Sept. 1, 1942. J. F. HAWLEY 2,294,456

METHOD OF MAKING PRINTING PLATES

Filed Sept. 30, 1940

Fig. 1.

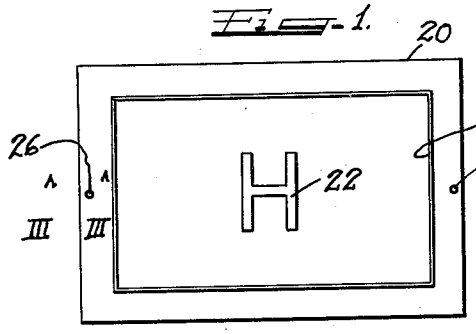


Fig. 2.

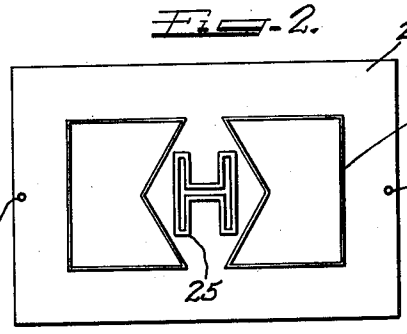


Fig. 3.

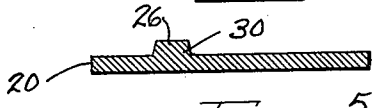


Fig. 4.

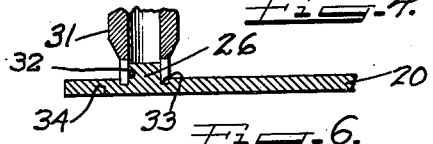


Fig. 5.

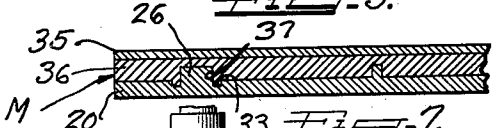


Fig. 6.

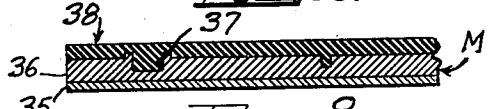


Fig. 7.

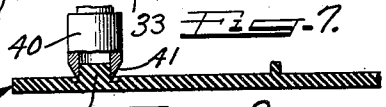


Fig. 8.

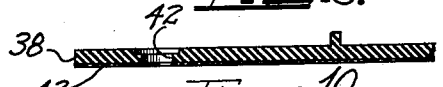


Fig. 9.

Fig. 10.

Fig. 11.

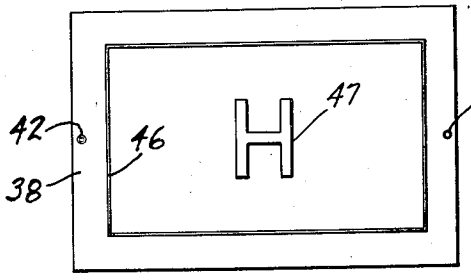
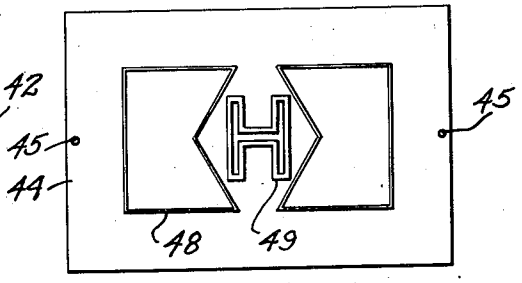
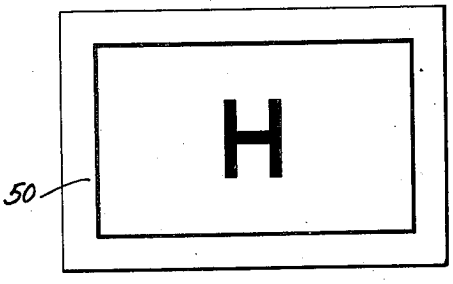
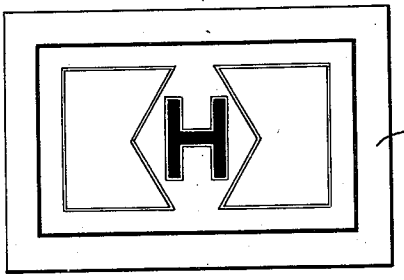


Fig. 12.







