locally shrunk pattern areas.
Substitution of a nitrocellulose reserve would
result in the pigmented areas being substantially
unaffected by the parchmmentizing paste in the
event of overlapping, whereby the pigmented
areas will be wholly shrunk in the subsequent
shrinkage treatment.

Process (3).—According to another important
modification of the invention, the original fabric
may be fed successively through a pair of print
rolls, one of which applies a wash-resistant pig-
ment reserve in a desired pattern, and the other
of which applies a gum reserve. The entire
fabric is thereupon subjected to a parchmment-
izing treatment in an acid bath, and washed to
remove the gum reserve. Thereupon the entire
fabric is again printed with a gum reserve, but
in a different pattern from the original gum
reserve, for example in stripes, and the entire
fabric so printed, subjected to shrinkage treat-
ment in an alkali bath, and then washed out to
remove the second gum reserve.

The resulting fabric will contain parchmment-
ized pattern areas, locally shrunk pattern areas,
and fabric areas which are neither parchmment-
ized nor shrunk, together with areas embodying the
wash-resistant pigment, which may appear in
whole or in part in either the parchmmentized,
shrunk or otherwise untreated fabric areas, de-
pending on the pigment reserve employed, and on

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the relative arrangement of the pigment and
gum reserves.

If, for example, a pigment reserve, such as
chlorinated rubber, is used which is impermeable
to both parchmmentizing and shrinkage treat-
ments, the pigment will appear in fabric areas
which are neither parchmmentized nor shrunk.
If, on the other hand, the pigment reserve used
is impermeable to acid but permeable to alkali,
such as nitrocellulose, the pigmented areas will
not be parchmmentized, but will be locally shrunk
in part and locally unshrunk in part, owing to
partial protection from the shrinkage treatment
by the second gum printing. This same result
is also obtained if a pigment reserve is used
which is permeable to both parchmmentizing and
shrinkage, such as acetyl cellulose, but the pig-
ment reserve is overprinted by the first gum re-
serve and hence protected from the parchmment-
izing treatment.

Example IV

A mercerized mousseline fabric is pattern
printed on a first print roll with a pigment re-
serve consisting of

180 grams nitrocellulose (including 35% butanol)
450 do amylacetate
150 do ethylacetate
20 do ethyl alcohol
200 do colored titanium white (TiO₂)

and, in the same machine, on successive print
rolls, is printed with one or more gum reserves
which may contain different colored dyestuffs.
After drying, the fabric is passed through trans-
parentizing sulfuric acid of 54° Bé. for 8 seconds
at 15° C. whereupon it is immediately washed to
remove the gum reserve, and dried. Then the
fabric is again printed with a gum resist in a
different pattern, for example in spaced stripes,
and is given a shrinkage treatment with a caustic
soda solution of mercerizing strength, for in-
stance 38° Bé. on steeping for example during
10 seconds without tension. Then the material
is pressed out, is left to itself for several minutes
and allowed to shrink, and is rinsed hot. After
the usual acidifying and rinsing, the fabric is
dried under the least possible tension.

Since the nitrocellulose pigment reserve em-
ployed is substantially impermeable to parch-
mentizing agents, neither the pigment reserved
areas nor the initially gum printed areas are
affected by the parchmmentizing agent, so that
only the exposed, untreated areas are parchmment-
ized, i. e. transparentized. On subsequent re-
moval of the initial gum reserves followed by the
second gum reserve printing in spaced strips and
overall treatment with the shrinkage agent, the
exposed portions of the theretofore untreated
areas, are shrunk, as are also the exposed por-
tions of the pigmented areas, since the nitro-
cellulose reserve is permeable to caustic. Also
the exposed portions of the transparentized areas
are rendered more sheer. Thus on washing to
remove the final gum reserve, the fabric will be
found to embody transparentized patterns em-
bodying alternating areas of greater and lesser
sheerness, respectively—the so-called shado-
ripple effect—against a background of pigmented
and unpigmented pattern areas embodying alter-
nately shrunk and unshrunk portions. Owing
to the localized shrinkage in the background
areas together with the absence of shrinkage
in the parchmmentized areas, the fabric assumes
an overall crinkly or puckered effect. Also if

dyes are employed in the initial gum reserves, the areas printed therewith will be correspondingly dyed.

