

May 16, 1944.

J. A. WHITE
METHOD OF MAKING REGISTERED DUPLICATE-IMAGE
MULTIPLE COLOR PRINTING PLATES
Filed Dec. 17, 1942

2,348,944

2 Sheets-Sheet 1

Fig. 1.

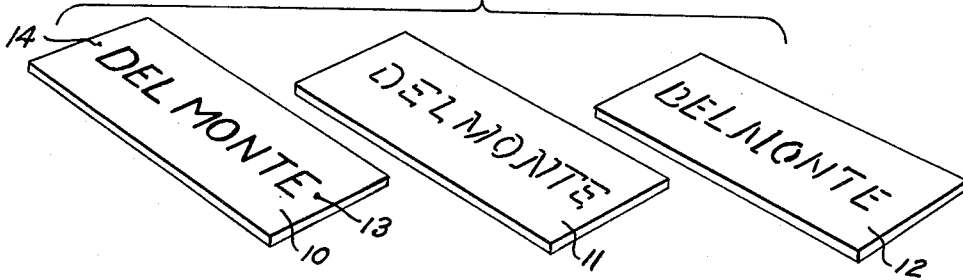


Fig. 3.

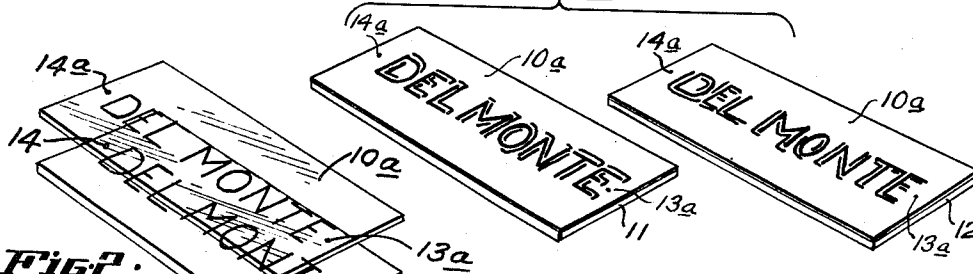


Fig. 2.

Fig. 4.

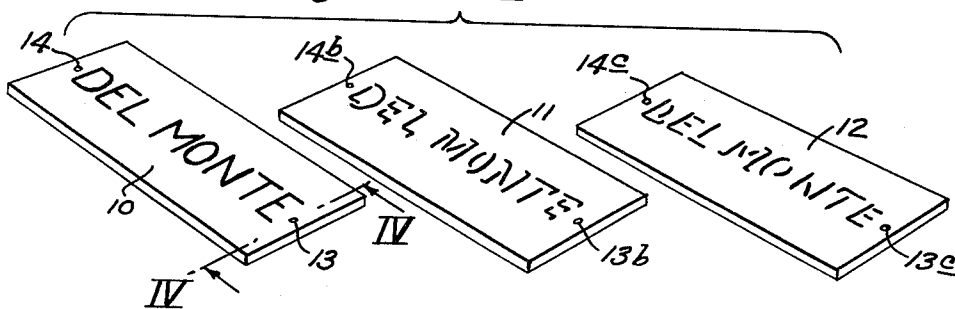


Fig. 4a.

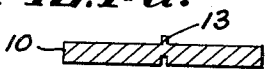


Fig. 5a.

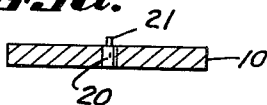
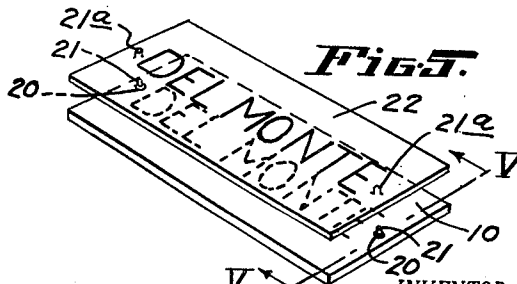


Fig. 5b.



Fig. 5.



