

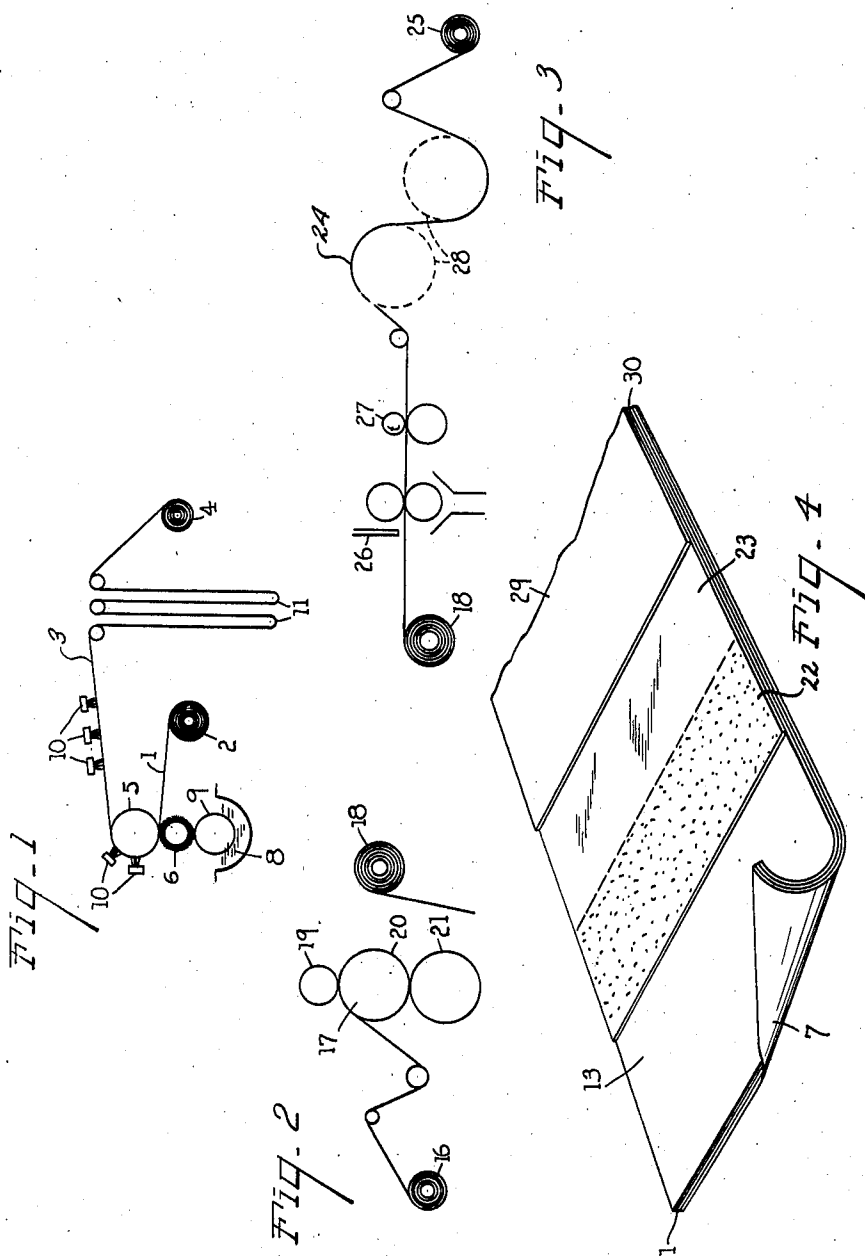
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PAPER AND METHOD OF MAKING

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PAPER AND METHOD OF MAKING

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The main objects of this invention are:

First, to provide a sheet of paper having an integral reflecting surface, the sheet being well adapted for use as a wrapper, for heat insulation and the like.

Second, to provide a grease and moisture proof paper well adapted as a wrapper for foods and the like and which may be economically produced.

Third, to provide a method of making paper of the foregoing character, which is simple and economical in practice and results in a sheet of very desirable appearance and insulating properties.

Objects relating to details and economies of my invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a diagrammatic view in side elevation of a coating machine adapted to apply various coatings to a web of paper during the practice of my method.

