Nov. 27, 1951 H. A. TOULMIN, JR 2,576,317

APPARATUS FOR PRODUCING SELF-SUPPORTING WRINKLE FILM

Filed Jan. 14, 1947 3 Sheets-Sheet 1

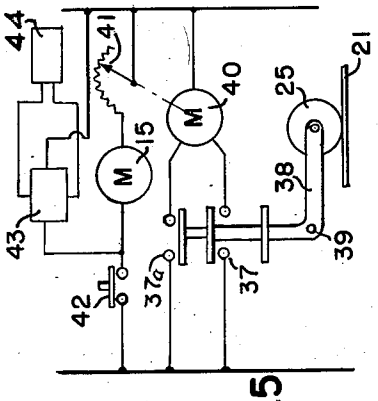


FIG. 5

FIG. 1

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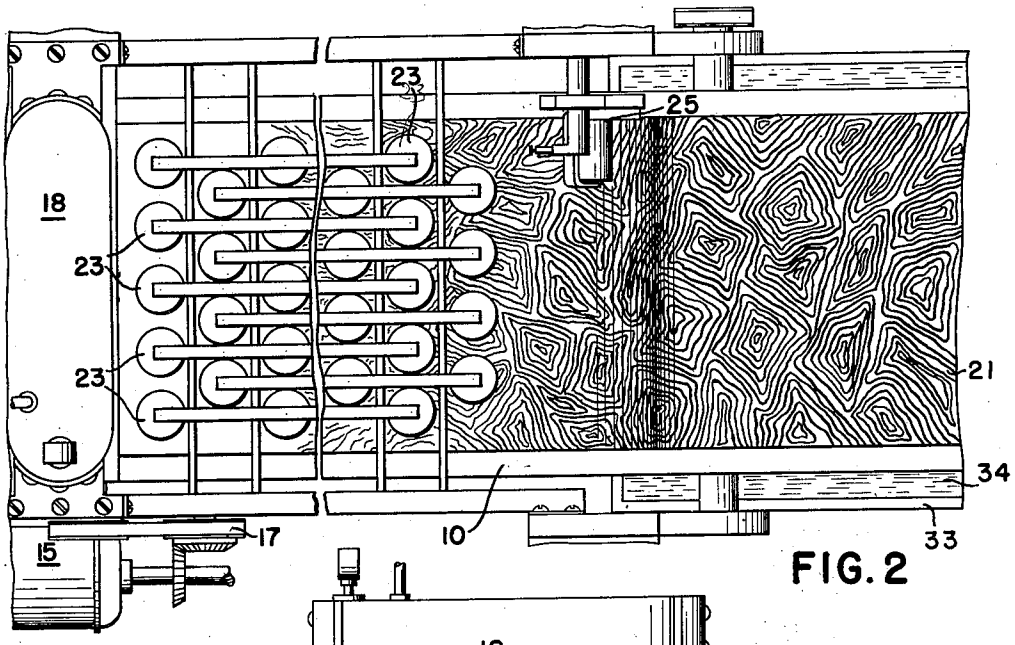


