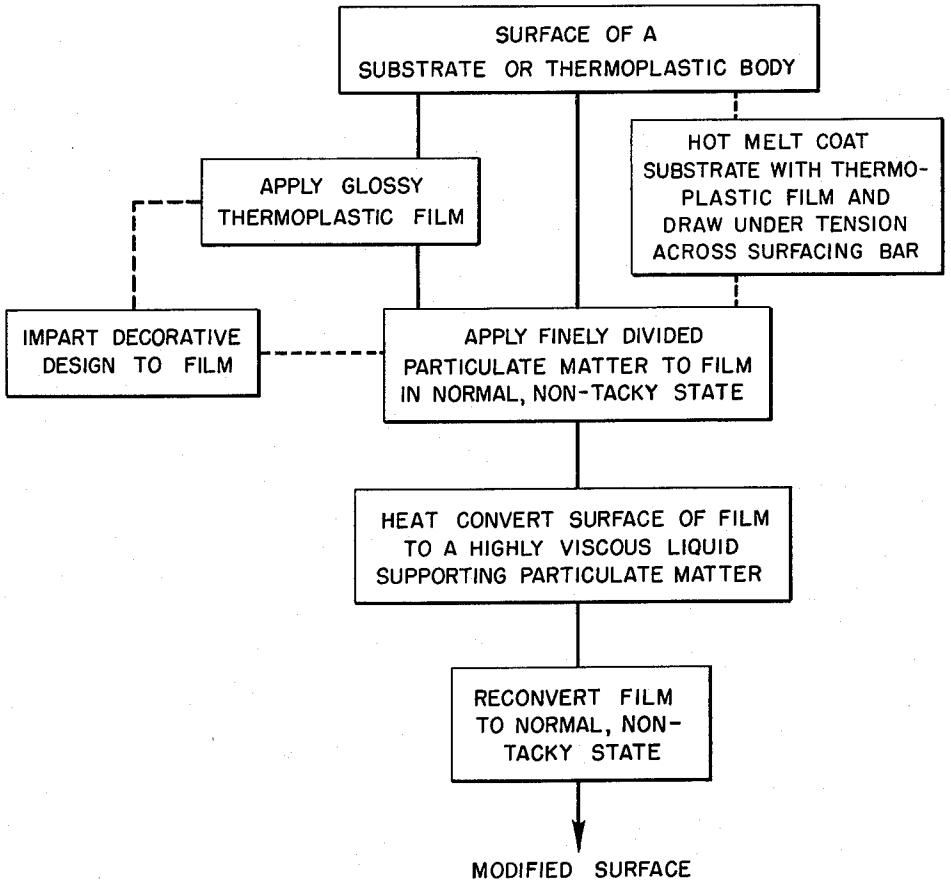
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SURFACE COATING WITH METALLIC POWDER AND THE LIKE

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SURFACE COATING WITH METALLIC POWDER AND THE LIKE

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This invention relates to coated surfaces and a process for forming them and more particularly to metalized surfaces.

Heretofore metalized articles and particularly metalized packaging materials have been produced by laminating a suitably-surfaced metallic foil to a base material, such as paper. While this type of product has been satisfactory for many applications it is relatively expensive to make, and if it is desired to incorporate color into the surface, it is necessary to introduce additional processing steps in the coloring operation.

It has also been proposed in the prior art to form metalized surfaces, and particularly metalized papers, by coating the surface with metallic powders or with so-called metallic leafing pigments suspended in a liquid, or by permitting metallic powders or leafing pigments to settle into a liquid binder deposited on the article's surface. Many of these processes require buffing, powder or pigment alignment, or other steps to impart the necessary luster to the finished surface. Such metalized papers may be subject to severe cracking when bent or folded due apparently to the nature of the metalized surface. Moreever, the amount of metal powder required to fill the liquid is relatively high thus making a heavy coating. It is not believed that any of the processes involving the combination of a metal powder in a liquid has resulted in commercially acceptable products, particularly for decorative wrappings and packaging.

A more recently developed technique involves the direct application of a metallic coating by means of well-known vacuum deposition techniques. The process is expensive and does not lend itself to a continuous coating operation because of the requirement for a vacuum.