If in the above example a chlorinated rubber pigment reserve like Example II—impermeable both to parchmmentizing and shrinkage treatment—had been employed, the pigment reserved areas would remain wholly unparchmmented and unshrunk, and would appear against a background of transparentized pattern areas containing the shado-ripple effect, and other pattern areas consisting of alternating shrunk and untreated regions.

Again if an acetyl cellulose pigment reserve like Example I, permeable both to parchmmentizing and shrinkage agents, were employed, the initially exposed pigmented areas would be parchmmented and stiffened, while the remaining portions would be alternately shrunk and unshrunk.

Process (4).—Ornamental effects similar to those just described, may be obtained by various modifications of Process (3). Thus in place of the initial gum printing followed by overall treatment of the fabric in a sulfuric acid bath, to parchmmentize selected areas, there may be substituted the single step of directly printing these areas with a parchmmentizing paste, as in Example III. Likewise, instead of the final gum printing followed by overall treatment in caustic soda solution to shrink selected areas, there may be substituted the single step of directly printing these areas with a suitable printing paste containing a shrinkage agent, such as a strong caustic soda solution thickened with British gum.

Example V

A mercerized mousseline fabric is pattern printed with a pigment resist consisting, for example of:

180	grams	nitrocellulose (including 35% butanol)
450	do	amylacetate
150	do	ethylacetate
20	do	ethyl alcohol
200	do	titanium dioxide

and in a different pattern, with a parchmmentizing paste consisting of:

69	grams	zinc chloride
29	do	water
2	do	viscose rayon

The fabric is then dried at 80° to 100° C. for about 10 minutes to develop the parchmmentizing effect, thereafter washed and again dried, preferably on a tenter frame. In a second printing operation the fabric is printed for example in spaced stripes, with caustic soda solution of about 35° Bé, thickened with British gum. After printing the fabric is allowed to lie, without tension for 5 to 10 minutes and so allowed to shrink. Thereafter it is washed with warm water, acidified to neutralize any residual caustic, thoroughly rinsed and dried under the least possible tension.

The resulting fabric shows parchmmented and pigmented pattern areas against a background of alternately shrunk and unshrunk, i. e. unchanged, areas. The pigmented pattern areas may appear in whole or in part in either the parchmmented or the alternately shrunk and unshrunk fabric areas, depending on the relative arrangement of the pattern areas printed with the pigment resist and the parchmmentizing paste.

Example VI

A mercerized mousseline fabric is pattern printed in registered relation with a pigment reserve as in Example I and a parchmmentizing paste as in Example III, dried, heated at about 80° to 100° C. washed and dried under tension. Then the fabric is printed in a different pattern, for example in spaced stripes, with a water soluble gum reserve, dried, impregnated with caustic soda solution of 38° Bé., allowed to shrink for about 5 minutes, washed with hot water, and after the usual acidifying and rinsing dried under the least possible tension.

In consequence of this treatment the fabric will comprise transparented, pigmented and shrunk areas as well as areas which are unaltered. The pigmented pattern areas may be wholly or partially surrounded by either parchmmented or alternately shrunk and unshrunk fabric areas.

It is to be understood of course that either or both of the above mentioned equivalent procedures may be substituted for the gum printing and bath treatment procedures of Process (3), without departing from the spirit of this invention. For example, parchmmentizing may be effected by gum printing and subsequent overall treatment in sulfuric acid, while the localized shrinkage may be thereafter affected by direct printing of a shrinkage paste. Alternatively, parchmmentizing may be obtained by direct printing of a parchmmentizing paste, followed by gum printing and overall treatment in caustic soda solution for effecting localized shrinkage. Or both of the above one-step procedures may be substituted for the equivalent two-step procedures of Process (3) for parchmmentizing desired pattern areas and for shrinking other pattern areas.

