

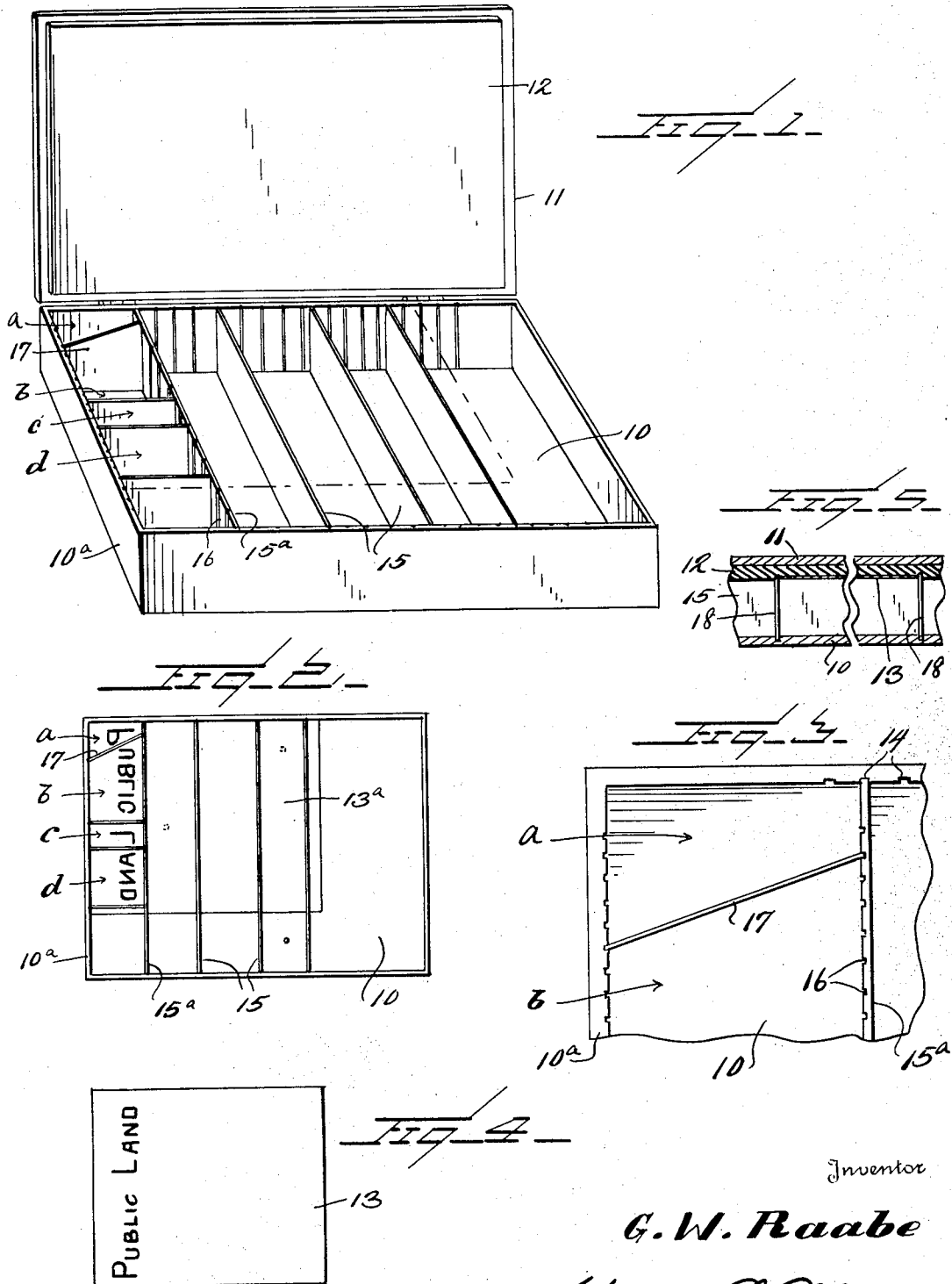
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DUSTING BOX FOR THERMOGRAPHIC PRINTING

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DUSTING BOX FOR THERMOGRAPHIC
PRINTING

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7 Claims. (Cl. 41—1)

This invention relates to that form of color printing which is known as thermography and also called raised printing which is produced by applying a resinous powder to the printed sheet while the size or ink which constitutes the size is still wet, the powder adhering to the inked surface only and in which after this operation, the sheet is passed through a "thermograph" or heater, between gas or electric heaters which melt the resinous powder giving an effect somewhat like engraving or embossing but at less expense. This process has attained quite a large commercial use and is used not only for printing type letters but for printing designs.