From the above description of the prior art it may be seen that each of the processes of the prior art for metalizing a surface suffers from one or more defects. Among these defects may be listed the requirement for a large number of process steps, the use of a relatively large amount of metal powder, the use of expansive equipment, the difficulty of adapting the process to continuous operation and the difficulty of forming a surface which is not susceptible to cracking when bent or creased.

There exists a large demand in the decorative wrapping field, in the field of packaging small articles and food, particularly bread and the like, and in the field of thermal insulation for a metalized flexible product which can be handled, printed on, sealed and otherwise employed without cracking or affecting the general appearance of the metalized product. Such a metalized product should be inexpensive, pleasing to the eye, and of such a nature that it can easily be varied in appearance, e.g., colored, stippled, striated, and the like. Moreover, it should adhere well to the substrate on which it is deposited, be flexible and capable of being bent, folded and creased, without exhibiting any appreciable undesirable markings and preferably, for some applications, without showing any appreciable increase in moisture vapor or gaseous transmission. For some applications it would also be desirable to have a metalized wrapping paper which has other properties such as being heat-sealable, grease-resistant and the like. Finally, it would be desirable to have a process which permits using a wide range of metal powders or other suitable particulate matter over a wide range of

powder pick-up to produce metalized articles having a wide range of properties.

It is, therefore, the principal object of the present invention to provide attractive metalized articles which are inexpensive, which are readily provided with various surface appearances including a variety of colors, and which may possess other properties such as being heat-sealable, grease-resistant or vapor-resistant. Another object is to provide articles of the character described wherein the metallic surface is permanently affixed and not subject to scarring or marking by a reasonable amount of pressure. Another object is to provide a metalized paper which is flexible and which may be folded and creased without cracking the metalized portion.

It is yet another object to provide a rapid method for metalizing the surface of articles which achieves an attractive lustrous surface with a minimum amount of a metallic powder. It is still another object to provide a process by which colored metallic surfaces may be achieved without additional processing steps. Other and further objects of the invention will be apparent from the following description.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the single FIGURE, which is a simplified flow diagram of the method of the invention.

In accordance with this invention these objects are achieved by applying to the surface of an article an essentially continuous glossy film of a thermoplastic material as a binder, applying to said film finely divided particulate matter sufficient to cover at least 10% of the surface of said film, and converting the surface of said film by heat to a viscous liquid supporting said matter in substantially the outer surface thereof whereby said matter is supported by said surface and firmly bonded thereto to produce an attractive surface. Color can be introduced by the use of colored film or by the use of colored particulate matter, preferably comprising a metallic powder. If the article to be surface coated has a surface of a suitable thermoplastic material, the particulate matter can, of course, be applied directly to the surface of the article.

By the process of this invention attractive finishes varying from a highly lustrous metallic surface suitable for decorative purposes to a rich matte appearance can be provided without polishing or buffing the surface, without requiring the alignment of the particles of powder, or without additional steps to introduce a variety of coloring matter. The amount of powder deposited may vary over a wide range as described below, thus giving the metalized article a very wide range of properties.

In order to make a metalized article and particularly a metalized sheet of paper suitable for such uses as food and small article packaging, decorative wrappings and the like, it has been found necessary to use a thermoplastic material, in the role of a binder film or coating, which is both tough and flexible. Thus, the material should be of a fairly high molecular weight to give the toughness required, and preferably have a measurable tensile strength and also preferably a measurable degree of elongation.

Since the actual molecular weight of film forming materials having the desired degree of toughness will vary from material to material, and moreover, since molecular weight is not easily determined, toughness for the purpose of this invention is defined in terms of viscosity of the thermoplastic film material at a given temperature. The temperature chosen to evaluate the film binder required for the practice of this invention is 300° F. and a thermoplastic material to be suitable for the bonding film between the substrate surface and the

metal powder should have a viscosity of at least 1000 centipoises at 300° F. Brookfield, 20 r.p.m. spindle speed.) It is preferable, however, that the thermoplastic material have a viscosity of at least 3000 centipoises at 300° F., since the higher viscosity material gives a better metalized coating. The requirement for high viscosity at elevated temperatures is also dictated by the fact that when the film is heated to bond the metal powder, the film must support the powder to prevent any appreciable penetration of the power into the film.

The property of flexibility can be related to tensile strength and to some extent to degree of elongation of the film-forming thermoplastic material. The thermoplastic binder of this invention is further described as one having a measurable tensile strength, i.e., at least about 100 p.s.i. as measured by the procedure set forth in ASTM Test D–882–49T. A preferable tensile strength may be defined as 1000 p.s.i. or greater.