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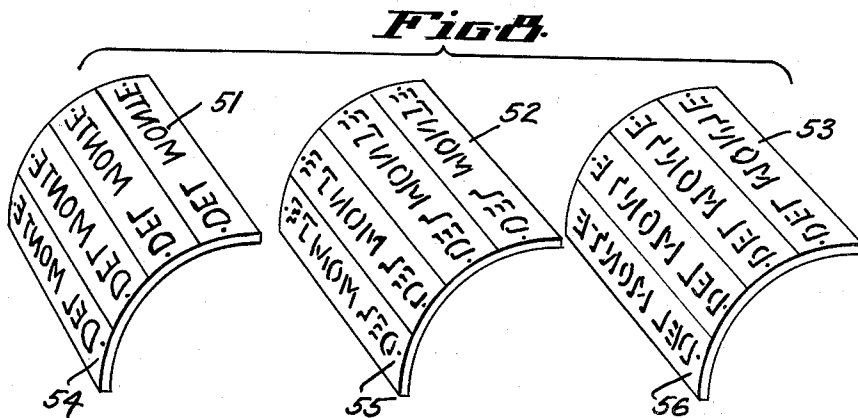
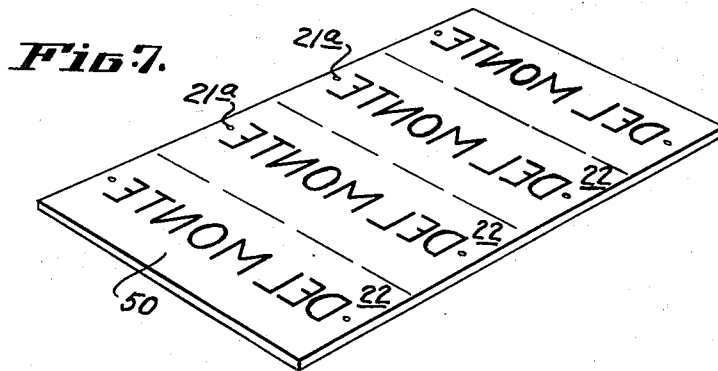
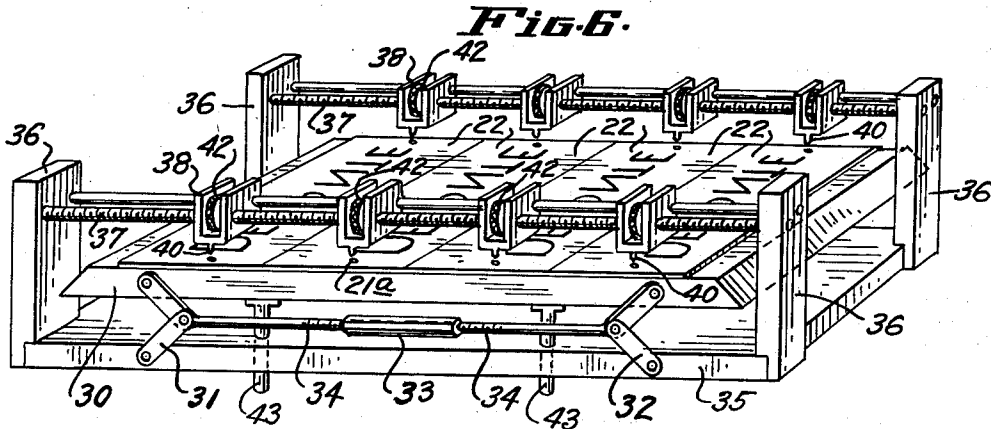
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METHOD OF MAKING REGISTERED DUPLICATE-IMAGE MULTIPLE COLOR PRINTING PLATES

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Application December 17, 1942, Serial No. 469,298

8 Claims. (Cl. 101-401.2)

My invention relates to a method for preparing from a set of original color plates a set of multiple image color plates where each of the latter plates contains a plurality of duplicate printing images for its particular color.

The object of my invention is to provide a method for making an integral set of multiple image color printing plates for each color and in which the multiple plate images for each color are in perfect register with the corresponding plates for the other colors so that the plates for each color can be placed in the press as a unit and can be brought into registry with a minimum amount of make-up time.

Another benefit flowing from the method of my invention, which permits the close spacing of each of the duplicate color plates for each color, is the elimination of waste of paper, amounting in a run of only 100,000 sheets of can labels to a saving of about \$100.00.

While my method may be practiced by various forms of apparatus and various modifications in the arrangement of steps, it is not my intention to relinquish the right to these by virtue of the following specific description which is intended to illustrate the method as required of me by section 4885 of the Revised Statutes.

