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SINGLE IMPRESSION MULTI-COLOR PRINTING DEVICE

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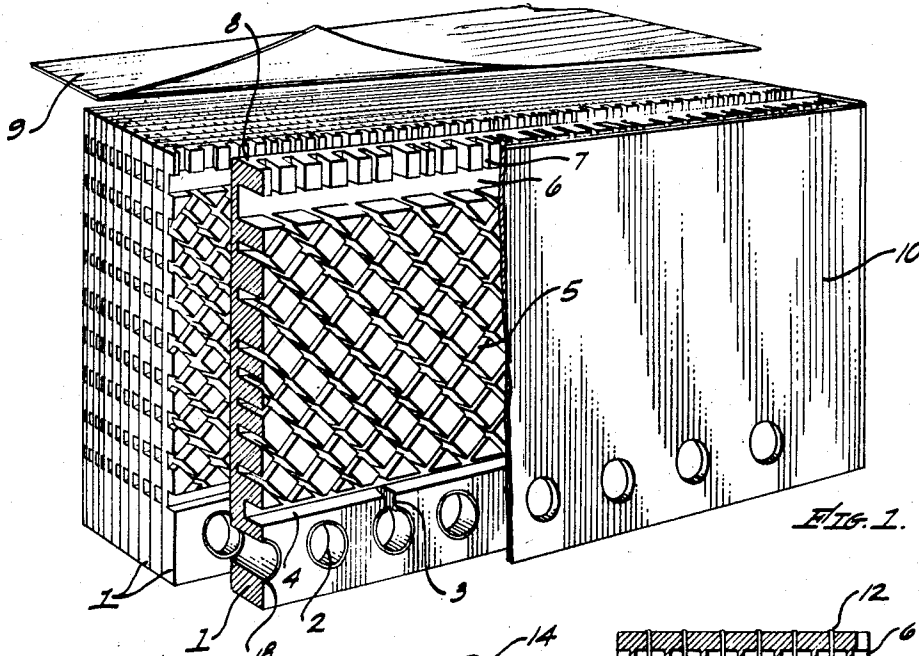


FIG. 1.

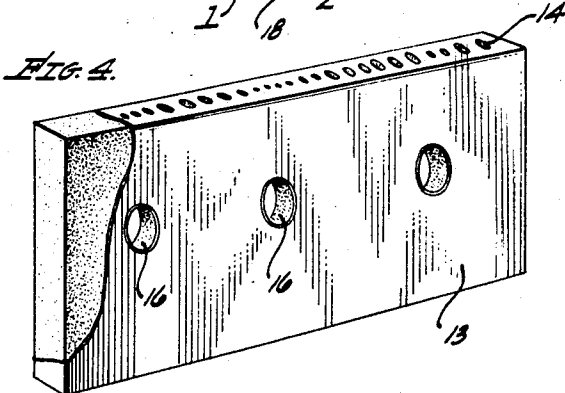


FIG. 4.

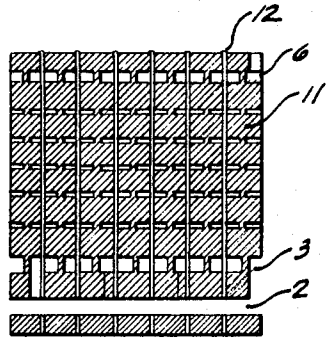


FIG. 2.

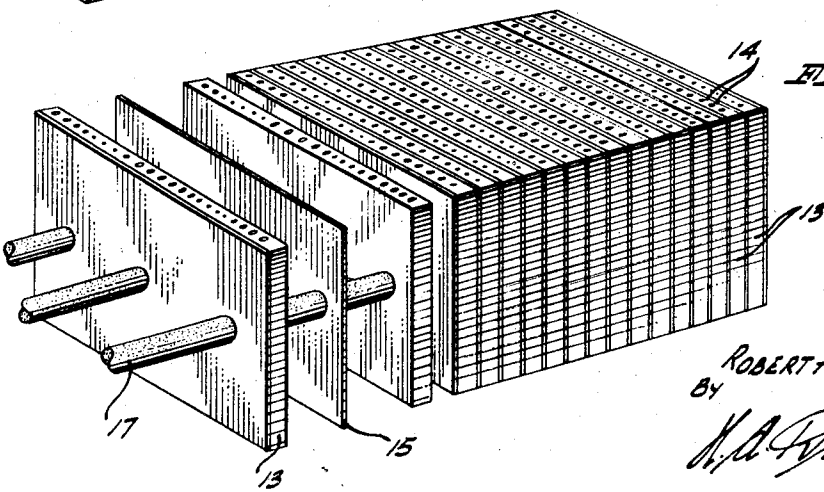


FIG. 3.

