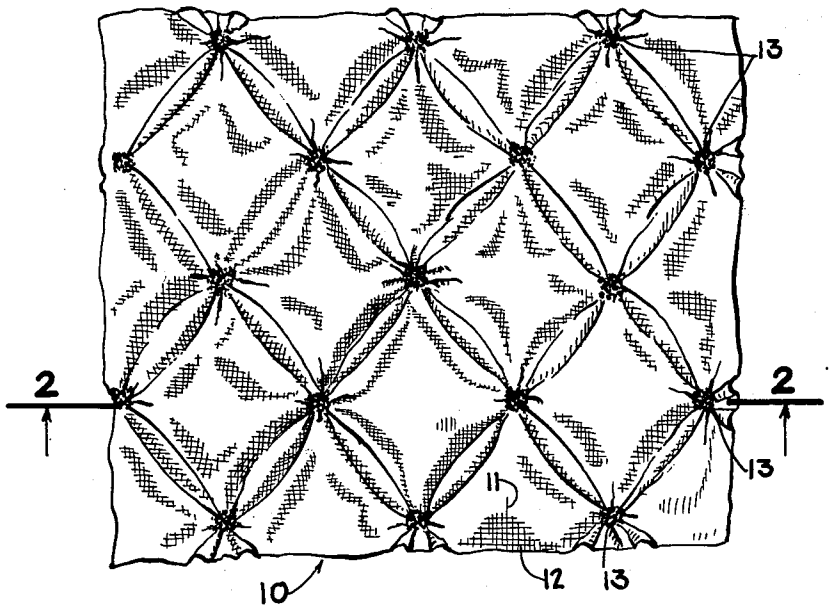
Feb. 26, 1963 H. FOUNTAIN ETAL 3,079,212

PUCKERING AND DECORATING FABRICS OR THE LIKE

Filed May 26, 1958 2 Sheets-Sheet 1

Fig. 1



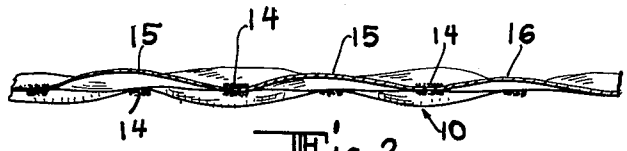


Fig. 2

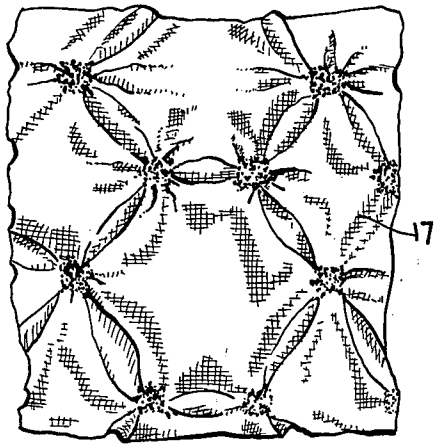


Fig. 3

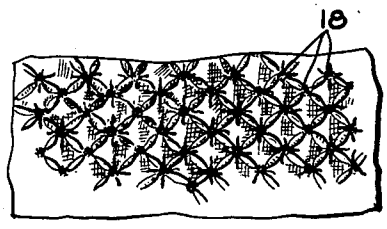


Fig. 4

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Feb. 26, 1963 H. FOUNTAIN ETAL 3,079,212

PUCKERING AND DECORATING FABRICS OR THE LIKE

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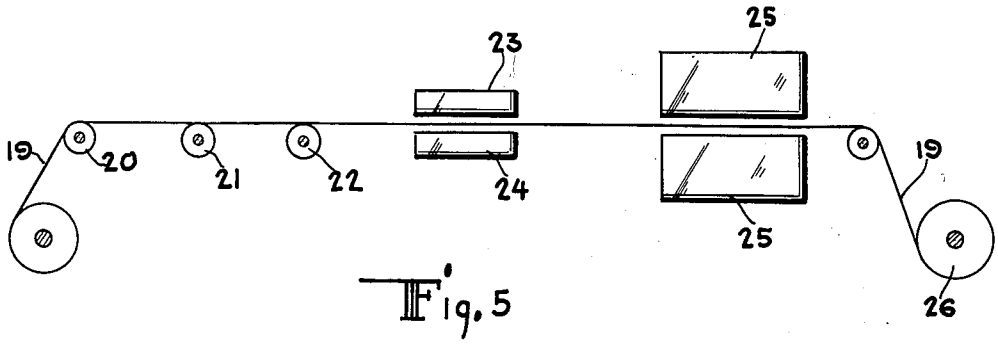