In the drawings:

Fig. 1 shows in perspective the original color plates intended for a three-color job;

Fig. 2 shows in perspective one of the original color plates with a proof being lifted from it;

Fig. 3 shows in perspective color plates for the other two colors with the proof lying on the top;

Fig. 4 shows in perspective the original color plates for the three colors;

Fig. 4a is a view in cross-section taken on the line IV-IV of Fig. 4, but showing a modified form of punching;

Fig. 5 shows in perspective one of the original color plates with a mold being lifted from it;

Fig. 5a is a view in cross-section taken on the line V-V of Fig. 5;

Fig. 5b is a view in perspective of an indexing pin;

Fig. 6 shows the duplicate molds being assembled in a jig;

Fig. 7 shows the molds secured together and ready to be used in making a printing plate; and

Fig. 8 shows in perspective the multiple image color printing plates.

Referring now to these different illustrations, I shall explain the various steps in carrying out my method. It is understood that I do not intend to limit my method of the use of any par-

ticular form of apparatus nor to the sequence of steps identically as set forth in this explanation, nor to bar myself from the combining of several steps into one step.

I shall illustrate and describe my method as applied to a three-color job, although it has application to printing in as many colors as is possible or desirable. In Fig. 1 the original color plates for a three-color job are denoted by the numerals 10, 11 and 12.

Original plate 10 preferably is the one for the dark blue or black color and is chosen as the key plate. Any of the other plates 11 or 12 could be used as the key plate, although I have found the process is more satisfactory when the plate chosen as the key plate is the one having the darker or foundation colors. In order to illustrate in these black and white patent drawings the idea of three plates 10, 11 and 12 carrying different colors, I have used the word "Del Monte" set off by shading in two different colors. Plate 10 contains the main lines of the letters in one color. Plate 11 contains the shading in a contrasting color for the upper and right-hand borders of the main lines of the letters, and plate 12 contains the shading in still another color for the lower and left-hand borders of the letters. As impressions are made from these three plates the result will be letters in one color shaded by two colors.

Having chosen 10 as the key plate, the next step is to lay off on this key plate two or more reference points such as 13 and 14. Preferably these are at points spaced well apart, and usually two such points will suffice. These can be made with a punch prick mark or in any other manner desired. Preferably the mark is one which will leave an impression on a proof to be taken from plate 10.

The next step is to take a proof of key plate 10, so that the reference points 13 and 14 will show up on the proof in relation to the letters Del Monte. If available, a transparent material should be used for this proof. This is illustrated in Fig. 2 where the original plate 10 is shown in perspective and the transparent proof 10a is shown being lifted off plate 10. The proof contains the letters Del Monte, together with the reference points 13a and 14a. These reference points 13 and 14 on the original plate 10 may be immovably marked on the proof 10a by a punch or prick mark while the transparent proof 10a is lying on the surface of plate 10. If this is done, great care should be taken to see that these marks 13a, 14a are made with the word

Del Monte on the proof in perfect registry with the word Del Monte on the original plate 10.

The next step (see Fig. 3) is to take the transparent proof 10a and lay it on the original color printing plate 11 and bring the word Del Monte on the proof in proper registry with the image on printing plate 11. When this is done a mark 13b and 14b is made in plate 11. The transparent proof 10a is then moved onto the face of original color printing plate 12 and a similar mark 13c and 14c is made on plate 12 when the word Del Monte on the proof is in registry with the image carried on plate 12.

These steps would be repeated for each original color plate in the series.

When the steps thus far are completed, there is on each original color plate a plurality of reference points 13, 13b, 13c, 14, 14b, 14c positioned so they would lie on a straight line passed through the plates 10, 11 and 12 at right angles to their printing surface when nested with the respective complementary color printing portions in registry.

The next step is to make the reference points 13, 13b and 13c on each of the plates more prominent so that they can be used as a physical anchoring point in the subsequent molding steps. There are several ways that this can be done. In Fig. 4 the reference points 13, 13b, 13c, 14, 14b, 14c have been enlarged as by a punch into holes about $\frac{3}{8}$ of an inch in diameter. Great care must be taken that these holes are drilled or punched exactly on the centers 13, 13b, 13c, 14, 14b, 14c, obtained by superimposing the transparent proof in an earlier step in the process. Instead of punching these holes, a jig may be used which would up-set the plate from the back so that each plate in cross-section would look something like Fig. 4a, having the projecting nipple 13. These are just two of many ways of obtaining the result sought and how it is done is not particularly material to my method so long as it is done very accurately and the reference points 13, 13b, 13c, 14, 14b, and 14c are not moved. The object sought is to get means on each original plate for transferring the reference points to the mold impressions in a bold enough manner to serve in properly spacing the duplicate mold impressions in a later step in the method.