Fig. 2 is a diagrammatic view in side elevation of a calendering machine acting to polish the coating of oxidized metal broken down.

Fig. 3 is a similar view of a machine in which a moisture and grease repellent coating is applied to the reflecting surface, the web being subsequently desiccated.

Fig. 4 is an exaggerated fragmentary perspective view of a sheet of paper embodying features of my invention, the steps being illustrated in the form of layers for clearness.

Referring to the drawing, 1 is a web of paper which passes from the supply roll 2 through the coating machine 3 and to the roll 4. As the web travels under the drum 5, the rotating brush 6 applies a base coating 7 to one side thereof, the brush being supplied with the coating mixture 8 by the roller 9. The base coating is subsequently distributed over the surface of the traveling web 1 by the brushes 10. Before the coated web is wound on the roll 4, the web is passed through drying loops 11 or other suitable drier wherein the coating is dried sufficiently to prevent sticking between the convolutions of the web on the roll 4. This coating may be of any desired color.

After the web has been coated on one side in the foregoing manner, it is passed through a coating machine similar to that illustrated in Fig. 1, wherein a base coating 13 is applied to the other side of the web in a similar manner, the material passing from the supply roll 2 through the machine to the roll 4. Since the same or a similar machine is employed in imparting three coatings to the web, it has been illustrated only once in Fig. 1, web 1 being understood to have

one, two, or three coatings applied thereto as the case may be. The base coating preferably comprises a mixture of clay, casein and wax in the proportion by weight of 100 parts of clay to 16 parts of casein to 10 parts of wax. The base coating 7 may, as stated, contain a pigment to color one side of the sheet, but the base coating 13 on the other side of the sheet is preferably white.

After the base coatings have been applied to both sides of the web, the latter is passed through another coating machine similar to that illustrated in Fig. 1, wherein a coating of a broken down metal oxide is applied to the base coating 13. In this case, the web likewise passes through the machine from the supply roll 2 to roll 4. The coating which I prefer to use comprises a mixture of oxide of zinc or tin which has been broken down, casein and carnauba wax in the proportion by weight of 100 parts of broken down metal oxide to 16 parts of casein to 10 parts of wax. I preferably employ the product of the breaking down of an oxide of tin in this second coating since when polished it gives a brilliant finish. The product of the breaking down of zinc oxide may be used, but this gives a rather leadened finish. I have found that a product marketed under the trade name "Argentine" is suitably employed in the above described coating to follow the base coating. The substance to be combined with casein and wax, which I have termed an oxidized metal broken down, may be produced by treating the oxide with muriatic acid, the product rising to the surface and having the appearance of a froth. I have also found colloidal tin to be very satisfactory for my purpose.

Such a coating will resist salt and is resistant to chemicals, whereas aluminum and aluminum coated articles are deteriorated by salt and are not particularly resistant to chemicals.

The above described secondary coating has a dull and dark appearance and in this condition acts as a heat absorber rather than as a heat insulator. To secure the polished effect which I desire, the paper is next passed through a calendering or polishing machine 17, Fig. 2, wherein the web in passing from the supply roll, indicated in machine 17 by the reference numeral 16, to the roll 18 is subjected to the differential movement of a fast polishing roll 19 and a slow polishing roll 20, the latter being driven by the roll 21. As the coating comprising metal oxide broken down passes under the fast polishing roll 19, it is given a highly reflecting metallic appearing surface by the slip or friction polishing action of the roll. This highly reflecting surface has the appearance of metal foil, is a good heat and light insulator and has a very attractive appearance.

In Fig. 4, the secondary coating is indicated 60

at 22 in its dull and unpolished state, the polished, highly reflecting surface of the coating being indicated at 23. The polishing step not only changes the reflecting properties of the secondary coating, but also distributes the oxide particles in a continuous layer, which increases the insulating properties of the material.