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SINGLE IMPRESSION MULTI-COLOR PRINTING DEVICE

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5 Claims. (Cl. 101—327)

This invention relates to a single impression multi-color printing process of the type in which the color and contour or design is impressed on a sheet of paper, or the like, in the form of very fine lines, these lines being multi-colored and arranged and assembled to produce the required color or shading.

An object of my invention is to provide a single impression multi-color printing process, including a number of thin plates or strips of metal, glass, plastic, or the like, these plates being approximately three-thousandths (.003) of an inch in thickness, these plates being embossed, engraved, etched or plated to provide the required channels or passages through which the ink, dye, or the like, can move.

Another object of my invention is to provide a novel printing process of the character stated in which the various thin strips or plates of metal, or the like, after being processed are then placed in juxtaposition in their proper sequence and are then effectively sealed or separated, each from the other, so that the ink or dye of a particular color will flow only in the particular plates or strips, so that the required color and contour is produced on the paper or other substance which is to be printed.

Another object of my invention is to provide a novel printing process of the character stated in which the various strips of metal, glass, plastic, etc., after being used in a pack, can be readily disassembled and cleaned to remove the excess ink or dye therefrom.

Still another object of my invention is to provide a novel printing process of the character stated, in which the ink or dye is conducted to the various strips under pressure and is then caused to move across the face of the strip through appropriate channels, and thence to the upper or printing surface of the strip where a thin colored line is produced on the paper or other substance, this colored line being separated from an adjacent line formed by the adjacent strip, the separation being very minute but sufficient so that the ink or dye does not intermingle or flow from one strip to another but, on the contrary, produces a distinct and very fine line of a definite color or shade.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a perspective view of a pack of strips in partially assembled position, the thickness of the strips being exaggerated.

Figure 2 is a transverse sectional view of a pack of strips showing a slightly modified shape of the strips from that shown in Figure 1.

Figure 3 is a perspective view of a pack of strips in partially assembled position and showing still another modified form of strip or plate.

Figure 4 is a perspective view of one of the strips or plates as shown in Figure 3.

My single impression multi-color printing process is

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based upon the use of a number of very thin plates 1 which are preferably formed of metal, glass, plastic, or the like, and are approximately three-thousandths (.003) of an inch in thickness, more or less, each of these plates before it is assembled in juxtaposition with the adjacent plates as shown in Figure 1, has been etched or grooved by a suitable and well known process since these grooves (which will be subsequently described) are extremely shallow, due to the fact that the entire plate is only about three-thousandths of an inch thick. The plates 1 are all provided with a number of holes or ports 2 in the bottom thereof, and the ink or dye flows through these holes under some pressure. Each hole or conduit 2 will carry a particular color, such as red, blue, yellow, and white, or other colors as desired, however, the combination of colors is selected to produce the required shading necessary on the printed sheet. A notch 3 extends from one of the holes 2 upwardly into a horizontal groove 4, which extends the entire length of a particular plate 1. Thus the groove 4 will carry only one color, since the other holes 2 are blocked off from this particular groove, but adjacent plates will have similar notches 3 to permit that particular color to flow upwardly into their corresponding groove 4.

