July 10, 1956 R. T. RICE 2,753,799

PRINTING DEVICE

Filed Dec. 19, 1952

Fig. 1

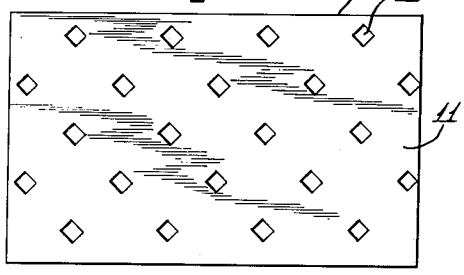


Fig. 2

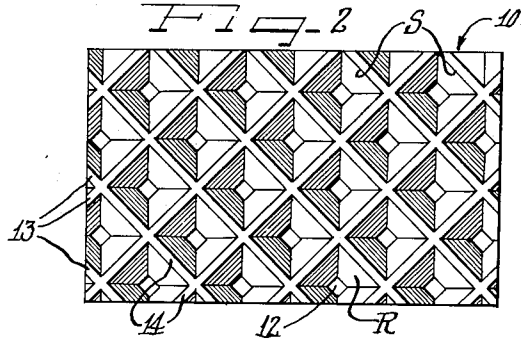


Fig. 3

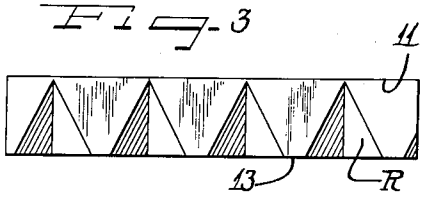


Fig. 4

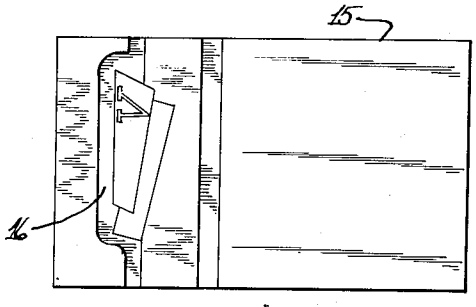


Fig. 5

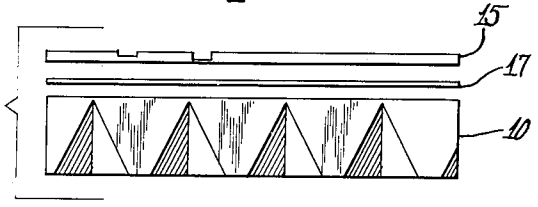


Fig. 7

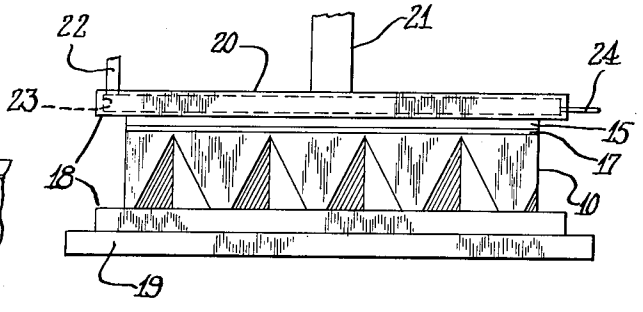
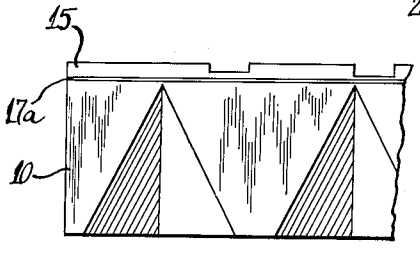


Fig. 6



Inventor

Robert T. Rice

by Hill Sherman, Meroni, Gross & Simpson Attys

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2,753,799

PRINTING DEVICE

Robert T. Rice, Chicago, Ill., assignor to Vandercook & Sons, Inc., Chicago, Ill., a corporation of Illinois

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1 Claim. (Cl. 101—382)

This invention relates to a printing device and to a method of making the same. More particularly, the invention relates to an assembly of a stable base, or block, and a printing plate, in which assembly the plate is adhesively secured to a surface of the base.