In the present state of the art, producing work of more than one color by this process adds very considerably to the cost and producing work of three colors, for instance, greatly increases the cost over producing work of two colors. This will be obvious from what follows. To perform two color work, it is customary to print the design or letter in one color on the sheet, then apply the powder, then put the sheet or sheets through the thermograph or heater with the heat reduced so that the powder is only partially melted, just sufficiently so that it will adhere to the paper. The second color is then printed, the powder applied to the letter or design which has just been printed and which is still wet, and the sheet is then passed through the thermograph and enough heat is used to melt the resin of both the colors completely. If a third color is wanted, not only the first color but the second color is partially melted. The third color is then printed and the powder applied thereto and then the sheets are passed through the heater and given sufficient heat to melt all three colors. This, however, is very difficult to do properly because the first color is usually melted down too much by the three heats applied thereto, resulting in an unsatisfactory job because the powder has a tendency to run and spread when melted too much. This frequently happens when three colors are attempted and this is the reason why three-color printing in this manner is very rarely attempted because the cost mounts with each additional color.

In this form of printing, there are two methods of applying the powder. By one of these methods, several freshly printed sheets are taken from the press and laid on the table or in a box. A quantity of powder is poured on to the top sheet, the sheet is picked up, tipped back and forth so that the powder shall cover all of the still sticky printed matter and the excess powder is poured on to the second sheet, the first sheet being fed in to the

thermograph or heater. The second sheet is now picked up and the process is repeated and so on for all of the sheets.

The second method is automatic in this that the sheets are fed into a machine which dusts on the powder and passes the sheets into a thermograph with which it is connected by a conveyor belt, the surplus powder being drawn off by an exhaust or in any other suitable manner. The only manual work required by this method is in feeding the sheets into the dusting machine. By this method, however, only one color is applied at one time just as by the first method and, therefore, if two colors have to be applied, each sheet must be run through the press, through the dusting machine and the heater twice or three times if three colors are to be applied.

The general object of my invention is to provide means whereby it is possible to apply or dust a dozen or more colors if desired at one time to a printed sheet, the sheet having to be passed through the press only once and through the thermograph or heater only once, thereby obviously effecting a considerable saving on all jobs of more than one color.

A further object of the invention is to provide very simple means whereby this can be accomplished comprising a colored powder container divided into compartments by removable partitions, each compartment having a cross sectional area somewhat larger than the area of the design to which the color is to be applied.

A further object is to provide a color holder of this character which has the form of a box having an area larger than or as large as the sheet to be colored and which is provided with removable partitions for the purpose stated and also with partitions which will support that portion of the sheet which is uncolored, this box or casing being provided with a lid or cover which when closed, holds the paper down in tight contact with the edges of the partitions so that the color is one compartment will not leak into and mix with the color of an adjacent compartment.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawing, wherein:—

Figure 1 is a perspective view of a dusting box constructed in accordance with my invention;

Figure 2 is a plan view thereof;

Figure 3 is an enlarged fragmentary plan view;

Figure 4 is a top plan view of the sheet to be dusted;

Figure 5 is a fragmentary vertical sectional view

through a portion of the box with the lid closed and showing the use of pins for the purpose of properly placing the paper in the box.

Referring to the drawing, 10 designates a casing in the form of a box having a bottom and four side walls. To the top of this box is hinged a lid 11, the lid being hinged to one of the side walls and the inside face of the lid being covered with a rubber mat 12. This mat has the same area as the outside area of the box 10 so that when the cover is closed, the rubber mat will contact with or force a paper sheet against the edges of the side walls and against the partitions which may be disposed within the box.

A paper sheet designed to have a design such as a sentence or letterhead printed thereon is designated 13. This sheet is shown as having a letterhead or heading printed thereon and it is the printing of this sheet which is to be colored. The side walls or end walls of the box are preferably provided with vertical grooves 14. These may be arranged at evenly spaced distances apart and as near together or as far apart as may be found necessary in actual practice and partition plates 15 are removably disposed in these grooves, these partition walls being shown as extending from one side to the other of the box. All of these plates or certain plates may also be provided with grooves 16. In Figure 1 a partition plate 15a is used which is provided with the vertical grooves 16, the partition plates 15 being considered as merely plain plates. The end wall 10a of the box is also preferably formed with vertical grooves such as 16 and coating with the partition plate 15a and the end wall 10a, for instance, are a plurality of smaller partitions 17 which may be disposed either parallel to the longitudinal axis of the box or diagonally with reference thereto or any other desired manner to define a plurality of frames which I have lettered *a*, *b*, *c*, and *d*. The arrangement of the partitions 17 and of the transverse partition 15a in the drawing is the arrangement to be used for printing the heading on the sheet 13, it being particularly to be understood that these partitions 17 can be changed to suit any particular job and that the spaces between the partitions 15 can all be sub-divided into color compartments by partitions 17 so that the whole sheet may be printed in different colors or just a portion of the sheet or one line on the sheet might be of one color, another line of type another color and a third line of type or a third portion of a design be still of another color and so on.

