Nov. 29, 1932. W. H. GROGAN ET AL 1,889,020

METHOD OF COLORING PAPER

Filed Dec. 24, 1931

Fig. 1.

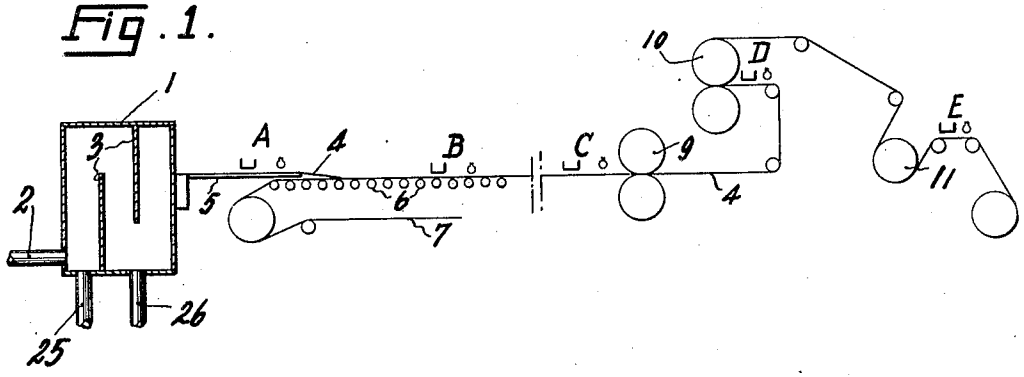


Fig. 2.

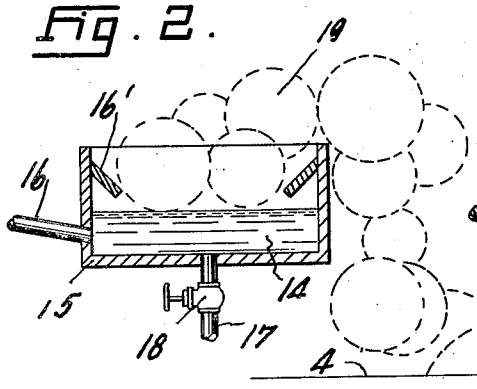
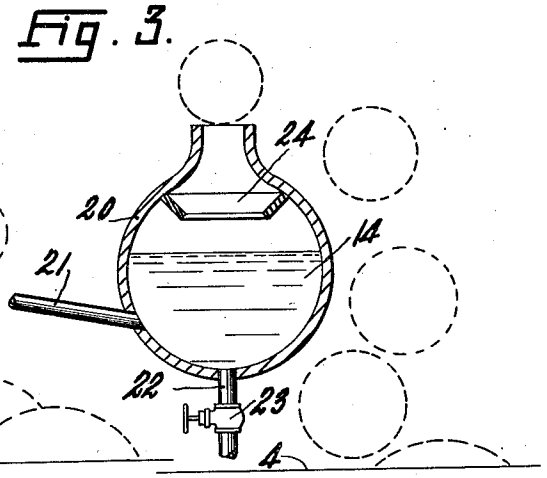


Fig. 3.



INVENTOR.
WILLIAM H. GROGAN
AND FRANK C. LADD
BY Chapin & Neal
ATTORNEYS.

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WILLIAM H. GROGAN AND FRANK C. LADD, OF TURNERS FALLS, MASSACHUSETTS, ASSIGNORS TO KEITH PAPER COMPANY, OF TURNERS FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

METHOD OF COLORING PAPER

Application filed December 24, 1931. Serial No. 582,996.

This invention relates to the decoration of paper and has as its object the provision of a method and apparatus by which a wide variety of novel color effects may be given to the paper.

Briefly, we propose to form bubbles from a suitable solution, colored with one or more colors, and to deposit the bubbles on the paper stock at one or more stages in its formation, the point or points of application of the bubbles and the manner of their application yielding a wide variety in the effects obtained as will hereinafter be more fully explained.

In the accompanying drawing, which illustrates one embodiment of the invention,

Fig. 1 is a diagrammatic view illustrating in combination a variety of ways in which the bubble formation may be introduced or applied to the paper;

Fig. 2 is a sectional view of one form of device for producing and applying the bubbles; and

Fig. 3 is a similar view of a different form of device for the same purpose.

Any suitable solution capable of forming bubbles when air, steam or gas under pressure is introduced therein, may be used to carry the color or colors; the following being examples of soap solutions which have given satisfactory results:

	Parts
#1—White hard soap	25
Glycerine	15
Water	1000
#2—Dry castile soap	2
Glycerine	30
Water	40
#3—Soap, hard or liquid	15
Glycerine	25
Water	200
Rosin size milk (1–5%)	10–15

In Fig. 1 certain conventional features of a paper making machine are shown in diagrammatical form, 1 designating the head box to which the stuff is admitted through pipe 2, the head box being divided into chambers by walls or baffles 3. From the head box the stuff as a sheet or web 4 passes over apron 5 to table rolls 6 where it is received by the wires 7 from which it passes to successive presses as at 9 and 10 and to driers 11. It will be understood that the present invention is not limited to any particular arrangement or type of paper making instrumentalities and that the arrangement illustrated is for the purpose of indicating some of the points at which the color may advantageously be applied.