It may be stated quite generally with respect to the processes above described, that where relatively large pattern areas are to be parchmmented or shrunk, better and more economical results are obtained by the above mentioned two-step procedures of gum printing to reserve desired areas followed by overall treatment of the fabric in a parchmmentizing or shrinkage bath, as the case may be. On the other hand where only small areas are to be parchmmented or shrunk, this is best accomplished by direct printing of a parchmmentizing or shrinkage paste onto the fabric.

Accordingly in the processes described thus far where a parchmmentizing bath is employed for reasons above stated, two resists have been applied to the fabric prior to parchmmentizing, one being the water-insoluble pigment resist and the other the water-soluble gum resist, the latter to reserve areas for subsequent incorporation of localized shrinkage effects as above noted.

Where it is desired, however, to incorporate such localized shrinkage effects only in the pigment printed areas, the step of pattern printing with a gum resist prior to parchmmentizing may be dispensed with provided a pigment resist is employed which is impermeable to parchmmentizing but permeable to shrinkage agents. As above stated nitro-cellulose is a resist of this character, and where it is employed under the conditions just described, only one resist, namely, the pigment resist need be printed on the fabric prior to parchmmentizing. Much more pleasing effects are obtained, however, by initially pat-

tern printing the fabric with two or more such pigment resists in different colors.

Process (5).—In accordance with the above, the fabric is initially pattern printed with at least one and preferably with two or more pigment resists in different colors, the resists being impermeable to acid but permeable to shrinkage agents, for example, the nitrocellulose resist of Example IV. Thereupon the fabric is subjected to overall treatment in a parchmmentizing bath of sulfuric acid as in Example IV, to transparentize the non-pigmented areas. After washing and drying the fabric is printed with a water-soluble gum reserve, for example, in stripes, and is thereupon subjected to overall shrinkage treatment in a bath of caustic soda, as in Example IV, and further treated as set forth therein to effect shrinkage of the exposed areas.

In consequence of this treatment the fabric will comprise pigmented pattern areas against a transparentized background. The pigmented areas will embody alternating shrunk and unshrunk portions, and the localized shrinkage effected therein in contrast to the non-shrinkage of the parchmmentized areas, will produce an overall crinkly or puckered effect in the fabric.

Example VII

A mercerized cotton fabric is printed with one or more pigment resists, substantially impermeable to parchmmentizing agents, but permeable to shrinkage agents, and consisting, for example, of:

180	grams nitrocellulose (including 35% butanol)
450	do amylacetate
150	do ethylacetate
20	do ethyl alcohol
200	do colored titanium white (TiO ₂)

After drying, the fabric is passed through a parchmmentizing bath of sulfuric acid of a strength 54° Bé. for 8 seconds, at 15° C., whereupon it is immediately washed to remove the acid, and dried. The exposed pigmented areas are not affected by this treatment, since the nitrocellulose pigment reserve is not permeable to the acid parchmmentizing bath. On the other hand, the exposed, non-pigmented fabric areas, are transparentized.

The fabric is then printed in a different pattern, for example in stripes, with a water-soluble, gum reserve, and subjected to overall shrinkage treatment in a bath of caustic soda solution, of mercerizing strength, for instance 38° Bé. and thereafter subjected to finishing treatment as in Example I.

In consequence of this treatment, the exposed portions of the transparentized areas, are rendered more sheer than the gum printed areas, giving the above-mentioned Shado-Ripple effect. The remaining exposed portions of the fabric, i. e., the pigmented portions, are shrunk; while the gum printed portions remain unshrunk, to give unshrunk pigmented portions.

In addition to the above effects, the fabric also embodies overall undulatory or crinkled effects, owing to the localized shrinkage of the areas above described.

Instead of the final gum printing and overall treatment in the bath of caustic soda for effecting the above mentioned localized shrinkage, there may be substituted the single step of pattern printing the fabric with a printing paste containing a shrinkage agent, as illustrated, for instance, in Examples V and VI.