Fig. 5

Fig. 6

TABLE OF ORGANIC ACID MODIFIERS

FORMIC ACID	$H-COOH$
ACETIC ACID	CH_3-COOH
PROPIONIC ACID	CH_3-CH_2-COOH
N-BUTYRIC ACID	$CH_3-CH_2-CH_2-COOH$
VALERIC ACID	$CH_3-CH_2-CH_2-CH_2-COOH$
CAPROIC ACID	$CH_3-(CH_2)_4-COOH$
CAPRYLIC ACID	$CH_3-(CH_2)_6-COOH$
CAPRIC ACID	$CH_3-(CH_2)_8-COOH$
LAURIC ACID	$CH_3-(CH_2)_{10}-COOH$
MYRISTIC ACID	$CH_3-(CH_2)_{12}-COOH$
PALMITIC ACID	$CH_3-(CH_2)_{14}-COOH$
STEARIC ACID	$CH_3-(CH_2)_{16}-COOH$

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3,079,212

PUCKERING AND DECORATING FABRICS OR THE LIKE

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Filed May 26, 1958, Ser. No. 737,628
15 Claims. (Cl. 8—114.5)

This invention relates in general to puckered or printed fabrics, and particularly to a flocked fabric or the like which is characterized by a pucker or series of shrunken portions in local areas only of the fabric. More especially, the invention relates to flocked puckered fabrics in which the pucker and flock occupy the same space or spaces of the cloth.

One object of the present invention is a process for simultaneously puckering and decorating nylon and other fabrics, which includes the step of printing the fabric in a predetermined pattern with an oil-modified alkyd resin adhesive blended with a shrinkage agent for puckering the fabric. The treated fabrics may be decorated with flock fibers, or otherwise, as hereinafter set forth.

Another object of the invention is to produce as a new article of commercial manufacture a puckered and flocked fabric or the like, made of or containing, for example, nylon or acetate or other fibers adapted to shrink upon the application of a solvent or swelling agent of the character hereinafter described.

The term "nylon" as used herein, and in the claims following, means and is intended to mean a fiber-forming linear polycarbonamide which has recurring amide groups as integral parts of the polymer chain. Another object of the present invention is a new method of simultaneously shrinking only selected areas of a nylon or other fabrics, for example, marquisettes or sheers, and applying thereto, that is to the selected areas that are being shrunk, a deposit of flock fibers.

The terms "flock," "flock fibers," and "flocking," as referred to herein, comprehend the deposition or distribution and fixation of finely divided particles or fragmentary material upon a surface, usually in pattern form or design arrangement. The particles so deposited are referred to as flock and ordinarily comprise very short cotton, rayon or wool fibers, or other fibrous or filamentary material less than one-quarter of an inch in length; often one thirty-second or one sixteenth of an inch. The diameter of the flock varies also, and usually is based upon the functional requirements of its end uses. In the textile industry flock is commonly applied for decorative effects to draperies, upholstery, print goods and dress goods. The flock may be attached or affixed to the surface by first applying to the material to be flocked a suitable adhesive for the flock as by means of a rotary stencil, printing cylinder roller, spray gun or silk screen, and subsequently depositing the flock fibers on the wet adhesive with a so-called beater bar, which utilizes the beating effect of a flat sided bar rotating against the underside of the sheet to be flocked. Alternatively, the flock may be applied electrostatically after the application of the adhesive to the surface of the material or web, by placing the adhesive carrying web in an electric field whereby the fibers are oriented and deposited on the adhesive covered portions of the web surface.

The terms "plisse" and "plisseing" are also well-known in the textile industry, and concern the application of a shrinkage agent, for example, sodium hydroxide (caustic soda), potassium hydroxide, or other shrinking agent to certain parts of the goods, that is, cotton, acetate, rayon, or other fabrics, so as to provide therein a crinkle, crepe or plisse effect. This effect may or may not be removed after washing, depending of course on the quality of the fabric or garment. It is desirable, of course, that the crepe or plisse effect be made permanent.