Although thermoplastic binders having little if any degree of elongation have been found to be satisfactory, it is preferable to use thermoplastic materials having at least a measurable degree of elongation, e.g., at least about 10 to 20%.

A thermoplastic binder material should also possess other general characteristics, among which may be listed the ability to be applied as a continuous film in a highly glossy state. It will be shown in the description below that the gloss of the final metalized surface is related to the degree of glossiness of the original film binder as it is applied to the substrate surface. Furthermore, the thermoplastic binder should be a material which can be applied to adhere well to the substrate.

The thermoplastic binder may also possess additional desirable characteristics which make the finished decorative article and particularly metalized paper suitable for a number of applications. These additional characteristics which can be achieved include, but are not limited to, ability to be colored, low moisture vapor transmission, low gas permeability, resistance to grease, heat-sealable, and easily deposited in the form of a thin film on the substrate. It will be apparent to those skilled in the art that by the proper choice of the thermoplastic binder the final metalized article may be given desired and predetermined physical characteristics. For example, the use of a polyethylene film results in the production of a heat-sealable paper which exhibits very low moisture vapor transmission and which has a good tensile strength and hence makes a good metalized paper for food wrappings.

The thermoplastic binder can also contain modifiers known to give the thermoplastic film certain desired characteristics. For example, they may contain tackifiers, plasticizers, and the like. These will be modifiers which are commonly employed with the various thermoplastic films and known to those familiar with plastic formulation techniques.

In the practice of this invention a wide variety of thermoplastic materials have been found suitable which possess the characteristics set forth for the film. Among the thermoplastic materials which can be employed in the practice of this invention are polyethylene, acrylics, polyamides, polyvinyl butyrals, polyvinyl formals, polyvinyl acetates and their copolymers with vinyl chloride, ethyl cellulose, styrene and its copolymers with butadiene and the like.

There are known in the art a number of ways of applying thin films of these thermoplastic binder materials to the surface of a substrate. Such methods include hot melt coating, calendering, extruding, and coating from a solvent or dispersion. The term "coating" as herein used in referring to the film of thermoplastic binder material on the substrate includes films applied by any of these methods as well as other known means of application. The type of binder film selected will depend on the intended end use, the particular binder being applied to the substrate by a method known to be appropriate for that material.

It has been found that the gloss of the finished metalized article is directly related to the degree of glossiness of the thermoplastic film binder originally deposited on the surface. There are a number of ways known in the art for depositing thin films of these thermoplastic materials having varying degrees of gloss. For example, if the thermoplastic material is to be deposited as a hot melt coating, the coated substrate can be run over a hot smoothing bar while the film is still in a melted condition to obtain high gloss. Other techniques for forming a glossy film include but are not limited to calendering, rapid chilling and the like. The choice of binder material also affects the final degree of gloss obtainable. Degree of gloss is readily and conventionally determined by visual means.

The thickness of the film on the surface is not critical as long as it is essentially a continuous film and preferably without substrate particles projecting therethrough. For example, films of thicknesses no greater than one-tenth mil are satisfactory provided they can be deposited upon the surfaces economically. Although films are normally defined as having thicknesses up to about 10 mils, this need not be considered an upper limit. However, for practical reasons, films ranging from about one-half to 2 mils thick have been found to be very satisfactory. Generally where flexibility of the finished metalized article is important, it will be desirable to use thinner films.

Any metal powder which can be reduced to an extremely fine form is suitable for the practice of this invention. Among such metal powders are aluminum, copper, bronze, zinc, combinations of these and the like. Very finely divided particulate matter such as a ultramarine blue, commonly used as a pigment in paints, can also be used. The metallic powders or other particulate matter should be very finely divided, preferably about 325-mesh or finer. Although the generic term powder has been used to define the particulate matter, it is possible also to use what is referred to as a leafing pigment, the latter usually having a stearic acid coating. However, it has been found that uncoated powder of the dimensions specified is preferable.

As noted above, other finely divided particulate matter meeting the size specification set forth may be substituted for the metallic powder or may be combined with metallic powder. For example, finely divided coloring material such as ultramarine blue can be added to the metallic powder.