Process (6).—Process (5) may be reversed by first pattern printing the fabric with only a water-soluble or gum resist, followed by overall parchmmentizing treatment in an acid bath and washing to remove the gum reserve. Thereupon the fabric is printed in a different pattern with the wash-resistant, pigment resist, and the fabric then subjected to overall shrinkage treatment in an alkali bath. A pigment resist may be employed which is permeable to shrinkage treatment, or one which is impermeable to shrinkage treatment, depending upon whether or not it is desirable to have the shrinkage effects appear in the pigmented areas. Also instead of the initial gum reserve followed by overall treatment in a parchmmentizing bath, the fabric may be initially printed with a parchmmentizing paste and thereafter printed with a pigment resist and optionally also with a gum resist. The following examples are illustrative:

Example VIII

A mercerized mousseline fabric is printed according to a desired pattern, with a water-soluble resist consisting of equal parts by weight of gum arabic and water, and thereupon the fabric is subjected to overall parchmmentizing treatment in a bath of sulfuric acid of 54° Bé. for 8 seconds at 15° C., whereupon it is immediately washed and dried. As a result of this treatment the exposed fabric areas, i. e., those unprotected by the gum reserve, are transparentized; while the gum printed areas retain the mercerized finish of the original fabric.

The fabric is now printed according to a different pattern with a water-insoluble and wash-resistant pigment reserve impermeable to shrinkage agents, and consisting of:

50	grams chlorinated rubber
175	do toluol
25	do American pine oil
80	do titanium white

Thereupon the fabric is subjected to overall shrinkage treatment in a bath of caustic soda of a strength 38° Bé. on steeping for about 10 seconds without tension, and subjected to finishing treatment as in Example I.

As a result of this treatment the non-pigmented and non-transparentized areas will be shrunk, and thus assume a denser weave and more compact appearance than the surrounding areas; while the transparentized areas will be rendered more sheer. The pigment reserved areas will not be shrunk, but may be so printed as to overlie the transparentized areas in greater or lesser degree, as desired, and to this extent the transparentized areas will be pigmented and opaque.

If, in the above example, the acetyl cellulose pigment reserve of Example I had been employed, the pigment reserved areas would have been shrunk to the extent that they did not overlie the transparentized areas.

As a result of the localized shrinkage, the fabric will also embody overall crinkled and cockled effects.

Example IX

A pattern is applied to a mercerized mousseline fabric by printing the same, at room temperature, with a parchmmentizing paste as follows:

69.5	grams zinc chloride
30.5	do water
1.8	do viscose

Thereupon the fabric is dried and heated at about 95° to 100° C. to develop the parchmmentizing effect, washed and again dried. The fabric is then printed in registry, on successive print rolls, with a chlorinated rubber, pigment resist as in Example VIII and also with a water-soluble gum resist, and it is thereupon subjected to overall shrinkage treatment and otherwise finished as in Example VIII.

The areas printed with the parchmmentizing paste will be transparentized. The pigment printed areas will not be shrunk, but may overlap and thus pigment the transparentized areas. The otherwise untreated areas which were not protected by the gum reserve, will be shrunk; while the portions thereof which were protected by the gum reserve, will retain the mercerized finish of the original fabric.

If the acetyl cellulose pigment reserve of Example I had been employed, the localized shrinkage effects could be arranged to appear also in the pigment printed areas, for example by partial overprinting with the gum reserve.

In the appended claims where reference is made to pattern-printing a fabric with a pigment reserve "in spaced relation," is meant that the pigmented and parchmmentized areas do not overlap. Also, where reference is made to pattern-printing pigment-reserved areas and parchmmentized areas "in registry," is meant that the pigmented patterns are definitely and precisely located with reference to the parchmmentized areas, such, for example, as parchmmentized dots at the centers of pigment-reserved circles, rather than randomly disposed with respect thereto.

By "resist" or "reserve" as employed in the specification and claims is meant a substance which bonds the pigment to the fabric, and which may also reserve the fabric areas so treated, against the action of either parchmmentizing or shrinkage agents or both.

