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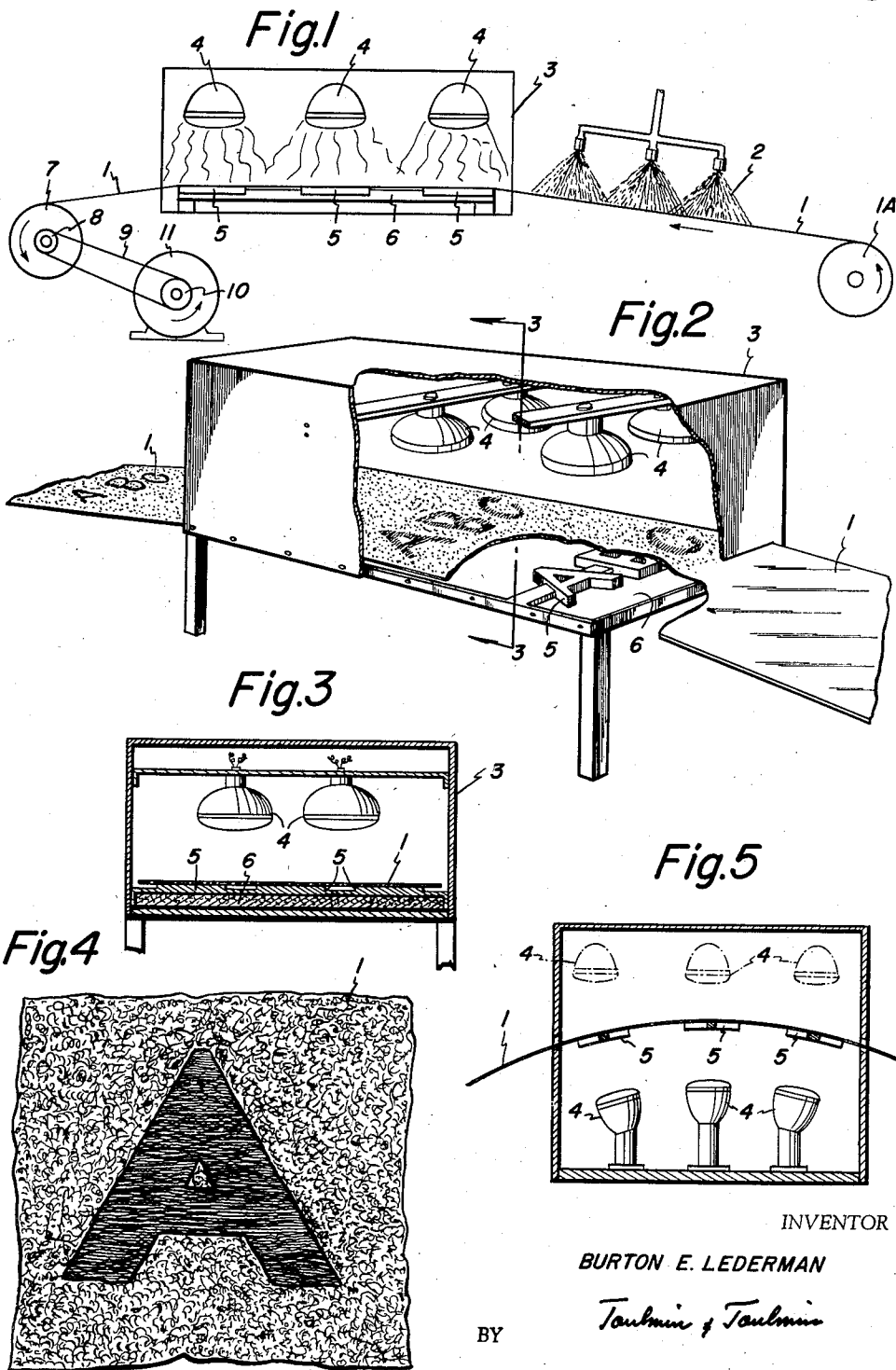
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2,862,835