The amount of powder deposited and remaining adhered to the film binder can be varied over a wide range depending upon the use to which the metalized article is to be put. Assuming for example that a paper is to be metalized, it has been found that as little as 10% of the thermoplastic film surface need be covered with metal powder to give a metalized surface which is extremely lustrous and attractive to the eye. It is preferable, however, in applications where the paper is to serve primarily in a decorative role, that from 20 to 40% of the film surface be covered in substantially uniform distribution with the metallic powder, thereby exposing in the finished article a major portion of the thermoplastic surface.

If the paper or metalized article is to serve as a thermal barrier or heat insulating material it is preferable that at least 75% of the surface of the binder film be covered with the metal powder and even more preferable if this approaches or actually attains 100%. This has been demonstrated in a simple experiment in which metalized paper formed in accordance with the process of this invention was evaluated for its ability to act as a heat barrier. A piece of thermal paper treated to turn black at 200° F. was taped to the under side, i.e., unmetalized side, of a sample of metalized paper and the corresponding metalized surface was exposed to radiation from a 375-watt infrared lamp placed 8 inches above the metalized sur-

face. When a metalized paper having about 10% of its area actually covered with aluminum powder was exposed to radiation, the thermal paper turned black in less than 10 seconds. When a metalized paper, the area of which was about 80% covered with aluminum powder, was tested in the same manner, the thermal paper did not turn after three minutes of exposure.

It will be seen that by the process of this invention it is possible to make a metalized article which is pleasing to look at and which contains a very small amount of particulate matter adhered to a glossy thermoplastic bonding film. For example, as little as one-quarter pound of aluminum per ream (3000 square feet) can be used. A preferable powder pick-up range is from about 0.25 to 0.5 pound per ream for decorative paper. This, of course, can be higher for thermal insulation material as shown above, i.e., up to about 1 to 1.5 pounds.

The ability to make a metalized article the surface of which is extremely reflective and appealing to the eye with so little metal powder is brought about through the practice of this invention by the fact that the metallic particles are deposited only upon the surface of the glossy thermoplastic bonding film and do not penetrate to any appreciable extent into the film. This is to be distinguished over metalized coatings which are applied either as a paint or by depositing metal powder in a binder which is reduced to a free-flowing liquid. Moreover, by the process of this invention no additional steps such as buffing or aligning of the metallic powder are required. Thus, the final metalized article may be described as having from about 10 to 100% of its surface area covered by metallic powder or other finely divided particulate matter.

As above described, the higher gloss of the thermoplastic film, the more lustrous the final metalized article. This is especially true of the metalized surfaces having the smaller area coverage with particulate matter. Apparently, even though the entire surface is not covered, the human eye integrates the entire surface to give a sensation of a highly polished surface which is very pleasing.

After the thermoplastic binder has been applied in an essentially continuous glossy film, the metallic powder or other finely divided particulate matter is deposited by any suitable way on the film surface. It can be dusted on, brushed on, or applied by any other suitable technique known in the art, including deposition in the form of a dispersion. The dispersing medium in this latter case may be a non-solvent (e.g., water) or a solvent (e.g., organic liquid) for the thermoplastic binder film. The dispersion medium should, however, be a liquid which wets the thermoplastic film. If it is a solvent, it may help bond the powder to the film but does not replace the next step of heating the film.

This next step comprises converting, by heat, at least that portion of the surface of the binder film contacting the particulate matter to a viscous liquid capable of bonding the particulate matter to the surface. Thus it is necessary to render only the said portion of the outer surface of the film bondable to the powder. It is unimportant whether or not the body of the film be melted provided its viscosity is sufficiently high to prevent settling or penetration of the particulate matter appreciably below the surface. For this reason, it is preferred that the body of the binder have a viscosity (Brookfield at 20 r.p.m. spindle speed) during bonding of at least 3000–4000 centipoises.

The step of converting the film surface to a viscous liquid is accomplished by heating the surface of the article, for example, by exposing the surface for a required period of time to a heated atmosphere, or by heating the substrate. Thus it is possible to accomplish this step of converting the surface to a viscous liquid by infrared, induction or other known means of heating.

After the film surface has been converted to a viscous liquid and the individual particles of metal or other particulate material have been firmly anchored to the surface of the film, the article is then cooled. In some cases it will be further desirable to accomplish the cooling as rapidly as possible to give higher gloss, depending upon the thermoplastic film binder and its characteristics. Rapid cooling or chilling can be accomplished by application of cold water, passing over a cold surface such as a drum and the like.