In the preparation of original photoengraving plates, electrotypes, stereotypes and plastic plates, for printing purposes, it has heretofore been customary to mount the printing plates on a wood base, or block, so as to get the proper height for the printing surface when the same is assembled in the usual chase with type, or the like. The use of a wood base or block, however, presents certain inherent disadvantages, inasmuch as wood is affected by atmospheric conditions, particularly humidity, and is therefore subject to dimensional changes due to swelling, shrinkage, warping or the like. With a view to providing a more stable base or block for the mounting of printing plates, it has been proposed to provide a base of a cast magnesium alloy having ribs integrally formed on the back side of the base for strengthening and rigidifying purposes. Such a base, however, also has certain disadvantages, particularly that of providing pockets into which type and other material may fall or become caught.

In accordance with the principles of my present invention, I provide a precision base, preferably cast of metal, or of a metal alloy, that is in the form of a stable, rigid block that has a generally planar, but apertured, surface to which the printing plate is to be adhesively secured. On the other side of the block, pyramidical pockets are formed that provide the openings referred to on, on the working face of the block, and the pockets are spaced apart by obliquely extending lands that intersect each other and also intersect the lateral edges of the block. These lands are sufficiently closely spaced as to provide a steady supporting surface for the block, and all of the lands are flat and lie in a common plane parallel to the plane of the working surface of the block. In general, the block is rectangular in plan and in cross section.

In assembling a printing plate to a block such as described, an adhesive is placed between the plate and block, without, however, filling the apertures. Thus, air passages are provided between the under surface of the adhesive and the supporting surface of the block by the pyramidical recesses previously described. These air passages permit the volatilization and escape of any gases or vapors that are generated when heat and pressure are applied to set the adhesive and unite the printing plate to the block. Also, the free passageways provided by the pyramidical recesses facilitate the disassembly of the printing plate and block, as by immersing the assembly in a solvent for the adhesive, since the passageways then provide means for the entry of the solvent into direct contact with the adhesive, whereby dissolution of the adhesive by the solvent takes place in all directions

from each of the apertures in the working face of the block.

It is therefore an important object of this invention to provide a printing device including a dimensionally stable, rigid block having an apertured surface and pyramidical recesses from the supporting face thereof in communication with said apertures in the working face of the block.

It is a further important object of this invention to provide an assembly comprising a precision base of dimensionally stable, rigid material, such as a metal alloy, having a generally planar but apertured working face, to which surface is adhesively secured a printing plate, or the like, and having its other, or supporting, face formed by a plurality of spaced parallel lands that intersect the lateral edges of the block and that lie in a common plane parallel to the plane of the working surface, with pyramidical recesses formed between intersecting portions of the lands to provide open communication to the apertures on the working surface, whereby air passages are provided to afford escape for gases or vapors generated during the adhesive bonding of the printing plate to the base and whereby the removal of the printing plate from the base is facilitated by providing access through such passageways for a solvent to contact and penetrate the adhesive and thereby soften and loosen the bond provided by the adhesive.

Other and further important objects of this invention will become apparent from the following description and appended claim.

On the drawings:

Figure 1 is a top plan view of a stable block constituting the precision base of a printing assembly embodying the principles of my invention.

Figure 2 is a bottom plan view of said block.

Figure 3 is a side view of a similar block to that shown in Figures 1 and 2.

Figure 4 is a top plan view of a printing plate, such as an original zinc, copper, or magnesium photoengraving plate, for attachment to the precision base of Figures 1 to 3.

Figure 5 is an exploded elevational view of the component parts of the assembly of my invention, including the base and printing plate of Figures 1 and 4 and a dry film of adhesive for securing the same together.

Figure 6 is a fragmentary side elevational view of the assembly.