A plurality of ducts 5, in labyrinth form, conduct the ink upwardly from the groove 4 to a second groove or passage 6 adjacent the upper end of the plate 1. From the passage 6 a plurality of slots 7 conduct the ink or dye upwardly to the top or inking surface 8 of the plate 1. The slots 7 are closely spaced so that the entire top surface 8 may be coated with ink or dye. The slots 7 give a dot effect along a line. The inking surface 8 of the plate 1 will thus produce dots along a very thin line on the sheet 9 when that sheet (paper or the like) is pressed against the inking surface of the pack of plates. It will be evident that the grooves 4, the ducts 5, the passage 6 and the slots 7 can all be formed in the plate 1 by a suitable process, such as embossing, plating, etching, or the like. The outer exposed edges of the assembled plates 1 are covered and closed by means of impervious sheets 10 which are pressed tightly against the plates 1 by suitable clamps (not shown) and thus prevent leakage of the ink or dye, and also act to inclose the various grooves 4, ducts 5, passages 6 and slots 7.

As shown in Figure 2, the plates 11 are constructed substantially identical to the plates 1, except that the plates are somewhat thicker and have the grooves 4, ducts 5, passages 6 and slots 7 formed on both faces thereof. With this construction it is then necessary to provide gaskets 12 between adjacent plates 11 to seal these plates one from the other. In Figure 1 the blank back wall of the plate 1 is pressed against the adjacent plate in which the grooves, ducts, etc., are cut, thus sealing the open sides of these grooves, ducts, etc. It is also possible to arrange the plates 1 in ribbon form similar to photographic film, if desired, since these plates are very thin, as previously stated. It will be understood that the groove 4, ducts 5, passages 6 and slots 7 do not necessarily have a rectangular shape but can be rounded or otherwise shaped as long as a passage is provided through which the ink or dye can move. While I prefer that the ink or dye be forced through the holes 2 under some pressure, it is possible, under certain circumstances, to utilize centrifugal force, capillary action, etc. The plates 1 are pre-formed, engraved, etched, embossed, or the like, and almost entirely before the entire pack is assembled ready for print. The only exception are the slots 7 and these are cut, burnt, plated or deposited on the sheet so that the proper amount of color is deposited on the paper or fabric 9, that is, the quantity of the ink or dye to be deposited on the paper or fabric 9 is thus controlled.

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The depth and width of the slots 7 determines the amount of color which is carried to the inking surface 8 of each plate 1.

In Figures 3 and 4 I have shown a plurality of plates 13 which are assembled in a pack, as previously described, and which are formed with suitable holes or openings 14 on the top or printing edge thereof through which ink or dye will flow onto the inking surface of the plate. The plates 13 are all formed of a porous substance, which are provided with natural ducts or passages through which the ink or dye can flow. Adjacent plates 13 are separated by thin gaskets 15 and are assembled in packs, as previously described. Each plate 13 is provided with a number of holes 16 extending therethrough, and pipes 17 pass lengthwise through the entire pack of plates. The ink or dye is forced through the pipes 17 and these pipes have suitable holes or ports therein which align with the particular plate 13 to which a particular color is to be conducted. The adjacent plate will be blanked off from this particular pipe so that adjacent plates will be inking a different color or shade, in the same manner as the plates 1 previously described. In the present instance the plates 13 are formed of a porous material through which the ink or dye can flow and it is not necessary to cut, etch, plate, ducts or grooves therein in the manner previously described and shown in the construction of the plates 1. All of the outer edges of the plates 13 are sealed by a coating 13' with the exception of the top edge which carries the ink onto the paper to be printed. The abutting faces of the plates 13 are not sealed by the coating 13' so that the inking fluid can flow from one plate to another. The gaskets 15 between adjacent plates are provided to separate one plate or group of plates from another where different colored inks are used.

In operation the plates 1 have been previously cut, embossed, drilled and the like, to provide the holes 2, the appropriate notches 3 and the grooves 4, ducts 5 and passages 6. The slots 7 are next cut in the plates 1 so that the proper amount of ink or dye is conducted to the printing surface 8. The plates are now all assembled in juxtaposition, walls 10 are provided around the pack so as to seal in the ink or dye. In order that the holes 2 may be properly sealed between the plates 1, I may provide projecting rings 18 around each hole, which projects into a complementary groove in the adjacent plate, thus sealing off the holes 2 and insuring the fact that the ink or dye will be conducted to the proper plate without leakage at adjacent plates. When the plates 1 have been assembled, ink or dye is conducted through the various holes 2 and the appropriate color passes through the notch 3 into the groove 4, and thence is distributed throughout the length of the plate through the labyrinth of ducts 5, thence into the passage 6 and then passes out through the slots 7 onto the printing surface 8, where the ink or dye is then deposited on the appropriate paper or fabric 9.