According to the present invention, it is proposed to produce a new article, namely, a nylon cloth in the piece, that is, piece goods of nylon, which is characterized by a combination plisse pucker and flock spots.

Another object contemplated is a novel method of simultaneously applying, in a single continuous operation, a shrinkage agent to selected areas only of a nylon fabric, and applying also in the same operation a deposit of flock fibers. The flock may be made of viscose rayon, acetate rayon, cotton, nylon, or any other fiber, or combination of fibers having the capacity of being anchored as by an adhesive to the base fabric.

A considerable variety of shrinkage agents for nylon already are known, such as, for example, di-hydric or tri-hydric phenols. Specifically, such phenols as resorcinol and catechol have been used together with other phenols for the purpose of producing pattern effects, such as a plisse, on nylon textile fabrics. (British Patent 544,821.) In British Patent 562,555, formic acid, acetic acid, and mineral acids are disclosed as satisfactory creping agents for the production of creped and like effects in nylon and nylon-mixed goods.

For an illustration of contemporary flocking or flock printing, reference may be made to Fountain's patent, U.S. 2,368,706, and especially FIG. 1 thereof which gives a schematic illustration of a method for depositing flock fibers on a moving length of cloth in the piece followed by a curing or setting interval before final take-up or storage of the flocked goods. As the specification of Fountain's patent (supra) sets forth, according to the process there disclosed the fabric, having been coated or printed with a suitable adhesive, is passed through a flock depositing zone or station at which flock is delivered onto the adhesive-treated fabric and thereby caused to adhere to the adhesive in the areas of the cloth that have been provided with the adhesive in the step of printing.

Another example in the known art of flock printing is shown in Fountain's patent, U.S. 2,695,244. Therein, as seen in FIG. 1 thereof, a moving length of textile fabric in the piece may have a composite design which is partially printed, as by means of an engraved color printing roller, and partially flocked, as by means of a cylindrical stencil adapted to deposit a flock adhesive on the cloth, thereby completing the second part of the composite design which is initially formed in color by means of the engraved color print roll.

It should be understood that the present invention contemplates the application of an adhesive composition for flock which has a dual function, in that it incorporates or comprises a shrinkage agent for the nylon cloth so that by one and the same means or composition there is applied thereto a material which will simultaneously function as a shrinkage agent for the cloth and as an anchor or adhering agent for the flock which is to be subsequently applied only to those areas of the cloth containing such composition.

It is to be further understood that according to the present invention the combination shrinkage agent and adhesive composition may be applied to the cloth by any conventional means including an engraved printing roll

and/or a cylindrical stencil. Examples of both of these devices are illustrated in FIG. 1 of the above mentioned patent to Fountain, U.S.P. 2,965,244. It is also feasible to apply the composition of the present invention as by means of a flat rectangular stencil sometimes referred to in the textile industry as a silk printing screen.

An example of a flock printing adhesive composition for anchoring the flock fibers in a textile fabric is seen in U.S.P. 2,311,850. As there explained, in the flock printing process a textile cloth is coated or printed with an adhesive in a pre-determined design, as, for example, by employing a suitable stencil. The coated or printed textile is then treated with flock which adheres to and then becomes anchored in the adhesive, the adhesive in turn becoming anchored in the textile or cloth. Subsequently, the flocked cloth is subjected to elevated temperatures and thus heated to set or dry the adhesive composition. It is necessary for a definite thickness of the adhesive to be built up above the surface of the cloth, not only to cover the individual yarns thereof, but also to bridge across the spaces between the yarns. This structure is commonly referred to as "loft." In this respect the process is differentiated from ordinary color printing of textiles, for in the latter it is only necessary to apply the color to the individual yarns or threads. As is further disclosed in the same patent (U.S.P. 2,311,850) a suitable adhesive flock printing composition may comprise a permanently flexible, oil-modified, alkyd resin of the heat-convertible type, dispersed in a volatile dispersion medium. Alkyd resins may be obtained by the reaction of a polybasic acid such as phthalic acid with a polyhydric alcohol. Products of this type of reaction are called alkyd resins; they are polyesters and considered important resins and plastics. Thus an oil-modified alkyd resin capable of being converted or polymerized by heat to substantial insolubility, infusibility, and flexibility may be obtained by reacting a polyhydric alcohol with a dibasic carboxylic acid and a fatty acid or mixture of fatty acids derived from a non-drying or semi-drying oil.