EPOXY WRINKLE ON RUBBER IMPREGNATED PAPER

Filed Feb. 17, 1956

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6

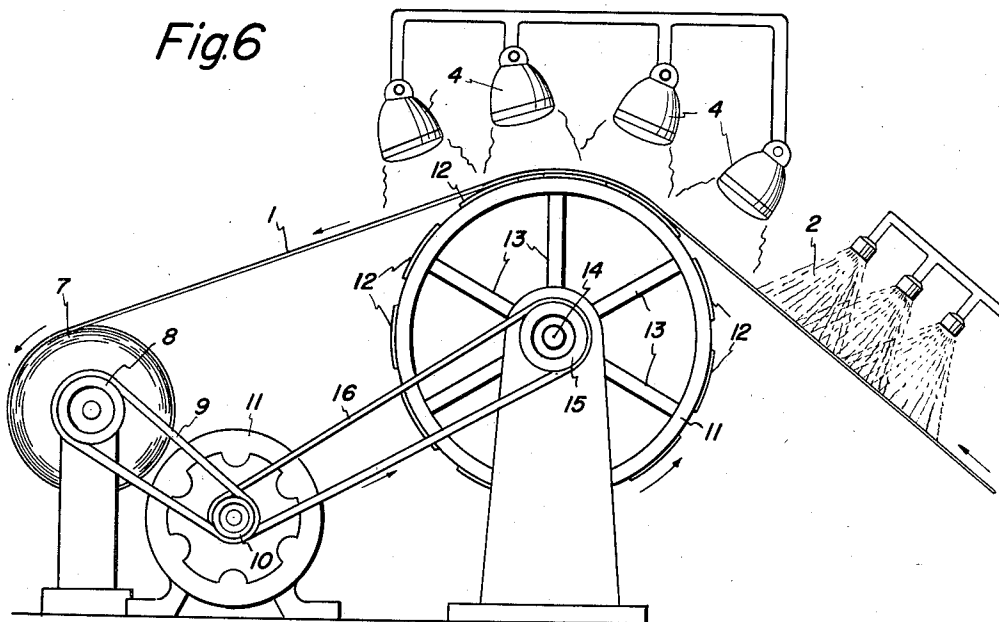
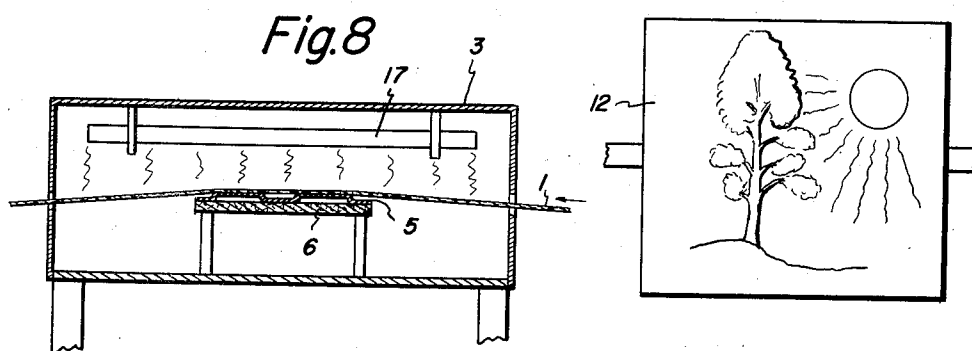


Fig. 7



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EPOXY WRINKLE ON RUBBER IMPREGNATED PAPER

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10 Claims. (Cl. 117—41)

This invention relates to printing in wrinkle finishes. It is an object of the invention to provide a high speed method and apparatus for causing designs to appear in wrinkle finishes in either plain or diverse wrinkle formulations on the surface of a sheet of paper, textile, vinyl film, and the like, without any contact by the printing design with the surface of the wrinkle and without any change in the formulation of the wrinkle.

It is a further object to provide rubber impregnated sheets, particularly epoxy wrinkles, in order to facilitate, in some cases, this method of printing.

It is an object to provide a master printing plate consisting of either a flat plate or drum for rotary printing which is flush with its supporting insulating board, the plate being all metal, so as to yield a design or printed words and letters without raising the background of the paper that is being used without embossing the paper, textile, etc.

It is an object to utilize the phenomenon discovered that the great differential in heat conduction between a metal design and insulating material such as Masonite, cardboard, wood, air, etc. permits of this diverse wrinkling on the surface of the supporting medium without contact on that surface by the design in metal.

It is an object thereby to use the raised design by the use of heat and a heat insulating board acting as a support for the metallic design when the heat source was above the coating with the metal of the design beneath the supporting media on the opposite side from the coating thereby achieving fast dissipation of heat from the media so supported in the area supported by the metallic design while the remaining area is insulated by an air space retained the heat and wrinkled and yellowed faster than wrinkle finish into more pronounced designs as compared with the designs of the wrinkling where the design itself was located.

It is an object of the invention to provide for faster heat dissipation through the metal of the design to thereby change the wrinkling effect in the design area as contrasted with the wrinkling effect in the non-design area.