Assuming that the reference points have been marked in plates 10, 11 and 12 by punching the holes, a pin 20 having a projecting nipple 21 (see Fig. 5b) is fitted, one in each hole (see Fig. 5a).

In Fig. 5 I have illustrated plate 10 having these pins with the nipples 21 projecting above the printing surface of the plate.

The next step is to lay the plate in a molding press with the molding medium on top of the plate and make several mold impressions 22 of plate 10. As many of these impressions are made as duplicates are to appear in the finished printing plate 51 (Fig. 8). Each duplicate will have a depression 21a corresponding to the nipple 21 which will enable the molds to be spaced accurately. These molds 22, one of which is shown in Fig. 5 being lifted up off of plate 10 after the impression has been made, may be of sheet lead, wax, terplate, or any other suitable material. While I have illustrated in Fig. 5 the making of mold impressions from plate 10, the same thing is done from original plates 11 and 12. In this present description I shall assume that the final printing plates 51,

52, 53 are to contain four duplicates. In other words every time the printing cylinder rotates, four labels will be printed.

The next step is to take the four duplicate mold impressions 22 made from color plate 10 and place them in contiguous spaced relation and then to secure them together so that mold plates 22 will have a definite and preferably the same spacing and alignment of the reference points 21a. This step may be carried out in any number of different ways. In Fig. 6 I have illustrated one form of jig which has been found to be satisfactory for this purpose. It comprises a base 30 supported on toggles 31 and 32 with the turnbuckle 33 and threaded elements 34 to raise and lower the base 30 in the frame 35. Uprights 36, also secured in the frame 35, support horizontal rods 37 on which may be accurately and evenly spaced the movable elements 38 having nipples 40 adapted to fit in indexing depressions 21a formed in molds 22. These indexing heads 38 are adjusted on threaded bars 37 by means of internally threaded wheels 42. Rods 37 are spaced apart so that each matching pair of nipples 40 are spaced the same distance apart as the distance between points 13 and 14 on plate 10 or depressions 21a on each mold 22. Guides 43 passing through openings in the base of frame 35 assure a perfect vertical traverse of base 30.

Using the jig shown in Fig. 6 the four molds 22 from color plate 10 are first trimmed to size and laid on the base 30. The turnbuckle 33 is rotated enough to bring base 30 and molds 22 up just short of entry of nipples 40 into recesses 21a. Then, the operator checks to see that the indexing heads 38 are properly spaced along the bars 37. In this connection it is important that the indexing heads positioning each mold 22 shall be spaced so that the molds are held parallel to each other as an aid in trimming the labels after the printing is done. It is also preferred that the indexing heads 38 be evenly spaced so that the distance between each adjacent pair of nipples 40 is identical. Here again this aids in the subsequent processing of the printed labels and makes for economy. However it is not absolutely essential that the distance between each adjacent pair of nipples 40 be identical.

The vital thing is that once the indexing heads 38 are placed for spacing the set of four molds 22 made from color plate 10, this spacing must not be disturbed. Then, the other sets of four molds 22 will be spaced by nipples 40 in an identical relation to the first set of four molds and thus assure perfect registry of the printed image in the several colors during the printing process.

Picking up the description now where the base 30 was lifted so that the nipples 40 are about on a level with the four molds 22, and the indexing heads have been properly positioned: Each mold is then positioned so that its depressions 21a align with the adjacent nipples 40. When these are aligned, the turnbuckle 33 is rotated to lift base 30, causing nipples 40 to enter depressions 21a. In this manner the molds 22 are accurately spaced and securely held on base 30 and the next step is for molds 22 to be secured together with molding wax or other material so that the four molds 22 become a unit. This unit containing the four duplicate original mold plates 22 from the original mold 10 is illustrated in Fig. 7. The numeral 50 rep-

resents this composite mold plate which is now ready to be put in an electrolytic bath to be copper- or nickel-plated to make up the usual printing plate illustrated in Fig. 8 at 51. This latter process of making a plate from the mold, of course, is well-known in the art and needs no further explanation.

The steps just described in securing together the four duplicate molds 22 from original plate 10 and making them into a unitary mold 50 as shown in Fig. 7 and then making the printing plate 51 as shown in Fig. 8, are carried out for the four duplicate molds 22 made from each of the original plates 11 and 12.