To facilitate the application of an oil-modified alkyd resin of the character above mentioned to the cloth, it is necessary to disperse the same in a volatile dispersion medium such as a volatile solvent, or water, or a mixture thereof, such dispersion medium being eliminated subsequently when the flocked fabric is heated to cure or insolubilize the adhesive resin composition.

According to the present invention, an oil-modified alkyd resin of the character mentioned above is blended with a medium comprising a shrinkage agent for nylon cloth, whereby the oil-modified alkyd resin composition thus altered by the addition of the shrinkage agent thereto, serves not only to anchor the flock fibers in the nylon cloth, but also, and concomitantly, to shrink the same portions of the cloth, that is, those areas thereof to which the altered adhesive composition has been applied.

It has been found that by incorporating a volatile monobasic organic acid in an oil-modified alkyd resin adhesive for flock, new products may be obtained by simultaneously flocking and puckering fabrics to which such a composition is applied. The acid component acts to shrink or pucker the cloth, while the resin adhesive anchors the flock fibers to the spots or dots where the puckering occurs. The preferred acid is formic acid. The preferred types of fabrics are nylon marquisettes and sheers. It should be understood, however, that the present invention is not limited in its application to fabrics made of or containing nylon fibers. On the contrary, compositions made up according to this invention may be applied to every fiber which can be affected by solvent action of monobasic acids. For example, fabrics made of or containing acetate fibers may also be puckered and simultaneously flocked with one and the same modified flock adhesive composition, but in such case variations in formula strength or concentration would be necessary. Other fibers, too, in addition to acetate may be affected by the solvent action of monobasic acids of the type hereinafter set forth.

With the above and other objects in view, as will be apparent, the present invention consists in the construction, combination and arrangement of parts, all as hereinafter more fully described, claimed, and illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of one embodiment of the new products obtainable by means of the present invention, and comprises an open weave or marquisette type fabric characterized by a pucker, plisse, or spot shrinking in isolated areas only of the cloth, said areas also comprising a deposit or permanent application of flock fibers having a loft structure, that is, a definite built-up layer of fibers protruding from at least the upper surface of the treated cloth;

FIG. 2 is a sectional view, taken along the line 2—2 of FIG. 1, of the puckered flocked fabric of FIG. 1 in which the puckering effect is seen in the manifestation or phenomenon that the portions of the base fabric surrounding the periphery of each flocked area or dot are raised or lifted up out of the normal plane of the cloth whereby the characteristic puckering effect is obtained;

FIG. 3 is another plan view similar to FIG. 1 of a piece of flocked and puckered nylon sheer cloth which of course has a tighter or closer weave than has the marquisette of FIG. 1;

FIG. 4 is a fourth example or embodiment of the type of product obtainable by means of the present invention, and here the application of a shrinkage agent and the deposit of flock fibers is in the form of small dots deposited upon a sheer fabric of a type of the same or similar to that of FIG. 3, the several dots being relatively close to each other, and not as widely isolated as are the larger dots of FIGS. 1 and 2 hereof;

FIG. 5 is a schematic illustration of a range of apparatus adapted to carrying out the invention and includes, as there shown, a supply of cloth, means for passing the cloth in open width form continuously through a treating zone comprising a station at which the modified binder composition described above for simultaneously shrinking or puckering a cloth and adhering the flock thereto, is deposited upon the moving cloth by roller printing means, by means of a cylindrical stencil, or otherwise; and further includes a flock depositing zone situated beyond the adhesive or binder applying zone or station, and a final curing and wind-up area; and

FIG. 6 comprises a table setting forth the respective common names and formulas of a number of specific compounds, to wit: volatile monobasic organic acid modifiers, all of which may be incorporated as the shrinkage or puckering agent in the present oil-modified alkyd resin flock adhesive composition, it being understood, however, that the preferred puckering or shrinkage agent is the lowest molecular weight member in the group, to wit, formic or methanoic acid.