It is an object to provide a printing surface with a countersunk metallic design supported by and in a non-conductor with the surface metallic design substantially flush with the metallic design.

Referring to the drawings,

Figure 1 is a side elevation of a diagrammatic view of the mechanism for practicing this invention.

Figure 2 is an isometric perspective view of the same mechanism broken away to show the location of the infra red lamps, the Masonite insulation board support and the metallic letters supported thereon to provide a design.

Figure 3 is a section on the line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 is an enlarged view of a portion of a backing strip coated with wrinkle finish in which the design has a different textured pattern from that of the non-design area.

Figure 5 is a view of an alternate method of heating the

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metallic design from the bottom and optionally from the top simultaneously.

Figure 6 is a view similar to Figure 1 showing the use of a drum carrying a design synchronized to rotate with the movement of the paper being driven from a common source and interconnected together so that the design can be applied to the surface of the supporting media under the infra red ray lamps.

Figure 7 is a plan view of a portion of the design drum consisting of the insulation material supporting the metallic design.

Figure 8 is a modified construction showing the use of electric heaters, a metal design plate with air spaces under the raised portion and an insulation board supplying the metal design.

Referring to the drawings, 1A is a roll of supporting media such as paper either latex impregnated or textile materials, vinyl film, etc. The supporting media from the roll passes beneath applicators designated 2 where the wrinkle finishes are applied. These wrinkle finishes may be applied by spraying, by flow-coating or by roller coating. The inherently flexible epoxy wrinkle finishes are preferred, particularly when they are adjusted to quick drying and wrinkling by a suitable catalyst. However, plasticized alkyd and oleoresinous wrinkles might be used. The composition of the wrinkle forms no part of this invention.

In Figure 1 there is illustrated the spraying of the wrinkle finishes 2 on the sheet 1. This sheet with coating of the wrinkle liquid in wrinkled condition passes into the heating chamber 3 where the infra red lamps 4 direct their light on the top of the paper which is supporting the wrinkle finish. Beneath the paper and in taut engagement with it due to tightness of the paper as it moves step-by-step through the heat oven 3 under the lamps 4 are designs of metal designated 5 supporting in or by insulation plates such as Masonite 6. In the areas where the metal engages the paper a different wrinkle finish of a different design will appear as illustrated in Figure 4 at the bottom of the first sheet of drawings. As this formulation is effected rapidly the process is continuous. The sheet thus formed into wrinkle finishes having designs is wound on the roll 7 by the pulley 8 and belt 9 mounted on the pulley 10 on the armature shaft 11.

Turning to Figure 6, it will be observed a rotary drum of insulating material 11 has mounted either imbedded in the surface of the drum or projecting slightly above the surface of the drum a metallic design 12. This drum is mounted on a frame 13 on the supporting shaft 14 on which is mounted a pulley 15 and a belt 16 which engages the motor pulley 10. In this way the motor 10 which moves the supporting media from its supply to its stored condition in the roll 7 has its printing roll 11 synchronized with its movements.

It will be noted in all cases that the supporting media sheet 1 is arranged to be drawn tightly over the surface of the printing design. It is preferred to have the infra red lamps above the design although they may be placed below the design in some cases where direct access to the rear of the printing design of metal may be possible. In some cases the lamps are placed both above and below the media as coated and the design mechanism.

Example I

A sheet of paper is impregnated with rubber latex. There is applied to the surface of the impregnated sheet when dry a thin coating of wrinkle finish, preferably of the epoxy-ester type. This sheet while wet is moved over and in tight engagement with a metallic design supported in or upon an insulation support of Masonite

or the like. Simultaneously, it is subjected to infra red heat for baking to cause the wrinkle finish, which is, when applied in its liquid form, smooth to convert into a wrinkle design consisting of a background of wrinkle finish and a design of wrinkle finish of a different configuration and appearance. The paper is maintained in a taut condition in firm engagement with the metallic design and passes through the chamber under the lamps for a period sufficient to cause the wrinkle finish to be completely formed and hardened as a result of the baking operation. Because of the completion of the coating with its design in hardened condition the supporting media and the wrinkle finish can be wound on a suitable roll for further decorative use.

Example II

In a high speed operation, with a very quick drying wrinkle finish, the supporting media which may be a vinyl film, polyethylene film, a paper, treated or untreated, textile materials etc., the roll of such material on it delivery directly on the machine manufacturing it results in the sheet being sprayed with either a roller coater, a spray or an electrostatic applicator of wrinkle finish fluid. The coated sheet then passes over a synchronized rotary drum which is driven from the source of power that is moving the sheet. The sheet is moved over the drum under the infra red lamps. The drum is of insulation material having either mounted on it or imbedded in its surface a metallic design that is desired to be reproduced in a reverse wrinkle finish on the surface of the supporting media. If paper is used the paper may either be impregnated with rubber latex or it may be sealed or unsealed with the usual sealers such as mordants, clays, etc.

