

No. 618,672.

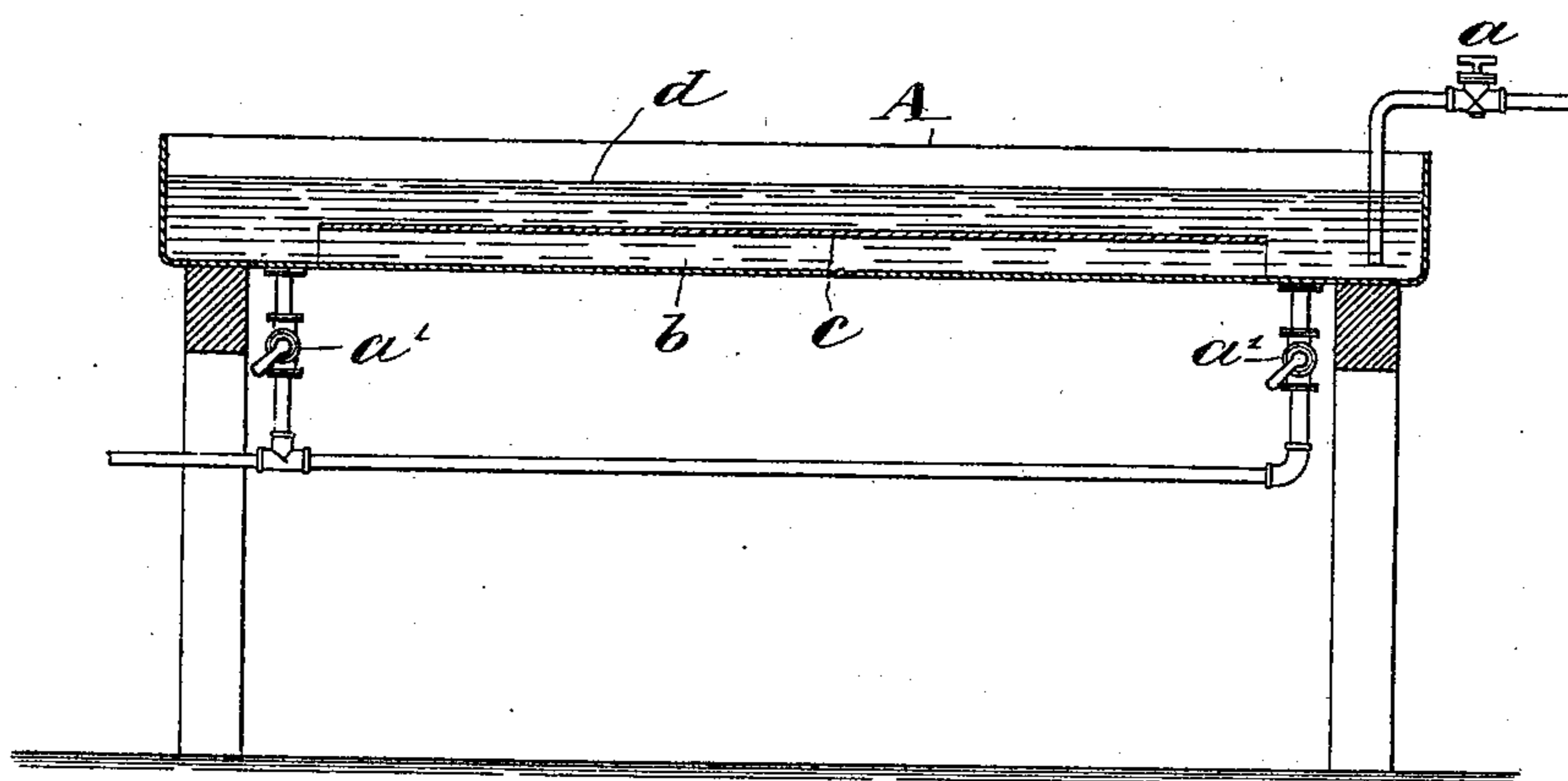
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C. HENRY.

METHOD OF PRODUCING AND FIXING IRIDESCENT COLORS ON PAPER.

(Application filed June 7, 1897.)

(No Model.)



Witnesses:

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METHOD OF PRODUCING AND FIXING IRIDESCENT COLORS ON PAPER.

SPECIFICATION forming part of Letters Patent No. 618,672, dated January 31, 1899.

Application filed June 7, 1897. Serial No. 639,664. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES HENRY, a citizen of the Republic of France, residing at Paris, France, have invented certain new and
5 useful Improvements in Methods of Producing and Fixing Iridescent Colors on Paper and the Like, (for which a patent has been granted in France, No. 262,580, dated December 28, 1896,) of which the following is a specification.
10 My invention relates to the fixing of the iridescent colors of interference on sheets of paper and surfaces of other material.

It is well known that most of the volatile essential oils when dropped on water will spread
15 over the surface of the water and form thin films which give rise to beautiful iridescent or prismatic tints or colors produced by "interference," so called, in a manner generally understood by physicists. I have discovered
20 a method of producing and fixing these colors on a surface, as of paper, in such a manner that they are made permanent and retain their brilliancy.

In carrying out my invention I cover the
25 sheet of paper or the like with water, then form a solution of bitumen of Judea in benzene, deposit some of this solution in the form of a film on the surface of the water, and then bring said film and the sheet of paper together—as, for example, by drawing off the
30 water gradually and allowing the film to deposit on the sheet.

A suitable solution for the purpose may be composed of about ten per cent. of bitumen of
35 Judea in crystallizable benzene, preferably with the addition of a few drops of the essence of lavender or spike.