Inventor

JOHN F. HAWLEY.

by Charles Stiles & Sons.

Patented Sept. 1, 1942

2,294,456

UNITED STATES PATENT OFFICE

2,294,456

METHOD OF MAKING PRINTING PLATES

John F. Hawley, Riverside, Ill.

Application September 30, 1940, Serial No. 358,977

3 Claims. (Cl. 101—401.2)

This invention relates to a printing plate and to a method of making the same, and more particularly to a flexible printing plate made of rubber, rubber composition, or the like.

It has heretofore been customary to make printing plates of rubber, rubber composition or the like and to provide the back of the plate with a pressure sensitive adhesive, by means of which the plate can be secured to the surface of a printing roll without the use of any other securing means.

In the use of rubber printing plates having adhesive backings, however, considerable difficulty has been experienced in properly positioning the plates upon the rolls of multi-color presses, since if the plate is not positioned properly initially, the plate must be detached entirely from the surface of the roll and repositioned each time until the desired registration is obtained. In some instances, the surface of a printing roll has been marked out in pencil to show where the printing plate is to be positioned, but even this method is unsatisfactory owing to the lack of any fixed relationship between the marginal edges of a plate and the printing indicia, design or the like.

In accordance with the principles of my present invention, I modify the usual method of making flexible printing plates in such a way as to embody in the plates means for enabling the plates to be positioned properly on the printing rolls with a minimum of possible error, and also with a minimum of time and effort on the part of the operator. In making up the original metal plate from which a flexible printing plate is to be reproduced, the engraver provides lugs or bosses, preferably along opposite margins of the plate, in predetermined relationship to the engraved printing indicia or design on the plate. Ordinarily, a pair of such lugs or bosses, positioned on the center line of the engraved design is preferable. Then, when a matrix is formed from the engraved metal plate, the positioning lugs or bosses are reproduced as depressions, or recesses, which are again reproduced in the flexible printing plate as lugs or bosses. These lugs or bosses in the flexible printing plate itself are next punched out to provide holes for receiving positioning pins during the operation of affixing the plate to a printing roll surface. The attachment to a printing press that includes the positioning pins and by means of which the plates can be properly positioned on a printing roll, or set of rolls, is described in my copending application entitled: "Printing press," Serial No. 358,978, filed September 30, 1940, now Patent No. 2,231,187, dated February 11, 1941.

It is, therefore, an important feature of my present invention to provide a printing plate, formed of some flexible, resilient material and having an adhesive backing, with means, such as spaced holes, accurately positioned with respect to the printing indicia or design carried by the plate and serving as an aid for the proper positioning of the plate upon a printing roll to insure proper registration between the several plates on a single printing roll or on a plurality of such rolls, as in a multi-color printing press.

It is a further important object of this invention to provide a method of making flexible printing plates to provide therein means for aiding in obtaining proper registration between a plurality of such plates when used on a multi-color printing press.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawing.

This invention (in a preferred form) is illustrated in the drawing and hereinafter more fully described.

On the drawing:

Figure 1 is a top plan view of an engraved metal plate bearing in relief printing indicia or other designs.

Figure 2 is a top plan view of a similar metal plate bearing a supplemental portion of the finished design that is to be imprinted by the plates of Figures 1 and 2 when used in a multi-color printing press.

Figure 3 is an enlarged, fragmentary sectional view taken substantially along the line III—III of Figure 1.

Figure 4 is an enlarged, fragmentary sectional view, similar to Figure 3, and showing an end milling operation on the lug or boss shown in Figure 3.

Figure 5 is an enlarged, fragmentary sectional view illustrating the reproduction in a matrix of the printing indicia or design carried by the metal plate shown in Figure 1 or 2.

Figure 6 is an enlarged, fragmentary sectional view, illustrating the casting of the rubber or other composition printing plate from the matrix of Figure 5.