Figure 7 is a side elevational view showing more or less schematically the heated press plates, or platens, for applying heat and pressure to the assembly to bond the block and plate together.

As shown on the drawings:

The reference numeral 10 indicates generally a block forming the precision base of the printing device of my invention. Said block 10 is preferably formed of a dimensionally stable, rigid material, such as metal, or an alloy, as for instance a type metal alloy. The block is suitably cast into a rectangular shape having an upper working surface 11 provided with spaced, lined apertures 12, arranged in rows lying at angles other than right angles to the lateral edges of the block. The other surface of the block 10 is formed by a plurality of lands 13 that extend from one edge of the block to another at angles other than right angles but that intersect each other at right angles to form individual squares S. From each of the squares S provided by the intersection of said lands the surfaces of the metal slope convergently toward the working surface 11 to provide pyramidical recesses R, the working face edges of which define the openings 12. By virtue of this construction, the block is lighter by about one-third than it would be if it were solid, while at the same time truss-like ribs 14 are formed that

include the lands 13 and that give the block the requisite amount of compressive strength. The ribs 14, being formed with the sloping walls, have increased strength toward the working face 11, while at the same time, due to the intersecting arrangement of the lands 13, provide a planar supporting surface that gives great stability to the block.

While the dimensions of the apertures 12 are not critical, it is preferable that these apertures be about 3/16 of an inch on a side, and, correspondingly, that the width of the lands be of the order of 3/32 of an inch and the spacing of the lands be about 5/16 of an inch apart. A block of type metal alloy having these dimensions was found to have a compression strength of between 600 and 800 pounds per square inch. The block of my invention also has considerable lateral stability by virtue of the truss-like ribbed construction.

As illustrated in Figure 4, the reference numeral 15 indicates a printing plate, which may be any of the various types of printing plates usually employed for mounting on a wood block, or the like, to bring the printing surface to the proper height when assembled with type, or the like, in the usual chase. Said printing plate 15, for instance, may be an original zinc, copper, or magnesium photoengraving plate, an electrotype, stereotype, or plastic plate. As illustrated, the printing plate 15 is formed of 16-gauge (0.064 inch) sheet metal having an engraved design 16 on the upper face thereof. The specific nature of the design forms no part of the present invention, since any design capable of being reproduced by a printing process may be employed.

Before assembling the block 10 and the printing plate 15, the block 10, as received in its as-cast condition, is machined, as by means of a milling cutter, to provide a smooth plane surface 11 in the working, or operative face of the block, and also a smooth plane surface represented by the lands 13 on the other surface, the plane surfaces, of course, being parallel to each other.

In the assembly of the block 10 and printing plate 15, an adhesive is used to join the base and plate together. While the adhesive may be in liquid or dry form, and may be applied either to the surface 11 of the block or to the under, or reverse, surface defined by the lands 13, it is preferable to use a dry form of adhesive, such as a dry sheet or film of adhesive like that indicated by the reference numeral 17. Where the adhesive is in a liquid or paste form, care must be taken not to fill the apertures 12. This may be done by applying the flowable adhesive to the surface 11 by means of a roller, or other spreading means capable of depositing a relatively thin film of the adhesive. Where the adhesive is in the form of a dry sheet, or film, such as the sheet 17, the sheet is laid over the surface 11 of the block 10 to be coextensive in area therewith and then the printing plate 15 is positioned over the adhesive sheet 17.

Various types of adhesive may be used, either hot or cold adhesives, which set up under pressure, or under heat and pressure applied conjointly. While thermoplastic adhesives have been found to be preferable, it is also possible to use thermo-setting adhesives. One of the advantages of using a thermoplastic adhesive is that it makes it easier to disassemble the device by the use of a solvent. Various thermoplastic adhesives, known under proprietary names may be used, such as the following: "Scotch Weld Bonding Film," made by Minnesota Mining and Manufacturing Company; "Pliobond," made by Goodyear Rubber Company, and "Bostik," made by B & B Chemical Co. There is also a thermo-setting film, known under the proprietary name, "Scotch Weld Bonding Film #580," which can be suitably used and which requires a temperature of about 300° F. for curing. The thermoplastic form requires a somewhat lower temperature, of the order of 200° F. Methyl-ethyl-ketone, or other common solvent for the purpose may be used to dissolve these adhesives when it is desired to disassemble the printing plate from the block.