In the design shown on the heading for sheet 13, it is assumed that the first capital letter of the design is to be printed in one color, that the second capital letter is to be printed in another color and that the small letters are to be printed in a third color. This, however, is purely explanatory. In order to arrange for this, the first partition 17 is disposed at an angle so as to pass between the letter P, for instance, and the next succeeding small letter *u*. The partitions 17 which define the compartment *c* are shown as disposed at right angles to the partition 15a, etc.

Whether the partition 17 will be disposed at less than a right angle to the partition 15a or at right angles thereto will depend upon the shape of the letter or the shape of the unit of design to be colored. Under any circumstances, however, the partitions define compartments corresponding to the units of design and these compartments are to be filled or partially filled with resinous colored powders. Thus, for instance, in

the design illustrated, the compartment *a* will be filled with resinous powder of one color, the compartment *c* with a resinous powder of another color, and the compartments *b* and *d* will be filled with any other desired color or colors. The spaces between the partitions 15, however, will not be filled with any color, this portion of the sheet being left to ordinary printing or being left blank.

In the use of this device, the following method is pursued:—After the form has been O. K'd., an impression is printed on the "packing" of the press. A sheet taken from the job to be processed is now put into the press and printed and on the back of this sheet, an offset or reverse will be printed by the ink from the packing of the press which adheres to the back of the sheet. This sheet which is designated 13a in Figure 2 is now placed in the bottom of the box 10 with the reverse side up and the corners of the sheet are passed down. Preferably, though not necessarily, the sheet is placed against one side and one end of the box, this side and the end of the box forming a guide for feeding the sheets into the end of the box. With this reversely printed sheet as a guide, the partitions 15a and 17 are now placed in the box depending upon the position and number of colors desired. The colored powder such as a red powder may now be placed within the compartment *a*, green powder placed within the compartment *c* and blue powder placed within the compartments *b* and *d*. In ordinary printing, of course, such colors as this would not be used, but I am merely calling attention to the fact that three colors may be used for such a heading as I have illustrated. Work is now ready to begin. A sheet which has been freshly printed with the heading desired is now placed face down on the partitions using the side and end of the box as guides so that the sheet will be correctly aligned. The lid 11 is then closed, sealing up any small inequalities in the height of the partitions, the rubber mat being relatively deep for this purpose. The partitions 15 merely act as supports for the uncolored portion of the sheet under the circumstances shown in Figure 1. The box is now turned upside down which throws the powder in the several compartments on to the sheet and this powder now adheres to the fresh ink which in effect constitutes a size. The box is then turned right side up and a jar is given to the box to dislodge any loose powder. The cover is raised and the sheet taken out, turned powder side up and fed into the thermograph or heater which may be of any usual or suitable construction. This whole action, as a matter of fact, can be very quickly and expeditiously accomplished and as the powder is applied only to that part of the sheet where it is required, very little of it is wasted.

The partitions of the box can be of ordinary "two point" brass rule which is kept on hand by almost all print-shops. Of course, the inside walls of the box must be of exactly the same height as the partitions. The smaller partitions 17 while they might be made of metal can also be made of stiff cardboard and glued in place where advantage cannot be taken of the grooves and it is within the purview of my invention to eliminate the grooves in the transverse members 15 or 15a and apply these smaller partitions 17 by cementing or gluing them in place.

While I have described a hand operated box, it is to be understood that the closing of the cover 11 and the inversion of the box and the

return to its initial position might be readily secured by machinery. The operator would only be required to feed the sheets in and take them out. Obviously the deeper the box 10, the more powder will be held in each one of the compartments, and, therefore, the box may be of any desired depth.

By comparison with the process heretofore described, it will be seen in the ordinary "thermographic" process, a three-color job by the methods now in use would necessitate "making up" each color of printing in a separate form, locking up each form separately, a "make ready" on three separate forms, then three runs on the press, three separate applications of powder and three separate runs through the thermograph heater. My method and mechanism requires only one make-up, one lock up, one make ready, one run on the press, one application of powder and one run through the thermograph, or, in other words, it only requires two more steps than in any ordinary printing job. It will be seen, therefore, that by the use of my device and that my method of using this device, I do away with a very great element of expense, particularly where many colors are to be used.