The paper web treated in the foregoing manner is next run through the pyroxylin coating machine 24, Fig. 3, and wound on the roll 25, the web traversing the pyroxylin applying apparatus 26, the distributing apparatus 27 and the desiccating rolls 28. The coating of pyroxylin or cellulose is applied to the polished surface 23 to provide a moisture and grease repellent coating 29, Fig. 4. The last coating is substantially transparent and increases the reflecting power of the metallic appearing surface and improves the appearance of the product. If desired, the last coating may be omitted.

In the foregoing manner, I provide a sheet 30 having on one side a surface permitting printing and on the other side a surface which has the appearance of being covered by metal foil or the like, providing a reflecting insulating surface, and also when coated with pyroxylin or cellulose a grease and moisture proof surface. My method is applicable to a paper web of any kind of stock such, for example, as that used in making containers, wrapping paper, building paper or the like, the stock in any case being given a continuous metallic appearing surface which greatly increases the insulating properties of the paper. The sheet may be used as an insulator either in protecting foods or for heat insulation or the like. In order to increase the reflecting or heat insulating capacity of the sheet, it may be embossed to produce a multiplicity of angular projections on the metallized surface.

An important feature of my invention resides in the fact that it is not necessary to add wax to the final coating of cellulose, as is usually the case, inasmuch as sufficient wax constitutes a part of the base and secondary coating composition. I have stated that cellulose or pyroxylin are used as lacquers. However, other lacquers may obviously be used.

The subject matter of my invention finds commercial application in wallboards, building paper and their manufacture, and in other relations. Building paper is made up of two sheets of my product pasted on a jute sheet and is used in the walls of buildings, etc.

I have illustrated and described my improvements in an embodiment which I have found very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of making paper of the character set forth, comprising the steps of covering both sides of a web of paper with a base coating comprising a mixture of clay, casein and wax, covering said base coating on one side with a coating comprising a mixture of an oxidized

metal broken down, casein and wax, polishing said second coating to provide a highly reflecting surface, and covering said reflecting surface with a moisture and grease repellent coating comprising a transparent material such as pyroxylin or cellulose.

2. The method of making paper of the character set forth, comprising the steps of covering both sides of a web of paper with a base coating comprising a mixture of clay, casein and wax, covering said base coating on one side with a coating comprising a mixture of an oxidized metal broken down, casein and wax, polishing said second coating to provide a highly reflecting surface, and covering said reflecting surface with a moisture and grease repellent coating.

3. The method of making paper of the character set forth, comprising the steps of covering both sides of a web of paper with a base coating comprising a mixture of clay, casein and wax, covering said base coating on one side with a coating comprising a mixture of an oxidized metal broken down, casein and wax, and polishing said second coating to provide a highly reflecting surface.

4. A sheet of paper having a base coating comprising a mixture of clay, casein and wax, a coating overlying said base coating comprising a mixture of an oxidized metal broken down, casein and wax, said second coating having a highly polished reflecting surface, and a moisture and grease repellent coating overlying said reflecting surface.

5. A sheet of paper having a base coating comprising a mixture of clay, casein and wax, and a coating overlying said base coating comprising a mixture of an oxidized metal broken down, casein and wax, said second coating having a highly polished reflecting surface.

6. The method of making paper of the character set forth, comprising the steps of covering a side of a web of paper with a base coating comprising a mixture of approximately 100 parts clay, 16 parts casein, and 10 parts wax, covering said base coating with a metallic coating comprising a mixture of approximately 100 parts of a metal oxide broken down, 16 parts casein, and 10 parts wax, and polishing said metallic coating.

7. The method of making paper of the character set forth, comprising the steps of covering a side of a web of paper with a base coating comprising a mixture of clay, casein, and wax, covering said base coating with a metallic coating comprising a mixture of a metal oxide broken down, casein, and wax, and polishing said metallic coating.

8. The method of making paper of the character set forth, comprising the steps of covering a side of a web of paper with a base coating comprising a mixture of clay, casein, and wax, covering said base coating with a metallic coating containing a metal oxide broken down, and polishing said metallic coating.

9. The method of making paper of the character set forth, comprising the steps of covering a side of a web of paper with a base coating comprising a mixture of clay, casein, and wax, and covering said base coating with a metallic coating comprising a mixture of a metal oxide broken down, casein, and wax.

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