What is claimed as new and desired to be secured by Letters Patent is:

1. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric with a pigment-containing, wash-resistant, water-insoluble reserve which is permeable to shrinkage agents, and with a parchmmentizing agent, drying and heating to fix the pigment and develop the parchmmentizing effect, thereby to produce permanent, pigmented and parchmmentized pattern areas, and thereafter subjecting at least portions of the pigment-printed areas, to treatment with a shrinkage agent, without tension, thereby to impart to the areas so treated, a different sheerness in previously parchmmentized but unpigmented fabric portions and shrinkage in previously untreated fabric portions as well as in pigmented but unparchmmentized fabric portions.

2. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric in at least partially overlapping relation with a pigment-containing, wash-resistant, water-insoluble reserve which is substantially impermeable to parchmmentizing agents but permeable to shrinkage agents, and with a parchmmentizing agent, drying and heating to fix the pigment and develop the parchmmentizing effect, thereby to produce permanent, pigmented and parchmmentized pattern effects, and subjecting at least portions of the fabric, including at least portions

of said pigmented pattern areas, to treatment with a shrinkage agent without tension, thereby to impart to the areas so treated, a different sheerness in parchmmentized but unpigmented fabric portions, and shrinkage in pigmented but unparchmmentized and in previously untreated fabric portions.

3. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric with a parchmmentizing agent, drying and heating to develop the parchmmentizing effect, and thereupon pattern printing the fabric, in registered relation, with a pigment-containing, wash-resistant, water-insoluble reserve which is permeable to shrinkage agents, and with a water-soluble reserve which is substantially impermeable to shrinkage agents, and subjecting the fabric to shrinkage treatment without tension, thereby to impart to the fabric areas unprotected by said water-soluble reserve, a different sheerness in parchmmentized but unpigmented portions and shrinkage in previously untreated fabric portions and also in pigmented but unparchmmentized fabric portions.

4. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric in at least partially overlapping relation with a pigment-containing, wash-resistant, water-insoluble, nitrocellulosic reserve which is substantially impermeable to parchmmentizing agents but permeable to shrinkage agents, and with a parchmmentizing agent, drying and heating to fix the pigment and develop the parchmmentizing effect, thereby to produce permanent, pigmented and parchmmentized pattern areas, at least portions of which are contiguously disposed, thereafter subjecting at least portions of the fabric, including at least portions of said pigmented pattern areas, to treatment with a shrinkage agent without tension, thereby to impart to the areas so treated, a different sheerness in parchmmentized but unpigmented fabric portions, and shrinkage in pigmented but unparchmmentized and in previously untreated fabric portions.

5. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric with a pigment-containing, wash-resistant, water-insoluble reserve which is permeable to shrinkage agents, and with a parchmmentizing agent, drying and heating to fix the pigment and develop the parchmmentizing effect, thereby to produce permanent, pigmented and parchmmentized pattern areas, and thereupon subjecting the fabric to overall shrinkage treatment without tension to shrink the unparchmmentized fabric areas and to impart a different sheerness to the previously parchmmentized but unpigmented pattern areas.

6. A process for producing permanent and wash-resistant pattern effects in cellulosic fabrics, which comprises: pattern printing the fabric in spaced, registered relation, with a pigment-containing, wash-resistant, water-insoluble reserve which is permeable to shrinkage agents, and with a parchmmentizing agent, drying and heating to fix the pigment and develop the parchmmentizing effect, thereby to produce spaced, pigmented and parchmmentized pattern areas, and thereafter subjecting at least portions of the fabric, including at least portions of the pigmented areas, to treatment with a shrinkage agent without tension, thereby to impart to the areas so treated, a different sheerness in parchmmentized fabric portions

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and shrinkage in pigmented and in previously untreated fabric portions.

GEORG HEBERLEIN, Jr.

*Legal Heir and Administrator of the Estate of
Georges Heberlein, Deceased.*

ERNST WEISS.

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