While it is true, as stated above, that the application of phenols and formic acids to nylon fabrics to shrink or pucker the same in selected areas is known; and while it is also known to apply a deposit of flock in the form of a design to nylon and other fabrics, it is nevertheless believed to be new to pucker or spot shrink nylon marquisettes and sheers, and at the same time adhesively secure deposits of flock fibers to the spots or local areas where the shrinkage has taken place or is taking place. It has been considered that formic acid, specifically, and in general, volatile monobasic organic acids, are incompatible with the oil-modified resins used as binders or adhesive agents in the flocking industry, for the introduction of an acid substance or composition into the resin printing emulsion tends to neutralize the oil modifier or other components thereof. This factor may tend to explain why it has not been known to incorporate formic or other volatile monobasic organic acids in the adhesive or binder compositions that are used in the flocking in-

dustry. It has now been found, however, that by modifying the binder or adhesive and incorporating in the printing mixture any emulsifying agent, e.g. one of a proteinaceous nature such as casein glue, the normal or ordinary incompatibility existing between formic and other volatile monobasic organic acids in respect of oil-modified alkyd resins is not encountered, whereby nylon sheers and marquisette fabrics have been successfully puckered and permanently flocked in one and the same continuous operation. Examples of other suitable emulsifying agents, in addition to casein, are triethanolamine, oleic acid, glycol and glycol derivatives such as polyethylene glycol mono-laurate.

With the above and other objects in view, the present modified printing binder paste or adhesive emulsion may be formulated by mixing together in a can, vat, or other large container the emulsion components comprising the adhesive binder or oil-modified alkyd resin, a hydrophobic agent such as silica-gel, an acid resistant pigment such as titanium-dioxide, the emulsifying agent such as Casgo glue, a hydrophilic pigment such as Bentone 34, a naphthanate drier for the oil in the oil-modified alkyd resin, and xylenes or dimethyl benzenes such as Xylol which is a non-polar solvent for the oil component in the oil-modified resin binder. All of the foregoing components are mixed together in a common vat to a viscosity of approximately 2000 seconds per 100 revolutions based on a 1000 gram weight on the Stormer viscosimeter, after which the mix is put through an ordinary grinder or grinding mill. Subsequently, the ground mix is diluted with more Xylol, and the acid such as formic acid is added. The acid is poured slowly into a high speed color mixer, and the mixing is continued until the solution or emulsion reaches a viscosity within the range of 20 to 100 seconds per 100 revolutions based or calculated on a 500 gram weight of the Stormer viscosimeter. The formula or emulsion is then of a thixotropic nature and the composition is ready for application in the usual manner as by stencil or engraved printing roller or by the silk screen method. The quantity or concentration of acid added to the binder emulsion may be within a range of from about 10% to about 50% by weight, and of course will vary according to the different types of patterns and the nature and construction of the fabrics to which such acid treating emulsions are applied. As will also be evident, the type of finish to which the material has been previously subjected will effect the quantum of acid required; the less finish there is on the fabric, the less acid need be used.

It should be pointed out as being of considerable interest that according to the present invention no wet after-treatment of the puckered and flocked fabrics is required, since the formic acid or other volatile monobasic organic acid that is incorporated in the binding mixture or adhesive for the flock is driven off, that is, evaporated under normal operating conditions, that is while the cloth passes through the heated curing oven, following the application of the printing adhesive mixture or emulsion to the goods.

Typical formulations for carrying out several embodiments of the present invention were made up as follows:

Formula B—for White Only

	Gm.
AL–54 Alkyd (tall-oil alkyd)	2400
Cabo-sil (silica-gel)	125
Titanium-dioxide	500
Casco-glue (casein)	75
Bentone 34	150
Midland drier (⅓ of 6% cobalt naphthanate and ⅔ of 24% lead naphthanate)	145
Xylol (xylene)	120
	3,515

Formula C—for Colors Only

	gm.
AL–54 alkyd (tall-oil alkyd)	2,400
Cabo-sil (silica-gel)	175
Titanium-dioxide	250
Casco glue (casein)	75
Bentone 34	150
Midland drier (⅓ of 6% cobalt naphthanate, and ⅔ of 24% lead naphthanate)	145
Xylol (xylene)	174
	3,369

For blue: Mix 750 gm. Formula C with 6 gm. of a 45% Monastal blue pigment grind.

For green: Mix 750 gm. Formular C with 4 gm. of a 70% medium chrome yellow pigment grind and 8 gm. of a 45% Monastral green pigment grind.