The differential in the design may be either due to a different design of wrinkle or to different color result due to different yellowing rates as I have observed a phenomenon that due to the metallic baking of the design there is a different color resulting, or it may be due to both different yellowing and configuration. This difference in color can be accelerated by combining with the wrinkle finish pigments that are sensitive to heat in certain ranges, that is, such pigments when heated to the higher temperature inherent in the metallic design will be photo-activated and bring about a printed effect due to change in color due to greater heat in the design areas than in the areas where there is either an insulation board or no support at all and the ordinary wrinkle finish in the ordinary color remains. It has been found, however, that baking the metallic plate, constituting the design, with an insulation material, with the heat source above the metallic design, and with the wrinkle coated paper between the metallic design and the heat source, more rapid effects are attained in bringing about this design printing. By this adjustment of the location of the insulation support with reference to metallic design, the speed of formation of the wrinkle and the wrinkle design can be controlled. It can also control the size and nature of the wrinkle finish in both the non-design areas and in the design areas.

Example III

When it is desired to secure a very sharp differentiation of a design, particularly a delicate design, it is preferred to use a supporting media such as paper of an unsealed white latex stock. The process of forming the design is as discussed in the previous examples, but by treating the stock with latex I have found that a sharper design results. Likewise, this provides a means of adjusting the shades of color in the design area and gives a sharper differentiation as a result. Subtle designs and printing with the wrinkle itself can be produced in a paper coating wrinkle by the selective choice of a backing plate having a conducting and insulating sur-

face with the heat source directed primarily to the wet coated upper paper surface.

Various typical flash dry and baking schedules may be employed. Both the white unsealed paper stocks as well as sealer papers of heavier stock can be employed.

Example IV

By employing a synthetic resin film of transparent or translucent character, particularly one with metallic particles embodied in it, provides a very satisfactory material for use with this process for employment as shower curtains, window shades, draperies and other decorative materials such as wall decorations, particularly where lights are located behind the wall decorations. By employing these metal bearing transparent and translucent films the wrinkle finish of transparent character, either with or without pigments, may be employed. When this treated sheet moves over the metallic design supported by the insulation, as described, and beneath the infra red lamps the formation of the wrinkle results so that there is a diverse wrinkle between the background and the design. Due to the presence of the metallic particles in the transparent or translucent material the degree of the wrinkle has the effect of changing the degree of reflectivity of the metallic particles hung in the path of a light source. There is upon the finishing of such media, so treated and so impregnated metallic particles beautifully scintillating of the desired design and color as the media itself may be also colored while still remaining transparent or translucent and the transparent wrinkle finish may or may not itself be a carrier of metallic particles. In the event that only the wrinkle finish carries metallic particles, then the result is accordingly interesting, or if the supporting media carries the metallic particles, the diversity of the wrinkle finishes will produce a diversity of design effects.

Example V

As shown in Figure 8 a metal plate 5 with raised portions to indicate the configuration or design may be mounted upon a lightweight board 6. The paper carrying the wrinkle finish is designated 1 and is brought over the top of the metal plate which, because of its areas that have been struck up, has under such areas air spaces. The electric heating element is designated 17. A clear impression of the configured plate is made in the wrinkle pattern. There is a definite case of difference in the wrinkle configuration in the background and over the configurations in the middle. When a heat insulating board is placed under the metal plate in the electric oven, a good effect is obtained. This indicates the need for the heat source to be above the coating with the metal sheet with its upraised letters and numerals achieving a fast dissipation through the metal where it engages the backing of the carrier sheet 1, there is a difference in the wrinkling over the raised backed areas and those that are not raised.

The foregoing examples are typical of the wide variety of treatment that can be effected by the method and apparatus of this invention. It makes possible the use of a wide variety of opaque translucent and transparent supporting media with a wide variety of pigments, temperatures, colors and reflectivity substances.