The paper to be decorated if in a sheet is placed in a tray or basin having a waste-outlet at the bottom and covered with water.
40 One drop of the solution put on the surface of the water in the tray will produce a film which furnishes a magnificent display of the colors of interference. By drawing off the
45 water and allowing the color-film to descend evenly it will eventually settle on the surface of the sheet of paper, to which it will adhere and produce a permanent decoration when the sheet is dried. Ordinary or common sized
50 paper may be employed; but a somewhat better result is produced by first dipping the

paper in a solution of ammoniacal zinc chlorid, drying it, and then coating it with a solution of gum—as tragacanth, for example.

In lieu of paper the color pellicle or film
55 may be applied to other smooth-surfaced material.

If it is desirable that the pellicle shall form more slowly, ordinary benzene may be used in lieu of the crystallizable benzene. 60

The bitumen of Judea gives a brownish-colored solution, which is best suited to dark-colored paper, and where the pellicle is to be deposited on a light or white surface it is sometimes desirable to replace the bitumen
65 by gum dammar. This solution will give very good results. Preferably this solution will be equal parts, by volume, of gum dammar dissolved in benzene and colophony dissolved in benzene. 70

I have in the above description supposed that the operation was to be performed by hand in trays or basins of moderate dimensions—that is to say, by spreading the sheet of paper or the like on the bottom of the tray
75 of water, then forming the film on the water with the solution, and then gradually drawing off the water at the bottom of the tray, so that the film may settle on the sheet. These trays, which are by preference of zinc, and,
80 say, one meter long, 0.70 meters wide, and 0.08 meters deep, are furnished each with a cock or cocks adapted to draw off the water slowly and allow the pellicle to deposit on the submerged sheet or surface evenly. 85

Such an apparatus is illustrated in section in the accompanying drawing, wherein A is the tray or basin; *a*, the cock for supplying water thereto; *a'*, cocks for drawing the water off therefrom, and *b* a bed fixed in the
90 bottom of the tray to support the sheet of paper *c* or the like destined to receive the pellicle *d* on the surface of the water.

Any suitable apparatus may be employed to effect the result sought. 95

I may give to the colored or iridescent films different aspects, forming true molecular landscapes, by varying the form of the jet of the drop and by changing the situations where the different drops of the mixture fall
100 on the surface of the water. I may obtain special decorative effects by mixing with the

solution some non-miscible substance which is rendered insoluble by light—as bichromated gum, for example. Before the formation of the pellicle the colors or tints may be changed
 5 (sometimes advantageously) by producing sound vibrations near the water, whereby the surface of the water has minute vibrations imparted to it. After the formation of the pellicle and before the water is drawn off any
 10 accidental breaks or fissures in the pellicle may be mended by injecting a fine jet of the solution at the proper point.

To avoid the production of fissures in the pellicle on the sheet when the latter is de-
 15 tached and removed by hand, the paper or other sheet to receive the pellicle may be attached to a removable bed or plate, of wood or other suitable material, (seen at *b* in the drawing,) and this bed or plate is properly
 20 secured to the bottom of the tray or basin for the water. The sheet of paper after removal from the tray may be left on this bed to dry or partially dry. Any suitable means of drying the sheet which has received a pellicle may be
 25 employed.

To avoid the formation of air-bubbles under the paper or other material and to press it down flat upon the bed which supports it, a sheet of wire-gauze may be laid on the pa-
 30 per and pressed down. The gauze is then removed.

Various forms of designs or patterns may be left uncolored on the paper or other material destined to receive the pellicle, and
 35 this may be effected by either of the ways that follow:

First. By patterns cut from some thin impermeable material (such as metal, celluloid, &c.) laid on the sheet which is to re-
 40 ceive the pellicle. When these are removed after the operation, the surface under them will be found uncolored.

Second. By laying on the colored sheet patterns moistened with benzene or essence of
 45 terebinthine. If mixed with ordinary printers' ink, the designs may be printed in ink on the surface over the pellicle.

Third. By using as a bed for the sheet an open pattern, like fretwork. In this case the
 50 colors of the pellicle over the openings in the fretwork will be found to differ in tone and

character from those underlaid by the solid parts of the bed, and the pattern of the fretwork will thus be brought out.

In explanation of the terms “crystalliz- 55
 able,” “rectified,” and “ordinary,” as applied to the several benzenes, I would say that the first is a pure benzene with a density 0.9, which boils at 80.4° centigrade and has the formula C_6H_6 . The second is the ordinary 60
 benzene treated with sulfuric acid and soda for the removal of the oils of the amines, phenol, thiophene, &c. It is then dried on lime and submitted to fractional distillation with-
 in suitable limits. The last-named or ordi- 65
 nary benzene has a density of 0.841 to 0.877 and contains the homologues of benzene—viz., phenols, anilins, alcohols, &c.

I am aware that the idea of applying and fixing the colors of interference on sheets of
 70 paper is not broadly new, and this I do not claim; but

What I do claim is—

1. The herein-described method of producing and fixing iridescent colors on the sur- 75
 face of paper and the like, which consists in covering the paper with water, forming a solution in benzene of a resinous fixative which is influenced by light, depositing said solu-
 tion on the surface of the water over the pa- 80
 per, then drawing off the water in order to bring the color-pellicle into contact with the surface of the paper, and then drying the paper, substantially as set forth.

2. The herein-described method of produc- 85
 ing and fixing iridescent colors on the surface of paper and the like, which consists in covering the paper with water, forming a solution in benzene of bitumen of Judea, then depositing this solution on the surface of the 90
 water, then drawing off the water in order to bring the color-pellicle into contact with the surface of the paper and then removing and drying the paper, substantially as set forth.

In witness whereof I have hereunto signed 95
 my name in the presence of two subscribing witnesses.

CHARLES HENRY

Witnesses:

EDWARD P. MACLEAN,
 AUGUSTE MATHIEU.