By means of my method the printer is assured that the printing plates 51, 52, 53, each of which contains four duplicate images corresponding with original plates 10, 11 and 12, can be brought into perfect registry in setting up the press by simply bringing into registry the images at 54, 55 and 56 on the printing plates.

The greater economy in time and materials which results from my method just described will be clear from the above description. When plates 51, 52 and 53 are put in the press, they will register as a group and the pressman can deal with them as a group instead of having to deal with a plurality of separate duplicate printing plates and spend a great deal of "make-ready" time in bringing a plurality of separate plates into registry. By using my method the pressman will know that as the first plate of each multiple plate is in registry with the similar plate on the other colored plates, then the second, third, fourth plates will also be in registry.

What I claim is:

1. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of marking on each original color plate a plurality of reference points positioned so they would lie on a straight line passed through the plates at right angles to their printing surface when nested with the respective complementary color printing portions in registry, making a plurality of mold plates from each of said original plates, placing on each mold plate the aforesaid reference points located in register with the original plates, placing in contiguous spaced relation and securing together each plurality of identical mold plates with the spacing and alignment of the reference points identical for each set of assembled mold plates, and making printing plates from each set of assembled mold plates.

2. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of marking on each original color plate a plurality of reference points positioned so they would lie on a straight line passed through the plates at right angles to their printing surface when nested with the respective complementary color portions in registry, making a plurality of mold plates from each of said original plates, said mold plates having provision for receiving said reference points during the molding operation, placing in contiguous spaced relation and securing together each

plurality of identical mold plates with the spacing and alignment of the reference points identical for each set of assembled mold plates, and making printing plates from each set of assembled mold plates.

3. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, marking on this key plate a plurality of reference points, taking a proof of said key plate, marking the reference points on the proof while it is in register with the key plate, placing this proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, perforating each of the original color plates at said reference points, setting a pin in each perforation to project above the surface of said plates, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said pins during said molding operation to form reference indentations on each duplicate, placing each plurality of duplicate mold plates on an assembly base, inserting a spaced measuring means in each reference indentation to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

4. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, marking on this key plate a plurality of reference points, taking a proof of said key plate on a transparent material, marking the reference points on the proof while it is in register with the key plate, placing this transparent proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, forming a marker on each of the original color plates at said reference points, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said markers during said molding operation to form reference markers on each duplicate, placing each plurality of duplicate mold plates on an assembly base, registering a spaced measuring means with each marker to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

5. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, marking on this key plate a plurality of reference points, taking a proof of said key plate on a transparent material, marking the reference points on the proof while it is in regis-

ter with the key plate, placing this transparent proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, perforating each of the original color plates at said reference points, setting a pin in each perforation to project above the surface of said plates, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said pins during said molding operation to form reference indentations on each duplicate, placing each plurality of duplicate mold plates on an assembly base, inserting a spaced measuring means in each reference indentation to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

6. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, taking a proof of said key plate, marking reference points on said proof and said key plate while they are in register, placing this proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, perforating each of the original color plates at said reference points, setting a pin in each perforation to project above the surface of said plates, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said pins during said molding operation to form reference indentations on each duplicate, placing each plurality of duplicate mold plates on an assembly base, inserting a spaced measuring means in each reference indentation to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

7. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other

plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, taking a proof of said key plate on a transparent material, marking reference points on the proof and on said key plate while they are in register, placing this transparent proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, forming a marker on each of the original color plates at said reference points, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said markers during said molding operation to form reference markers on each duplicate, placing each plurality of duplicate mold plates on an assembly base, registering a spaced measuring means with each marker to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

8. In preparing from a set of single original color plates a set of multiple image color printing plates where each of the latter plates contains a plurality of duplicate printing images for its particular color, a method to assure registry of each plural set of color images with each other plural set of color images, which includes the steps of selecting one of the original color plates as a key plate, taking a proof of said key plate on a transparent material, marking reference points on said proof and said key plate while they are in register, placing this transparent proof successively in register with the image on each of the other original color plates and while in register marking the reference points on each of the latter, perforating each of the original color plates at said reference points, setting a pin in each perforation to project above the surface of said plates, making a plurality of duplicate mold plates from each of said original plates, said mold plate material conforming to said pins during said molding operation to form reference indentations on each duplicate, placing each plurality of duplicate mold plates on an assembly base, inserting a spaced measuring means in each reference indentation to align and space identically each like set of mold plates, securing said like mold plates in this spaced position, and making printing plates from each set of assembled like mold plates.

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