Further decorative effects can be achieved by imparting a design to the binder while the binder is applied to the substrate. For example, the hot binder on the substrate can be drawn over a wire-wound surfacing bar to impart an attractive ribbed appearance. The article can also be embossed before or after particulate matter is applied thereto, or the above heat can be applied in a pattern.

Finally, in the process of this invention it may be necessary to remove any excess metallic particles or other particulate matter after cooling and solidifying of the film has been accomplished. This can be done by any suitable way, such as lightly brushing off the excess with sheep skin rolls for example, gently vibrating the metalized article to shake loose the unattached particles or other similar techniques.

The particulate coating according to this invention can be applied to substantially any desired backing including wood, cloth, paper and cellophane. Expensive, high-grade papers are not required. In addition to sheet materials, the process can be used to metalize thread or molded objects economically. For example, nylon or rayon threads can be coated with the polyethylene melt of Example 1 below, cooled, dusted with metal powder and heated to set, all as set forth in Example 1. If desired for improved laundry and light-fastness characteristics, the metalized threads can thereafter be given a clear coating of plastic. Similarly, molded articles not already possessing the requisite surface can be coated, for example, with the polyethylene melt in Example 1, and thereafter metalized in a similar manner.

Furthermore, the process of this invention can also be applied to articles already posessing a suitable thermoplastic surface without additional coating. Thus articles molded from resins as herein set forth can be dusted with metal powder and fused as previously described to provide an attractive metallic surface.

This invention is further described by the following examples which are meant to be illustrative and not limiting. Since the metalizing of paper puts the most stringent requirements on the bonding film as far as flexibility and toughness are concerned, the thermoplastic film binder will be discussed and defined in terms of its use on a paper surface. However, it is, of course, not meant to limit the substrate to paper, which is used hereinafter for purposes of illustration only.

Example 1

To a suitable base, for example an 85-pound paperboard (ream basis, 500–20 by 26 inch sheets), a 0.6-mil coating of low-molecular weight polyethylene (Epolene C of Eastman Chemical Products, Inc.), was applied from a hot melt at 350° F. by roll coating. This low-molecular weight polyethylene is further characterized as having a melting point of about 100° C., an elongation of 50% to 60%, a tensile strength of 900 p.s.i. and a Brookfield viscosity of 8000 centipoises at 300° F. While the polyethylene was still in a molten state, the paper was passed over a hot finishing roll to impart a high degree of glossiness to the film thus formed.

After this binder film was cooled, a step which can include passing it over a chilled drum, finely divided aluminum powder was applied by dusting onto the coating face using sheepskin-covered rolls. The aluminum powder applied was 325-mesh, non-leafing pigment (sold by the Aluminum Company of America as Alcoa No. 552). The dusted film was then heated in a circulating-air oven for one minute at 350° F. to convert the surface to a highly viscous liquid without completely melting the coating,

thereby firmly and attractively anchoring the metal powder to the coating. The metal coating thus applied was very thin, covering about 25 to 30% of the actual film surface as measured under a microscope and present in a weight equivalent to about 0.35 pound per ream. The result was a metalized surface with a rich brilliance having the aluminum powder so firmly bonded to the coating that it would not rub-off to any significant extent.

The surface appearance of the article could be further enhanced, if desired, by rapidly chilling the same after fusion by passing the coated face over a smooth, chilled roll or by applying cold water directly to the hot metallic surface. No excess powder remained on the surface.

The moisture vapor permeability (ASTM Test D–988–51T) of a metalized paper prepared as above described was 2.7 grams per 24 hours per 100 sq. in. at 100° F. and 90% relative humidity. Creasing of this sheet at 70° F. and 50% relative humidity prior to testing it increased the permeability only to 4.5 grams.

Metalized paper prepared in accordance with this example is particularly well suited for decorative wrappings and packaging in general because of the good toughness and flexibility of the low-molecular weight polyethylene.

Example 2

A sheet coated with a thin film of the polyethylene of Example 1 was prepared as in that example and a 325-mesh aluminum leafing pigment dusted on. The dusted sheet was heated for one minute at 400° F.