For pink: Mix 750 gm. Formula C with a 6 gm. of 40% India Red pigment (naphthol pigment) and with 2 gm. of a 60% Rex Orange pigment grind which is a mixture of lead and Molybdtanum chromates.

Sample No. 1: 150 gm. Formula B is diluted with 20 ml. (cc.) Xylol plus 50 cc. of an 85% formic acid solution (balance water). That results in an acid content of 26.4% by weight or 23.2% by volume.

Sample No. 2: 150 gm. Formula B is again diluted with 30 cc. (ml.) Xylol plus 75 cc. of the 85% formic acid solution. That results in a formic acid content of 36.9% by weight or 33.4% by volume.

Sample No. 3: 150 gm. Formula B is again diluted with 35 cc. (ml.) Xylol and 100 cc. formic acid of 85% concentration. Result 40.0% by weight acid content or 35.6% by volume.

Blue sample: 150 gm. of Formula C blue is diluted with 35 cc. Xylol and 30 cc. of formic acid (85% concentration) which gives a total of 210 grams. Also results in an acid content of 16.5% by weight and 14.8% by volume. This printing paste was printed in the form of a large square spot pattern or design.

Now, 190 gms. of the above paste were diluted with 15 cc. Xylol and 35 cc. of formic acid (85% concentration) which resulted in a 33.8% by weight acid concentration or 30.0% by volume concentration. That was printed on a comma or dot-like pattern.

Green sample: 150 gm. Formula C green were diluted with 45 cc. Xylol and 40 cc. formic (85% concentration) resulting in 230 gm. This comprised a 20.2% by weight acid concentration formic or 17.3% by volume. This paste was printed on the fabric in the form of the large squares.

Then 225 gm. of the above printing paste was added to 30 cc. Xylol and 40 cc. of the formic (85% concentration) which resulted in a concentration of 36.5% by weight and 30.0% by volume of acid. This paste was printed on the comma or dot-like pattern.

Pink sample: 150 gm. Formula C pink were diluted with 45 cc. Xylol plus 50 cc. of formic (85% concentration) giving a total of 242 gms. and a concentration of 24.0% by weight or 20.8% by volume. This paste was printed on the big squares.

Then 227 gm. of the above printing paste was added to 30 cc. Xylol and 50 cc. formic (85% concentration). That resulted in a 43.3% by weight formic acid concentration or 37.1% by volume concentration. This paste was printed on the fabric in the form of the comma design.

Glossary for Components of Formulas B and C (Supra)

AL 54—Tall-oil modified alkyd resin marketed by Carpenter & Morton of Everett, Mass.

Cabo-Sil—Silica-gel sold by Godfrey L. Cabot of Boston, Mass.

Gasgo glue—Comprises the protein casein and is made by the Borden Company of Long Island City, N.Y.

Bentone 34—Is a product resulting from cation exchange reactions between organic bases and bentonite or its clay mineral component, montmorillonite. It is a thickening agent for non-polar organic solvent systems and is sold by the National Lead Company of New Jersey.

Midland drier—Is an aqueous solution made up of one part of 6% cobalt naphthanate, and 2 parts of 24% of lead naphthanate, which is used by the Midland Print Works of Fall River, Mass.

Xylol—Is a product marketed by Esso Corporation of New Jersey. It comprises dimethyl benzenes, ortho, para, and/or meta, and these benzenes are commonly referred to as xylenes.

FIGS. 1 to 4 inclusive hereof illustrate the application of the present invention to marquisette fabrics and sheer fabrics of nylon, and as there seen such application is characterized by a plurality of flock deposits, each one of which overlies or coincides with a pucker or pinched portion of the fabric. As is apparent in FIG. 1, the marquisette weave of the nylon fabric **10**, there shown, is made of a so-called open weave in which the several spaces defined by the crossings of the warp threads **11** and filling threads **12** appear to be relatively large. The flock deposits **13** may be of any desired size or shape, and may be uniformly spaced from each or otherwise and arranged in any motif or pattern that may be required.