FIG. 2

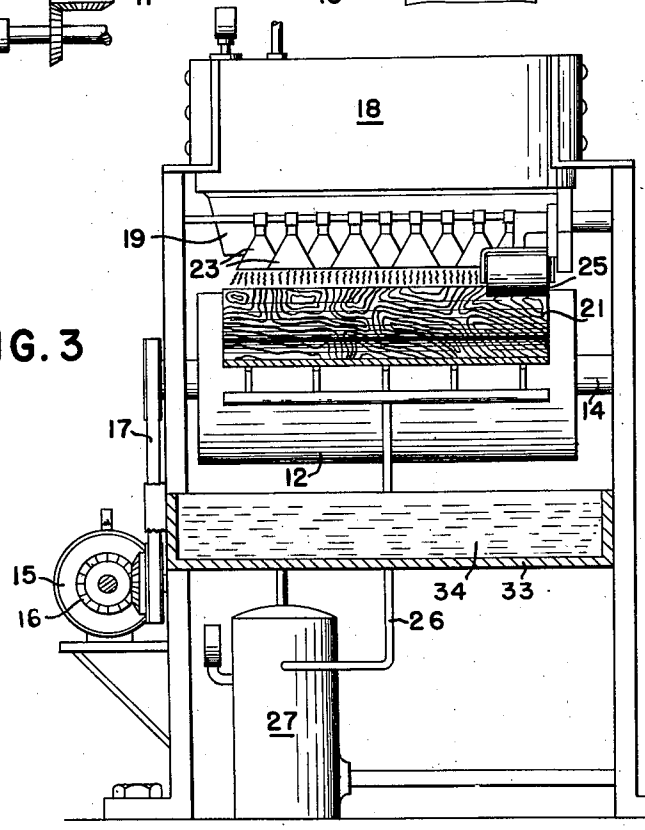


FIG. 3

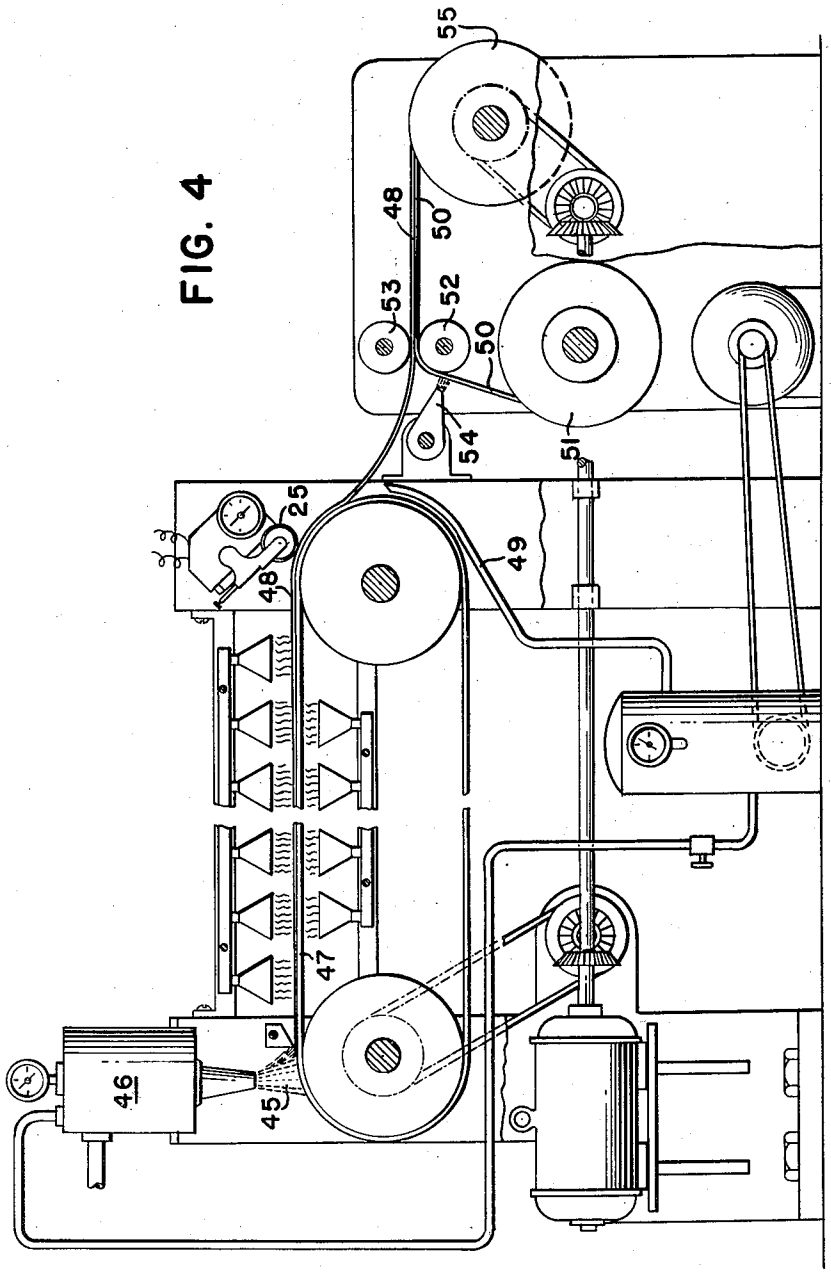
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Filed Jan. 14, 1947 3 Sheets-Sheet 3

FIG. 4



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APPARATUS FOR PRODUCING SELF-SUPPORTING WRINKLE FILM

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Application January 14, 1947, Serial No. 722,059

4 Claims. (Cl. 18—15)

1

This invention deals with an apparatus for the production of self-supporting wrinkle films.