It will also be understood that while I have illustrated this process and device as being used in connection with coloring printed matter, that designs of any form may be colored in the same manner and parts of a design be in one color while other parts of the same design are in another color and further it is to be understood that while I have referred throughout the specification to the use of ink upon which the powdered resinous colors are to be applied, that the design or the printing may be printed in any size alone which would be sticky enough to hold the powdered color when applied thereto. An ink or size of the same color as the powder may be used or a transparent size upon which the different colored powders could be applied might be used. Almost any light colored ink can be used for a size, inasmuch as the colors in the standard powders are strong enough to overcome the color of the size or ink.

Obviously many different changes might be made in the invention without departing from the spirit of the invention.

In Figure 1, I have shown the side and end wall of the box 10 as acting to guide a sheet into place. On smaller sheets, however, as illustrated in Figure 5, three pins 18 may be disposed within the box and extending upward from the bottom thereof, two of these pins acting as guides for the side of the sheet and one pin acting as a guide for the end of the sheet. These guides would be slightly higher than the partitions 15, 15a or 17 but the rubber mat 12 would be of sufficient thickness as to give immediately over these pins when the cover was closed.

While I have described this dusting box as being particularly applicable to thermographic printing where fusible powders are used, I do not wish to be limited to this as it might be used for the application of infusible powders which would simply stick to the ink or size and would not be passed through a heater, thus it could be used for metallic bronzes or pigments in various colors or one could be thermographed and another color simply formed by dusting infusible powder upon any particular portion of the sheet desired.

I claim:—

1. A method of multi-colored thermographic printing which consists in printing the design on

a sheet of material in size and then simultaneously dusting on appropriate portions of the design differently colored, fusible powders, and then simultaneously and at a single operation fusing all of said powders.

2. A method of multi-colored thermographic printing which consists in printing the design in size on the material to be printed, inverting a case having compartments containing different colored, fusible powders on to the sheet to cause the different colored powders to be applied to different colored appropriate portions of the design, then returning the case to its initial position and removing the sheet and then simultaneously fusing all of said powders.

3. Means for applying differently colored fusible powders to different portions of a design printed in size comprising a dusting box, interchangeable, movable partitions engaging the walls of the box whereby the box may be divided into compartments and the compartments may be formed having different cross sectional shapes, each approximating the area of the design unit intended to be dusted with the particular color contained in the compartment, and means for holding a sheet having the design printed thereon in size tightly against the open ends of the compartment whereby when said dusting box is inverted upon the sheet, the powders in the compartments will be applied to the design units.

4. Means for applying differently colored fusible powders to designs printed in size comprising a dusting box divided into compartments by partitions, the compartments having cross sectional shapes approximating the area of the design units intended to be dusted with the particular colored powder contained in any particular compartment, and a cover for the dusting box and adapted to close tightly against a sheet supported upon said partitions of the box, said cover having an elastic mat upon its under face yieldingly bearing against the paper and holding the paper sheet against the edges of said partitions.

5. Means for applying differently colored fusible powders to designs printed in size comprising a dusting box, certain of the walls of which have inside faces formed with vertical grooves, partitions removably disposed in said grooves, the partitions having the same height as the side walls of the box, minor partitions adapted to be disposed at angles to the first named partitions to divide the space between the first named partitions into powder containing compartments, the second named partitions having a height equal to the walls of the dusting box and the first named partitions, and a cover adapted to be applied against the face of the box and having an elastic mat upon its inside face and acting when the cover is closed to hold the sheet of paper in tight contact with the outer ends of said partitions.

6. Means for applying differently colored powders to designs printed in size comprising a dusting box having a number of transverse partitions dividing the box into a plurality of transversely extending compartments, and a plurality of partitions disposed at an angle to the first named partitions, and dividing the interior of the box into a plurality of compartments, each of which is adapted to contain a colored powder, and a cover hinged to the box and having an elastic mat on its inside face and adapted when closed to force a sheet of paper into tight contact with

the walls of said compartments and the wall of the box whereby to apply the colored powder to selected portions of the sheet when the box is inverted.

- 5 7. Means for applying different colored powders to different portions of a design printed in size comprising a dusting box having a bottom and side walls, the side walls being vertically grooved, partitions having their ends insertible

into said grooves whereby the dusting box may be divided into compartments, the partitions being insertible into different grooves whereby to form compartments of different shapes, and means for holding the sheet having the design printed thereon in size against the edges of said partitions.

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10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150