The purpose of illustrating in FIG. 2 a section of the marquisette cloth shown in plan in FIG. 1 is to make apparent the results of the shrinkage agent, that is the formic or other volatile monobasic organic acid, on the base cloth or fabric to which it has been applied. Thus, as seen in FIG. 2, it being understood that the acid forms a component modifying part of the adhesive for the flock which is printed on the cloth before the flock is applied thereto, the outer edge or periphery of each flock, dot, or portion **14** is surrounded by a puckered or pinched segment **15** of shrunken cloth which gives the flocked fabric its characteristic puckered or creped or plissed effect. It will also be noted from FIG. 2 that the flock deposit may be applied to both sides of the fabric **10** although, if desired, it may be limited or restricted to one side only thereof, as for example, the upper surface **16** of the cloth **10**.

FIG. 3 illustrates the application of the invention to a nylon fabric of closer weave, that is, what might be termed a nylon sheer fabric **17**.

Moreover, in FIG. 4 the flock dots **18** of the nylon sheer fabric **17** are considerably smaller in size and are much closer to each other, but here again it must be understood that the shape and size of the flocked portions of the sheer fabric **17** is a matter of choice, as is also the color thereof, and all of these factors may be varied at will as may be considered necessary or desirable.

In FIG. 5, as previously mentioned, there is illustrated a rather schematic range or assembly of apparatus adapted for applying the principles of the instant invention. It may be mentioned here that there is no new machinery involved in the present proposals wherein novelty is considered to reside in a new product, viz. a plissed flocked fabric, the plisse and flocked portions being co-extensive with each other, and a new modified binder composition comprising a volatile monobasic organic acid incorporated in the flock adhesive. However, to give some idea of the conventional means whereby flock may be applied according to the tenor hereof, and as indicated in FIG. 5, the flocking assembly should include a source of supply of nylon marquisette or sheer **19** which is adapted to be moved as by rollers **20** or otherwise into a roller printing zone having either an engraved printing roll **21** or a cylindrical apertured stencil roll **22**, or both, for laying down in the form of any desired design a modified adhesive for the flock, which adhesive incorporates the shrinkage agent above described for simultaneously forming the desired pucker in the cloth. After the cloth **19** passes over the engraved printing roll **21** and/or the cylindrical stencil **22**, and while the modified adhesive there applied is still wet, it is passed in one continuous operation through a flocking zone **23**, **24** where flock may be applied to one or both sides of the cloth **19**. Upon emerging from the flocking zone **23**, **24**, the binder or adhesive composition is set or cured by passing the cloth **19** through a festoon or other heated drier **25** wherein the volatile acid shrinking agent is evaporated off so that no after-wet treatment is necessary. Upon leaving the drier **25**, the cloth **19** which is now not only flocked but also puckered, the puckered portions thereof being co-extensive with the flock deposits thereon, may be rolled up on a storage reel **26** or otherwise disposed of.

Thus, the present invention contemplates the application of flock and a modified adhesive therefor in the customary way to nylon cloth in the piece, preferably of the marquisette open weave type, or the more closely woven sheer type. However, the adhesive printing composition, paste or emulsion normally used is modified by the addition thereto of a shrinkage agent, to wit, formic acid or some other volatile monobasic organic acid, and said printing paste or emulsion composition is further modified by incorporating therein another substance or agent which serves the function of making the normally incompatible formic or other acid compatible with the oil-modified alkyd resin which is the prime adhesive component used in anchoring the flock to the cloth.

In the present case, it has been found that a proteinaceous substance, preferably casein, for example, in the form of Casco glue sold by the Borden Co. of Long Island City, N.Y., is a suitable compatibility modifier, as above described. By using such modifier, in the manner heretofore set forth, the formic or other volatile monobasic organic acid is rendered compatible with the oil-modified alkyd resin. Furthermore, as previously stated, because the normal incompatibility of the acid and the oil-modified alkyd resin is eliminated, it has been possible to make a new product according to the present invention by utilizing the above described composition, the new product being characterized by puckered areas and flocked portions which are co-extensive with each other, that is, which occupy the same portions of the fabric.

In FIG. 6 there appears a table of volatile monobasic organic acids, any one or more of which may be incorporated in the adhesive or binder for the flock. It should be mentioned, however, that the preferred monobasic acid is formic (methenoic) acid having the formula H—COOH. It has been found that acetic acid and propionic acid are less effective for purposes of the present invention than is formic acid, but nevertheless are more effective in that regard than the other longer chain monobasic organic acids set forth in the table of FIG. 6.