In Fig. 2 is shown one form of device for producing and applying the bubbles to the paper. This comprises an elongated trough 15 adapted to be mounted over the paper and to which the bubble forming liquid 14 is fed by gravity through a pipe 16 from a suitable reservoir not shown. One or more pipes as 17, preferably controlled by valves 18, enter the bottom of trough 15 through which compressed air or the like is admitted to the liquid to form masses of bubbles 19 at the surface of the liquid. The growing accumulation of bubbles falls over the sides of the trough onto the paper, as indicated in dotted line, where they are broken or flattened in the progress of the paper through the machine, as by the dandy or suction box (not shown), thus leaving irregular rings and broken and interconnected lines of color. Inclined deflector plates 16′ prevent the liquid from being carried over the edges of the trough with the bubbles. The trough 15 may extend across the entire width of the paper, or overlapping or other arrangements of short troughs may be employed, different colors being supplied to different troughs. The effects obtained may be further varied by feeding differently colored liquid to different portions of the same trough.

In place of the trough shown in Fig. 2, or in combination therewith, individual cups, as shown at 20 in Fig. 3, may be employed. These cups, which produce individual bubbles, are generally spherical in shape and are supplied with the bubble producing liquid 14 through a pipe 21 and with compressed air or the like through a pipe 22 controlled by a valve 23. An inclined annular deflector member 24 prevents escape of the liquid with the bubbles which are generated by the passage of the air through the liquid. A plurality of cups 20 containing differently colored liquids

may be positioned in variously spaced or staggered arrangements above the paper to give a variety of color effects.

Referring to Fig. 1, one or more bubble producing devices may be positioned over the stuff as it comes from the head box 1. At this point (A) the stuff is over the apron 5 which prevents escape of water from the material tending to a greater diffusion of the color into and through the stuff and since the rate of travel of the material is slowest at this point the color is deposited in a more perfectly circular form than is the case at succeeding points where the increased speed of travel tends to give an elliptical form to the deposited color. Color bubbles may be discharged on the paper with characteristic effects at any other point of its travel through the machine; for example, at B, where it is on the wires; at C just before it enters the first pressing rolls; at D where it is reversed in entering the second presser rolls, the bubbles in this latter case falling on the reverse side of the web; or at D in the driers. Still a different effect may be obtained by applying the bubbles as the paper leaves the sizing bath.

A further application of the invention is shown in Fig. 1 where suitably colored bubble forming liquid is introduced through pipe 25 directly into the first chamber of the head box 1, and color bubbles are generated therefrom in the pulp mass by compressed air or the like introduced into the last chamber through pipe 26. The effect of this latter procedure differs from the others in that the bubbles produced are smaller in size and less brilliant in color.

As will be obvious, a wide range of color effects may be obtained by employing one or more, or different arrangements and forms of, the applying devices with one or a plurality of colors, and various modifications in form and arrangement will readily suggest themselves to those skilled in the art.

What we claim is:

1. The method of decorating paper which comprises introducing bubbles of colored liquid to the paper stuff.

2. The method of decorating paper which comprises applying bubbles, formed from a coloring liquid, to the stuff prior to the escape of the water from the stuff.

3. The method of decorating paper which comprises applying bubbles, formed from a coloring liquid, to the paper during its manufacture.

4. The method of decorating paper which comprises applying bubbles of colored liquid to the surface of the paper.

5. The method of decorating paper which comprises applying a mass of bubbles, formed from a colored liquid, over the surface of the paper.

6. The method of decorating paper which comprises introducing compressed air or the like into a colored soap bubble liquid to form bubbles, discharging the bubbles onto the surface of the paper and disrupting the bubbles.

7. The method of decorating paper which comprises continuously introducing compressed air or the like into a colored soap bubble liquid to form bubbles, discharging the bubbles over the surface of a continuously moving web of paper and disrupting the bubbles.

8. In combination with a paper making machine, means to introduce bubbles of colored liquid of substantial size to the stuff during a formative stage.

9. In combination with a paper making machine an open receptacle positioned above the path of travel of the stuff through the machine, means to supply bubble forming liquid to the receptacle, and means to introduce compressed air or the like through the bottom of said receptacle.

10. In combination with a paper making machine, including a chambered head box, means to introduce a colored soap bubble liquid to the first chamber of the head box and means to introduce compressed air or the like to last chamber of the head box whereby bubbles of color are formed in the stuff in passing through the head box.

In testimony whereof we have affixed our signatures.

WILLIAM H. GROGAN.
FRANK C. LADD.