In assembling the base 10 to the printing plate 15 by means of a dry sheet of adhesive 17, a hydraulic press, indicated generally by the reference numeral 18 (Fig. 7) is employed. The pre-assembled elements are positioned upon a stationary platen 19, or bed plate, and compressed by means of a heated movable platen 20 connected by a plunger rod 21 to the piston (not shown) of a hydraulic or pneumatic press. The movable platen 20 may suitably be heated as by means of a steam pipe 22 through which steam is introduced into the hollow chamber 23 shown in dotted lines in Figure 7. A steam discharge pipe 24 is connected to the other end of the chamber 23. Suitable temperatures and pressures are used for the particular type of thermoplastic or thermo-setting adhesive that is employed.

In its assembled form as shown in Figure 6, the printing plate 15 is secured to the block 10 by a film or layer 17*a* of the adhesive material. It will be particularly noted that the adhesive material of the layer 17*a* does not extend into and fill up the pyramidical recesses but these recesses are open to the under side of the adhesive coated printing plate. The passageways so provided serve to allow the escape of gases or vapors evolved during the application of heat and pressure in the assembling of the block and printing plate, so that no closed gas pockets will be formed between adjoining surfaces of the block and printing plate.

The pyramidical recesses also perform a useful function when it is desired to disassemble the printing plate from the base. In that case, the simplest method is to turn the assembly upside down and immerse it in a bath of the solvent, which may be cold or hot. Various solvents may be used, such as methyl-ethyl-ketone, acetone, and the like. Usually, each manufacturer of an adhesive specifies a particular solvent best adapted for dissolving adhesive, so that it is an easy matter to select the proper solvent for any particular adhesive. When the assembly is immersed in a solvent, the solvent enters the pyramidical recesses and comes into direct contact with the adhesived under surface of the printing plate 15. The penetrating and solvent action is such that the layer 17*a* is quickly softened or dissolved from the base 10. If it were not for the fact that the apertures 12 are relatively closely spaced, a much longer time would be required for penetration of the solvent into the adhesive layer 17*a*.

As will be readily understood to those skilled in the art, many different forms and dimensions of block and printing plate assemblies will be required in any large size printing establishment. It is therefore important that these assemblies have a high salvage value, since it would not be feasible to carry in stock over long periods of time the various forms and sizes of assembled units that would otherwise accumulate. Consequently, it is particularly advantageous that the assembly of my invention can be almost 100% salvaged, merely by disassembling and remelting and recasting the metal or alloy of the block 10. Thus, the initial cost of the metal or alloy block, as compared with wood, is not a controlling factor in the use of the printing device of my invention.

Initially, a large block of the construction herein described may be cast and this large block then sawed to the desired dimensions as to length and width. This makes for greater economy in casting. Also, since the ribs 14 run at angles other than right angles to the lateral faces of the sawed block, and since the ribs are relatively closely spaced, there are no large unsupported areas in the final block around the lower edges thereof. Consequently, the block has great stability in all sizes.

I claim as my invention:

A printing device comprising a block of rigid, dimensionally stable cast metal alloy having a planar first surface provided with symmetrically spaced apertures and having a second surface parallel to the first and con-

stituted by intersecting lands extending at angles other than right angles to the edges of said block, with wall portions between intersecting portions of the lands defining pyramidical recesses open at their small ends through said apertures, a printing plate having a planar under surface superimposed upon said first surface, and a uniformly thin layer of adhesive material securing said plate to the planar surface of said block and extending across said apertures but without filling said recesses so as to be exposed to ambient atmosphere via said recesses.

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