While the foregoing description of the present invention emphasizes the simultaneous puckering and flocking of nylon and other solvent sensitive fabrics, it should be understood that the same invention also contemplates the puckering of some fabrics which receive no deposit of flock at all, as will be explained. For example, the cloth may receive merely a deposit of the modified resin adhesive in the form of a dot, spot, or other pattern, and without the subsequent application of flock to the adhesive coated areas or pattern. For example, metallic figures of bronze or other metal, or combination thereof may be substituted for the flock fibers, and printed on the cloth in any desired motif. Another example within the scope of the present invention is the application of foils such as aluminum foil, or ground-up Christmas tree ball stock instead of flock. In all of such cases, that is whether the flock is simply omitted, or is replaced by some other material, the adhesive composition is modified by the incorporation therein of a volatile monobasic organic acid of the character described. As a result, the base cloth

or printed fabric is simultaneously puckered and printed or otherwise decorated in the same areas.

What is claimed is:

1. A flocked and puckered fabric wherein the flocked and puckered areas are co-extensive.

2. A puckered fabric flock printed with a design overlying the puckered portions thereof.

3. Nylon fabric further characterized by spaced puckers and a flock printed design overlying at least the puckers of said design.

4. Nylon marquisette fabric further characterized by spaced puckers and a flock printed design overlying at least the puckers of said design.

5. Nylon sheer fabric further characterized by spaced puckers and a flock printed design overlying at least the puckers of said design.

6. Adhesive composition for simultaneously puckering and anchoring flock to nylon fabric comprising a monobasic volatile organic acid puckering agent, an oil-modified alkyd resin adhesive agent, and glue.

7. Adhesive composition for simultaneously puckering and anchoring flock to nylon fabric comprising a formic acid puckering agent, an oil-modified alkyd resin adhesive agent, and casein.

8. Adhesive composition for simultaneously puckering and anchoring flock to nylon fabric comprising a formic acid puckering agent, an oil-modified alkyd resin adhesive agent, and a proteinaceous substance.

9. Adhesive composition for puckering and flock printing nylon fabrics comprising an oil-modified alkyd resin binder, silica-gel as a hydrophobic agent, titanium-dioxide as an acid resistant pigment, casein as an emulsifying agent, a bentonite hydrophilic pigment, a naphthanate drier for the resin binder, and a xylene as non-polar solvent for the oil of the oil-modified resin.

10. Adhesive composition for puckering and flock printing nylon fabrics comprising an oil-modified alkyd resin binder, silica-gel as a hydrophobic agent titanium-dioxide as an acid resistant pigment, casein as an emulsifying agent, a bentonite hydrophilic pigment, a naphthanate drier for the resin binder, a xylene as a non-polar solvent for the oil of the oil-modified resin, and formic acid.

11. Adhesive composition for puckering and flock printing nylon fabrics comprising an oil-modified alkyd resin binder, silica-gel as a hydrophobic agent, titanium-dioxide as an acid resistant pigment, casein as an emulsifying agent, a bentonite hydrophilic pigment, a naphthanate drier for the resin binder, a xylene as a non-polar solvent for the oil of the oil-modified resin, forming acid, and a coloring composition.

12. Process of flock printing which comprises applying flock to a textile printed in a predetermined design with an adhesive composition comprising an emulsifying agent selected from the class of emulsifying agents consisting of casein, tri-ethanolamine, oleic acid, glycol, and glycol derivatives, and a permanently flexible oil-modified alkyd resin of the heat convertible type dispersed in a volatile dispersion medium and blended with a volatile monobasic organic acid puckering agent, and heating the flock printed textile to eliminate the dispersion medium and heat set the resin, while permitting the puckering agent to pucker said textile.

13. Process of simultaneously puckering and decorating fabrics which includes the step of printing the fabric in a predetermined pattern with a composition comprising an emulsifying agent selected from the class of emulsifying agents consisting of casein, tri-ethanolamine, oleic acid, glycol, and glycol derivatives, and a permanently flexible oil-modified alkyd resin adhesive of the heat convertible type, dispersed in a volatile dispersion medium and blended with a volatile monobasic organic acid puckering agent for said fabric.

14. The process of claim 13 wherein the monobasic organic acid is formic acid.

15. The process of claim 13 in which the monobasic organic acid is acetic acid.

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