Other powders or particulate matter which have been successfully applied by this means include, but are not limited to, a bright zinc flake, a bronze powder, copper powder, ultramarine blue pigments, and a mixture of 85% by weight 325-mesh aluminum powder and a 15% finely divided ultramarine blue. Many pigments and substantially any decorative metallic powder can be applied by this means to obtain a variety of attractive colors and surface textures. While pigments such as ultramarine blue can be applied, better surface appearance is obtained by mixing such pigments with metallic powders, preferably aluminum powder. It is also, of course, within the scope of this invention to achieve coloring by using a colored film as the thermoplastic binder.

In the case of the low-molecular weight polyethylene of Example 1, which has been found to be one of the preferred film-forming thermoplastics, it has been found preferable to further achieve a highly glossy film surface by drawing the film coated surface while the polyethylene is still molten, under tension across a surfacing bar prior to dusting the powders thereon to further improve the surface appearance of the finished article. For enhancing brilliance, the surface of this bar or roll can be smooth and polished or it can be striated or otherwise altered to impart a design to the coating. For example, a surfacing bar wound with fine metal wire has been found to apply an attractive ribbed appearance to the finished article.

Example 3

A mixture of 90 parts by weight of the low-molecular weight polyethylene of Example 1 and 10 parts by weight of a terpene resin (Piccolyte S–115 of the Pennsylvania Industrial Chemicals Corp.) serving as a tackifier was roll-coated at 325° F. on a 35-pound paper pouch stock followed by rapid chilling. Polished aluminum powder (325-mesh) was then applied by brushing onto the coated face and the composite heated at 300° F. for one minute. The small quantity of tackifier permitted the metallic powder to be more easily adhered to the binder film at lower temperatures.

Other modifying materials can be added to the low molecular weight polyethylene to modify its properties provided that the resulting viscosity at 300° F. is not reduced below 1000 and preferably not below 3000 centipoises. For example, 0.5% by weight of a high-molecular weight aliphatic amide (for example, Armid O of Armour & Co.) can be incorporated in the coating of Example 3 above to provide a more brilliant metallic finish on the product. A small quantity of a paraffin wax may also be added to the polyethylene to reduce its cost and to somewhat reduce its viscosity.

Example 4

A medium-molecular weight polyethylene resin (sold by E. I. du Pont de Nemours and Company, Inc., as Alathon 18) was extrusion laminated to a board stock support to a coating thickness of 1 mil. This polyethylene can be further characterized as having a melt index of 24.5 as determined by ASTM Test D–238–52T. Its viscosity, even at 300° F., was so high that it could not accurately be measured.

After cooling, the plastic surface was dusted with 325-mesh aluminum powder and then heated by a blast of hot air at 450° F. for about one-half minute. This higher temperature was required for good bonding since the molecular weight and melt viscosity of this polyethylene are higher than the polyethylene of Example 1. A higher molecular weight polyethylene having a melt index of 3 was used in place of the medium molecular weight material and heating by hot air blast at 550° F. for about one-half minute was required to render the film surface sufficiently tacky to firmly attach the aluminum powder.

Example 5

A polyamide resin having a viscosity of 3,700 centipoises at 300° F. and a tensile strength of 1000 p.s.i. was knife coated at 350° F. onto a 55-pound highly calendered glossy paper (ream basis, 3000 sq. ft.) to a coating thickness of 1 mil. This polyamide is commerically available from General Mills, Inc., as Versamid 940. Aluminum powder of 325-mesh was dusted onto the coating surface, the excess removed, and the sheet thereafter heated for one minute at 350° F. to bond the metal to the resin. The same resin was also dissolved (40% solids) in equal parts of isopropanol and toluene and reverse roll coated onto a highly calendered paper stock weighing 40 pounds per 3000 sq. ft. The coating was dried in an oven with a resulting coating 0.2 mil in thickness, dusted with the same aluminum powder and heated in a circulating air oven at 300° F. for one minute.

Example 6

A butadiene-styrene copolymer (sold by Pennsylvania Industrial Chemical Corp. as Piccoflex 100), having a viscosity in excess of 100,000 centipoises at 300° F. and a tensile strength of 500 p.s.i., was reverse-roll coated from a 50% solids solution in toluene onto the paper stock of Example 5 to a coating thickness of 0.15 mil. The film was then dried in an oven and thereafter dusted with a fine bronze powder. The dusted sheet was heated for one minute at 300° F. and subsequently cooled.