Figure 7 is an enlarged, fragmentary sectional view of the rubber, or rubber composition, plate of Figure 6, illustrating the punching out of the lug or boss.

Figure 8 is an enlarged, fragmentary sectional

view of the rubber, or rubber composition, printing plate after the punching operation has been completed.

Figure 9 is a top plan view of a finished rubber, or rubber composition, printing plate reproduced from the metal plate of Figure 1.

Figure 10 is a top plan view of a finished rubber, or rubber composition, printing plate reproduced from the metal plate of Figure 2.

Figure 11 is a top plan view of an imprint made from the plate of Figure 9, and

Figure 12 is a top plan view of an imprint made by a combination of the imprints from the plates of Figures 9 and 10.

On the drawing:

The reference numeral 20 indicates a metal plate bearing in relief a marginal portion 21 and a letter 22. As illustrated, the plate 21 is one of a set of two plates to be used in a multi-color printing press. Accordingly, the marginal portion 21 and the letter 22 represent that part of the imprint that is to be in one color, while the second plate, indicated by the reference numeral 23, bears the portion of the printing indicia or design that is to supply the other color to the finished imprint. For purposes of convenience and simplicity, only two plates of a set are illustrated, although it will be understood that there will be as many different plates as there are different primary colors making up the final imprint.

The engraved metal plate 23 thus carries a supplementary design indicated by the reference numerals 24 and 25. In accordance with my present invention, both of the plates 20 and 23 are provided with lugs or bosses 26 and 27, and 28 and 29, respectively. These bosses, which are preferably identical in shape and dimensions, are placed in fixed relationship to the indicia or design carried by the respective plates, so that when the imprint of the finished printing plate made from these metal plates are superimposed, as in making the final imprint upon a web of paper or the like, the progressively made imprints will be in exact registration.

As formed by the engraver on the metal plates 20 and 23, the lugs or bosses 26 have somewhat sloping side walls, indicated at 30 (Fig. 3). The next operation, accordingly, is that of end milling each of the lugs or bosses 26, as by means of an end milling tool 31 (Fig. 4) to provide each lug or boss 26 with truly cylindrical walls 32, while at the same time providing an annular groove or recess 33 around the base of each lug. Each lug 26, after the milling operation, constitutes a right cylinder, with its axis normal to the plate of the under side 34 of each metal plate 20 or 23.

The next step is to form a matrix from the metal plates 20 or 23. While it would be possible to cast the final rubber printing plate from the metal plate itself, it is more satisfactory and less expensive to form a matrix first and then cast the rubber printing plate from the matrix. The matrix is formed from any suitable material, such as a plastic like a phenol-formaldehyde resin. As illustrated in Figures 5 and 6, the matrix may comprise a backing layer 35 of paper, cloth or the like, and a layer of plastic material 36 bonded thereto. In forming the matrix, the metal plate 20 or 23 is placed in a form (not shown) and the plastic material 36 in a partially cured state is superposed on the metal plate, with the backing 35 on top. Under suitable pressure and at a proper temperature, the plastic material 36 is caused to become molded and assumes the female counterpart of the engraved design or indicia on the metal plate 20 or 23. In other words, each of the lugs 26 becomes a corresponding cylindrical recess 37 in the face of the matrix.

The final printing plates are then cast from the matrices in the manner illustrated in Figure 6, in which the reference numeral 38 indicates the rubber or rubber composition printing plate formed by molding against the matrix M. As will be obvious, the molded face of the printing plate 38 acquires the exact configuration of the prepared metal plates 20 or 23.

As illustrated in Figure 7, the plate 38 is provided with a cylindrical lug or boss 39, which, in accordance with my present invention, is removed by means of a punch 40. Said punch 40 is provided with an annular, beveled cutting edge 41 having an inside diameter exactly equal to the diameter of the lug 39, so that the punch may be inserted thereover to completely remove the lug 39 and form a hole 42 of corresponding diameter extending through the thickness of the printing plate 38. Each of the lugs 39 is removed in this manner to provide corresponding holes 42 which serve as aids in the proper positioning of the printing plates on the printing rolls.