It is an object of this invention to provide an apparatus for producing self-supporting wrinkle-textured films, the thickness of which is automatically controlled.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of an apparatus of my invention;

Figure 2 is a plan view taken along line 2—2 of Figure 1;

Figure 3 is a cross-sectional view taken along line 3—3 of Figure 1;

Figure 4 is a side elevation of a modification of the apparatus of my invention; and

Figure 5 is a diagrammatic showing of the circuit controlling the speed of the belts.

Referring to the drawings in detail, the reference numeral 10 designates an endless belt which runs over two guide rolls 11 and 12. The roll 11 is mounted on an axle shaft 13 and the roll 12 on an axle shaft 14. A motor 15 is connected with and drives the axle shaft 13 by means of a bevel gear 16 and a belt 17. A container 18 is mounted over one end of the belt 10. This container holds film forming material 20 which is dispensed onto the belt 10 by means of a discharge spout 19. The film formed on the belt 10 is designated with the reference numeral 21. A knife 22 provides for uniform distribution; it also may control the thickness of the film 21. However, this is more efficiently done by another means which will be described later. Infrared lamps 23 are spacedly arranged over the belt in order to subject the film to baking. In the instance illustrated, another series of infrared lamps 24 is arranged at the inside of the belt 10.

The belt moves in the direction of the arrow and brings the film under a control gage 25 where the thickness of the film is determined. After the film leaves the roller 12, it is partly cooled by means of an air blast supplied by a pipe 26. The pipe 26 is connected with a pressure container 27 which contains compressed air. This pressure container is furthermore equipped with a pipe 28 which leads to the container 18 so that the discharge of the film forming material may be carried out under the application of pressure. The cooled air emanating from pipe 26 not only cools the film, but it also peels it from the supporting belt. The isolated film is then guided onto a second endless belt 29 which is guided over rolls 30 and 31 also driven by motor 15

2

through bevel gears 16a and belt 17a. This belt 29 is being cooled continuously; by this, the film 21 is thoroughly cooled and hardened. Cooling of the belt 29 is carried out by guiding it through a container 33 which holds a liquid cooling medium 34, the temperature of which is lowered by means of cooling coils 35. The hardened film 21 is finally wound onto a reel 36.

The gage 25 controls the speed of the motor 15. This is illustrated in Figure 5. The gage 25 is connected with a reversing switch 37 by means of a control arm 38 which is pivoted around a fulcrum 39. It is obvious that when the thickness of the film 21 increases, the vertical part of the arm 38 drops and closes the switch 37. When the switch 37 closes, a control motor indicated with the numeral 40 rotates in counterclockwise direction, and the resistance 41 in the circuit is decreased thereby. When the resistance 41 is decreased, the feed motor 15 will run with increased speed and consequently also the belts 10 and 29, respectively, driven by them. The increased speed of the belts, in particular that of the feeding belt 10, causes a thinner distribution of the coating material and consequently a thinner film. On the other hand, if the film 21 becomes too thin, the gage wheel 25 lowers whereby the vertical part of the arm 38 is raised and caused to close the reversing switch 37a. In this case the motor 40 is caused to turn to the opposite side so that the resistance in the circuit is increased and the speed of the belts decreased.

A manually operated stop and start switch 42 for the feed motor 15 and the motor 32 is arranged in the circuit. Moreover, a vibration mechanism is installed in the circuit. In the instance illustrated in Figure 5, this mechanism consists of an oscillator 43 and a supersonic vibrating attachment 44.

It will be understood that instead of infrared light, other means of curing known in the art may be used.

The belts may be made of steel, in particular of stainless steel and also of paper, fabric, plastic, and the like. Instead of using a belt on the cooling device, the film peeled off from the belt of the feeding device may also be deposited on a base material on which it is permanently to form one of the layers of a combination material. Such combination materials are often used for draperies, shower curtains, upholstery, packaging materials and the like. This modification is illustrated in Figure 4. There, the coating material 45 is dispensed from a container 46 onto a belt 47 as a film 48 as shown in Figure 1.