By any of the foregoing examples, an attractive firmly bonded metallic sheet, particularly desirable for use as a packaging material, can be produced economically and with a variety of surface appearances and colors. However, any article on which it is feasible to deposit a glossy film of a thermoplastic material of the type defined can likewise be given a metalized surface.

Where paper or other flexible membrane comprises the support, very high production speeds are possible, for example, linear treating speeds from 200 to 800 feet per minute may be employed. The amount of metallic powder or particulate matter applied may be varied; and in general low powder pick-up results in greatest gloss while the higher powder pick-ups result in rich, deep but duller matte finishes which, particularly in the case of aluminized surfaces, afford a good thermal barrier.

It will be seen from the description of the product and

process of this invention that it is possible to form novel and useful metalized articles. Moreover the process is simple, it permits variations without additional steps and achieves the metalizing of a surface with a minimum quantity of metallic powder. Moreover, the articles formed have a wide variety of applications. For example, the metalized papers, some containing as little as 10% metal coverage, are extremely pleasing to the eye and offer wide applications in decorative wrapping papers. Moreover, such metalized papers may be formed in many variations, such as smooth surface, rippled surface and the like. When the metallic powder is applied in heavier quantities, i.e., up to the point where 100% of the surface is covered with metallic powder, an article may be made with exhibits very high thermal insulation characteristics.

By means of this invention, the defects of the prior art products and processes are overcome and an attractive decorative product is provided which is substantially less expensive than foil laminate or vacuum-deposited surfaces. The metallic powder is so well bonded to the thermoplastic film surface that there is no substantial rub-off or scratch removal of pigment in ordinary usage. As an example of this excellent bond, pressure-sensitive tape, such as Scotch brand tape, can be adhered to the metal surface and stripped therefrom without any substantial removal of particulate matter. In addition to their attractive appearance, products according to this invention may possess other desirable properties such as low vapor transmission and may be heat-sealable which makes them very desirable as packaging materials.

It should be understood that the foregoing description is for the purpose of illustration only and that this invention includes all modifications falling within the scope of the appended claims.

I claim:

1. The method of coating the surface of an article with particulate matter, said surface comprising a glossy thermoplastic material having a Brookfield viscosity of at least 1,000 centipoises at 300° F., which comprises as steps applying to said surface while in its normal non-tacky solid condition finely divided particulate matter to the extent that between about 10 and 100% of said surface is substantially uniformly covered with said particulate matter, thereafter converting said surface by heat to a highly viscous liquid supporting said particulate matter in substantially the outer surface thereof, and reconverting said surface with cooling to said normal non-tacky solid condition whereby said matter is supported by said surface and firmly bonded thereto to produce a highly attractive surface.

2. Method in accordance with claim 1 wherein said finely divided particulate matter is metallic powder substantially all of which is sized no larger than 325-mesh.

3. Article formed by the method of claim 1 and characterized by a particulate coating present in a quantity not greater than about 1.5 pounds per 3,000 square feet of said surface.

4. The method of coating the surface of an article comprising the steps of applying to said surface a substantially continuous glossy film of a thermoplastic material having a Brookfield viscosity of at least 1,000 centipoises at 300° F., applying to said film while in its normal, non-tacky solid condition finely divided particulate matter sufficient to substantially uniformly cover between about 10 and 100% of the surface of said film, converting said surface of said film by heat to a highly viscous liquid supporting said particulate matter in substantially the outer surface thereof, and reconverting said surface with cooling to said normal non-tacky solid condition whereby said matter is supported by said surface and firmly bonded thereto to produce an attractive surface.

5. Method in accordance with claim 4 wherein said thermoplastic material has a Brookfield viscosity of at least 3,000 centipoises at 300° F. and is further characterized as having a tensile strength of at least 100 p.s.i.

6. Method in accordance with claim 4 wherein said thermoplastic material is polyethylene.

7. Method in accordance with claim 4 further characterized by the step of imparting a decorative design to said thermoplastic film.

8. Method in accordance with claim 4 wherein said applying said thermoplastic material to said surface is accomplished by hot melt coating and further characterized by drawing said thermoplastic film under tension across a surfacing bar during said coating.

9. Method in accordance with claim 4 wherein reconverting said surface comprises the step of rapidly chilling said film.

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