In preparing a printing plate 38 for use, a pressure-sensitive adhesive coating 43 is applied to the back surface thereof to enable the printing plate to be secured to the surface of a printing roll by merely applying pressure thereto. The adhesive coating is preferably coextensive with the back face of the printing plate.

Figures 9 and 10 illustrate the finished printing plates, indicated by the reference numerals 38 and 44 prepared respectively from the metal plates 20 and 23. The plate 38 is provided with positioning holes 42, 42, and the plate 44 with positioning holes 45, 45. As shown, each of the pair of positioning holes lies on a center line of the printing plate, but it would be feasible to place the holes at any other position along the opposite margins of the plate, so long as the holes bear an exact dimensional relationship with respect to the printing indicia or design carried by the plate and this relationship is the same for all of the plates of a set. Plate 38 carries in relief a marginal outline 46, corresponding with the marginal outline 21 of the metal plate 20, and a letter 47 corresponding with the letter 22 of the metal plate 20. Similarly, the plate 44 carries a design 48 and letter 49 corresponding with the design 24 and letter 25 of plate 23.

Figure 11 illustrates an imprint 50 formed from the plate 38, and Figure 12 illustrates an imprint 51 formed by imprinting over the imprint 50 by means of the plate 44. The imprint 51 thus represents a composite of the imprints from the printing plates 38 and 44. It will be understood that printing from the plate 38 is done with one color and printing from the plate 44 with a different color, so that the composite imprint 51 will be in two colors. Perfect registration of the imprints is thus obviously required if the composite imprint 51 is to be distinct and not blended or blurred. This perfect registration, as above pointed out, is accomplished by the cooperation afforded between the positioning openings or holes 42, 42, and 45, 45, and the positioning pins on an indexing attachment such as described in my copending application above referred to.

The same principle as above described would

be employed in the case of printing presses employing three or more colors. There would always be as many different printing plates in a set as there are different colors to be applied by the printing press. The provision of the positioning holes in the manner described in each of the plates of a set insure exact registration of the imprints as they are progressively applied in the printing operation. This is accomplished by reason of the fact that the positioning holes on each of the plates of a set of plates are always in the same dimensional relationship to the center of the printing indicia or other design carried by the plates.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In the method of making a set of printing plates for a multi-color printing press, including forming the printing indicia or design in metal plates, making matrices therefrom, casting from the matrices rubber composition plates bearing the printing indicia and applying adhesive coated backings thereto, the step of providing said plates with indexing means which comprises forming spaced lugs on said metal plates identically aligned on each plate with respect to the printing indicia or design, which said lugs result in corresponding recesses in said matrices and corresponding lugs on said rubber plates, and accurately punching out said last mentioned lugs to remove said lugs and leave holes in their places in said rubber plates.

2. In the method of making a set of printing plates for a multi-color printing press, including forming the printing indicia or design in metal plates, making matrices therefrom, casting from the matrices rubber composition plates bearing the printing indicia and applying adhesive coated backings thereto, the step of providing said plates with indexing means which comprises forming spaced lugs on said metal plates identically aligned on each plate with respect to the printing indicia or design, milling said lugs to form right cylindrical lugs normal to the plane of the broad faces of said plates which said lugs result in corresponding recesses in said matrices and corresponding lugs on said rubber plates, and accurately punching out said last mentioned lugs to remove said lugs and leave holes in their places in said rubber plates.

3. In the method of making a flexible printing plate composed of a rubber composition or the like and having an adhesive coating on its back and printing indicia on its printing face, including forming the printing indicia in a metal plate, making a matrix therefrom, casting from such matrix a flexible plate bearing the printing indicia and applying an adhesive coated backing thereto, the step of providing said plate with indexing means which comprises forming spaced lugs on said metal plate aligned with respect to the printing indicia, which said lugs result in corresponding recesses in said matrix and corresponding lugs on said flexible plate, and accurately removing said last mentioned lugs to leave holes in their places in said flexible plate.

JOHN F. HAWLEY.