The film is then peeled off by cold air dispensed from a pipe **49** and deposited on a continuous sheet or strip of base material **50** which is dispensed from a reel **51**. A pair of compressing rolls **52** and **53** provide for integral combination of the base and the film materials. In the instance illustrated, mucilage is dispensed from a spray gun **54** onto the base material in order to enhance the bond of the layers. Instead of mucilage, heat or other means which increase the adhesion may be applied. The combination material formed of the base **50** and the film **48** is then wound onto a reel **55** which is rotated by means of a motor **56**.

It is obvious that instead of peeling the material from the base by applying a stream of cold air, other mechanical peeling means, such as knives or blades, may be used. Likewise, cooling may be carried out in one instead of in two steps and by other known refrigerating means but those shown in the drawings.

It will furthermore be understood that the vibration for the purpose of obtaining a homogeneous film may be carried out by other mechanical means instead of supersonic energy. However, it also may be entirely omitted without changing the essence of the invention.

Any wrinkling coating composition may be used with the apparatus of my invention. By wrinkle coating composition is meant a spreadable liquid compounded with unsaturated drying oils which upon drying forms a hill and valley configuration. The character of the surface and general formulations which will produce this type of coating finish are explained in a general way in the patents such as those of Root, 1,896,594 and 1,950,417. The time and temperature of curing or setting are greatly dependent upon the kind of coating material used and also upon the thickness of the film. Heating for the purpose of curing may be carried out by means of heating devices arranged on one side of the feed belt or on both sides thereof, the latter case being shown in the drawings.

It will be understood that while there have been described herein certain specific embodiments of my invention, it is not intended thereby to have it limited to or circumscribed by the specific details given in view of the fact that this invention is susceptible to various modifications and changes which come within the spirit of this disclosure and the scope of the appended claims.

I claim:

1. An apparatus for producing wrinkle finishes comprising an endless belt of stainless steel, driving means for said endless belt, means for dispensing a film of wrinkle coating composition onto said belt, heating means for baking said film on said belt, air nozzles for peeling said film from said belt and cooling said film, a second endless belt, driving means for said second belt, a container with cooling liquid, said second belt being arranged so as to receive the film peeled from said first belt and pass through the cooling liquid in said container to further cool the film, and means for receiving said film after it was hardened on said second belt.

2. An apparatus for producing wrinkle finishes comprising an endless belt, means for dispensing a film of wrinkle coating composition onto said endless belt, means for driving said belt, heating means for curing the film, means including a thickness control gage for accurately measuring the thickness of the film obtained and for controlling the speed of said belt, means for cooling and removing said film from said belt, a container having cooling liquid therein, a second endless belt, means for driving said second belt, said second belt being arranged so as to receive the film removed from the first belt and pass through the cooling liquid in said container to further cool the film.

3. An apparatus for producing wrinkle finishes comprising an endless belt, means for dispensing a film of wrinkle coating composition onto said endless belt, means for driving said belt, heating means for curing the film, means including a thickness control gage for accurately measuring the thickness of the film obtained and for controlling the speed of said belt, speed adjusting means for said belt connected with and controlled by said thickness control gage, means for cooling and removing said film from said belt, and a second endless belt, driving means for said second belt, a container with cooling liquid, said second belt being arranged so as to receive the film removed from said first belt and pass through the cooling liquid in said container to further cool the film.

4. An apparatus for producing wrinkle finishes comprising an endless belt, means for dispensing a film of wrinkle coating composition onto said endless belt, means for substantially controlling the thickness of the film on said belt, means for driving said belt, heating means for curing the film, means including a thickness control gage for accurately measuring the thickness of the film obtained and for controlling the speed of said belt, speed adjusting means for said belt connected with and controlled by said thickness control gage, means for cooling and removing said film from said belt, a second endless belt, driving means for said second belt, a container with cooling liquid, said second belt being arranged so as to receive the film removed from said first belt and pass through the cooling liquid to further cool said film, and means for receiving said film after it has completely hardened on said second belt.

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