It is understood that the particular form of heat may be varied, the wave length of such heat lights may be varied, the composition of the wrinkle may be of a great many different types and kinds and the supporting media may vary widely. The basis of the invention is to provide such decorative materials with high speed printing of the design giving diversity of effect on the wrinkle surface. It is an object to do this at high speed and low cost with a minimum of equipment.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and, accordingly it is desired to comprehend

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such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. In a method of manufacturing a wrinkle finish sheet of supporting media coated with a wrinkle finish and having a wrinkle finish design thereon, the step (a) of applying the liquid coating wrinkle finish, the step (b) of supporting the resultant coated sheet on a metallic design, and the step (c) of heating the said coated sheet and design while supported in contact with a heat insulating material to form a different pattern of wrinkle finish over the design as contrasted with the rest of the wrinkle finish sheet.
2. In a method of manufacturing a wrinkle finish sheet of supporting media coated with a wrinkle finish and having a wrinkle finish design thereon, the step (a) of applying the liquid coating wrinkle finish, the step (b) of supporting the resultant coated sheet on a metallic design, and the step (c) of heating the said coated sheet and design to form a different pattern of wrinkle finish over the design as contrasted with the rest of the wrinkle finish sheet, the step (d) of supporting the metallic design against the back of the sheet with an insulating material that is substantially non-heat absorbent.
3. In a method of forming a wrinkle design on a wrinkle finish sheet the step (a) of applying a wrinkle drying coating finish, the step (b) of applying a physical design member of a desired configuration to one side of the sheet after it has been coated, and the step (c) of heating the other side of the sheet on which the wrinkle material has been coated while supported in contact with a heat insulating material to form a diverse wrinkle effect in the design area as contrasted with the background area.
4. In a method of forming a design on a wrinkle coated sheet of different wrinkle texture from that of the background texture of the wrinkle on the sheet, combining the step (a) of applying a liquid coating wrinkle drying composition to the sheet on one side, the step (b) of applying heat on the same side and simultaneously to the coating with wrinkle, the step (c) of simultaneously supporting the other side with a metallic design against a heat insulating material during said heating of the wrinkle coating.
5. In a method of forming a design on a wrinkle coated sheet of different wrinkle texture from that of the background texture of the wrinkle on the sheet, combining the step (a) of applying a liquid wrinkle drying composition to the sheet on one side, the step (b) of applying heat on the same side simultaneously to the coating with wrinkle, the step (c) of simultaneously supporting the other side with a metallic design, and the step (d) of supporting the metallic design with a non-metallic support whereby the design will only appear in a different wrinkle over the metallic portion and the heat will be reflected back from the non-metallic support so as to control the wrinkling effect.
6. In a mechanism for diverse printing of a wrinkle surface comprising means for applying a liquid wrinkle drying composition to the surface of a sheet, a printing means comprising a metallic design supported on a heat

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insulating material beneath the wrinkle coated sheet, a heat source above the coated side of the sheet and means for moving the sheet with reference to the design and the heat source so that successive designs of the same character may be applied on the same sheet.

7. In a mechanism for printing a design in a wrinkle finish of diverse wrinkle character on a sheet, means of supporting a sheet in taut condition, means of passing the sheet through a heating zone, said means on the coated side of the sheet, means of coating them with a wrinkle drying coating composition before it enters the heat zone and means for supporting the design beneath the sheet and selectively restricting the application of heat by the same source of heat that heated the wrinkle finish to cause it to wrinkle.

8. In a mechanism for printing a design in a wrinkle finish of diverse wrinkle character on a sheet, means of supporting a sheet in taut condition, means of passing the sheet through a heating zone, said means on the coated side of the sheet, means of coating them with a wrinkle drying coating composition before it enters the heat zone and means for supporting the design beneath the sheet adapted to be heated by the same source of heat that heated the wrinkle finish to cause it to wrinkle, said design being mounted upon a rotary drum, the surface of which comprises heat insulating material and which is maintained in close engagement with the underside of the sheet in the heat zone, said drum being synchronized in its movements with the movements of the sheet, for the application of wrinkle finish and the application of heat to the wrinkle finish on the sheet during the period the sheet is in engagement with the metallic design on the drum.

9. A method of producing a decorative coating on a substrate which comprises applying to the surface of the substrate a wrinkle drying composition, bringing a metal shape design having a desired configuration contiguous with the under-surface of said coated substrate, and heating the coating while supported in contact with a heat insulating material to cause the same to wrinkle and form a contrasting wrinkle texture pattern conforming to said metal shape design with a surrounding background of different wrinkle texture pattern.

10. As a new article of manufacture made in accordance with process of claim 9 comprising a flexible sheet of material having a wrinkle finish surface, said wrinkle finish surface comprising a design or configuration thereon, said design comprising a wrinkle finish having a different texture wrinkle than that of the surrounding area and forming a background for the design.

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