Having described my invention, I claim:

1. A single impression multi-colored printing plate consisting of a plurality of rectangular plates arranged in juxtaposition, an upper horizontal inking edge on each of the plates, all of said inking edges being arranged substantially in the same plane, each of said plates having transverse ports extending therethrough and through which the inking fluid passes, each of said plates having a horizontal groove therein arranged adjacent said ports, and said plates having notches therein extending from said groove to certain of said transverse ports, each of said plates having a passage therein adjacent the upper edge thereof, each of said plates having a plurality of substantially vertical ducts therein extending from the first named horizontal groove to said upper passage, and each of said plates having slots therein extending from the upper passage to the inking edge of each plate.

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2. A single impression multi-colored printing plate consisting of a plurality of rectangular plates arranged in juxtaposition, an upper horizontal inking edge on each of the plates, all of said inking edges being arranged substantially in the same plane, each of said plates having transverse ports extending therethrough and through which the inking fluid passes, each of said plates having a horizontal groove therein arranged adjacent said ports, and said plates having notches therein extending from said groove to certain of said transverse ports, each of said plates having a passage therein adjacent the upper edge thereof, each of said plates having a plurality of substantially vertically extending grooves therein forming a labyrinth, and said vertical grooves extending from the first named horizontal groove to said upper groove, and each of said plates having slots therein extending from the upper passage to the inking edge of each plate.

3. A single impression multi-colored printing plate consisting of a plurality of rectangular plates arranged in juxtaposition, an upper horizontal inking edge on each of the plates, all of said inking edges being arranged substantially in the same plane, each of said plates having transverse ports extending therethrough and through which the inking fluid passes, each of said plates having a horizontal groove therein arranged adjacent said ports, and said plates having notches therein extending from said groove to certain of said transverse ports, each of said plates having a passage therein adjacent the upper edge thereof, each of said plates having a plurality of substantially vertical ducts therein extending from the first named horizontal groove to said upper passage, and each of said plates having slots therein extending from the upper passage to the inking edge of each plate, said horizontal groove, upper passage, notch and vertical ducts being arranged in one abutting face of each of said plates, the other abutting face of each of said plates being smooth and bearing against the adjacent plate.

4. A single impression multi-colored printing plate consisting of a plurality of rectangular plates arranged in juxtaposition, an upper horizontal inking edge on each of the plates, all of said inking edges being arranged substantially in the same plane, each of said plates having transverse ports extending therethrough and through which inking fluid passes, each of said plates having a horizontal groove therein arranged adjacent said ports and one on each abutting face of the plates, said plates having notches therein extending from said groove to certain of said transverse ports, said notches being arranged in both abutting faces of each plate, each of said plates having a passage therein on both abutting faces thereof and adjacent the upper edge of each plate, each of said plates having a plurality of substantially vertical ducts therein extending from the first named horizontal groove to said upper passage, each of said plates having slots therein extending from the upper passage to the inking edge of each plate and on both abutting faces of each plate, said means sealing the abutting faces of adjacent plates each from the other.

5. A single impression multi-colored printing plate consisting of a plurality of rectangular plates arranged in juxtaposition, an upper horizontal inking edge on each of the plates, all of said inking edges being arranged substantially in the same plane, each of said plates having transverse parts extending therethrough and through which inking fluid passes, each of said plates having a horizontal groove therein arranged adjacent said ports and one on each abutting face of the plates, said plates having notches therein extending from said groove to certain of said transverse ports, said notches being arranged in both abutting faces of each plate, each of said plates having a passage therein on both abutting faces thereof and adjacent the upper edge of each plate, each of said plates having a plurality of substantially vertical ducts therein extending from the first named horizontal groove to said

upper passage, each of said plates having slots therein extending from the upper passage to the inking edge of each plate and on both abutting faces of each plate, and means sealing the abutting faces of adjacent plates each from the other, said sealing means consisting of gaskets positioned between the adjacent faces of the plates.

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